

A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Explain.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate?

Explain.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

Explain.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** *greater than*, *less than*, or *equal to* the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

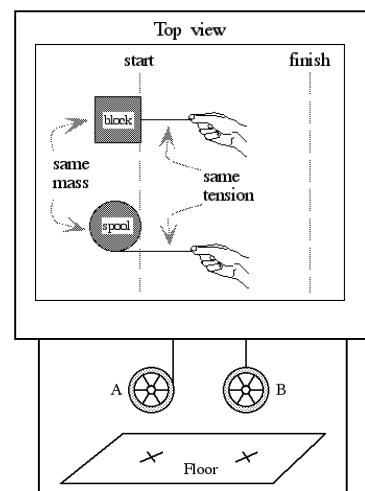
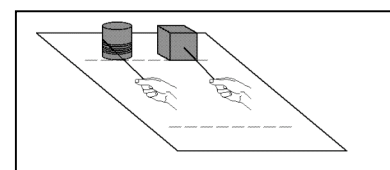
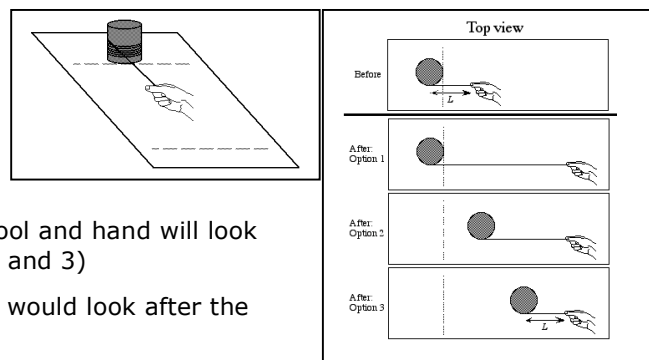
Explain.

Q12. Is the magnitude of the acceleration of the center of mass of spool A *greater than*, *less than*, or *equal to* the magnitude of the acceleration of the center of mass of spool B?

Explain.

Q14. Will spool A hit the floor *before*, *after*, or *at the same instant* as spool B?

Explain.



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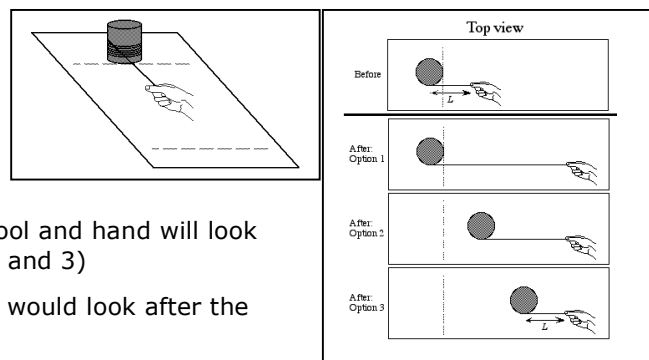
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Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. Because the table is frictionless the spool will move some but the thread will also unwind to a certain extent.



Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

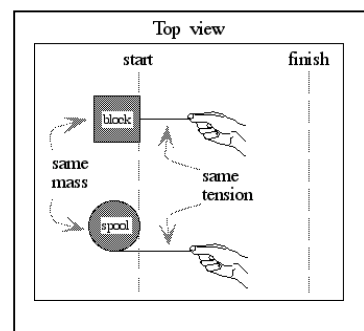
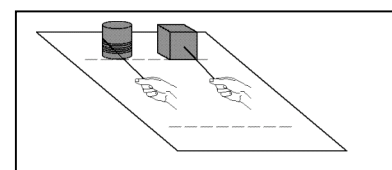
Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. Yes the torque on the spool will cause it to rotate.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. because the spool is spinning some of the energy from the hand is causing it to spin while some of it causes the spool to move forward, while the block has all its energy moving it forward.



Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. They would be equal b/c they are identical pulley except the length of the string is changing.

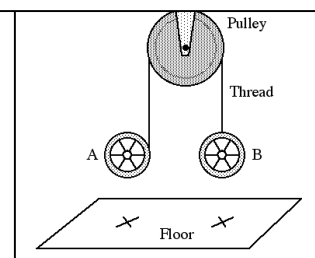
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. They would be accelerating at the same rate.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. They just would



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Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. Because the string would get pulled out and the spool would get dragged along

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Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*
Explain. Since they are the same mass and the block isn't moving then the spool won't move either

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. The spool will unwind some

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The tension in the thread just above spool A is equal to that just above spool B.

Explain. Because spool B will be moving downward the tensions will equal.

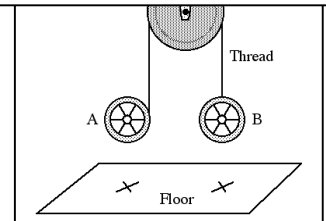
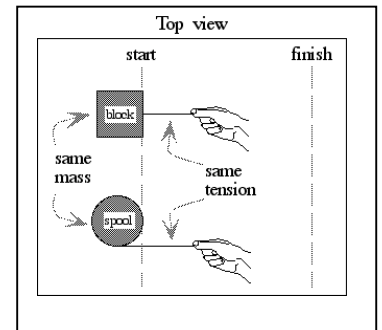
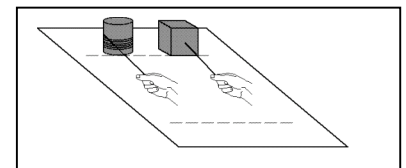
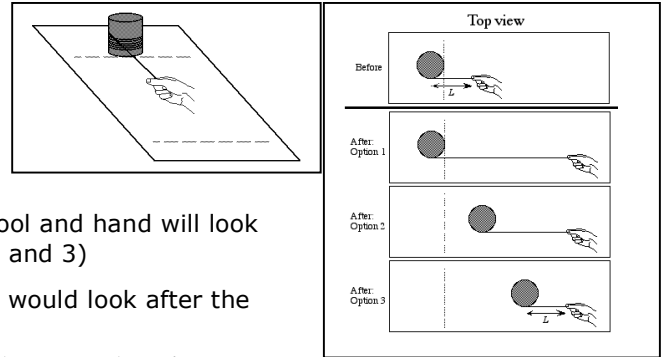
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. Because at first B will be moving the most to balance out the unraveling of spool A.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. Some reasoning as above B travels downward as A unravels



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Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.
Explain.

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Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*
Explain.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.
Explain.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

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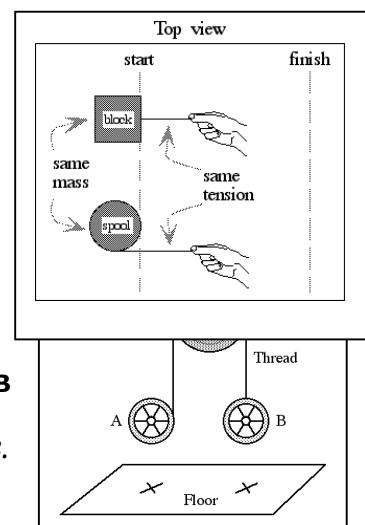
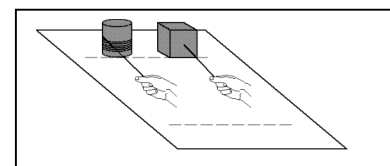
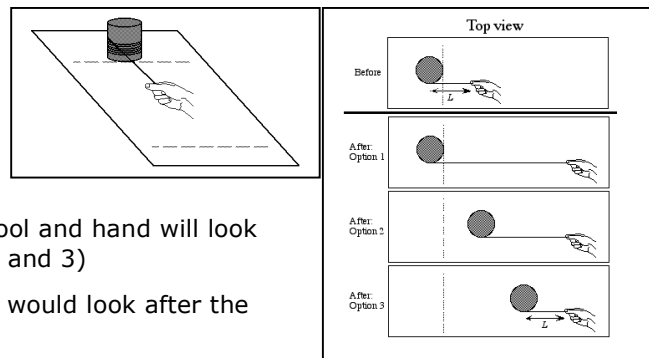
The tension in the thread just above spool A is less than that just above spool B.
Explain.

Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *unanswered*

Explain.

Q14. Will spool A hit the floor *before, after, or at the same instant* as spool B?

Spool A hits the floor after spool B.
Explain.



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Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain.

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Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*
Explain.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** *greater than, less than, or equal to* the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

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Explain.777

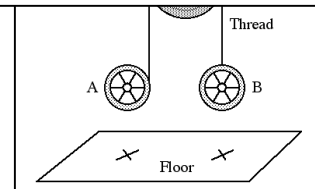
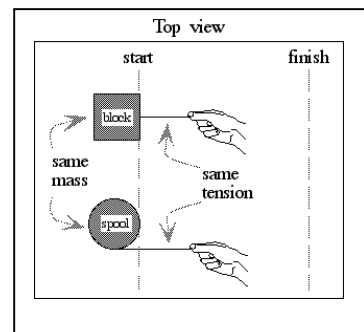
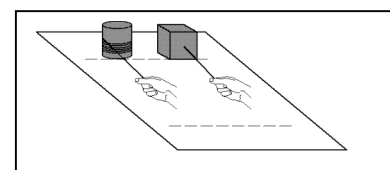
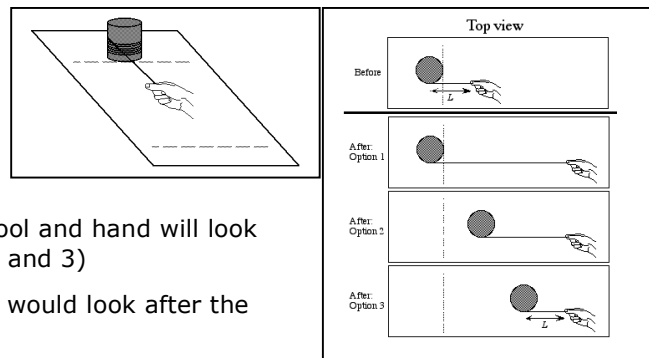
Q12. Is the magnitude of the acceleration of the center of mass of spool A *greater than, less than, or equal to* the magnitude of the acceleration of the center of mass of spool B? 777

Explain.777

Q14. Will spool A hit the floor *before, after, or at the same instant* as spool B?

777

Explain.777



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

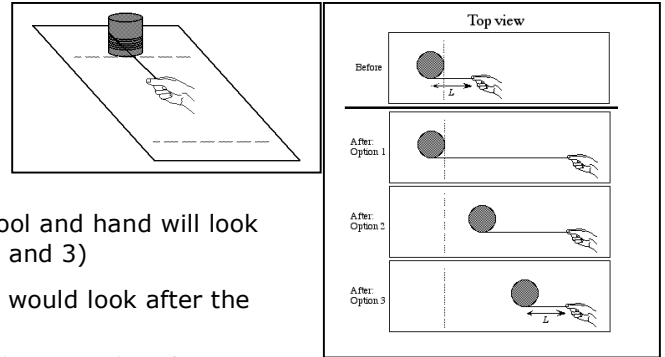
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Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. because the spool is not anchored in place the torque would cause the spool to move along with the hand



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Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. if they are the same mass the tension should be enough

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. because the string is wrapped around the spool it wont move as fast

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Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. because $f = m \cdot a$ and they both have the same mass and acceleration it is the same tension

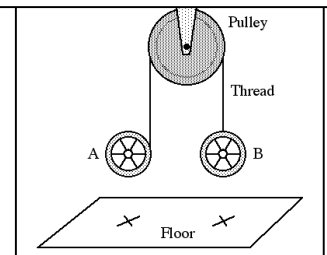
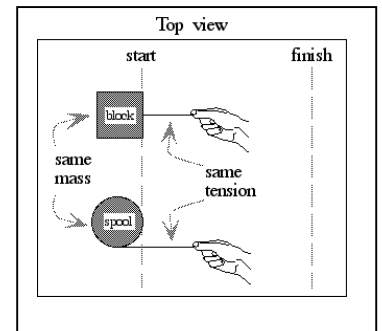
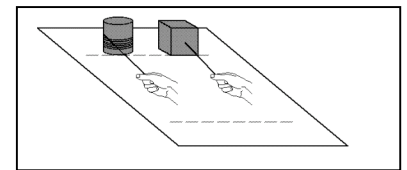
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Explain. once again $f = m \cdot a$ and if the forces are the same and the masses are the same the acceleration must be the same

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. if the accelerations are the same they will hit the ground at the same time



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Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. don't know

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Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. the force is applied far from the center of mass

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the spool won't accelerate in the direction toward the finish line as fast as the block since it is unwinding

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The tension in the thread just above spool A is equal to that just above spool B.

Explain. A will unwind but they are both on the same cord and the tension is the same

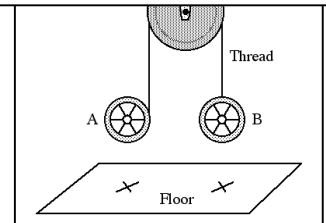
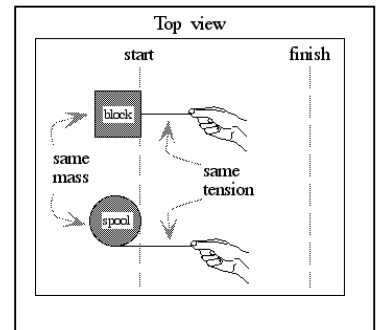
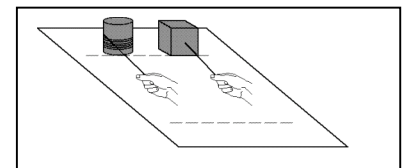
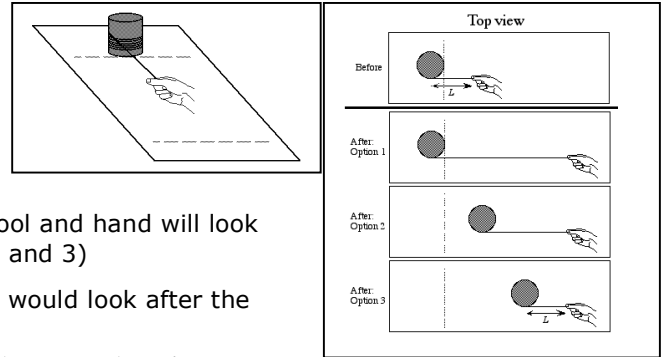
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Explain. it will unwind downward on top of the same amount of acceleration as B

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. it falls faster



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Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain.because you pull the spool back a little as you pull the thread

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Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain.because of its shape

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain.because there is lag time from when the thread is unwinding from the spool

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The tension in the thread just above spool A is less than that just above spool B.

Explain.because it can roll off

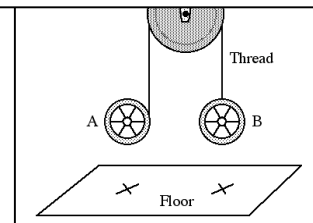
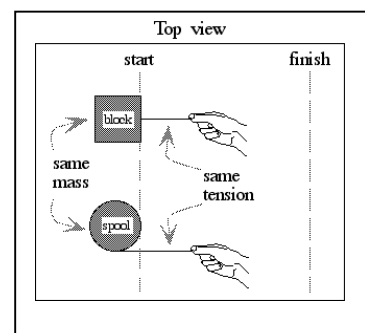
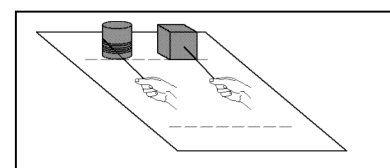
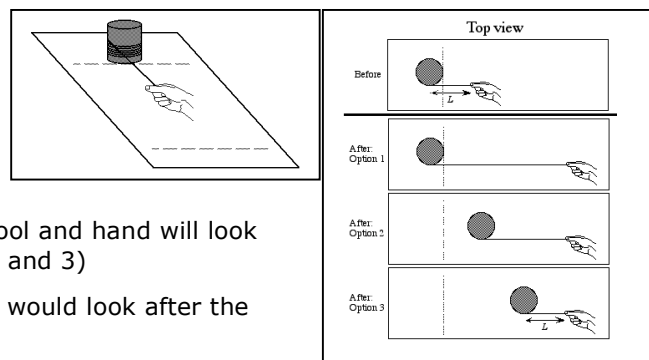
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Explain.because it is off centered

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain.because it has to unwind first



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Option 2; they both move to the right, and the distance between them increases.

Explain.greater torque

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Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain.yes because of angular acceleration

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain.same force

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The tension in the thread just above spool A is greater than that just above spool B.

Explain.greater torque

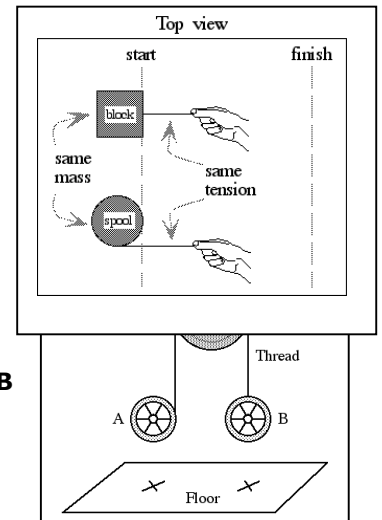
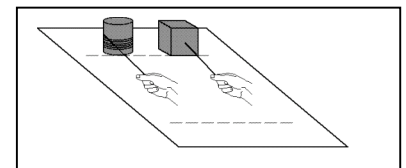
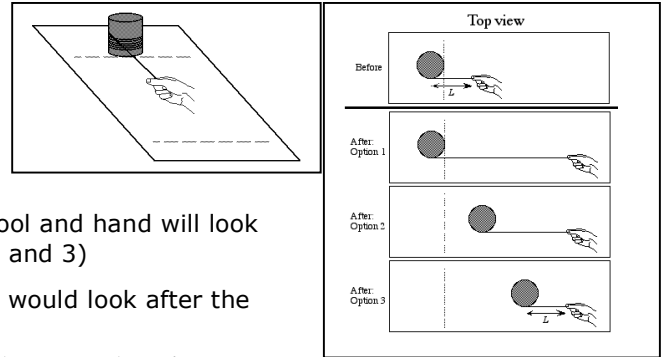
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain.rigid body

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain.different force



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. Because the string is wrapped around the spool, it would make sense that it would be going in the direction it was pulled because the string is still wrapped around it.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. Because the string will unwind, as it unwinds, it will cause the friction between the spool and the string to collide, rotating the spool.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The center of the spool stays in the same place and does not cross the finish line at all.

Explain. Since there is no friction, the spool would not move.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is greater than that just above spool B.

Explain. Because it rotates, the spool will pull back just a little bit, hence it rotates.

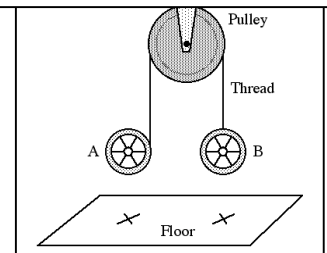
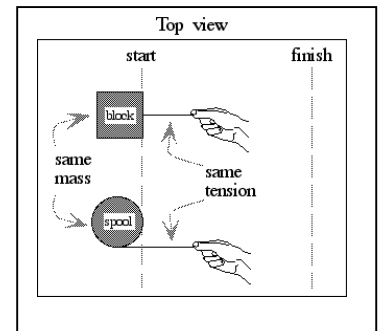
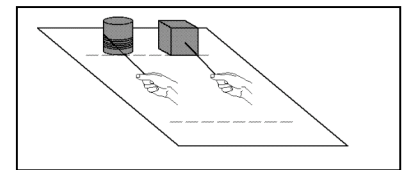
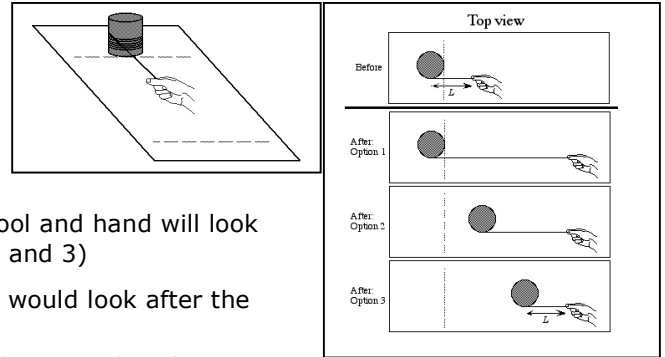
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. Since spool A has to spin as it falls, it will have a force stopping it from falling at the same speed spool B does, therefore the acceleration would not be as high.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. Less acceleration, it will be slower than spool B.



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Option 2; they both move to the right, and the distance between them increases.

Explain. the spool will unwind but also move

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. Enough force to move the block will make the spool rotate

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. The spool will move at the same speed as the block

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. This is due to the placement of the thread on spool A

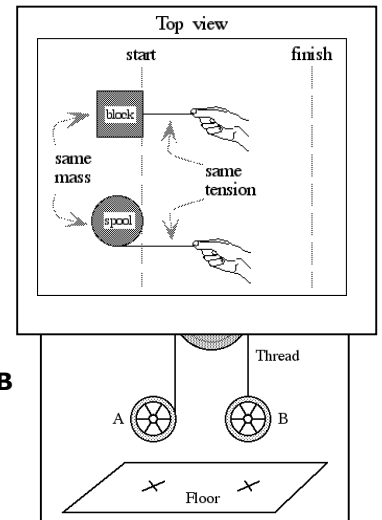
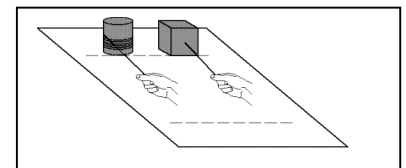
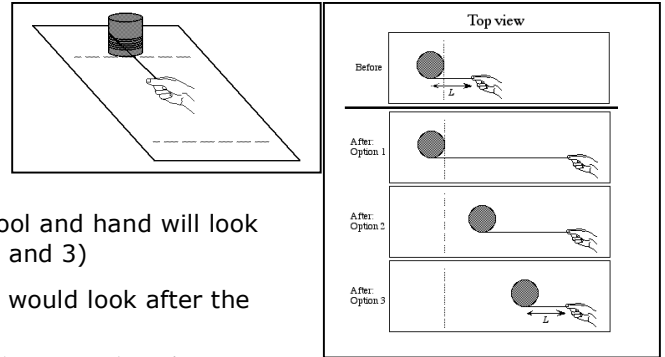
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. Both spools weigh the same.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. Again, due to the placement of the thread.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

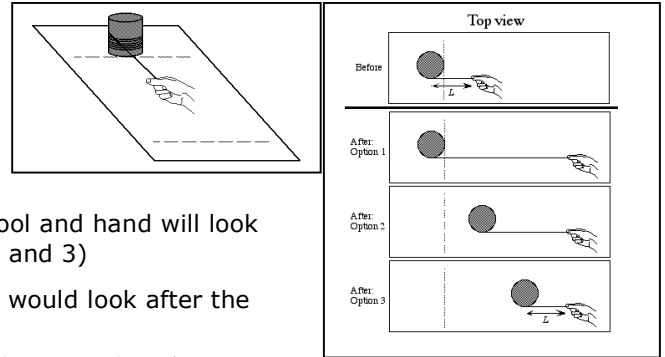
The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. i think that as the spool turns it has to move some and it does turn so the distance between will increase



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Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. i don't know

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the tension acting on the spool is less than that on the block

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. tension is focused around the spool

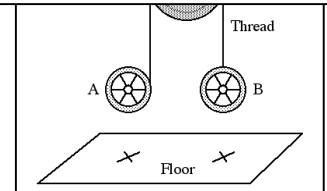
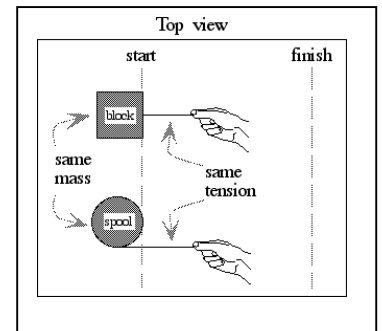
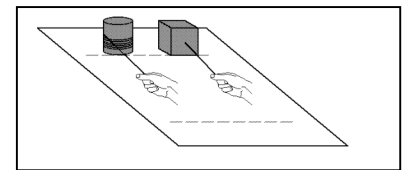
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. both fall at same rate

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. i think they'll both fall at the same rate



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Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. I think it goes that way because that is what we discussed in class

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Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. same as above

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The center of the spool stays in the same place and does not cross the finish line at all.

Explain. still the same as above

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

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The tension in the thread just above spool A is equal to that just above spool B.

Explain. i like that answer

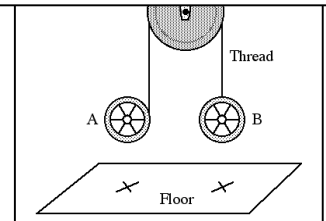
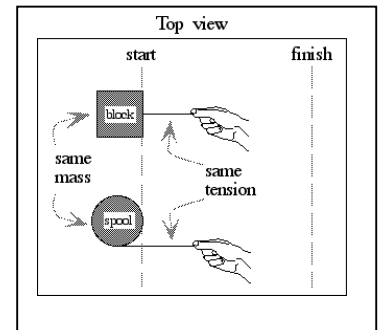
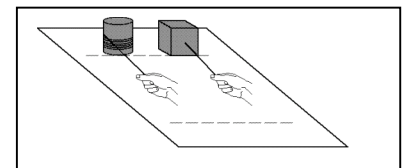
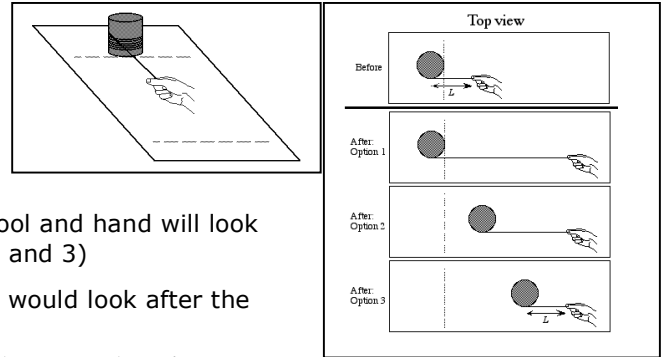
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. its the right answer

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. I don't want to explain



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The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. It won't unwind fast enough not to cause some force in the pulling direction

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. the force of tension in the string causes tangential acceleration which causes the rotation

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. Some of the tension force going in the string of the spool is going toward the tangential acceleration whereas the block has all the force concentrated in the single direction

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. They both have the same mass but the string length connecting them is increasing but that won't effect the tension in the string

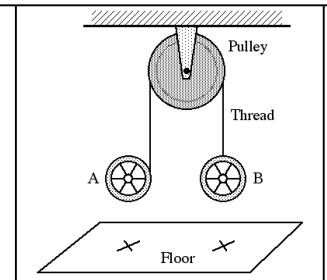
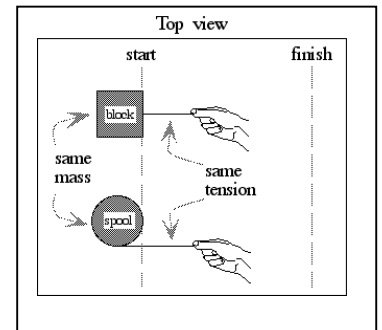
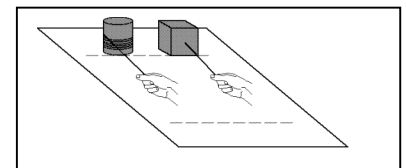
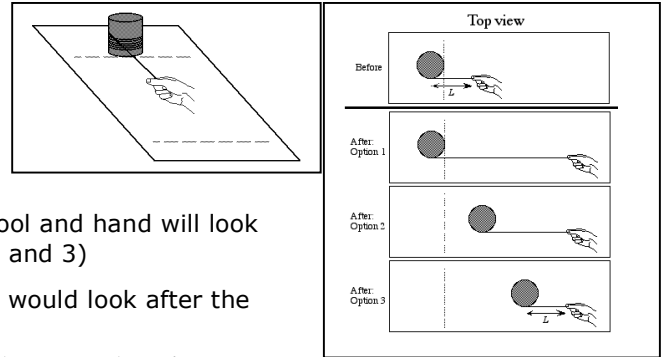
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. since they have the same mass the string will get longer but the distance between both spools and the pulley will be equal

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

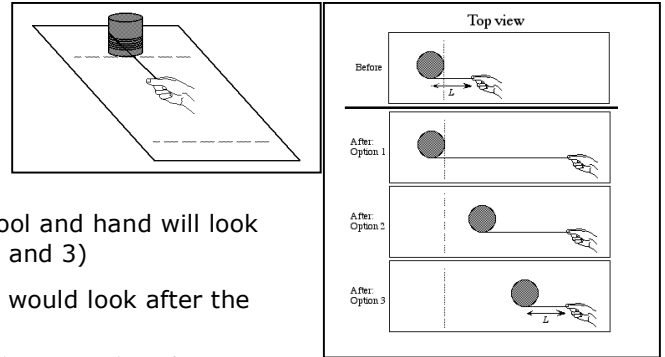
Explain. since the spools will always have equal lengths from the spool to the pulley, they will hit the ground at the same time



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The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

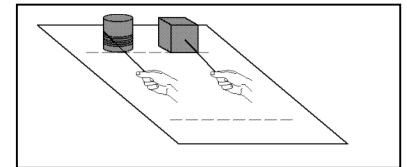


Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. option 1 is if there was no friction by the rope, but there is friction, so it will pull it.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.



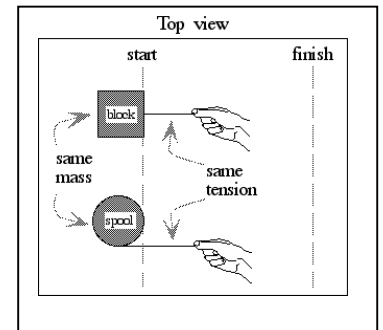
Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. It has to move, and in order to do that it has to rotate as well.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the distance between the hand and block will remain the same but the spool will unwind, causing the distance to be greater.

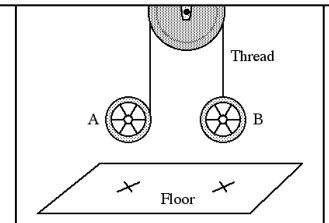


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Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is greater than that just above spool B.

Explain. they have the same weight but A has friction and will pull more on the string.



Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. the friction from the string makes it so it slows down.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. friction slows it down.

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Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. *Wheels don't have much friction between themselves and the objects they roll over, and the string would unravel fairly evenly while lightly pulling the spool.*

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. *The string is coming from one side of the spool, so the force is being applied to one side of the spool, giving it a rotation of some kind.*

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. *Because the string unravelling will account for some of the force applied, the spool will not accelerate as fast as the block.*

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Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. *Both strings are falling with the masses of the pulleys, so both strings should have the same tension.*

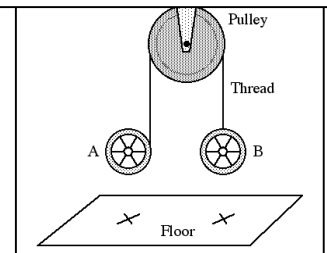
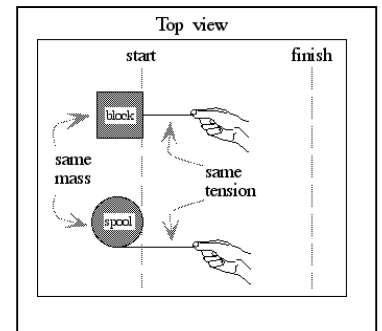
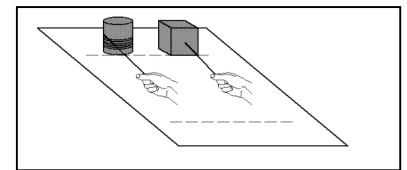
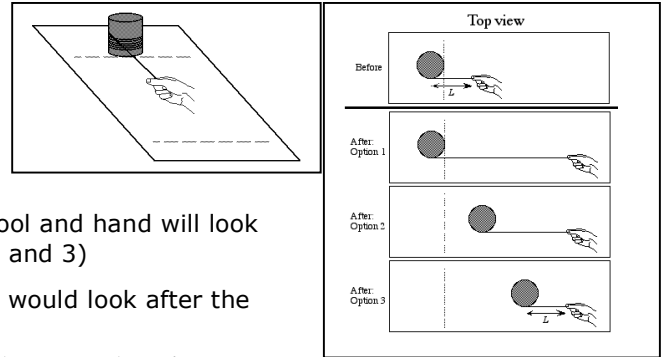
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. *The unraveling motion of A will cause A to experience a sort of frictional force, whereas B will simply fall straight down.*

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. *Since A's acceleration downward is less, the time it takes to hit the ground will be greater, due to the friction involved with the string's unraveling.*



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Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. frictionless but torque moves it

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Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. because of torque

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. because it moves but slow since the force on the block is more direct

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The tension in the thread just above spool A is less than that just above spool B.

Explain. because B is falling down

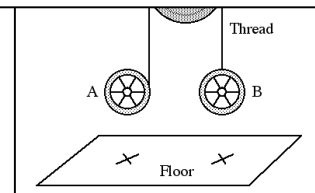
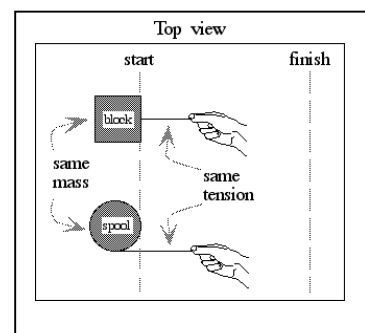
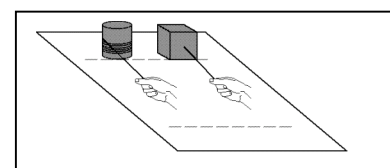
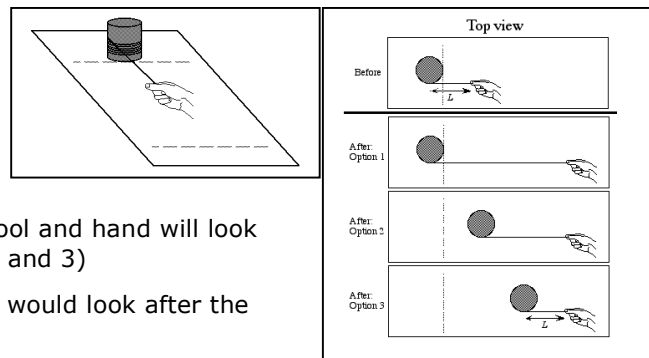
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. its moving faster so it must be greater

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. its held up by the string for a little bit



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.
Explain.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. *Applied an unbalanced force.*

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. *Part of force goes into torque.*

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. *because it is part of the same rope*

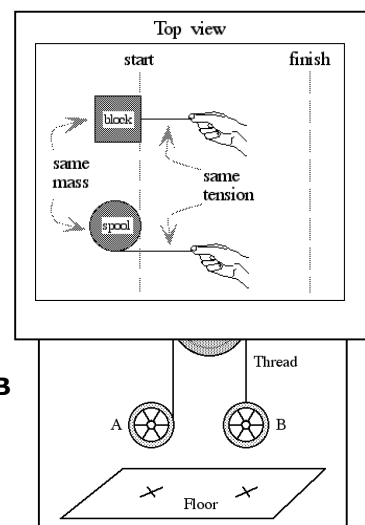
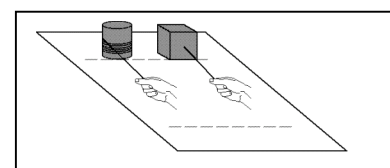
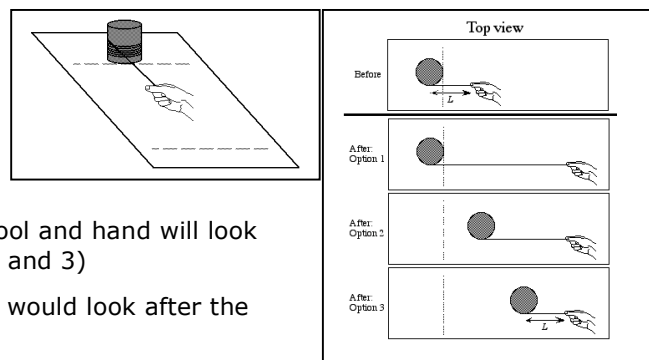
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. *gravity*

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. *b has greater acceleration*



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. Torques and tensions and newtons third law pairs and all that business. Mostly intuition though.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. There is a torque on the spool.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. Because the spool is not fixed, some of the tension is converted to torque while the rest causes a linear acceleration.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. That's how tensions do.

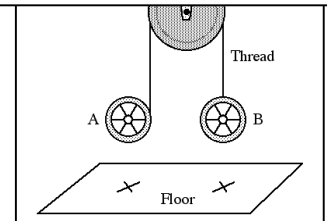
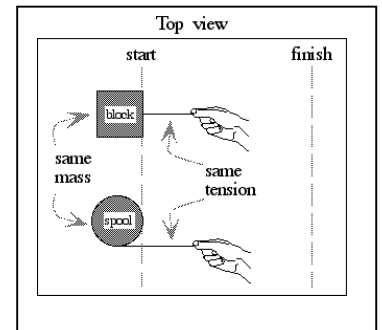
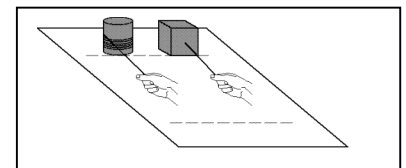
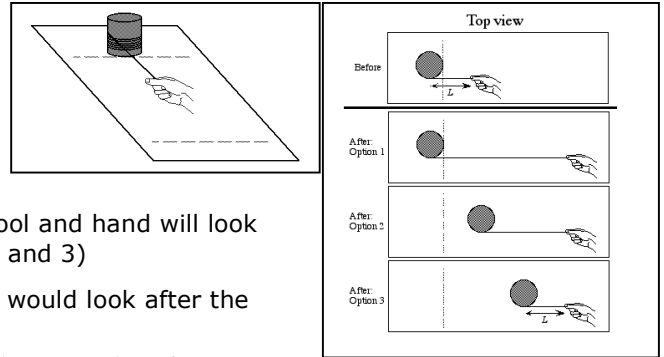
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. A is allowed to fall freely, hindered only by a torque by the tension. B is not.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. This is one of those mindblowers that I'm not really sure of. It is extremely late. Goodnight.



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The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. The distance L stays the same because it is a frictionless system

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*

Explain. The spool shouldn't rotate because there is no friction

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. The tension is the same and there is no friction so they should finish at the same time.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. The tension on spool A is not directly down so it is not as great as the tension on spool B

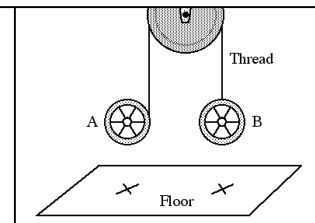
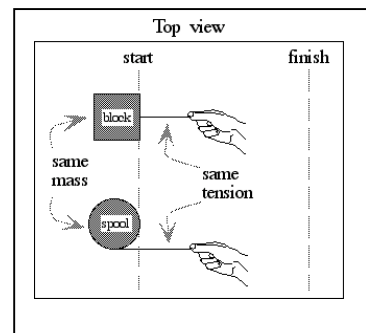
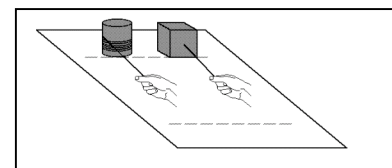
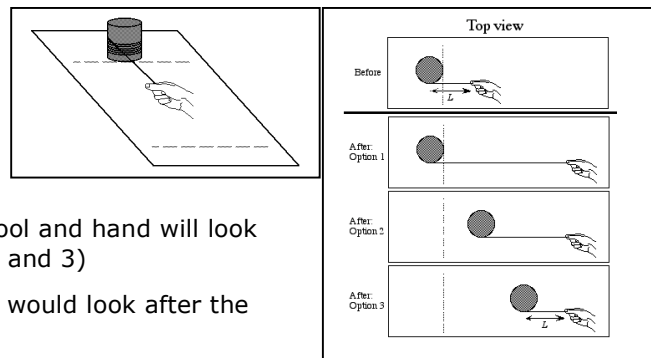
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. Acc. of A is greater because it is spinning due to where the string is attached.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. Before because the acceleration is greater.



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The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 1; the hand moves to the right, and the center of the spool stays in place.

Explain. There would be the greatest distance between hand and spool.

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Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. There is a torque involved.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. Center of spool acts like the center of the block, it just spins around its center.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

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The tension in the thread just above spool A is equal to that just above spool B.

Explain. It is the same string.

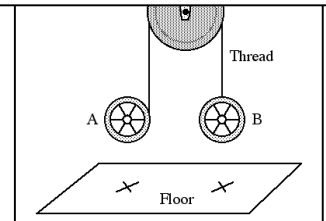
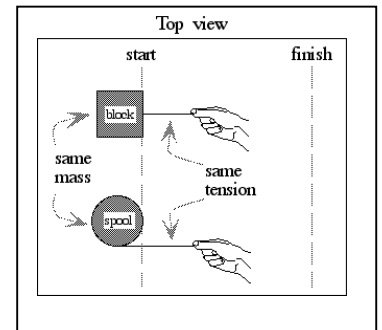
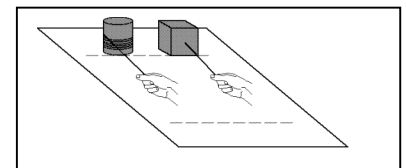
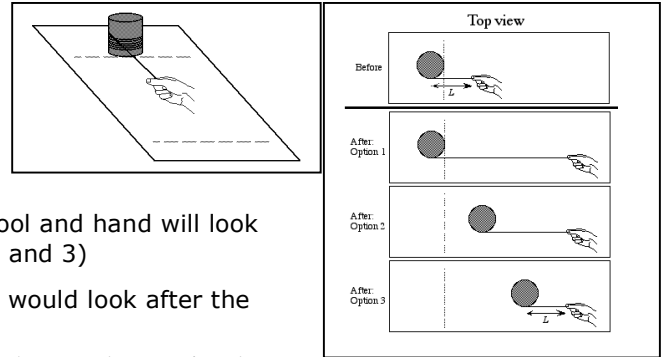
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. Gravity is the same for both spools

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. Same acceleration



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The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. *A force is exerted on the spool to the right so it would logically move to the right but with this force being applied on the far left of the spool it would also unwind a little*

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. *the force is applied on the outer edge of the spool which will induce torque on the object so it will rotate*

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. *although the same force is exerted on both all of the force exerted on the block is focused towards the finish line however there is both torque and force towards the finish line together to equal the total force so it will cross the finish line only after the block*

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Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. *although the weight force is equal in both cases there is an clockwise torque on A so it helps to release some of the tension on the string connected to A*

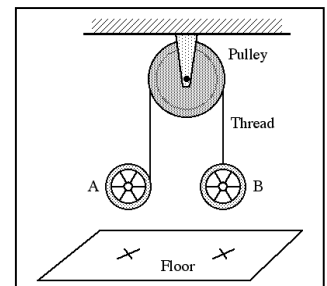
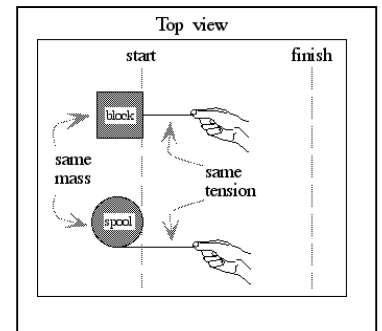
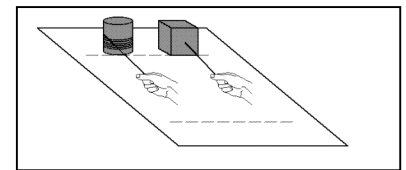
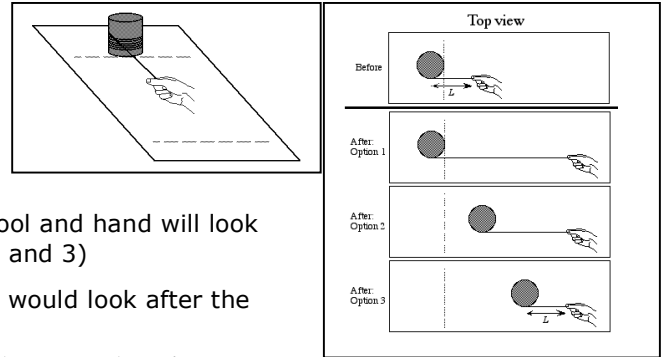
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. *B would fall at a rate equal to Weight minus tension however there is the tension force and Torque in the tension in the upward direction opposed to gravity so it's acceleration would be less.*

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. *Because the acceleration of a is less it will hit the floor after B*



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The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

none of these

Explain. The surface is frictionless, so once the thread begins to pull the spool, there is never a point where it all stops unless there is another outside force on the spool.

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Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*

Explain. The surface is frictionless and thus as the string begins to be pulled, the spool will just be pulled with it.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. Frictionless - so they will pass the line at the same time.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. Although the spool A is falling, it is still not applying anything to the rope besides its original weight.

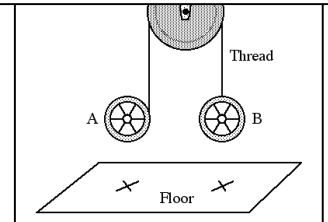
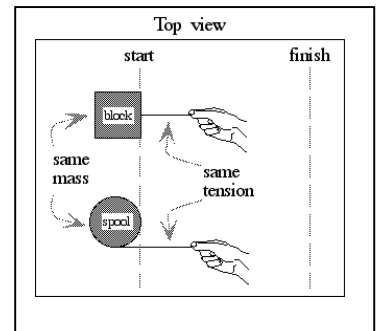
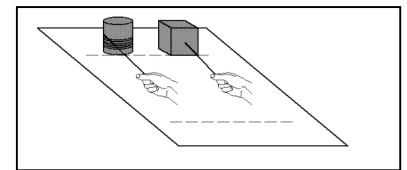
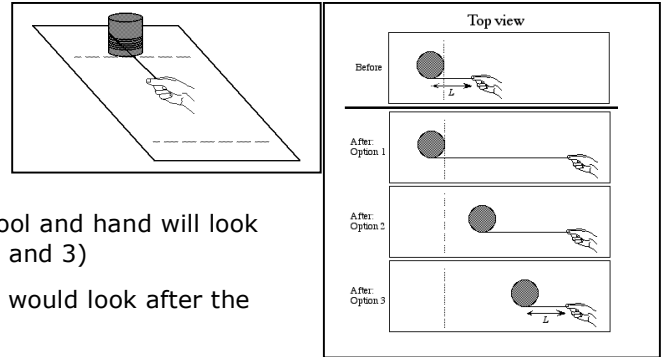
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. the center of the spool is standing still.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. Uhhh... I got lost - why would spool B move?



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The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 1; the hand moves to the right, and the center of the spool stays in place.

Explain. the string is that long

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. the spool is round

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. they have equal length of the string

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. B has more mass affecting it

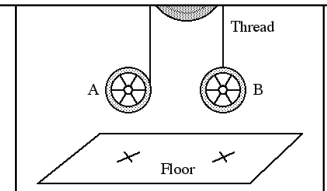
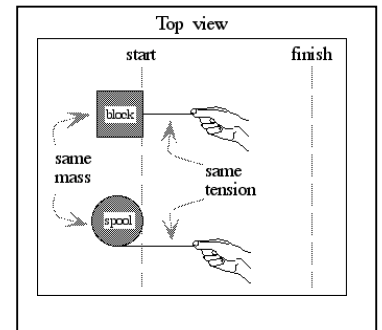
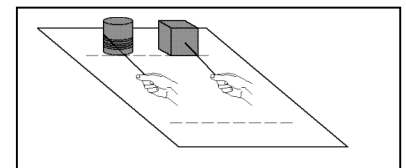
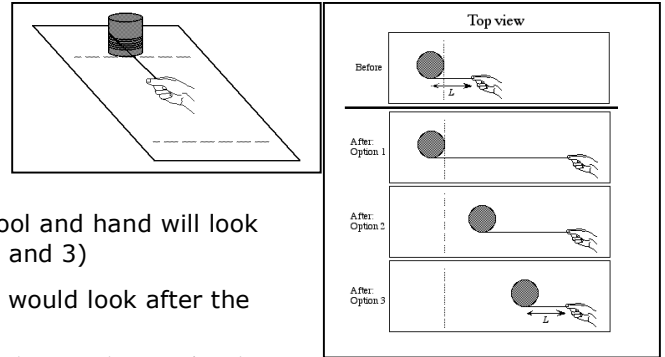
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *unanswered*

Explain. they have the same mass

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. the tension is greater



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The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. dunder mifflin

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*

Explain. because the block doesn't move

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. it takes time for the line to unwind from the can

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

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The tension in the thread just above spool A is equal to that just above spool B.

Explain. dont know

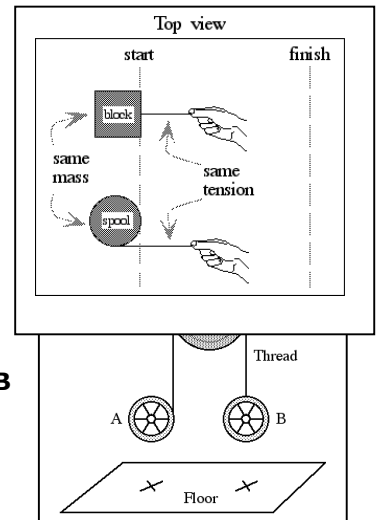
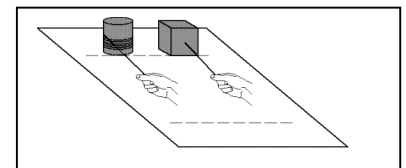
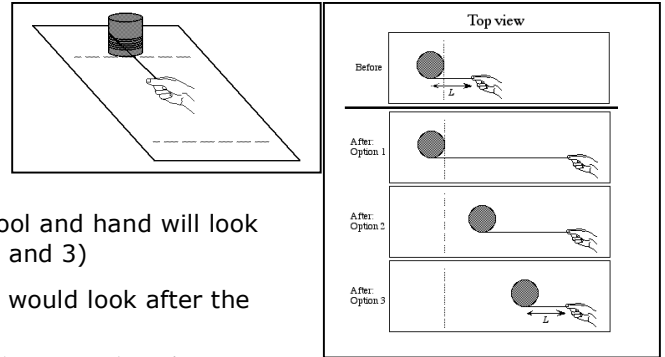
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. because they are the same size

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. gravity is constant



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 1; the hand moves to the right, and the center of the spool stays in place.

Explain. Because the absence of friction prevents the spool from moving

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. because the spool will stay in place

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. because the spool will unvarle a little bit

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. because it is one single connected string... tension does not change

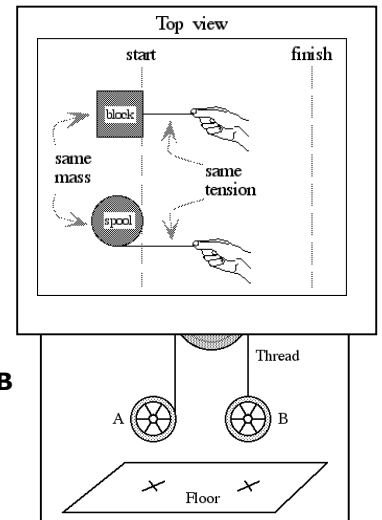
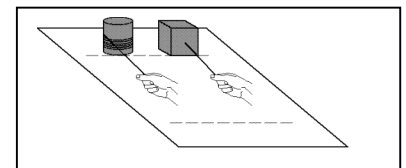
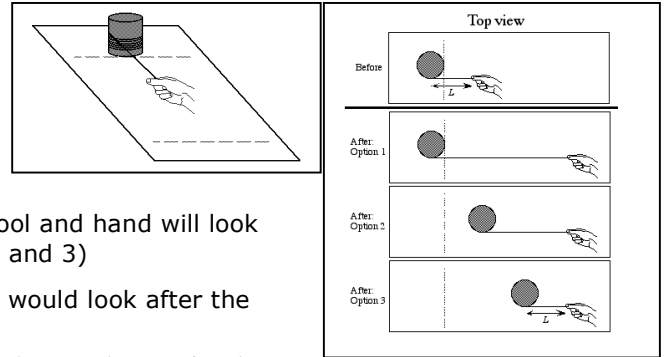
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. because the force on a is perpendicular

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. because it will unravel making is closer to the ground



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

none of these

Explain. They are not equal

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. there is a rotation force

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line before the block.

Explain. It is moving faster

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. They are equal

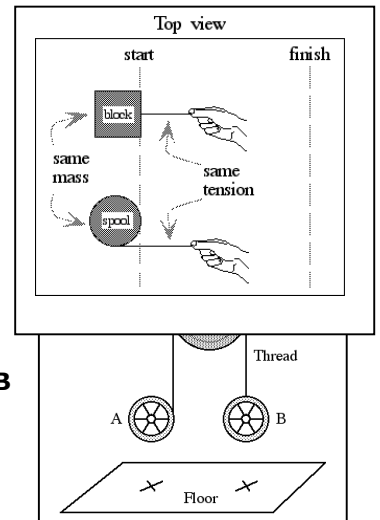
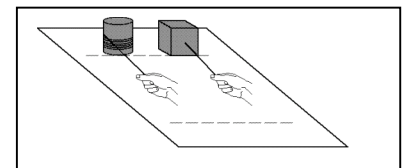
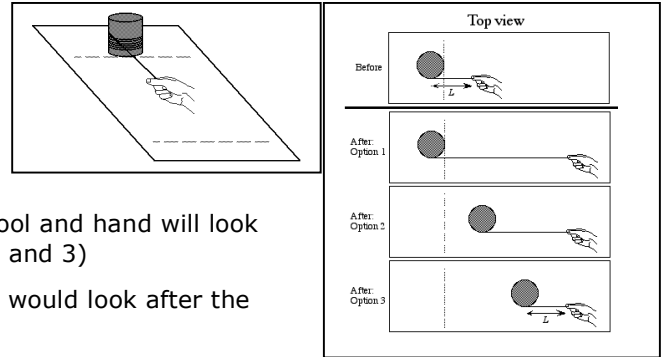
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. Same

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. same



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. because the frictionless surface would make it ease for the spool to move as the string does.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*

Explain. without friction there is no force keeping the spool in place

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. The same mass without the string extending will end at the same time as the block.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. mass and acceleration are the same.

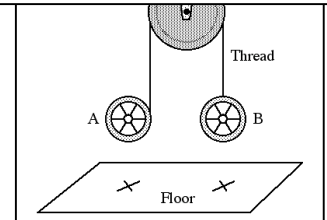
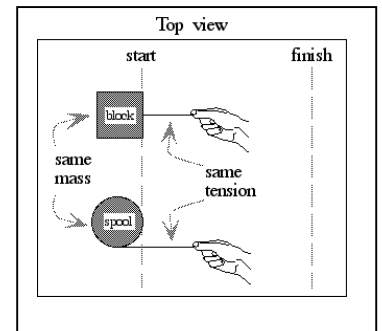
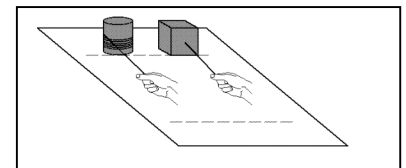
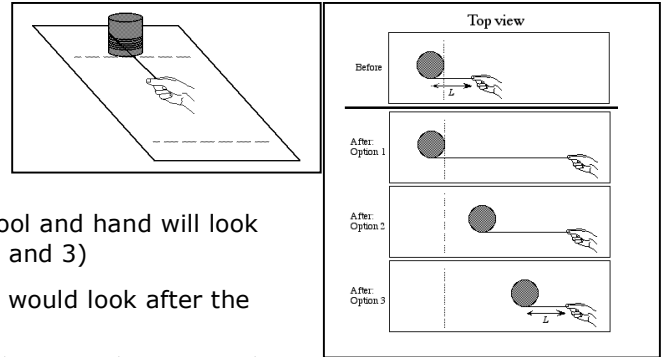
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. Same mass and same tension.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. because they have the same constant acceleration g.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. Because Newton's 2nd Law and torque.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*

Explain. Because friction is sooo overrated.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the spool goes slower therefore finishes later cuz its slower and usually the faster wins.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. force is neither created, destroyed, or improperly used for immoral actions.

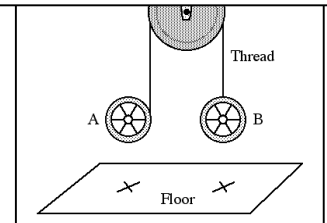
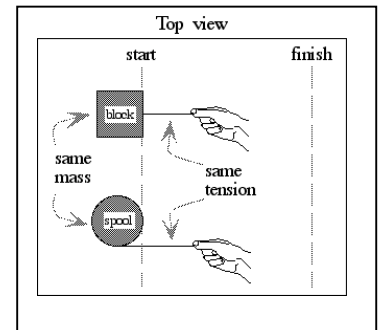
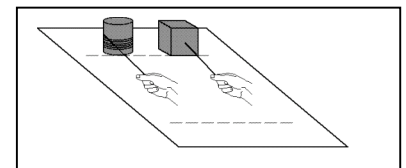
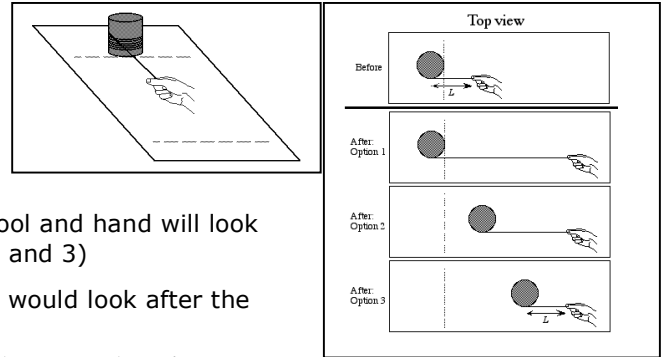
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. $f=ma$

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. gravity has the same affect on the spools and the mass is the same.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. Friction, tension.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. Friction, the tension is at one side of the spool.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. The string will unravel first.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. Identical spools, identical length.

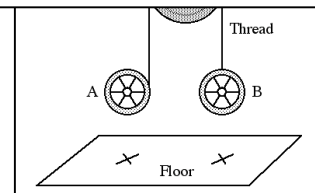
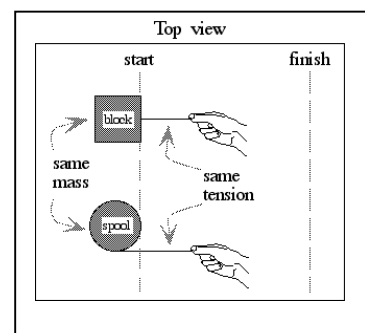
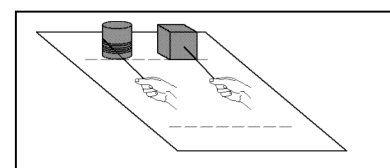
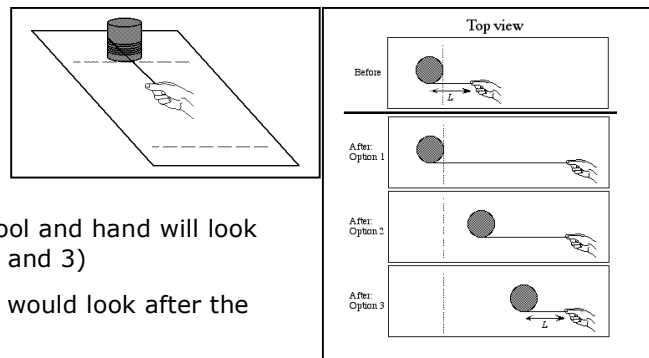
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. Identical mass of spools, identical length.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. They have the same acceleration.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.
Explain.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*
Explain.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.
Explain.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

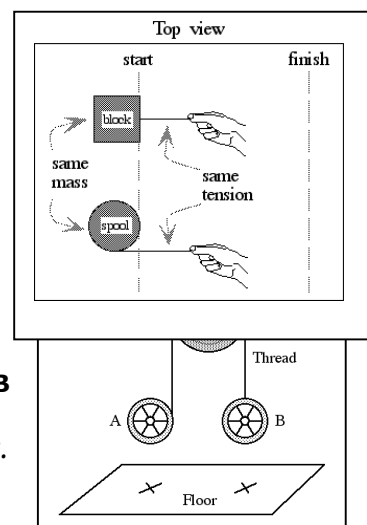
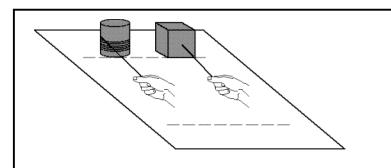
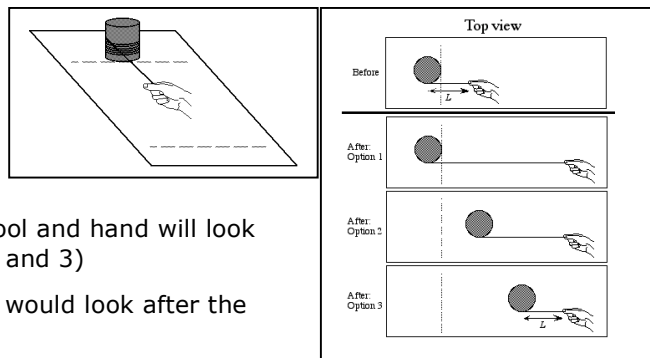
The tension in the thread just above spool A is less than that just above spool B.
Explain.

Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.
Explain.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. because there will be some force in the x-direction and there will also be a rotational force on the spool allowing for the distance L to increase.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. because there is a rotational force on the spool.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. they both have the same tension being pulled on them. The only difference will be that the hand pulling the spool will be farther than the hand pulling the block.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. the tensions must be equal to each other since they are both connected through the same string.

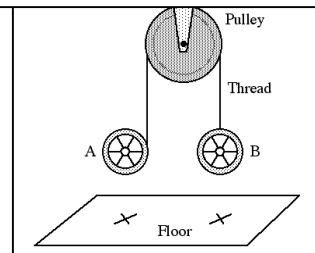
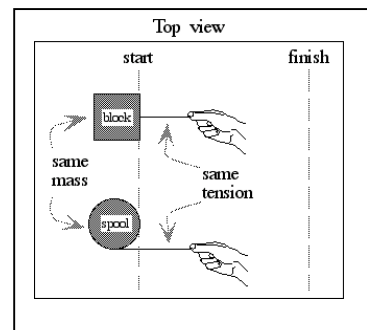
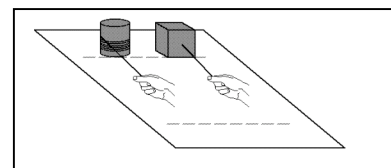
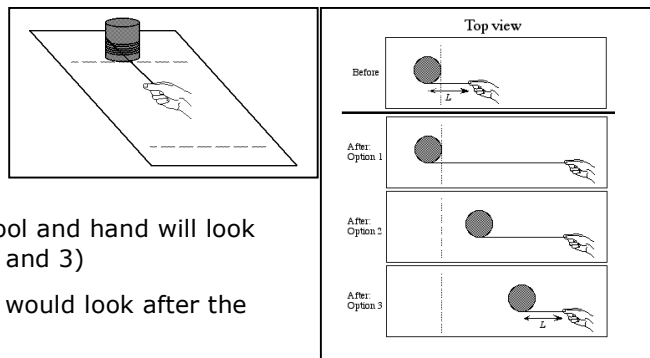
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. they both fall with the same velocity.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. because they both have the same acceleration so they will both hit at the same time.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. the cord is wrapped around it and will unroll but still move to the right.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. it is wrapped around the spool.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the circular block will unroll so it won't move at the same speed.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. they are connected by the same string.

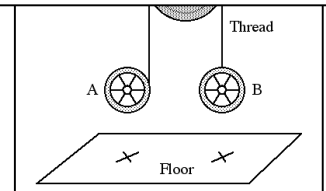
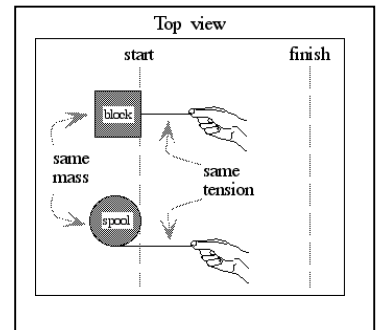
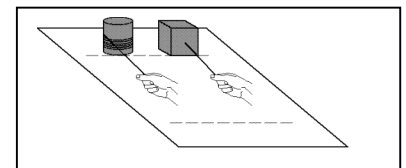
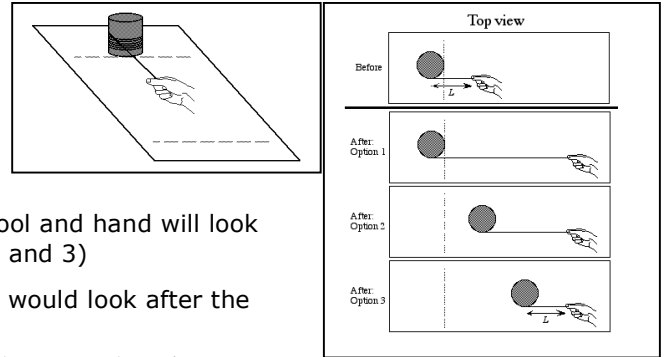
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. it is unrolling while b is not.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. gravity is acting on both of them.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. because the spool will still move but the distance has to increase as the spool unrolls

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. because the pull is not coming from the center of mass so as the object is pulled the spool will begin to rotate

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. eventually the spool will run out of string and then will begin to move forward and eventually cross the finish line but it will be long after the block crosses the line

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. they should be equal despite the string on b is at the center of mass and string on a is off to the side

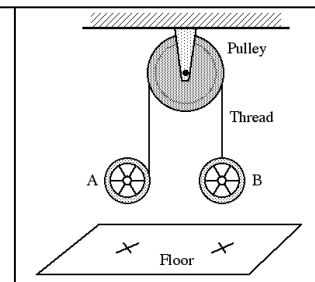
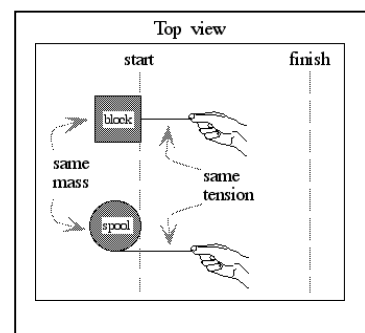
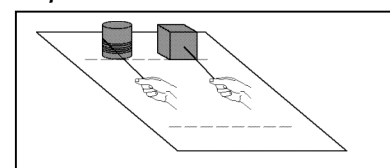
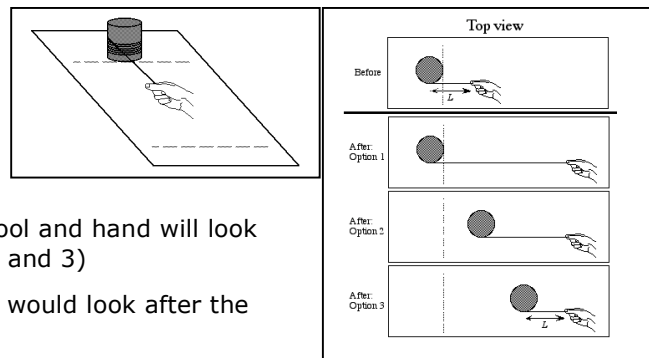
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. because it will also have rotational acceleration to account for

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. because the spool will unravel before the pulley will set spool b down



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain.experience

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain.why wouldn't it

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain.the block gets pulled the spool has to unwind first.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain.same mass

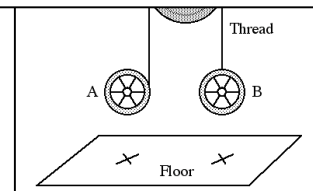
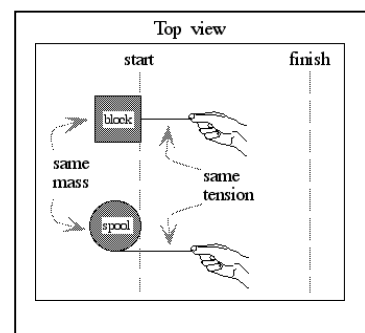
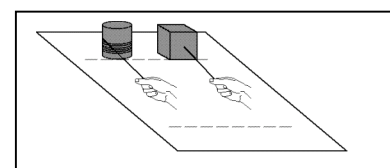
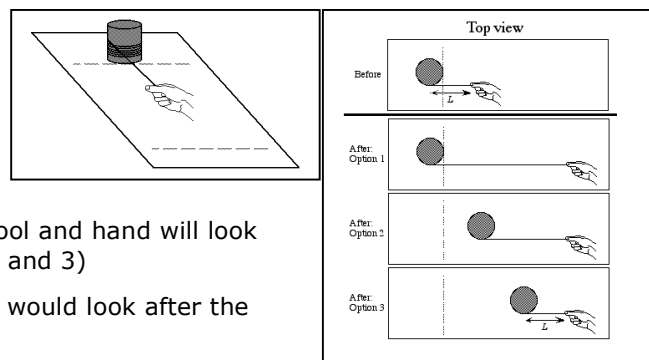
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain.same conditions

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain.same conditions



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain.the earth

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*

Explain.string cheese

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain.stereotype

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain.ambidextrique

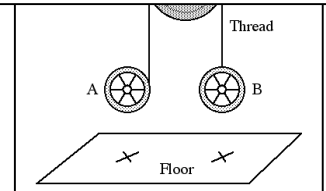
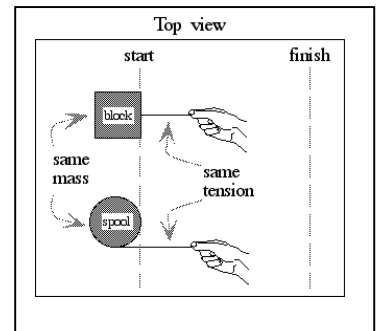
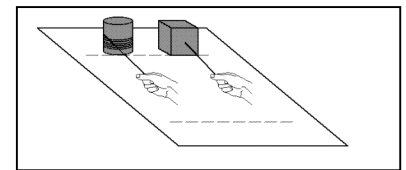
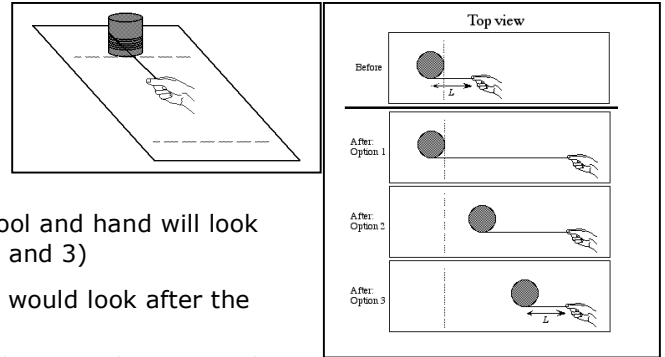
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Explain.papito

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain.jh



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The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. Frictionless surface.

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Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*

Explain. friction between string and spool. no friction between spool and surface

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. mass and tension are the same

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. random choice, i'm running out of time

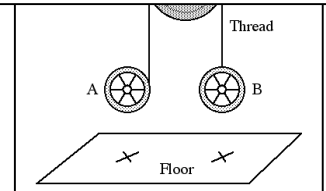
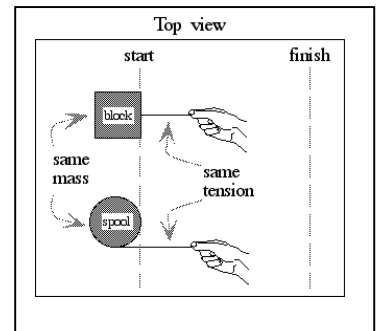
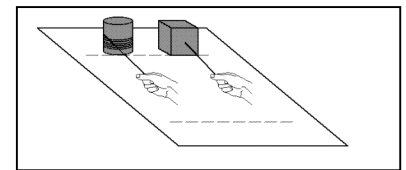
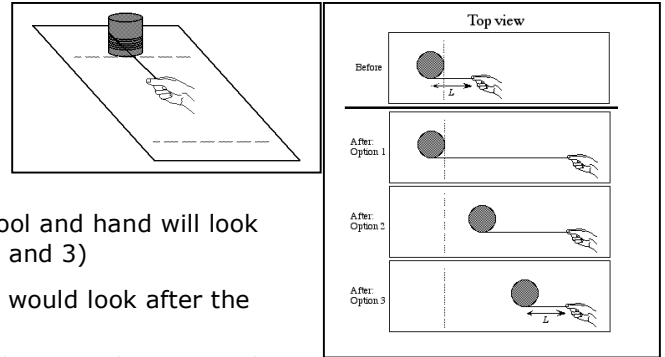
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. same stuff.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. spool a is pulling on spool b with an equal and opposite force.



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The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. the force would cause both the hand and the spool to move but the string will move more

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Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. the string is pulling the side of the spool causing the spool to move some and spin at the same time

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the block would move faster than the spool in turn finishing first

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The tension in the thread just above spool A is less than that just above spool B.

Explain. the string would have less tension because it would spin down and have less tension

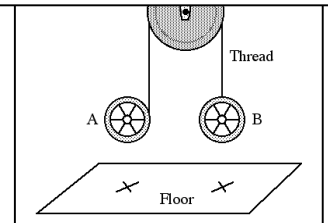
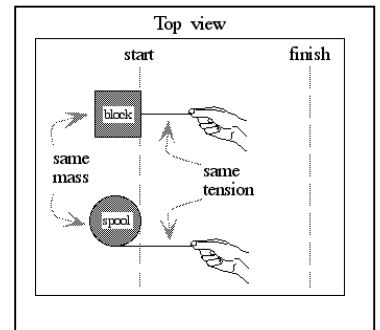
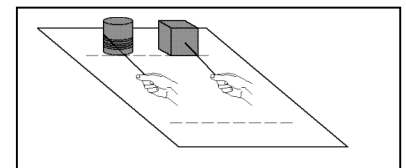
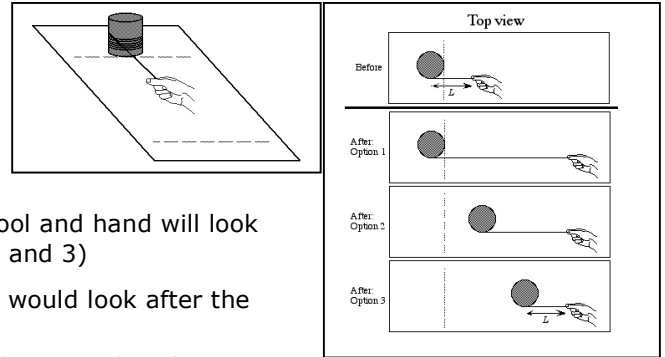
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. it would be spinning plus the force of gravity forming more acceleration

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. it will spin and fall at the same time with the same acceleration of gravity so it will hit the ground first



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Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. the thread will have friction on itself and pull the spool

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*

Explain. friction on the thread

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. same force, same mass, same distance

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Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. A will unwind so the tension must be more on B otherwise the string wont move

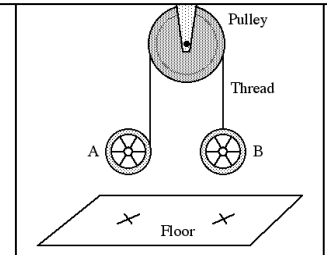
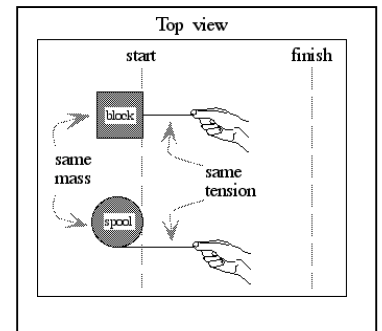
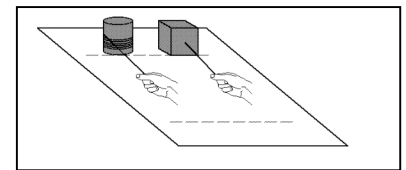
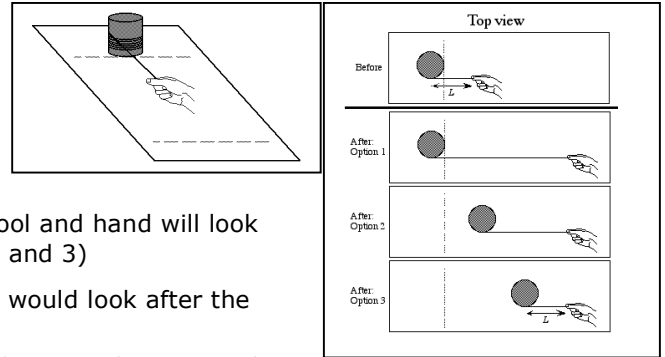
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. A has rotational acceleration and B has acceleration

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. A wont start falling until the tension is equalized



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. the frictionless table would cause the spool to move along the table, but the hand pulling the string would also bring the string out further from the spool

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. since the string is massless and the table is frictionless, and there is a distance "r" between the rotational point of the spool, there would be rotation, especially since the tension force is not on line with the center of mass of the spool then the bottom side would move faster than the top side, causing rotation.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the spool would still move since there is no friction on the table, and the tension would still cause the spool to move across the table at the same time as the rotation occurred. the block would not rotate, and all the force would go to the linear movement of the block

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. the tension never changes in a scenario like that. there will be rotational movement in spool A, and spool B will still fall, but the tension cannot change since the string is massless and the pulley is massless as well.

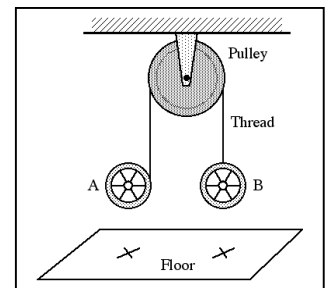
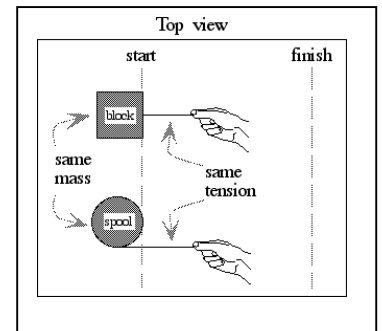
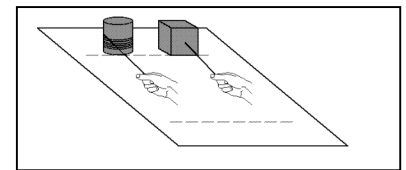
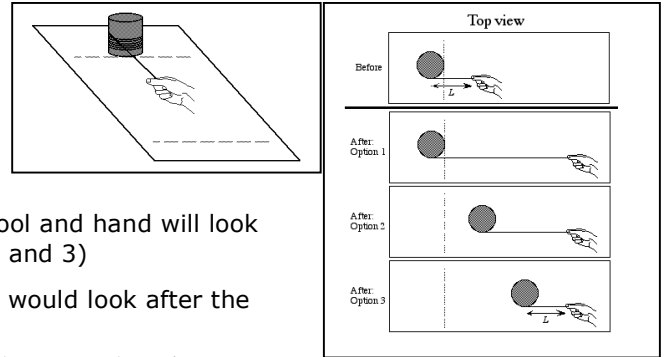
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. there are the same forces acting on the two spools, but spool A goes into rotational acceleration as well as linear acceleration. B just goes through linear acceleration and therefore the center of mass accelerates faster than that of A

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. Going back to the previous response, B has greater acceleration than A, and therefore will hit the floor before A



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The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. without any friction the spool will not unroll.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate. Explain. no friction means that the spool will slide before it unspools.*

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. Since the spool does not unwind it will cross the line at the same time.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

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The tension in the thread just above spool A is equal to that just above spool B.

Explain. they both move 1/2 the distance that spool A unwinds.

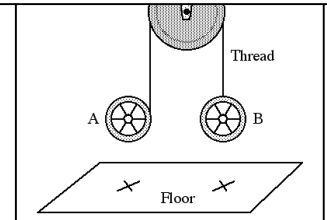
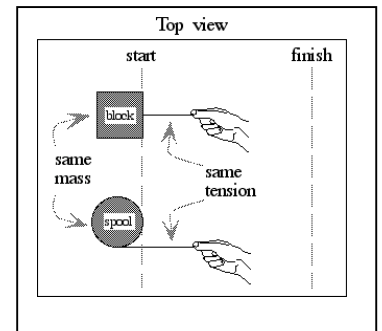
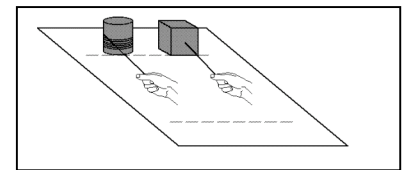
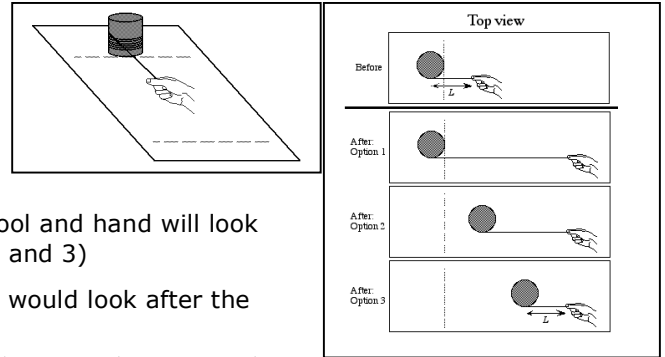
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. they have the same acceleration because they cross the same distance in the same amount of time.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. A will unroll the distance that is split between the two. they will hit at the same time.



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The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. the spool will move a bit before becoming unraveled.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. there is no friction to keep the spool from rotating and because the string is not attached at the center it will rotate.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the block will move linearly with the tension of the string and the spool will move with less than a linear movement.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. the spools have not moved and so they have the same tension.

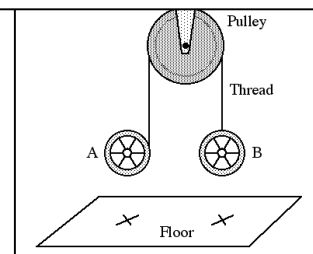
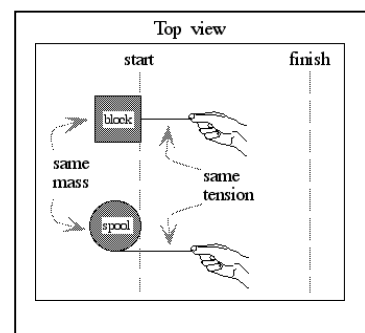
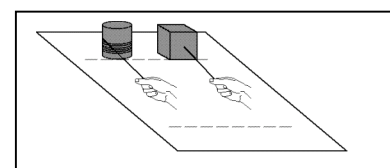
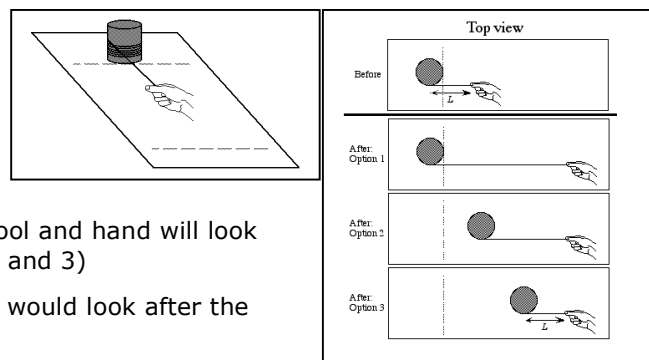
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. both spools will drop at the same time as they fall after being released.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. A will unravel and consequently fall at the same speed of B.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. The string pulls the spool to the right and it unwinds.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. there is a force pulling on one side of the spool so it rotates.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the string is unwinding so it takes longer.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. it's the same string

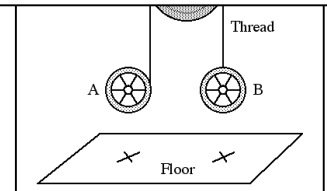
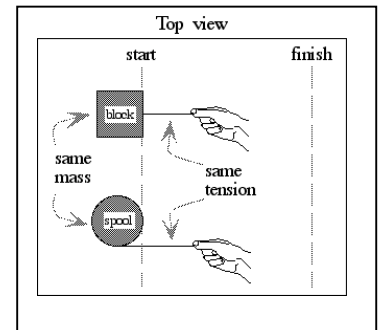
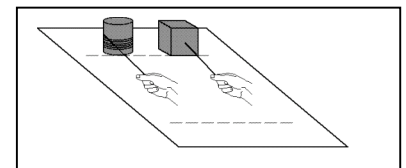
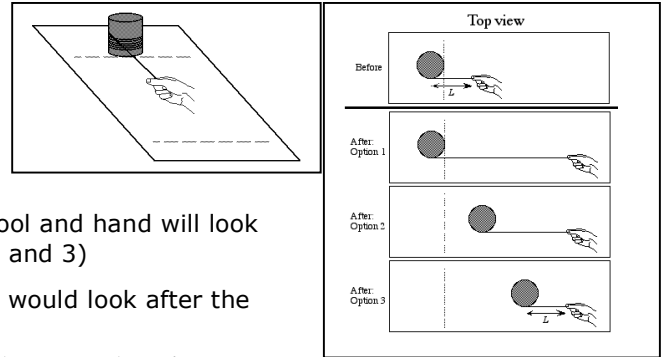
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. they have the same acceleration

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. they start at the same height and have the same acceleration.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. The spool is pulled to the right because it does not unwind as fast as it is pulled, the distance increases because the spool does unwind.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. the spool will rotate because it is being pulled by a string that is wrapped around it.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the spool unwinds, the string on the block does not.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. spool a is unwinding

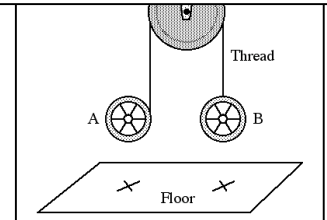
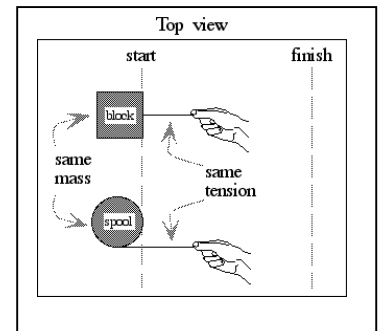
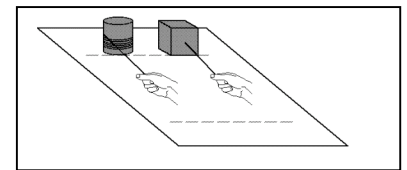
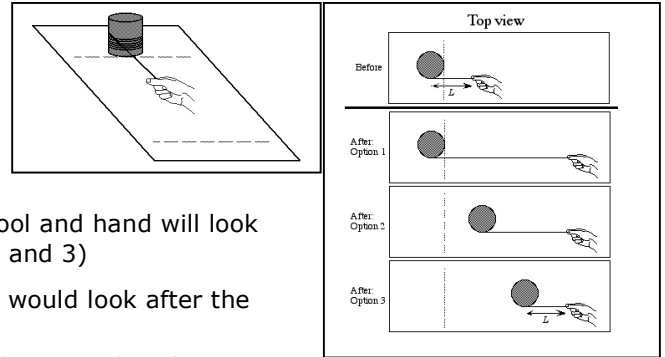
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. A is rotating.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. spool a is unwinding while spool b is relying on spool a to fall so that it can begin to fall.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 1; the hand moves to the right, and the center of the spool stays in place.

Explain.because of the forces.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain.because of gravity

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line before the block.

Explain.because the masses of the 2 objects

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is greater than that just above spool B.

Explain.tension of A is greater cause of gravity

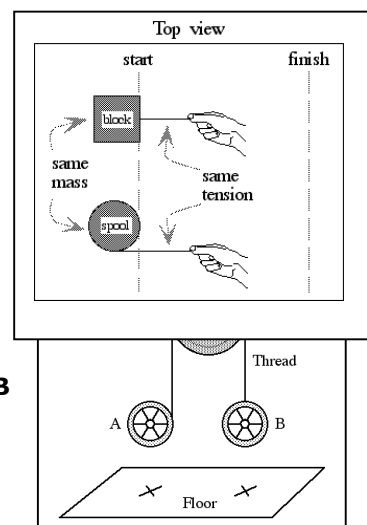
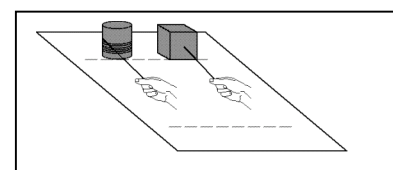
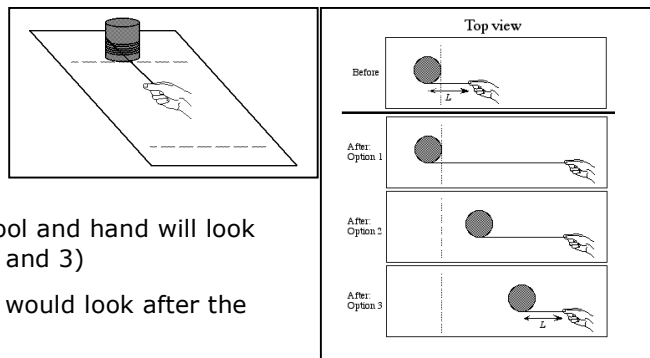
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain.greater because of gravity

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain.same masses.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 1; the hand moves to the right, and the center of the spool stays in place.

Explain. *Only angular acceleration is acting on the object due to torque.*

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. *Torque is acting on the object.*

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The center of the spool stays in the same place and does not cross the finish line at all.

Explain. *Frictionless table.*

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. *Equal masses and gravity is the only force on the object.*

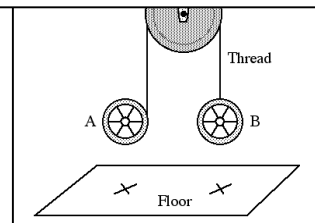
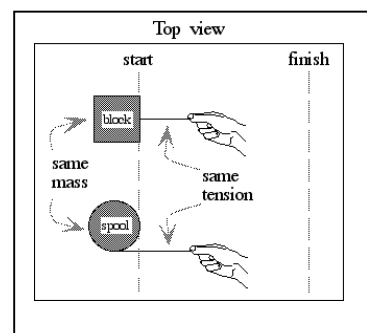
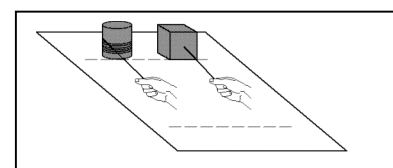
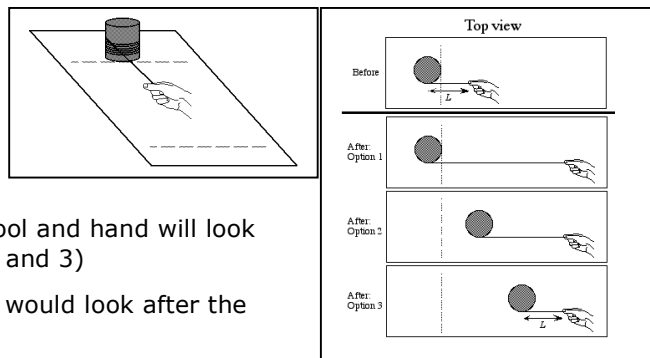
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. *The center of mass remains in the same place for both so angular or rotational acceleration does not matter in this case.*

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. *Only gravity.*



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. The plane is frictionless

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*

Explain. It is a frictionless plane

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. Frictionless surface

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. A is weightless because it is falling

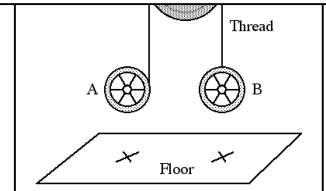
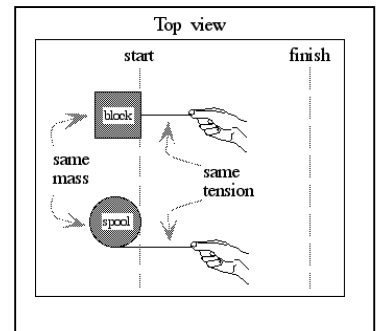
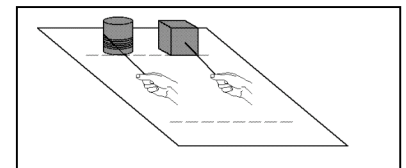
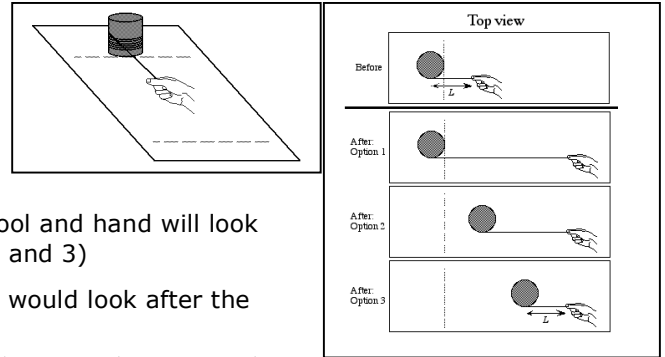
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. A is spinning the same distance B is moving down

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. A is spinning in place and b is falling



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

none of these

Explain. *None of the threads depict how the hand and the spool would look after pulling the thread because the only difference among them is the length.*

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. *Because since the block and the spool have the same mass, they will require the same force, so if the block moves, then there is enough force to rotate the spool.*

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The center of the spool stays in the same place and does not cross the finish line at all.

Explain. *Since the block doesn't require rotational force, it can just be instantly moved. However, torque and force are both needed to move the spool.*

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. *It has less tension because B requires more force to hold block A.*

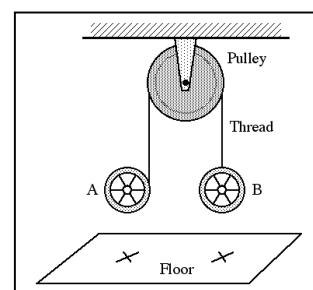
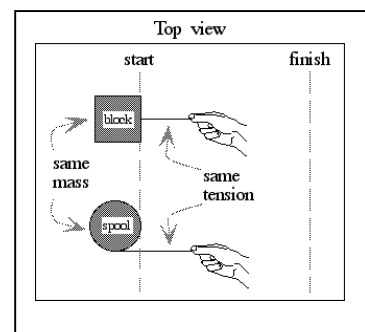
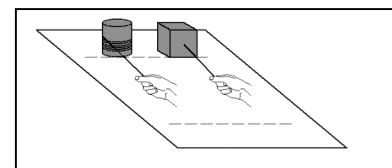
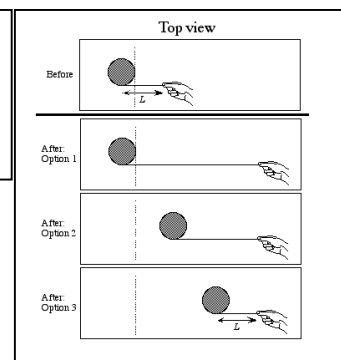
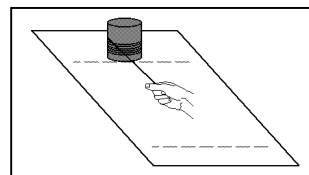
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. *Since A has rotational force, it is likely for B to have a lesser magnitude of acceleration of the center of mass.*

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. *I think that the rotational force of Block A will be greater than the gravitational force of Block B. Since Block A will have a greater force, then it will have a larger acceleration.*



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. this is because there is no friction.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*

Explain. there is no friction.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. this is because they are both essentially the same.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. They are attached to the same string.

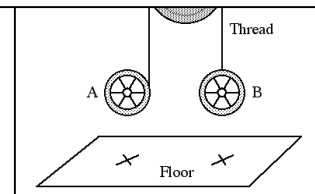
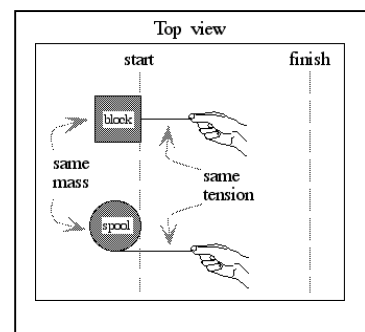
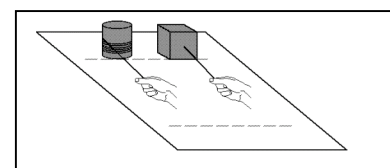
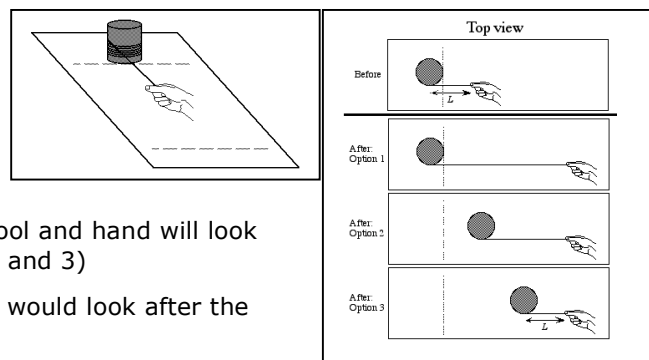
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. They both have the acceleration due to gravity.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. It is because gravity acts on them the exact same.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 1; the hand moves to the right, and the center of the spool stays in place.

Explain. It seems like since the force is being applied to the very edge of the spool, the spool will only rotate and not move relative to the surface.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. Force applied tangentially will create a rotational motion.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The center of the spool stays in the same place and does not cross the finish line at all.

Explain. Like I said, it seems that, since the force is applied to the very edge of the spool, this will translate into rotational motion, not motion relative to the surface.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. Tension is constant throughout the string.

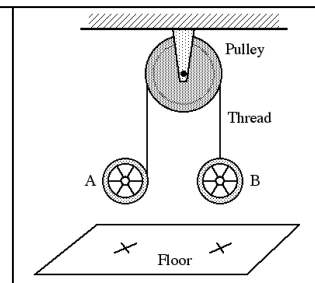
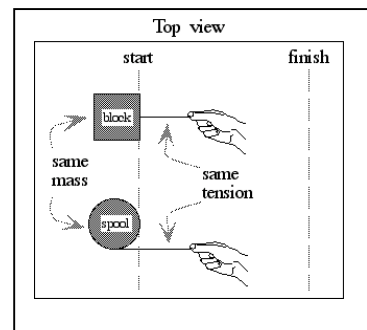
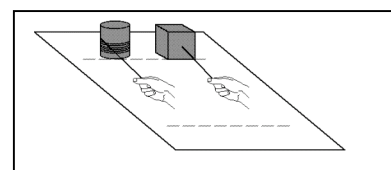
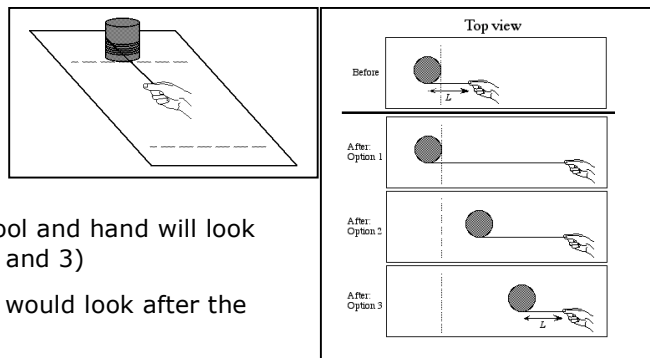
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. The tangential force on A seems like it wouldn't act on the center of mass, so it seems like CM of A would act as though it were in free fall. CM of B, however, would have the inertial force taken to rotate A acting against the force of gravity, therefore lessening the acceleration felt by CM of B.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. Again, I think acceleration on B would be less than that on A, so A will hit the floor first.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. The hand will exert a force on the spool also, pulling it towards the hand.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. Yes, the rope generates a torque on the spool causing the spool to rotate.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. The force on the block is pulling it straight towards the finish line so it will get there before the spool because the spool isn't being pulled straight towards the finish line.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. the rope to B has to worry about the weight force and the rope to A doesn't as much because A will fall towards the X.

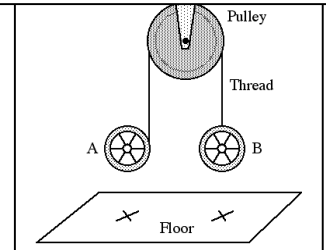
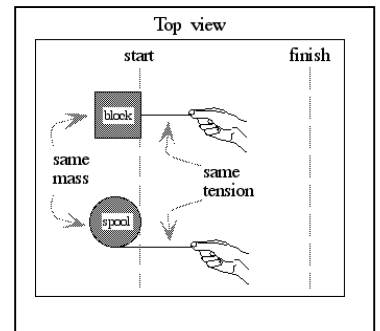
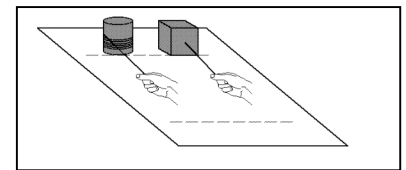
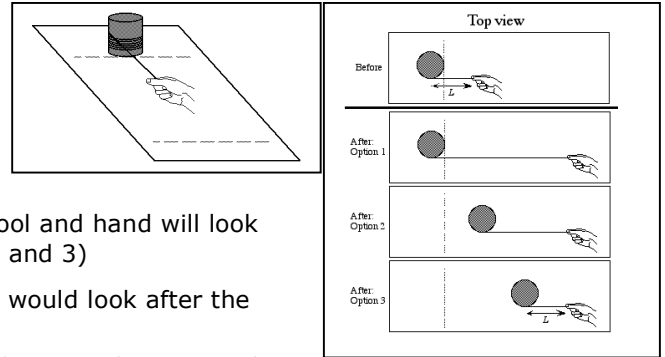
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. A will fall towards the earth so its acceleration will be greater

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. it falls faster so it hits the floor first



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. because the string is not pulling directly on the center of the block it will not only pull it forward but pull that side of it causing the block to spin and unwind the string

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. for the same reason above, the force is not acting on the center of the spool, so it has force pulling on one side making it rotate.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. some of the pulling force is being exerted in the rotation of the spool versus simply pulling it as with the block, so it doesn't have the same forward movement as the block

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. they are attached, the string can only have one tension

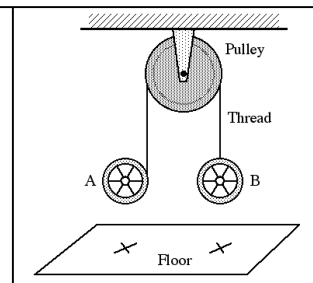
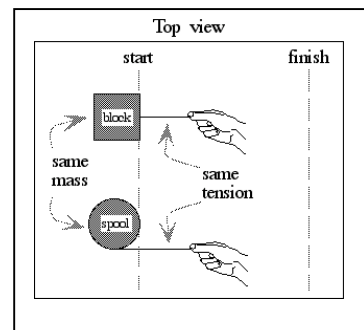
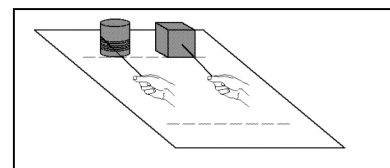
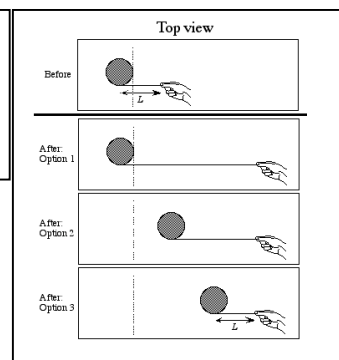
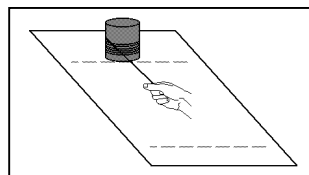
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. As the spool unwinds from A B will accelerate at the same rate from the equal and decreasing tension of the string holding it up

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. If the acceleration is the same as above, then they must hit the floor at the same time.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. I just figured the spool would slide a little even as more string was being let out

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. I don't know why, intuition makes me think this is the case

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the string is let out so it takes a little longer for the spool to cross

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. they are attached by the same rope so the tension must be the same.

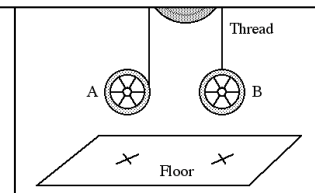
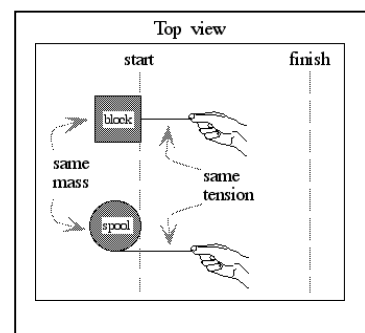
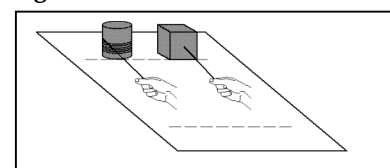
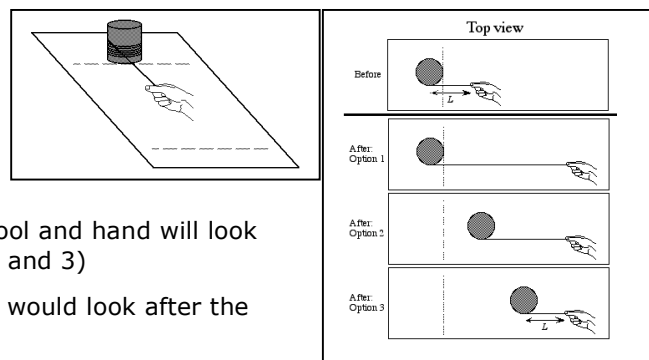
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. the tension is the same and the masses are the same so the acceleration must be the same

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. the net force on each is identical so the time it takes to hit the floor must be the same



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. as the hand pulls it takes only the rope and it is moving away .

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. when the hand is pulling the rope the spool don't move but rotate.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. when the rope is finish it will start to move and cross the line .

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. same rope

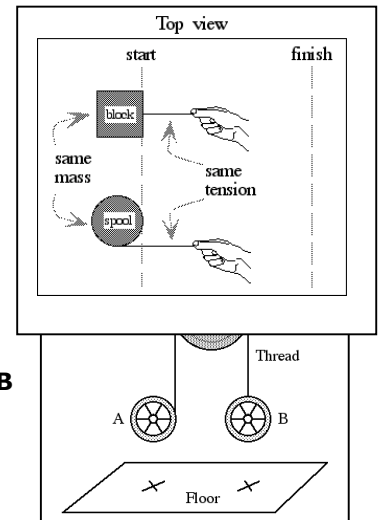
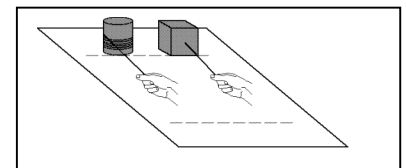
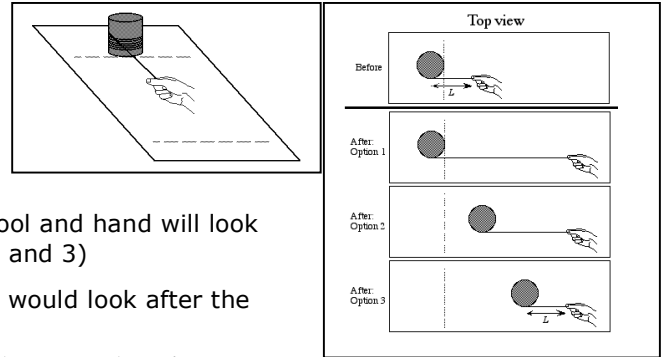
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. same rope and same forces

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. everything is moving to the right .



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 1; the hand moves to the right, and the center of the spool stays in place.

Explain.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is greater than that just above spool B.

Explain.

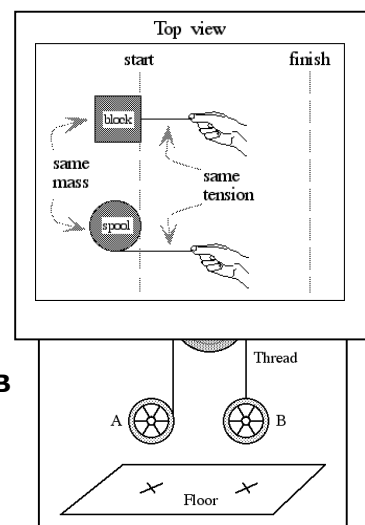
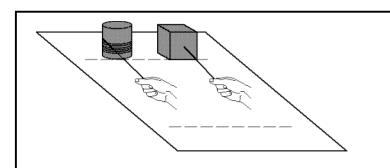
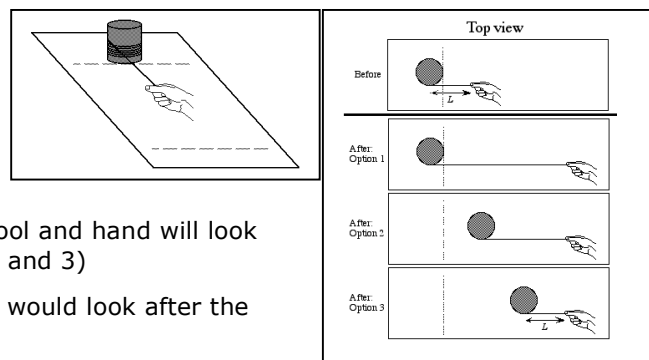
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. The tension of the string wrapped around the spool exerts torque on the spool; thus it moves to the right with the hand and the string gets longer.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. The spool will rotate at almost any tension.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. Some of the tension of the string is lost to the torque that is rotating the spool, so the tension force will not solely be moving the spool toward the finish line as is the case with the block.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. The string above A is not supporting the complete mass of A while it is falling and the string is unwinding.

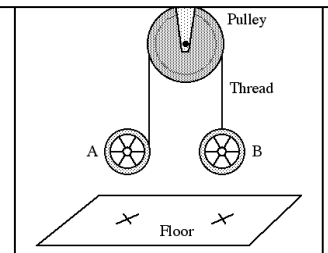
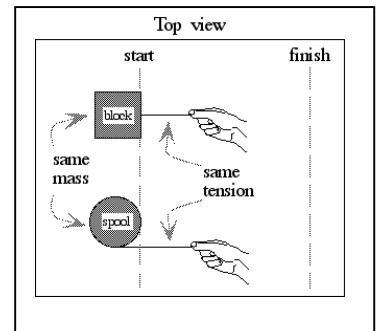
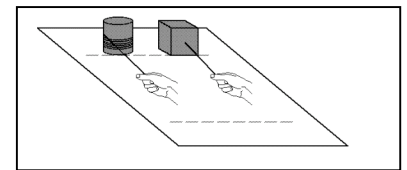
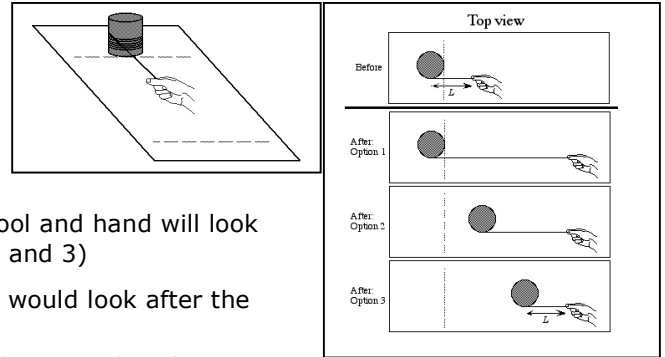
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. The additional force of the downward torque that is caused by the string spinning around the spool causes A to accelerate faster than B.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. The acceleration of spool A is greater than that of B because of torque, so it must hit the floor first. Plus, this seems like the logical answer. Strings on spools unravel quickly when dropped!



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. The force of the hand acting on the thread causes a torque on the spool, the spool unrolls, going in the opposite direction while the hand continues to pull, and some of that force is converted to torque, it's hard to say as I'm not used to considering the effect of friction on the surface.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. The force of the spool is acting on the edge causing the rotation, like a lever

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. Some of the force acting on the spool is converted to torque, some is still pulling toward the right.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

unanswered

Explain.

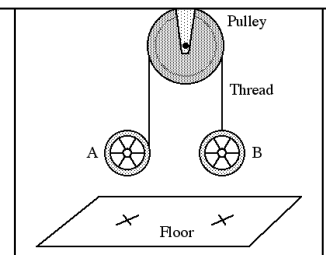
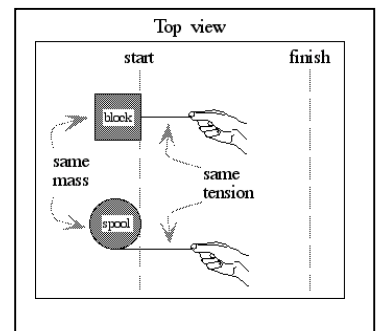
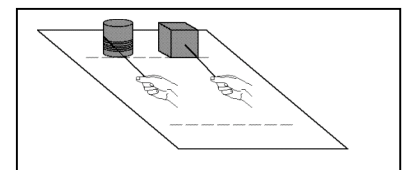
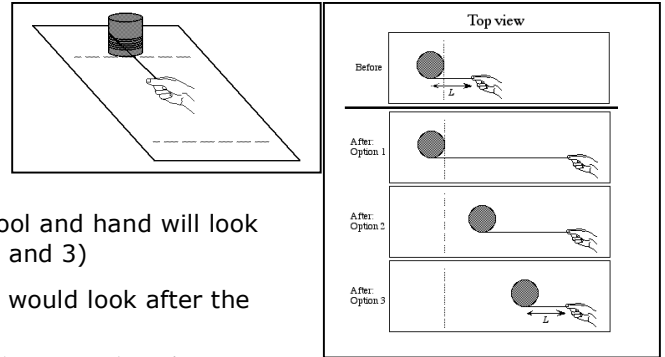
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *unanswered*

Explain.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

unanswered

Explain.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. Because the hand is moving away and the rope length increases

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. hand pulls the rope away so the spool has to rotate

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. When all the rope is pulled it will start to move ahead !! ...

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. The same rope so the same tension.

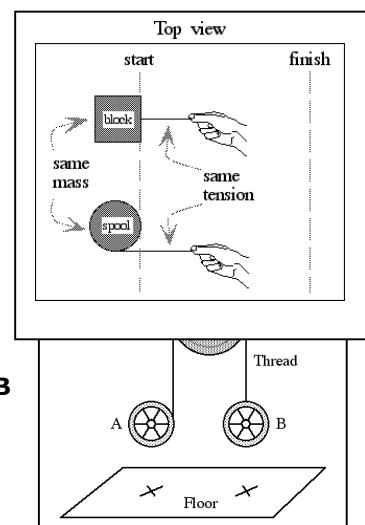
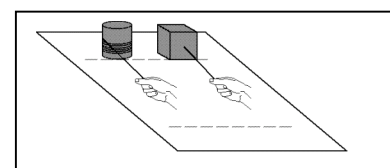
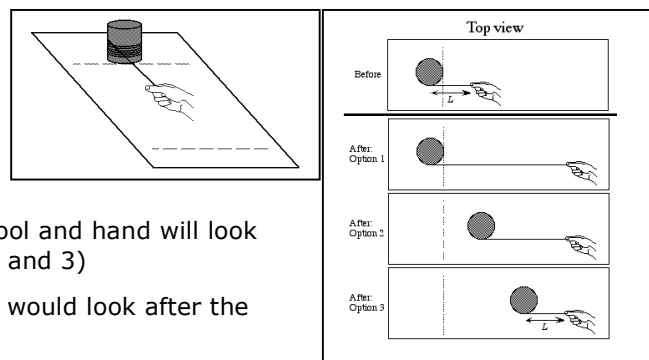
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. same tension same forces so gotta be the same acceleration.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. same forces !! ...



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

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Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. the distance between them will stay the same

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. because of the direction of the tension

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the velocity is less

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. because it has different mass

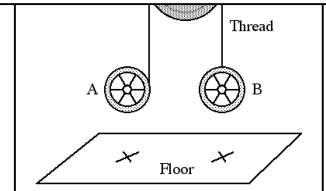
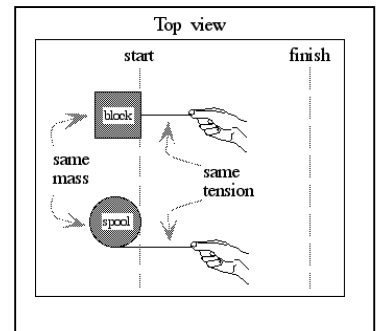
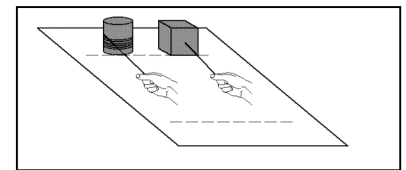
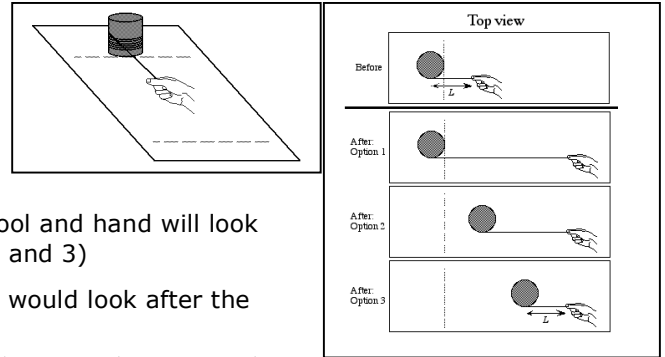
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. because of the tension and mass

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. because of the different masses



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

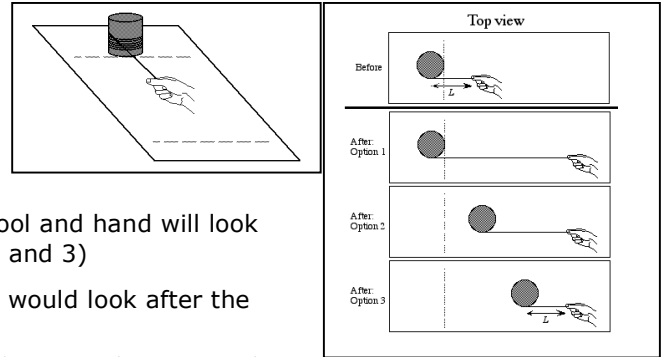
The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. If the surface is frictionless, there is nothing slowing the spool down so its displacement should be the same as the hand's displacement.



Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

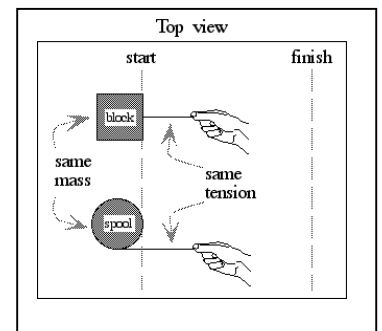
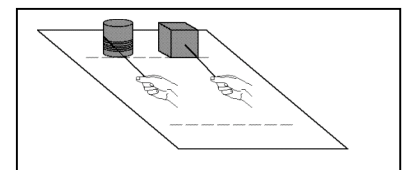
Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. A force is exerted on one side of the spool so it will spin.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. The spool won't start moving until it is fully unwound so the block will cross the finish line first.



Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. The tension should be the same throughout the entire thread.

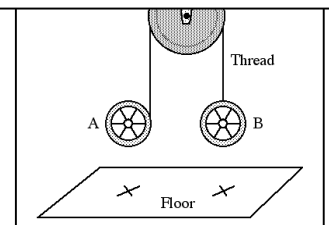
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. They're the same mass and they have the same force acting on them so they must have the same acceleration.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. Spool A will unwind as spool B begins to drop so B will hit the floor first.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 1; the hand moves to the right, and the center of the spool stays in place.

Explain.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain.

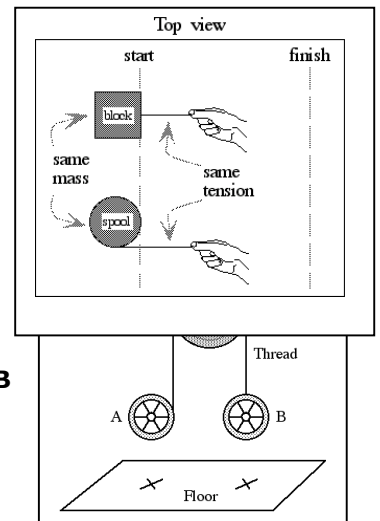
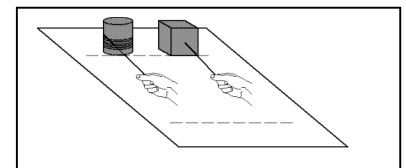
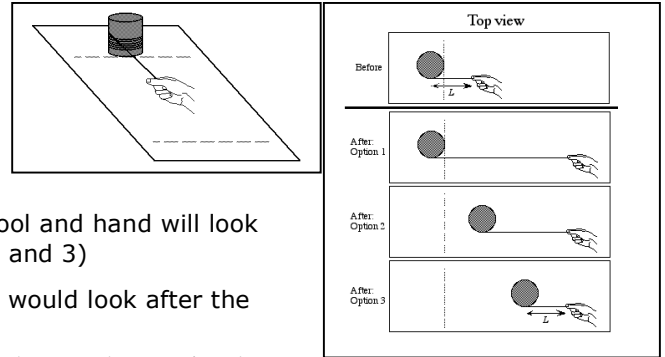
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

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The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. The no friction means that the spool will move but the fact that the string pulls from one side will cause that side to move faster causing it to spin releasing more of the thread.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. The spool gets more speed on the one side so its going to rotate.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. Some thread will be let out so the spool will be a little behind the block because the length L is now longer.

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Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. Its less than because spool A is going to be moving downwards as it rotates.

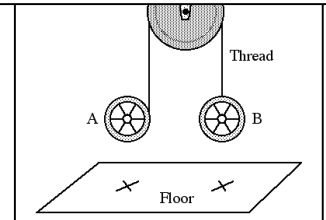
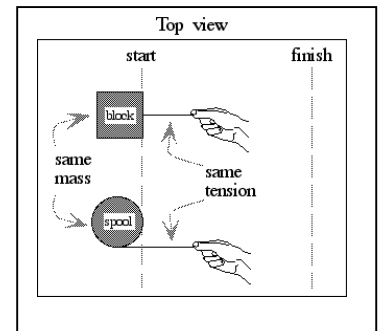
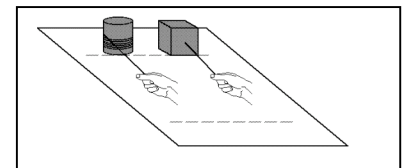
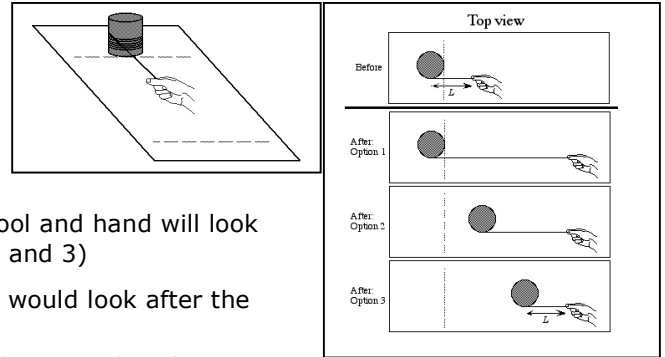
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. A will move towards the ground while b stays in the same place.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. B isn't moving while A is spinning to the floor



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The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. The hand is exerting a force on the string, and the tension in the string pulls the spool towards the hand, but the string is still unwinding as the hand pulls it.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. The string is applying tension to the side of the spool and not the center, therefore the spool will begin to turn.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. The tension is split between unwinding the string, and pulling the spool towards the hand, while all the tension is exerted directly on the block.

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Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. The tension in the string remains constant throughout.

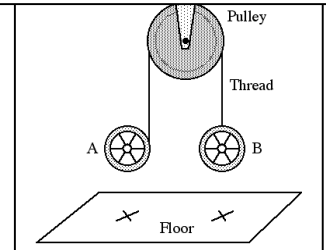
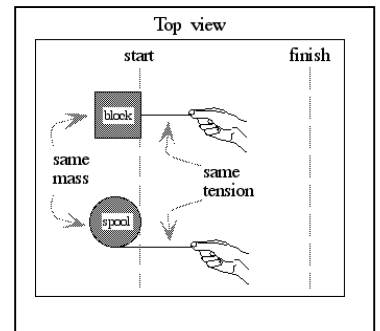
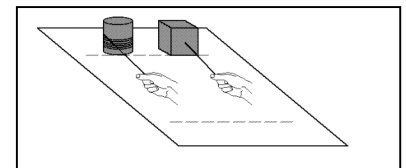
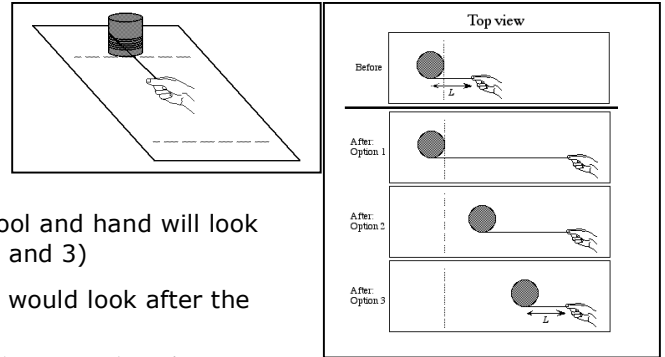
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. As B is accelerating downwards it is pulling up on A and so B has greater downward acceleration.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. B has more downward acceleration as A.



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Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. because the string make almost a tangential Velocity. spinning the tube, an as the string unwinds, it pulls the tube toward the right.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. just like a car around a track, the rope is moving and be pulled off the spool. this creates like a tangential velocity, which spins the spool.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. because the ropes work is pulling the spool only a fraction to the right. so the block reaches first. but the spool is still being pulled right, and it does cross the finish

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Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. because the thread unwinds and the spool almost free falls. all the weight of B is on the thread above B

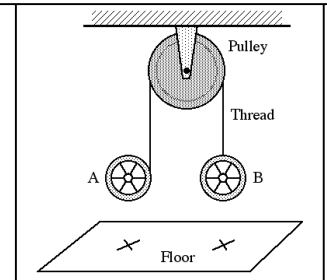
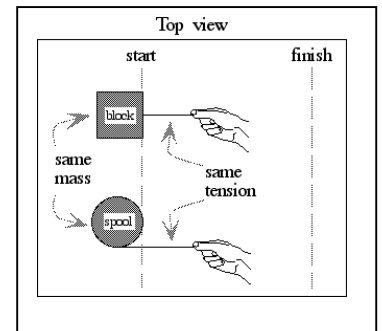
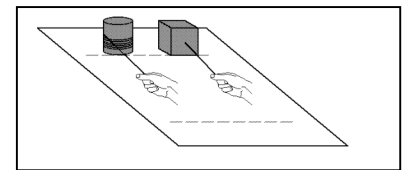
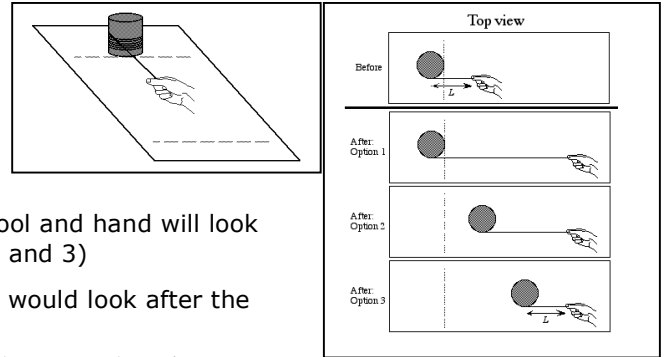
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. because the thread unwinds and the spool almost free falls. which gains speed.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. because there is more tension above B than A. so B is being forced up more than A. so A fall faster.



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Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. the surface is frictionless so both the string and spool should move in the direction of motion.

depending on how fast the string is pulled depends on the length and how fast the spool will move, i think.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. i have no idea. it just feels right.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the spool will be spinning while the block is only being dragged.

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The tension in the thread just above spool A is equal to that just above spool B.

Explain. it's a closed system. i think. but what about the extra mass of spool A with the string wrapped around it?

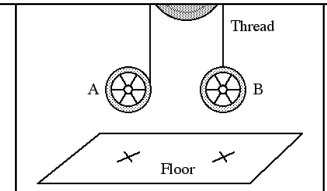
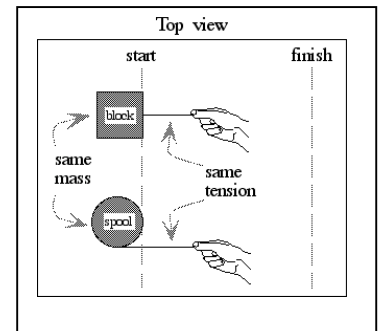
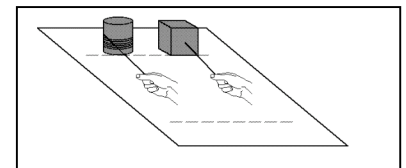
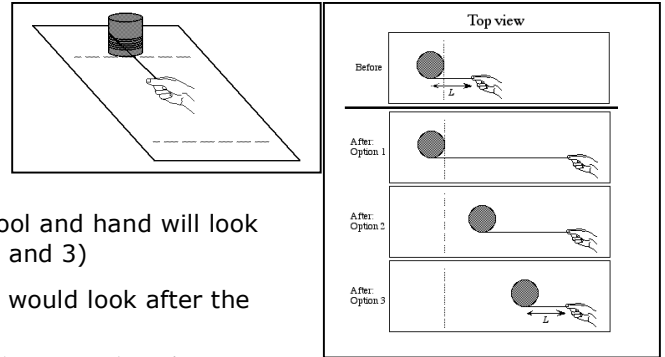
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. because it has a higher mass?

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. because it can unwind



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The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 1; the hand moves to the right, and the center of the spool stays in place.

Explain. *I felt it was right*

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. *spools rotate often*

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. *that how it go*

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is greater than that just above spool B.

Explain. *devine wisdom*

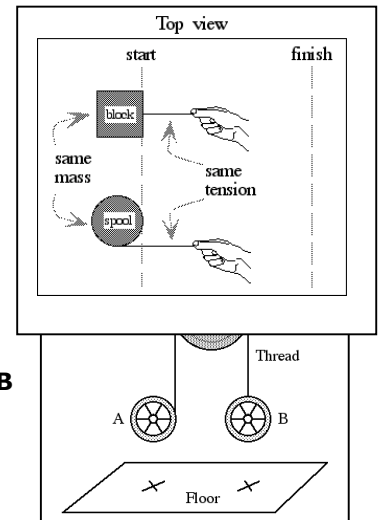
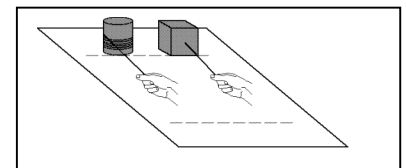
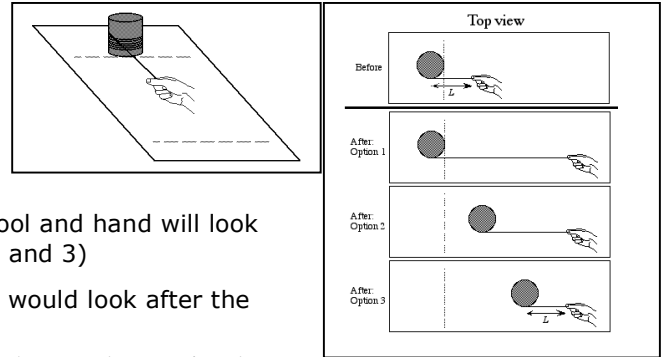
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. *higher torque, lower acceleration*

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. *felt good*



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. the spool unwinds but not as fast as the hand moves away causing a force to move the entire spool

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. there is friction on the spool but not so much that it won't unwind

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the spool unwinds a little but it can't beat the block across the finish

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. they both have the same force pulling down on it with the same mass, therefore the tensions are equal

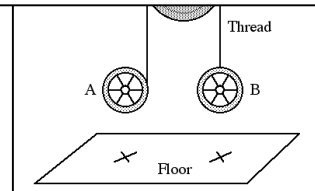
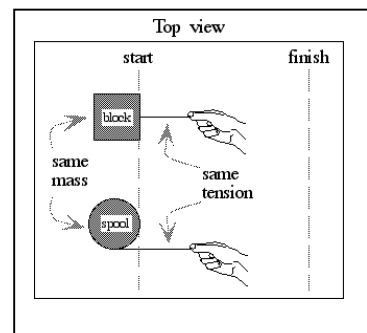
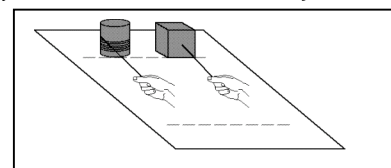
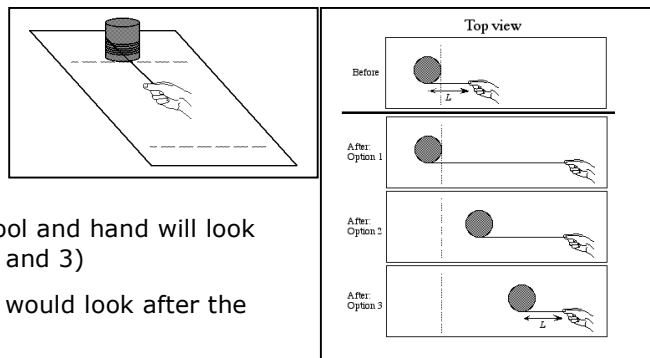
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. they both have the same force pulling on them therefore the accelerations must be equal

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. spool a will unwind but spool b has to wait for spool a to unwind and start to decrease the tension on its side of the pulley before spool b will unwind.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 1; the hand moves to the right, and the center of the spool stays in place.

Explain. just a guess

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. Tension force applied to the spool will cause a tangential acceleration

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The center of the spool stays in the same place and does not cross the finish line at all.

Explain. being consistent with guess on question one

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. tension in the string is always equal

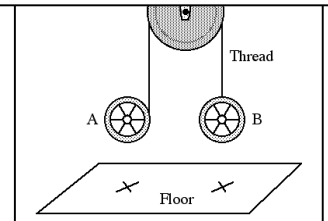
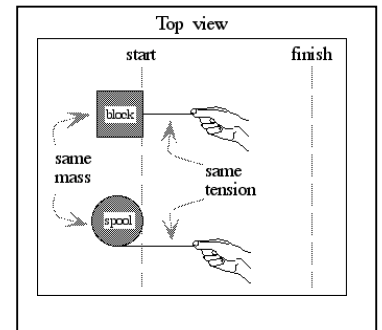
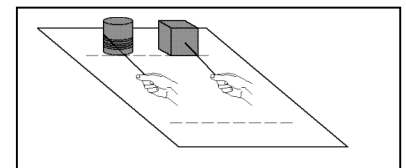
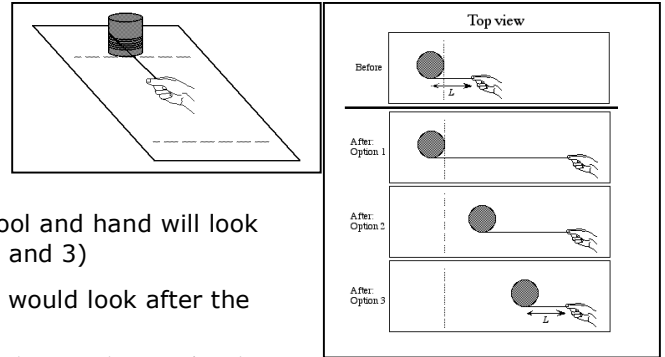
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. tension is the same and mass is the same so acceleration must also be the same

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. as spool a unwinds it will maintain the same height above the ground as spool b (b and a adjusting height to one another) until both spools hit the ground at the same instant



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 1; the hand moves to the right, and the center of the spool stays in place.

Explain. All of the force is in the form of torque on the spool, causing it to rotate.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. There is torque on the spool.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The center of the spool stays in the same place and does not cross the finish line at all.

Explain. See above.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. There is only one tension, so it must be equal.

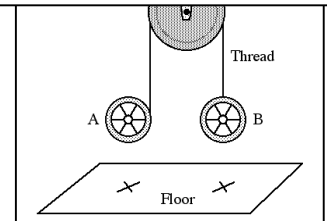
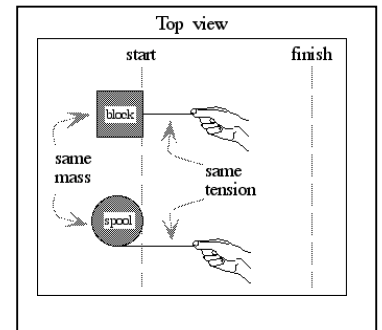
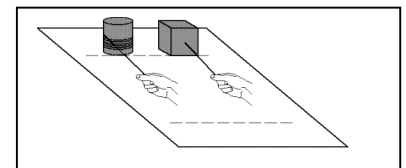
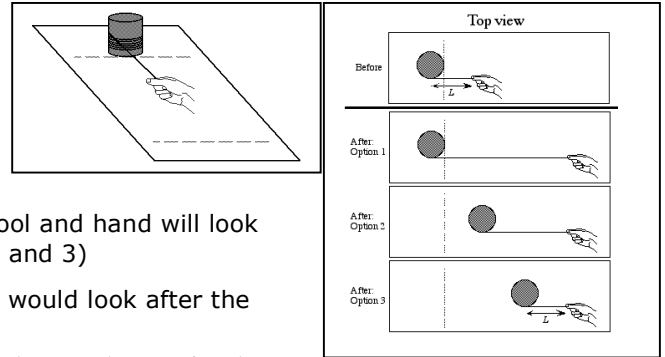
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. This is because the force would be pulling both and the spool's friction pulls it back.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. the force will not be straight

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line before the block.

Explain. I am not quite sure what this is asking

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. Spool a is more tense

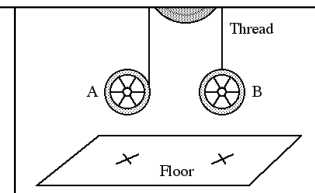
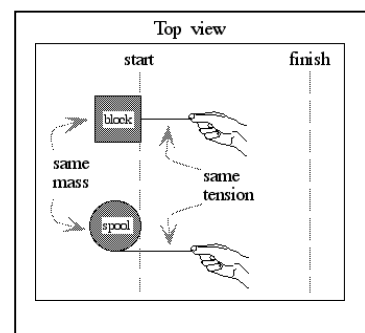
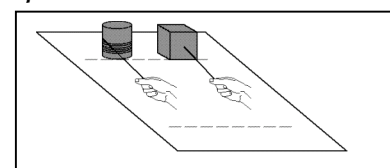
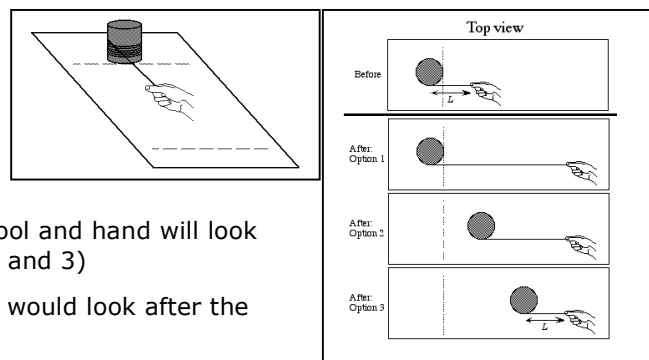
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

unanswered

Explain.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. Even though its unwinding it will still move in the direction that the hand is moving.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. no friction and the spool is unwinding

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. string gets longer as it unwinds

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. same mass and same distance above the ground

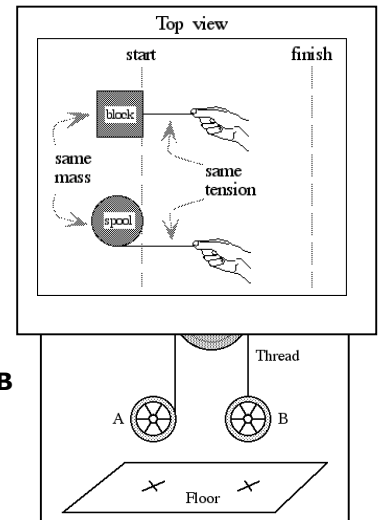
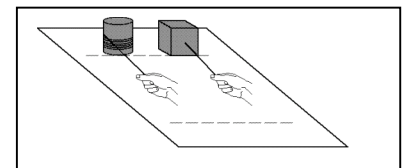
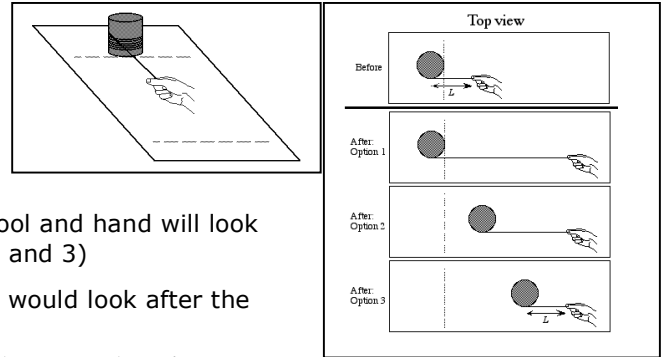
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. they are the same thing and fall the same distance under the effects of the same gravitational force

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. same as above



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

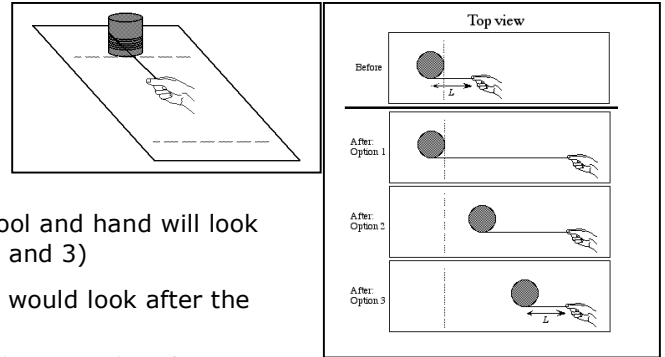
The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. *Your string would unravel with the spool but the spool would be pulled along with the string and hand.*



Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

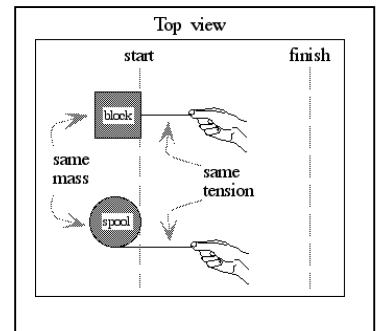
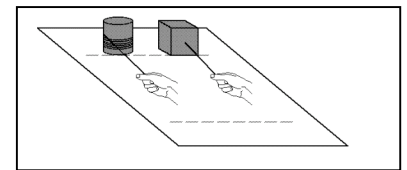
Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. *The tension from the string would unravel and rotate the spool.*

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. *Because the spool rotates, the spool doesn't keep a constant force on it.*



Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. *They are attached to the same string giving them the same tension.*

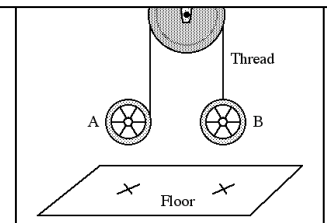
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. *Since the string starts closer to the end of the spool it will accelerate faster than B.*

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. *Since it has a faster acceleration, it will hit the floor faster than spool B.*



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. The spool will remain on its axis and the torque is radius \times force and the torque on the string will only rotate the spool. The hand is a perpendicular force to the spool and causes only torque.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. The spool will rotate about its axis.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The center of the spool stays in the same place and does not cross the finish line at all.

Explain. The rotational mass of the spool keeps it in the same spot.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. Some of the tension of spool A is taken up by the torque of its rotation lessening the tension on the string above it.

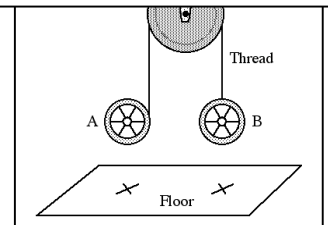
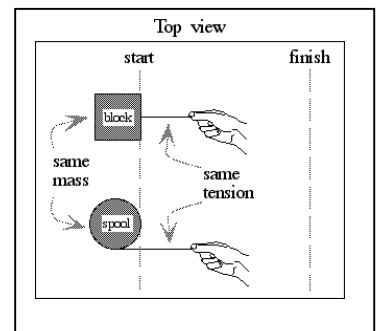
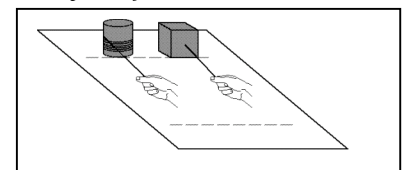
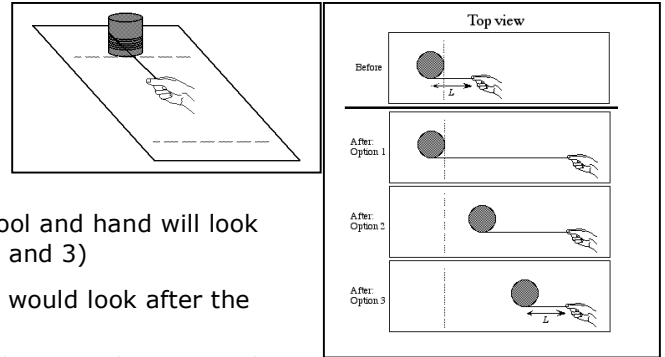
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. The masses have equal velocities for they are both acted upon by gravitational force and torque does not contribute to movement of the center of mass, but only rotates it.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. The velocities of the spools are the same only the angular velocities differ.



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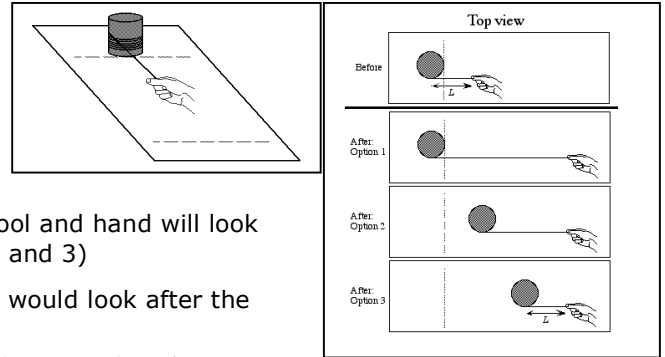
The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. I conducted an experiment and found 2 to be true



Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. Some of the force exerted on the string will be used to unwind the string on the spool, while the rest becomes a normal force between the string and the spool, which will cause the spool to move

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. The spool's progress will be slower owing to the fact that some of the force exerted on it is consumed to make the string unwind.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. since both are the same mass, both should have the same tension due to gravity

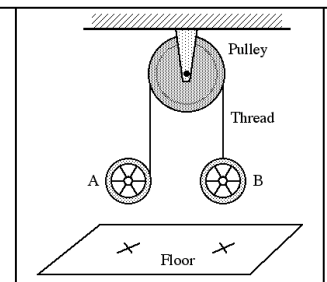
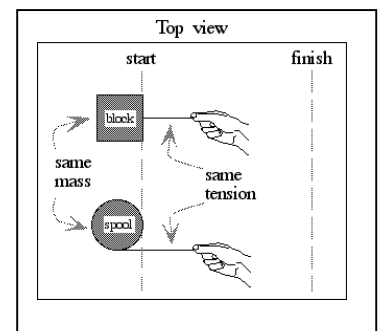
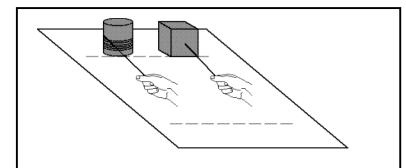
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. for the same reasoning in Q # 11

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. because, assuming that the thread must be unwound from around spool A, the two spools will hit the same time, because both can only move down at the rate that the thread is unwound



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

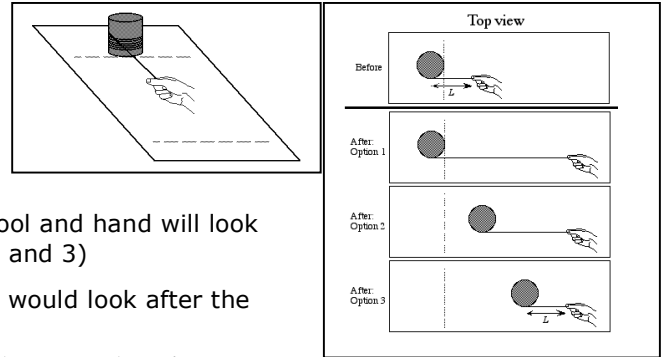
The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. the spool will unwind



Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

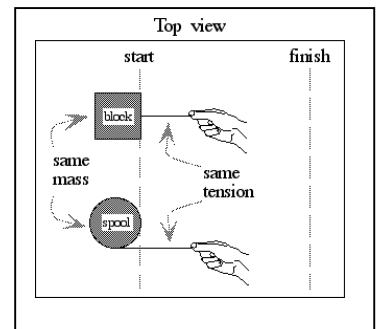
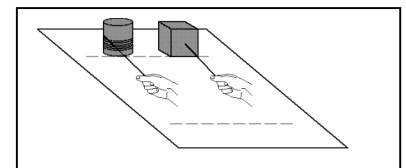
Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. that's just what happened

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. it's slower because it unwinds



Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. that's just the way it is

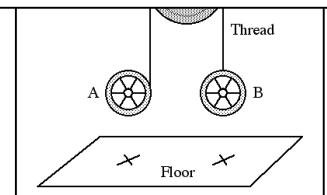
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. that's just the way it is

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. look above



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. The string would unwind a little before the spool starts to move, so the distance between them would change, and the spool would in fact move.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. It will rotate because the string wants to unravel more than the spool wants to move at first.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. Since the string will want to unravel at first, it will take awhile before the block starts to move, while the block basically has more time to move.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. It is less than, because B will want to go to the floor as will A, but A still has to unravel.

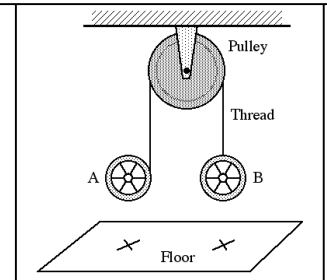
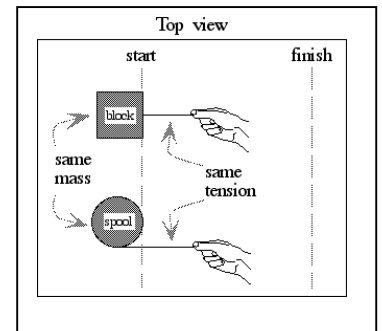
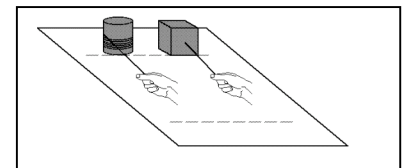
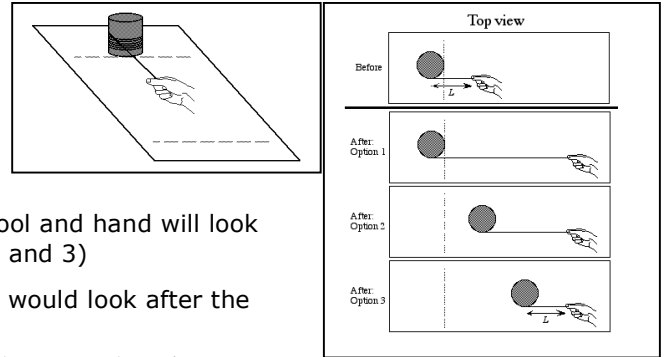
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. It is greater than because it is unraveling whereas B is just plummeting.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. Although they accelerate differently, A has more string to unravel so it will hit the floor at the same time as B even though B moves more at first.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 1; the hand moves to the right, and the center of the spool stays in place.

Explain. the force is applied on the edge of the spool and is purely rotational... the spool will spin in place while it unwinds.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. the string applies torque on the spool causing it to rotate.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The center of the spool stays in the same place and does not cross the finish line at all.

Explain. same as above

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. The spool above A applies barely any force on the string

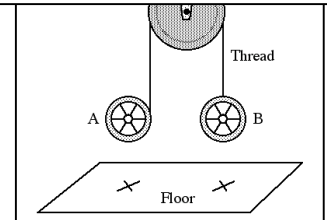
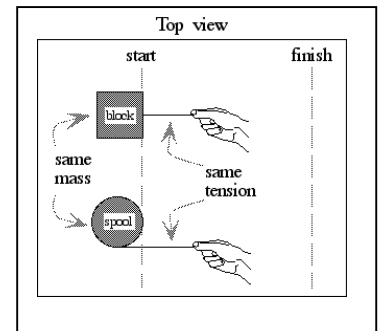
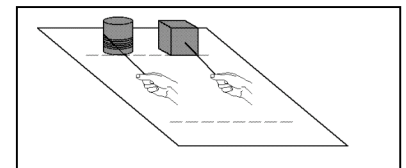
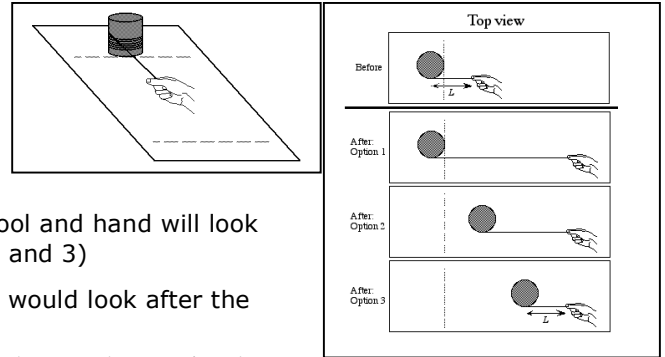
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. B does not move until A hits the floor and B begins to fall and unwind the string from spool A

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. B does not move until A hits the floor and B begins to fall and unwind the string from spool A



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. there is no friction so the spool slides towards the hand but the string also unwinds, causing the distance between hand and spool to increase

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. the side of the spool is being pulled and the tangential velocity is greater where the string is unwinding

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. less of the same tension is used to move the spool so it moves more slowly

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. they are the same but the force causing spool A to move is the smaller normal force countering the tension.

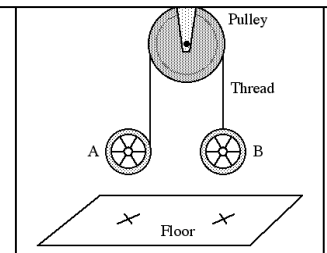
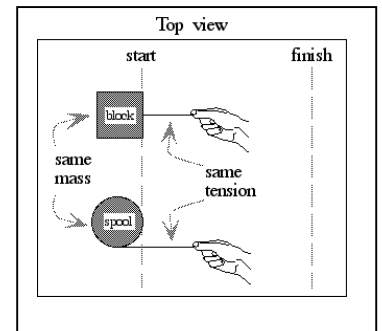
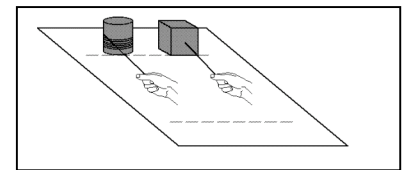
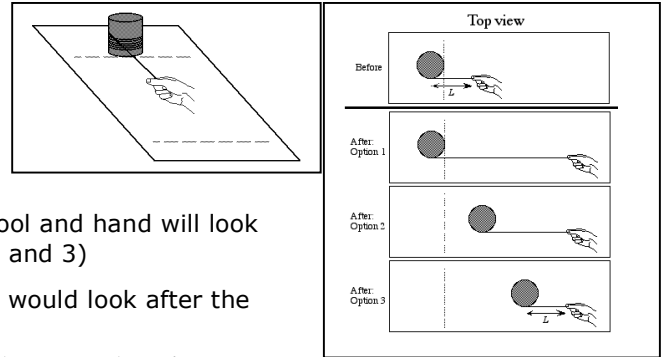
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. the string is unwinding so spool A accelerates faster than spool B

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. both spools drop at the same rate



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. there is no friction

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*

Explain. The spool will not rotate because there is no friction to prevent the spool from sliding on the surface

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. since the spool does not unwind, they will cross at the same time

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. it is the same string so the tension must be the same

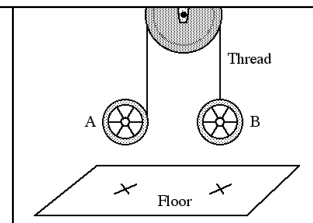
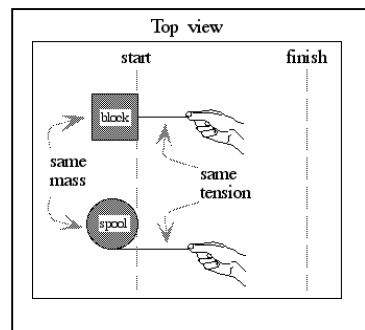
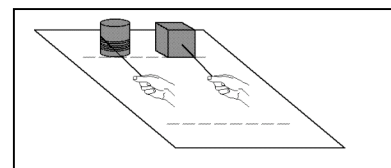
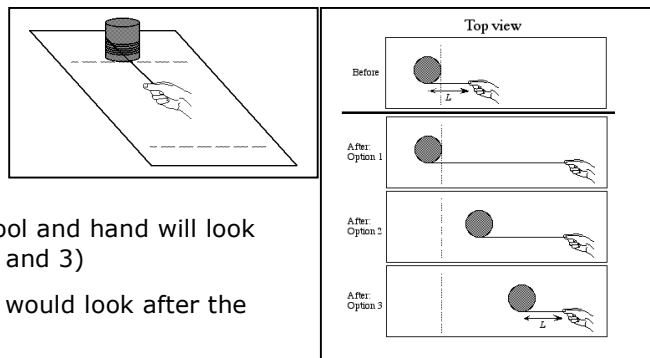
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. the acceleration of a is greater because it is unwinding

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. it is accelerating faster so it will hit the ground first



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. they both move to the right

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. it will spin and therefore it will not move as far as the block

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. some of the force goes into the spool spinning instead of moving the spool

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is greater than that just above spool B.

Explain. the velocity is greater than the escape velocity

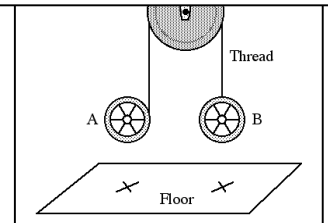
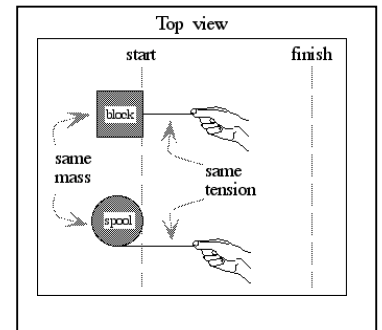
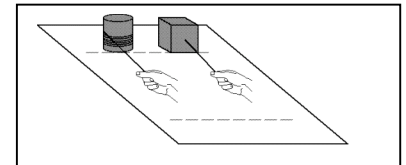
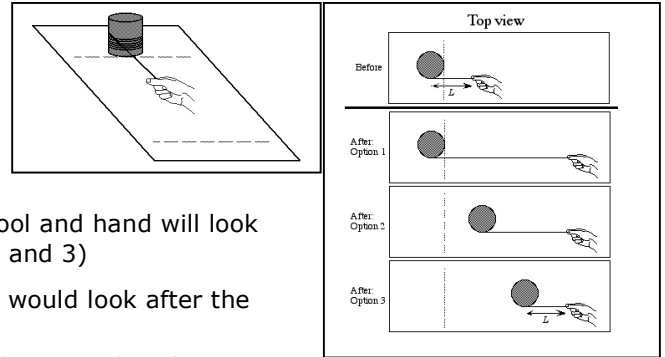
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. I really don't know

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. I really don't know



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 1; the hand moves to the right, and the center of the spool stays in place.

Explain. As the hand moves to the right, the center of mass of the spool remains the same because the string is wrapped around the spool, so when the hand is pulling the string, only string is removed and the spool does not actually move.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. The spool will rotate because the energy of the string will make a rotational force to rotate the spool.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. The string around the spool makes the spool lose energy and the string attached to the square will beat it because it is not wrapped around the square.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. Considering they have the same masses, the spools have the same tension.

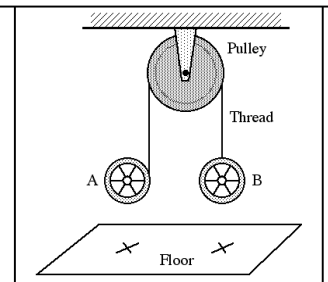
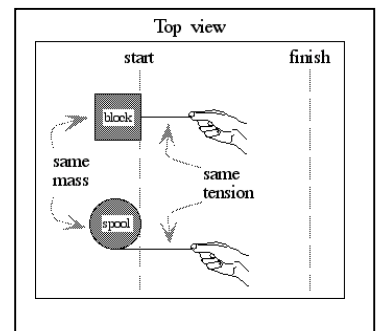
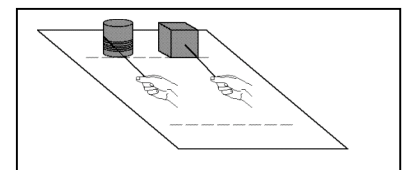
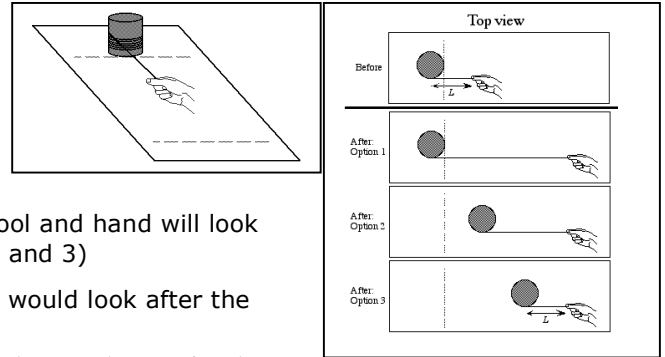
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. The rotational acceleration is exactly the same for both spools.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. Because they have the same mass and the same torque.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. Without friction it would not stay put, and it would unwind as it moved across the ice

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. the torque would cause the object to spin

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. it is still moving the same direction and depending on the length depends whether it will cross or not

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. spool B does not move until A is completely unwound

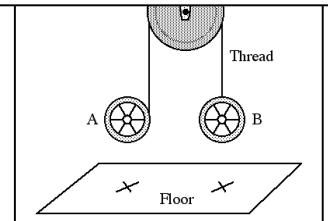
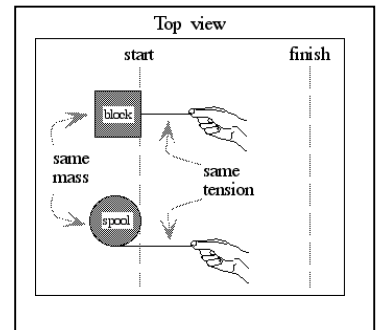
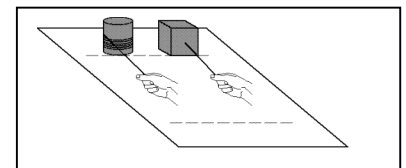
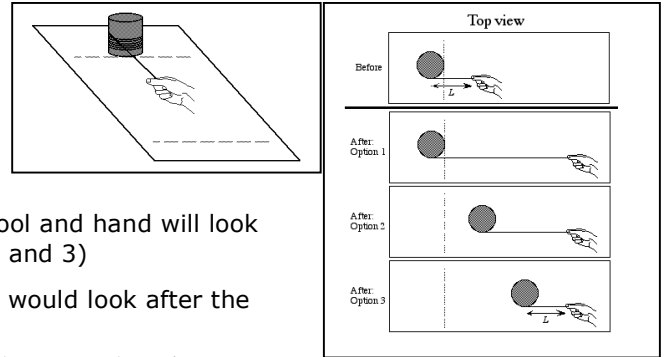
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. it has tension pulling up on it so it is less

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. A unwinds before it moves



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. The spool will move because the string is attached to the spool by friction, and the spool will unwind because of the rotation.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. I think the spool will rotate cause of torque.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. Some of the energy is spent spinning the spool instead of pulling it, so i think it will arrive late.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. Because it's unraveling it's not holding on as much as B is so it has less tension.

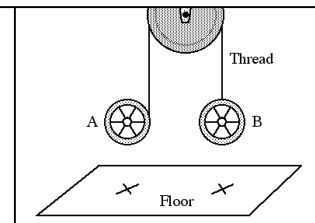
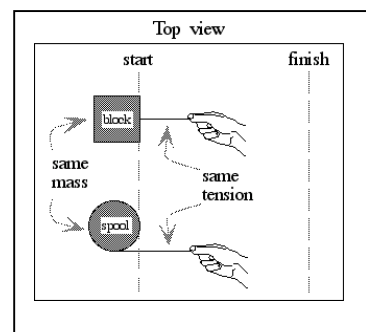
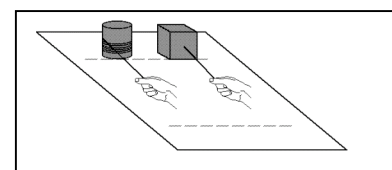
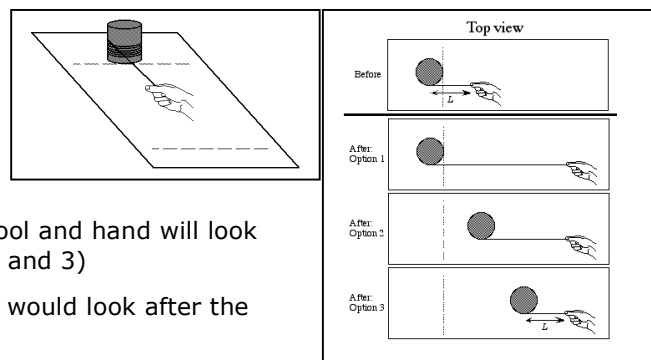
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. Should be falling equally. And the string i don't think will slow it down.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. For the same reason as the last question.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. Since the surface is frictionless, the spool will move but it will also unwind.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. The torque on the spool will make it spin.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. The spool will slide forward and unwind and so it will cross later than the block.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. It holds the weight of B whereas A does not

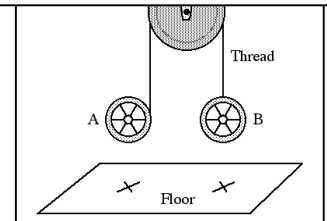
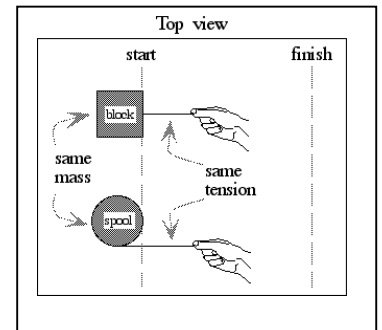
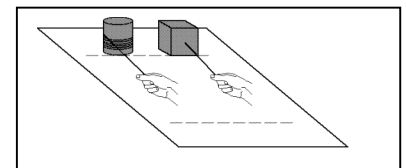
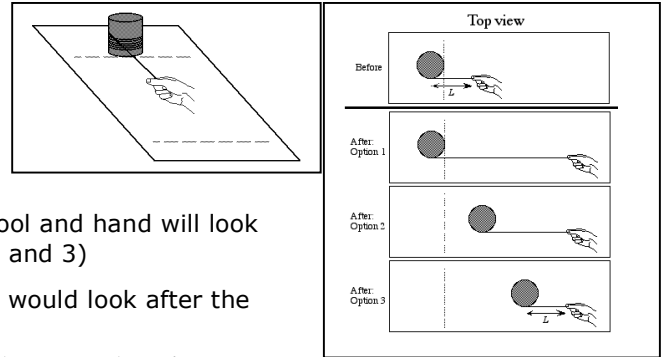
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. A will unwind and B will not.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. As A unwinds B will fall and they fall at the same speed.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. some would go to the mass moving and some to thread.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. The force of the hand would pull on the thread.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The center of the spool stays in the same place and does not cross the finish line at all.

Explain. the thread would just keep moving.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. they have to be even for conservation of energy.

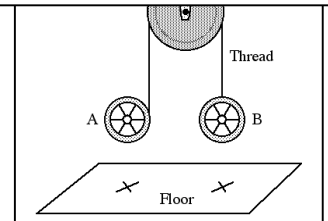
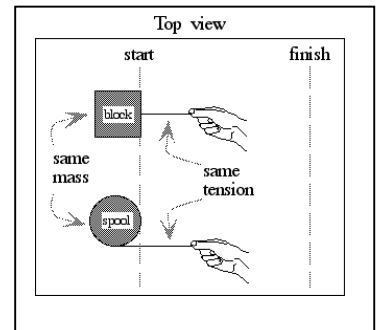
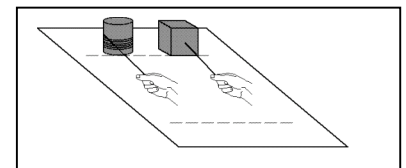
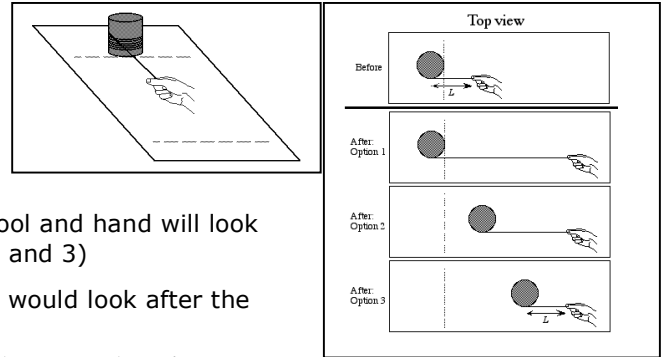
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. $f = ma$

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. acceleration is the same



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. that's just intuitively how I would think

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. again, intuition.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. same as above

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is greater than that just above spool B.

Explain. that's how I would think about it

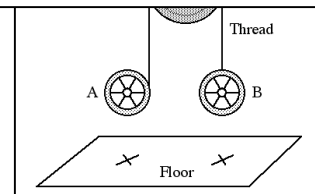
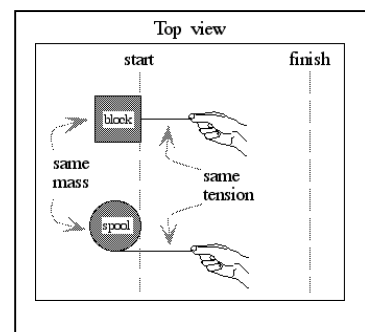
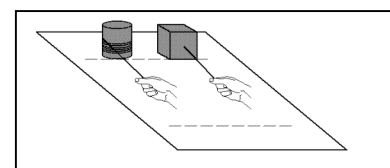
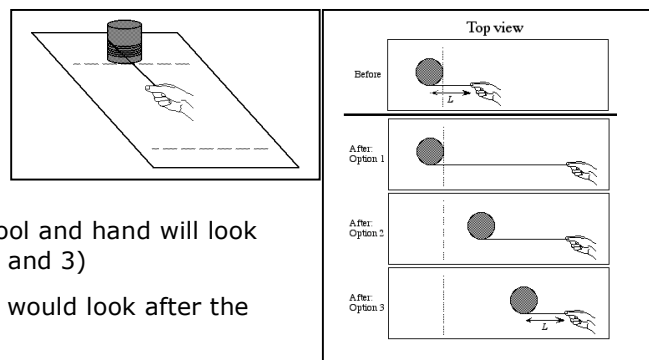
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. same reasoning

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. again, same reasoning



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

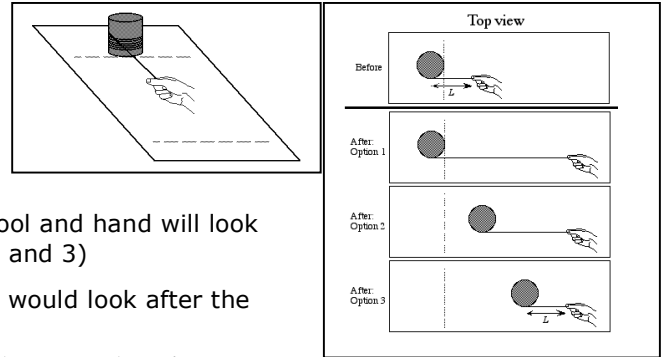
The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. it will have a horizontal component force moving the spool and unwinding it



Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. it is giving a force acting on the spool causing it to rotate and move

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

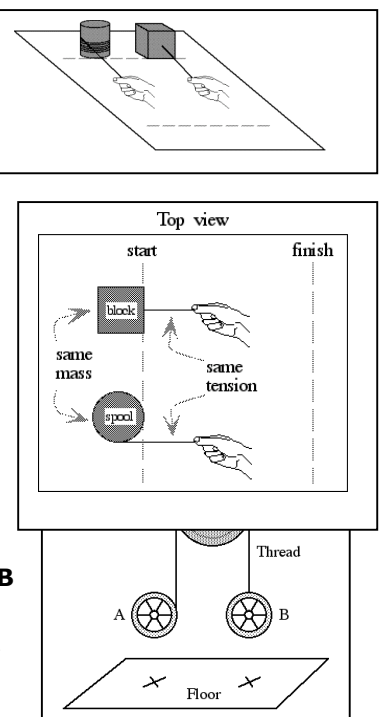
Explain. some energy is given into the rotation. so it moves less horizontally

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. same force applied to string



Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. gravity acting the same on both

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. A expends energy into spinning.

A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. the spool moves but not as fast as the hand does

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. same as above

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the block will move faster

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. same string, so same tension

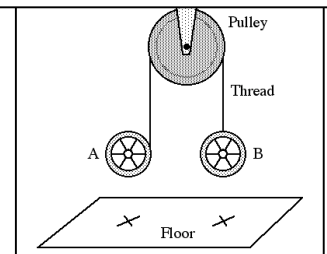
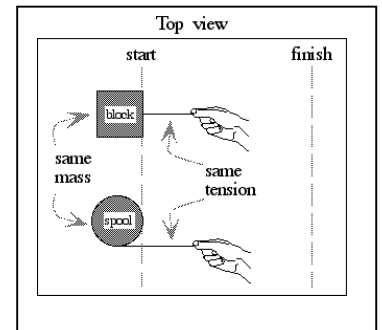
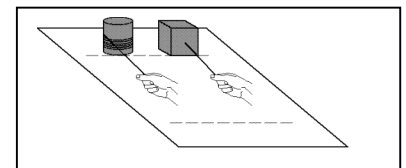
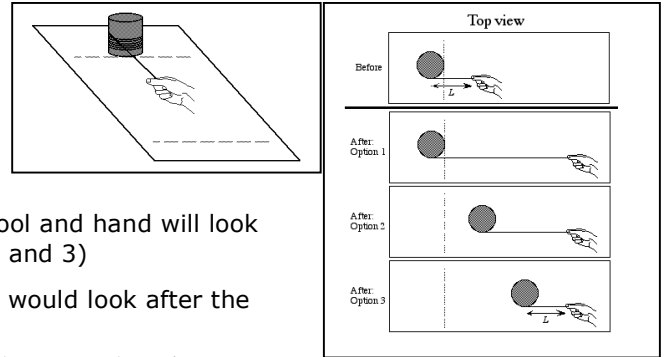
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. the spool doesn't accelerate as fast

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. same as above



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. pulling the twine will unwind it from the spool and the leftover still on the twine pulls the spool to the right.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. the tension from the force will rotate the spool.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. Because it does.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. Summation of Forces

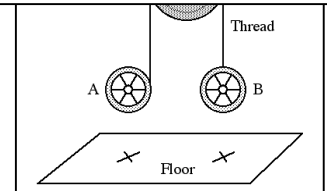
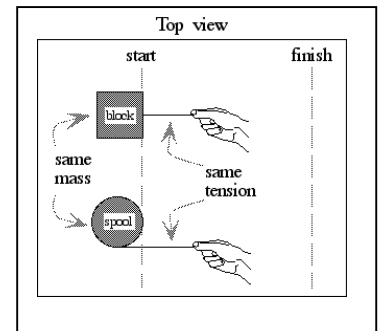
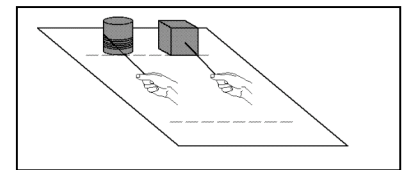
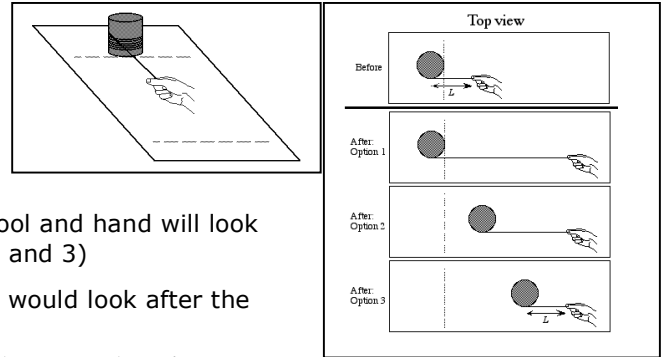
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. Because it does.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. gravity pulls objects at the same rate



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

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The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. I did the experiment.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. Putting tension on the string will cause it to unwind the spool, thus rotating it.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. All the tension of the string goes into pulling the block while some of the tension goes into rotating the spool.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. The tension in the string is equal on both sides.

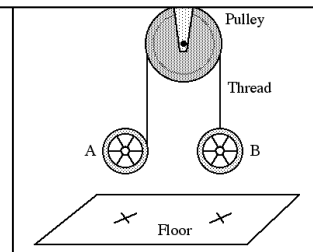
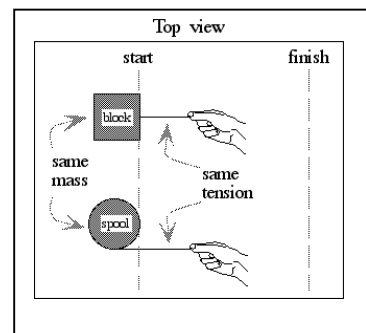
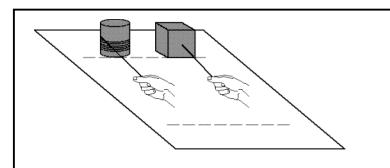
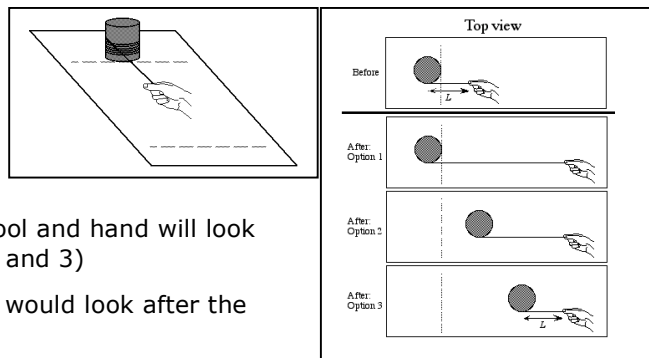
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. Spool A can drop immediately due to the extra string while B is reliant on the tension from the mass of A.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. It unwinds immediately whereas B cannot.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. the friction on the spool is greater than the frictionless table.. so it wont unspind

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*

Explain. frictionless table

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. frictionless table. so the block and spool move at the same speed because of the same applied force

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. its the same, just length is changing

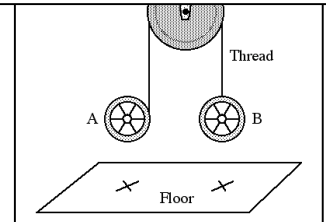
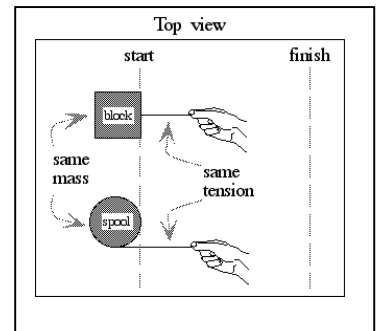
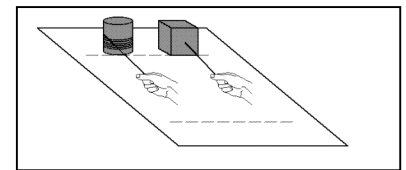
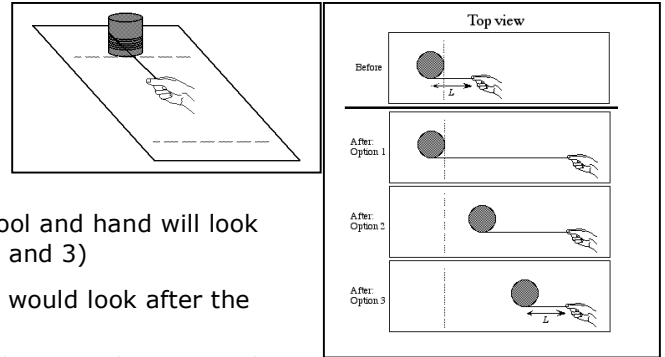
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. a of both centers is zero

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. B falls at the same rate A unwinds



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. *The spool won't unwind quite as fast as the hand pulls so the spool will move.*

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. *The tension is put onto the side of the spool so that one side will move faster.*

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. *The spool won't stay in place but it will move slower than the block.*

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. *They are both moving at the same rate because they have the same mass.*

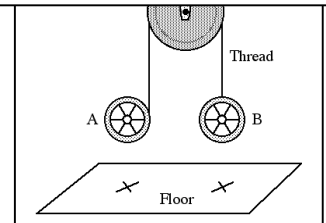
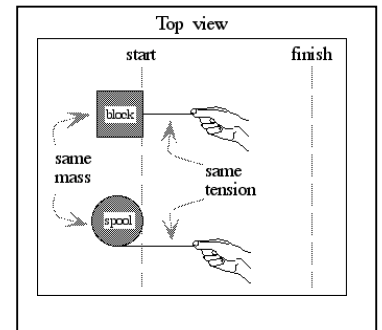
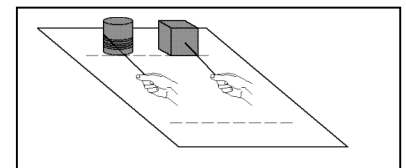
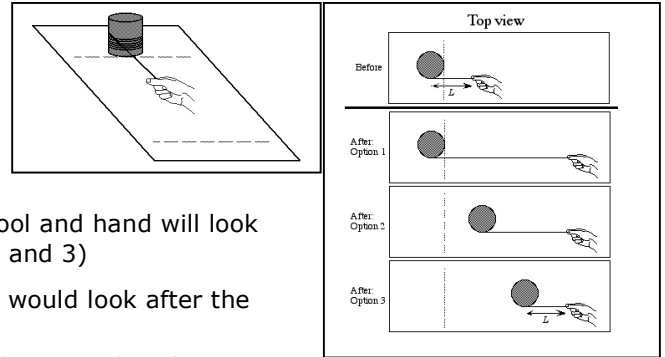
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. *The center of mass is the same because both are moving.*

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. *The string is unwound and B moves down at the same rate because B must move at the same speed of the unwinding spool.*



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. I've done this in real life (or at least very similar), so I'm just intuitively guessing.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. That's just what I figure.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. The block will be pulled and the string length will stay the same, but when the spool is pulled, the string length will increase and it won't cross at the same time.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is greater than that just above spool B.

Explain. Spool b will accelerate downward, which means that spool a will accelerate upward, and acceleration and force are in the same direction, so b is accelerating downward, which means the tension above b is lesser than the tension above a.

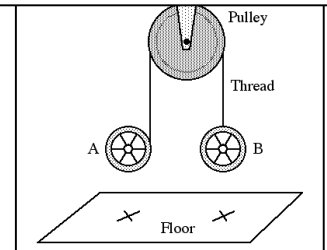
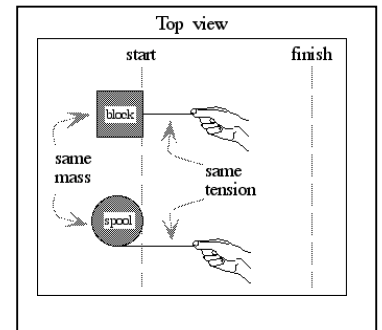
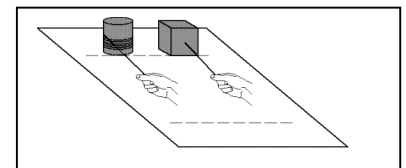
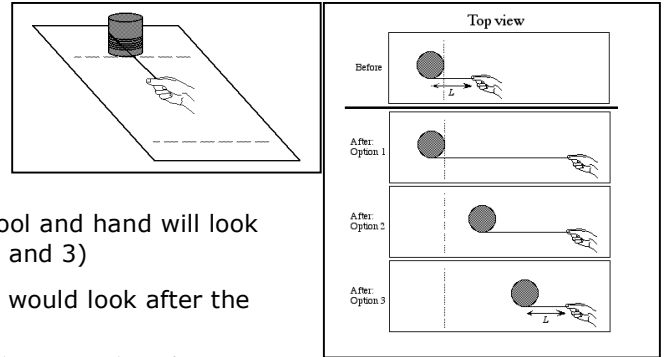
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. A will not fall directly down like b will, so b will have a greater acceleration.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain. See q13.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

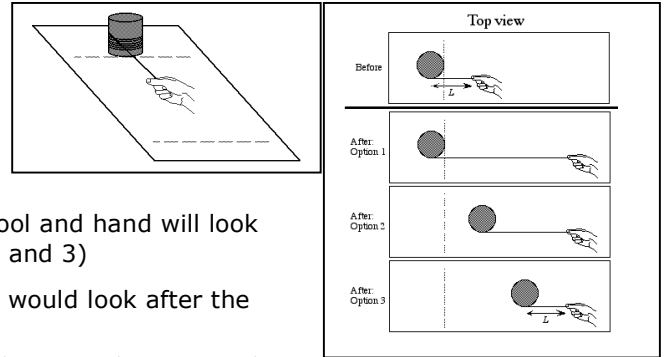
The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 3; they both move to the right, and the distance between them stays the same.

Explain. On a frictionless surface it will not unwind. The friction of the string around the spindle is greater than that of the spindle and table.



Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

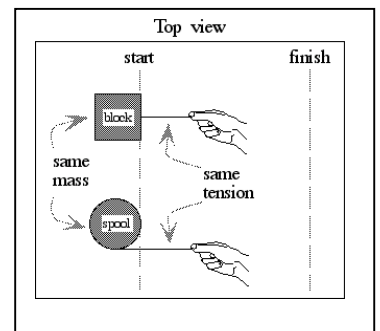
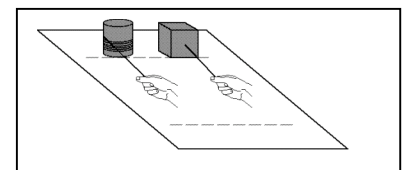
Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*

Explain. Same as question 5

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line at the same time as the block.

Explain. $F=ma$; equal masses on a frictionless surface with the same amount of force applied will cross at the same time



Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. As it unwinds less weight is applied on the string, resulting in a lesser force.

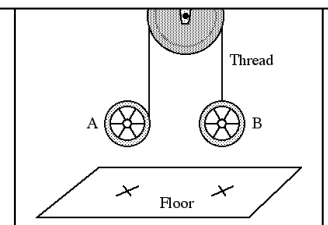
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. the same masses will fall identically

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

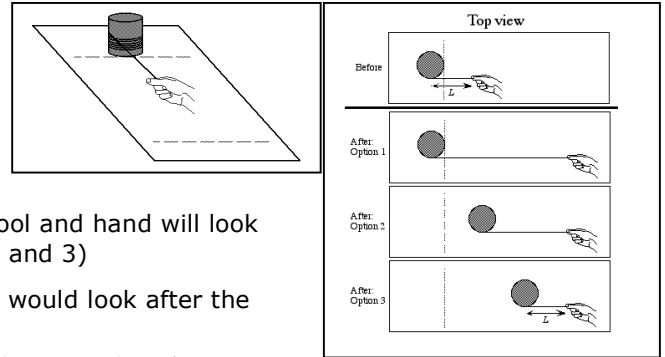
Explain. since they are the same mass they are traveling at the same speed (since the pulley is frictionless) and therefore will hit the ground at the same time



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

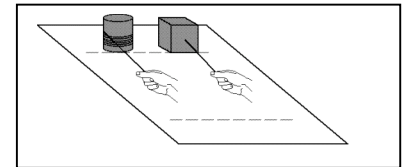


Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. *The distance between the hand and the spool increases because they both move to the right.*

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.



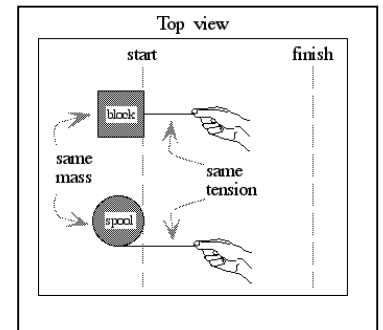
Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. *since there is the same tension happening, the spool would begin to rotate.*

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. *because it is moving faster*



Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is greater than that just above spool B.

Explain. *It is greater just above A than just above B*

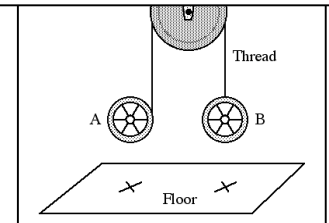
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. *the acceleration of the center of mass of B is less than that of A*

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. *They hit the floor at the same instant speed*



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 1; the hand moves to the right, and the center of the spool stays in place.

Explain. Without friction, the spool would just spin around perfectly where it is for as long as the string keeps pulling, so no movement

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. No friction and a tangential pull results in perfect rotation.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The center of the spool stays in the same place and does not cross the finish line at all.

Explain. With no friction, none of the pull goes into moving the spool forward, it all goes into rotation.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. The spools have the same mass so the tension would be the same.

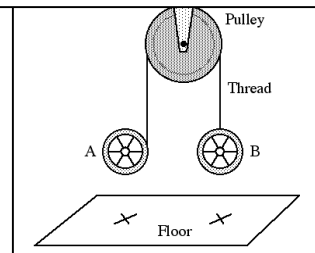
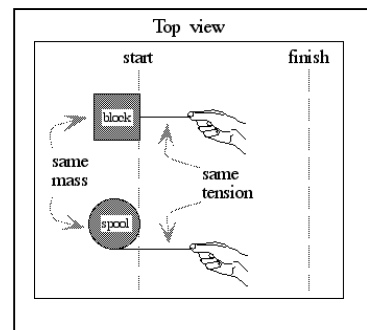
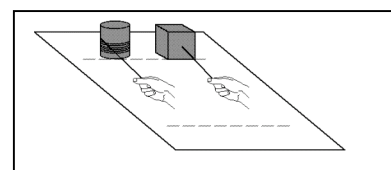
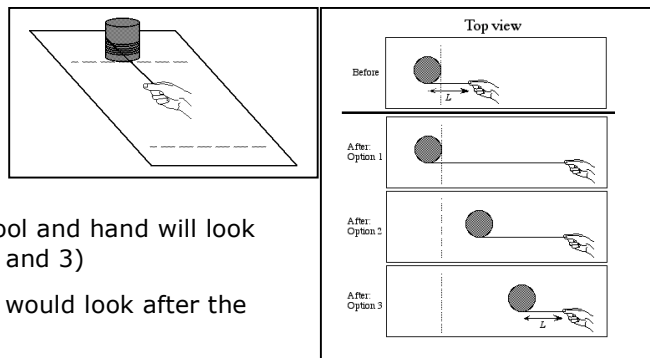
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. Both drop straight down to the floor with no sideways movement.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. Both fall at same speed, rotation does not matter.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

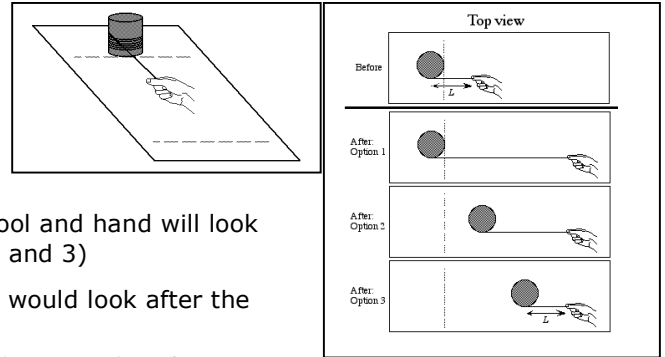
The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. it is move because the hand is pulling on it and the distance would increase because we are unwinding the thread.



Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

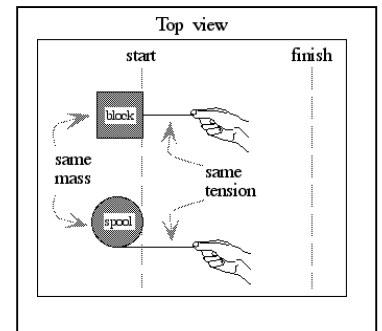
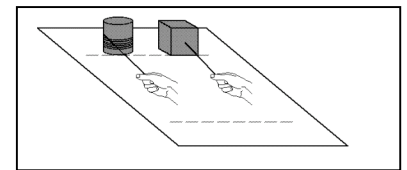
Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. any sort of force would unwind the thread

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. the thread would unwind and then started moving while the block is being pulled



Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is equal to that just above spool B.

Explain. it is the same string

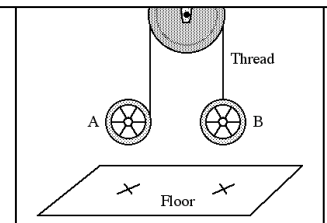
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is equal to that of B.*

Explain. they are on the same string

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.

Explain. they are attached to the same string



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

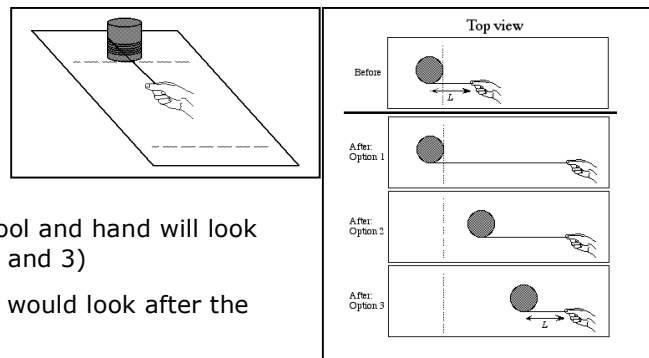
The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. *The string would unravel of course, but since the hand is exerting a force on the spool via tension, it will move as well.*



Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

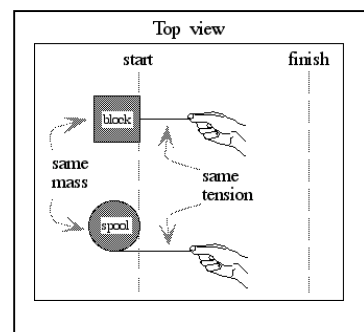
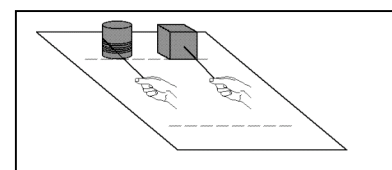
Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*

Explain. *It is the only way for it to move, the force is not acting on the center of mass of the spool.*

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. *the block will have all of the motion via tension from the hand going into moving it forward, the spool has some of the force of tension pulling the string off the spool (making it rotate) and some of it into moving the spool, so it will take more force to make it move at the same speed as the block.*



Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is less than that just above spool B.

Explain. *Since spool A will unravel and hit the ground, the tension on the string above A will be less, since it does not have to carry all of the weight force of the spool A.*

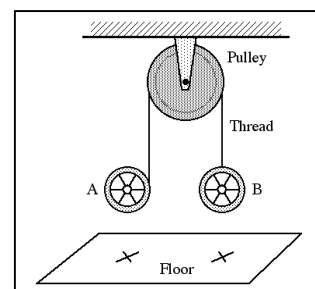
Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain. *A is undergoing near gravity acceleration, while B is not undergoing the same rate of acceleration due to the fact that it is not unraveling.*

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor before spool B.

Explain. *The string that A is attached to will unravel from A about as fast as A falls in near free fall, while B will not as it does not unravel at all.*



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.
Explain.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *Yes. The spool will begin to rotate.*
Explain.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.
Explain.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

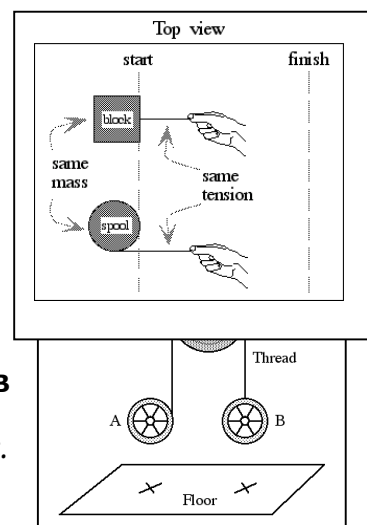
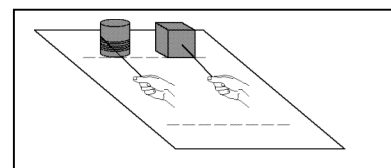
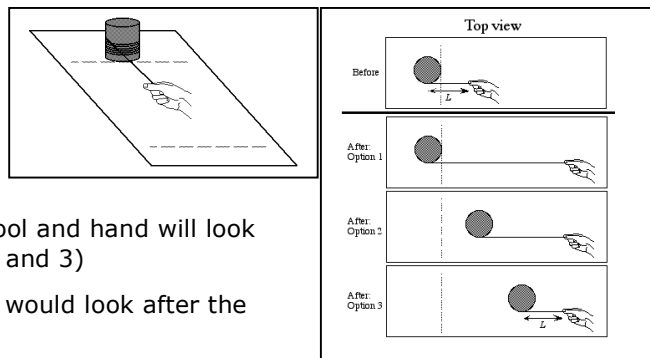
The tension in the thread just above spool A is less than that just above spool B.
Explain.

Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is greater than that of B.*

Explain.

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor at the same instant as spool B.
Explain.



A spool is placed on end on a frictionless surface. A thread is wrapped many times around the spool and may unwind as the thread is pulled.

The top figure at right shows the spool just before a hand starts pulling the thread. Initially, the length of thread that is unwound is L .

The bottom figures show three possibilities for how the spool and hand will look after the hand has been pulling the thread. (Options 1, 2, and 3)

Q4. Which option best shows how the hand and the spool would look after the hand has been pulling the thread?

Option 2; they both move to the right, and the distance between them increases.

Explain. The spool will move to the right while the length will still increase as the spool is unrolled.

Two objects, a block and a spool, are each pulled across a level, frictionless surface by strings. The string pulling the block is tied to a small hook at the center of the front face of the block. The string pulling the spool is wrapped many times around the spool and may unwind as it is pulled. The block and the spool have the same mass. The strings are pulled with the same constant tension and start pulling at the same time.

Q6. Will the spool begin to rotate? *No. The spool will not begin to rotate.*

Explain. As the line unrolls it will come out but it will not spin because all of the rotational force is taken by the string and not the spool.

Q8. Does the spool cross the finish line before, at the same time, or after the block?

The spool crosses the finish line after the block.

Explain. The spool will cross after because the block only feels the force of the string but the spool feels the rotational force as the spool is unraveled.

Two identical spools are held the same height above the floor. A thread is wrapped many times around A. The same thread passes over a pulley, and is attached to a fixed point on B, so that B will not rotate. An "X" is marked on the floor below each spool. Both spools are released from rest at the same instant.

Q10. Is the tension in the part of the thread just above **spool A** greater than, less than, or equal to the tension in the part of the thread just above **spool B** (after the spools are released but before either one hits the floor)?

The tension in the thread just above spool A is greater than that just above spool B.

Explain. The tension in the thread just above spool A is greater than that just above spool B because the rotational acceleration of spool A is far greater because of its larger length and momentum.

Q12. Is the magnitude of the acceleration of the center of mass of spool A greater than, less than, or equal to the magnitude of the acceleration of the center of mass of spool B? *The acceleration of the center of mass of A is less than that of B.*

Explain. The acceleration of the center of mass of A is less than that of B

Q14. Will spool A hit the floor before, after, or at the same instant as spool B?

Spool A hits the floor after spool B.

Explain.

