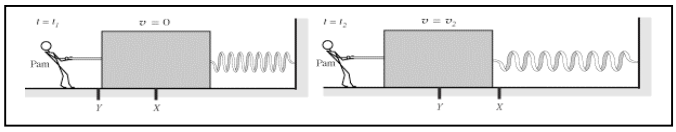
A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

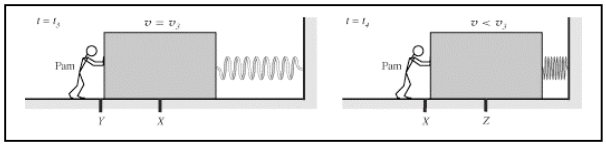
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?*

Explain.

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

Explain.

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

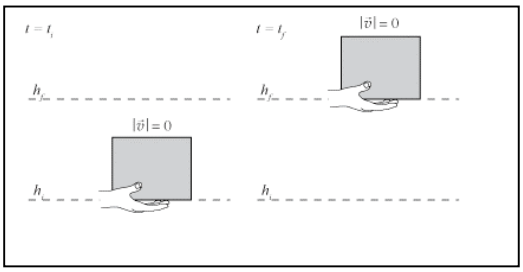
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

Explain.

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

Explain.

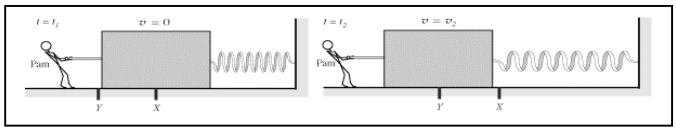
A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

Explain.

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

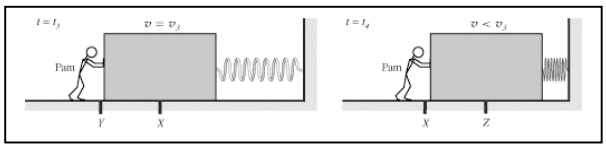
Explain. ***if work is done on te system then the system gains energy***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain.

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

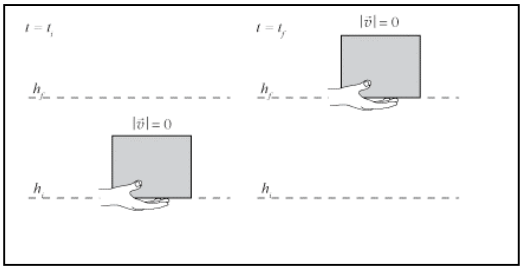
Explain.

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain.

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

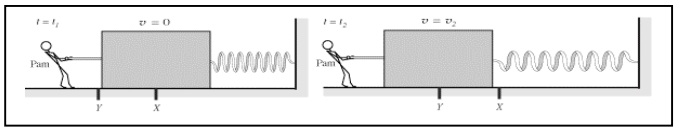


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain.

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is positive.*

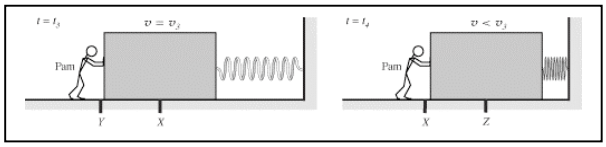
Explain. *because its being pulled in a direction it doesn't want to go.*

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. *its being pulled in the direction it wants to go*

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

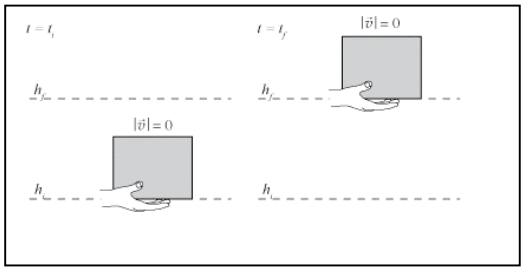
Explain. *its being pushed in a direction it doesnt wan tto go*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. *its being resisted in the direction in wants to go*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

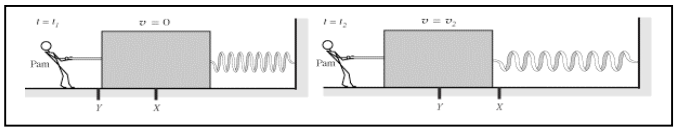


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. *because it is all positive, the absolute value would be the same.*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

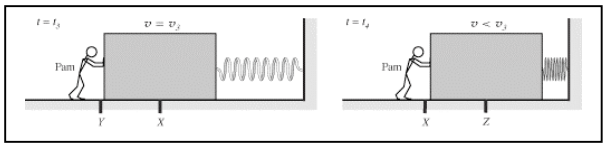
Explain. ***Because the external forces are against the motion you are trying to pull at, therefore, it is negative.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***Because the net force comes out to be the same.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

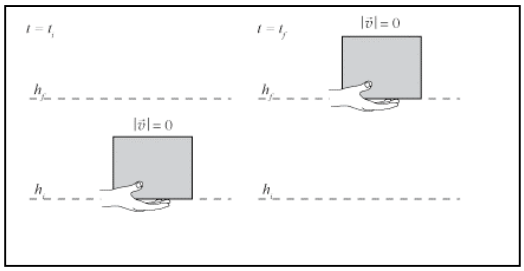
Explain. ***Because they are working against the system.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***Because the net force never change so it comes out to be 0***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

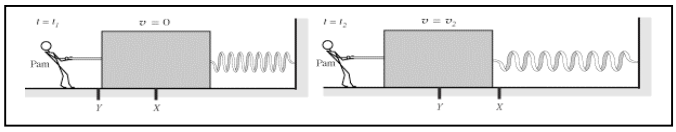


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***Because the work done has to be greater than the earth in order to move the block vertically up.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is positive.*

Explain. *the work is positive because the force is negative and so is the displacement, neg time a neg is pos.*

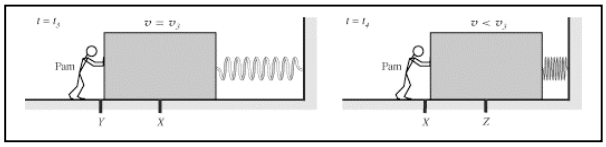
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. *the equation for KE is 1/2 mv^2 so if velocity is neg to the left then the KE would be neg.*

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.



Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

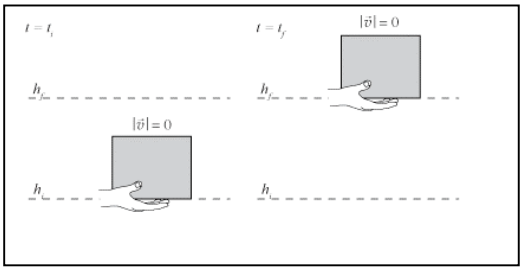
Explain. *the force is in the positive right direction and so is the displacement.*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *KE = 1/2mv^2, v is positive so the KE is positive*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

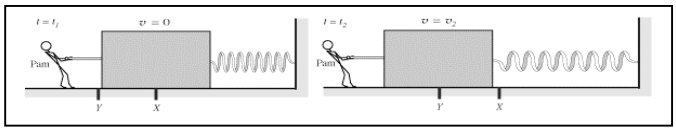


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. *They both do the same amount of work on each other, due to conservation of energy.*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

Explain. ***you are transferring energy into the system not out of the system.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***you are adding potential and kinetic energy.***

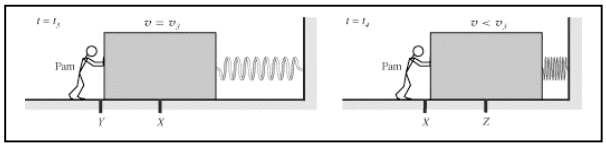
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

Explain. ***once again adding energy to the system.***

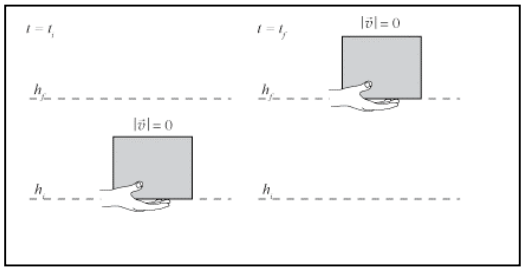


Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***moving the block creates kinetic energy and loading the spring adds potential energy.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

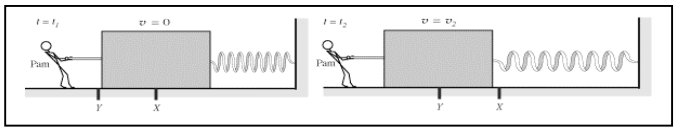


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***the student is lifting the book against the force of gravity.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

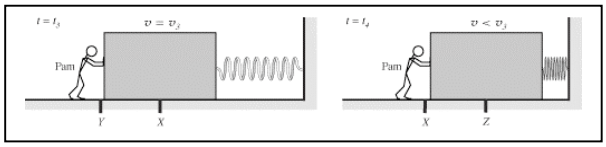
Explain. ***Pam sure looks like she's working hard***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***pam seems to be putting energy into this system.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

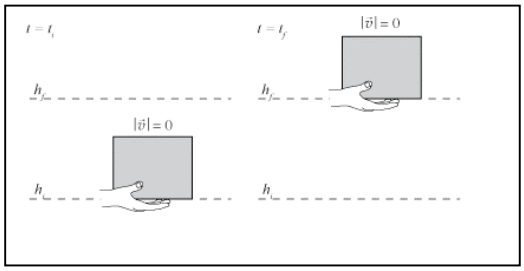
Explain. ***Pam's gonna need a break soon, she's working awful hard***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***pam's energy -> the spring***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

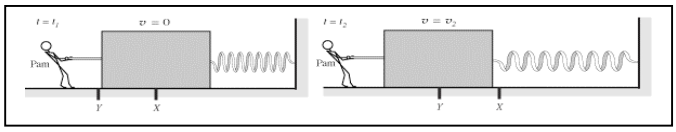


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***Stupid lazy earth***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

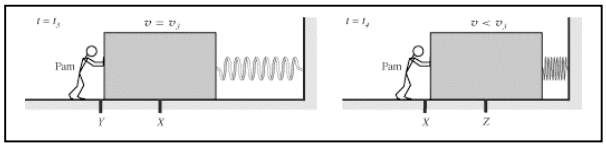
Explain. ***the system is moving in the direction of the force.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***Energy is being added to the system by moving it.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

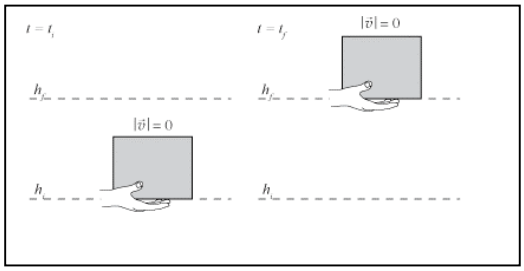
Explain. ***The system is moving in the direction of the net force.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***Energy is being added to the system in the form of the compressed spring.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

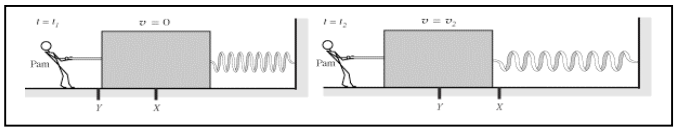


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***The block is moving upward, thereofre the work of the hand is overcoming the work of the earth.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

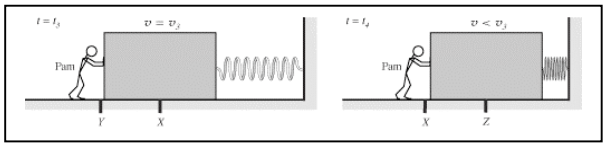
Explain. ***yeah***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***yeah***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

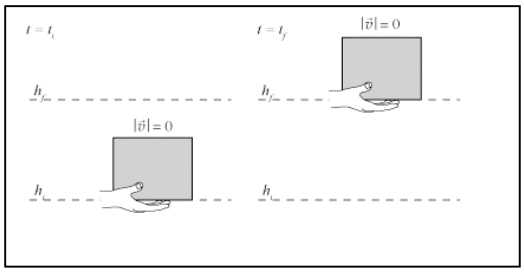
Explain. ***yep***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***mhmm***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

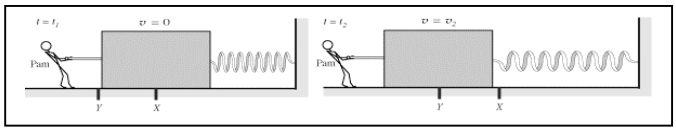


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***i said so***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

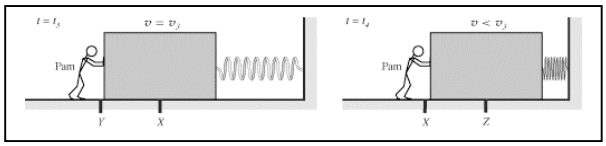
Explain. ***Force is being applied by external forces (pam) to the left and the system is moving to the left, giving a positive work.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***Equilibrium will have a total energy of no kinetic plus a constant potential, that of being raised up on the table. Afterwards, it gains energy kinetically by moving across the table.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

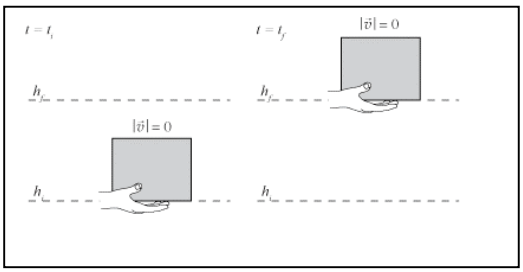
Explain. ***Pam's external force is now to the right, and the block is now moving to the right, giving a positive work yet again.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. ***The block's speed is decreasing, with no change in potential energy by being at vertical rest. Thus the change is a reduction as it slows down.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

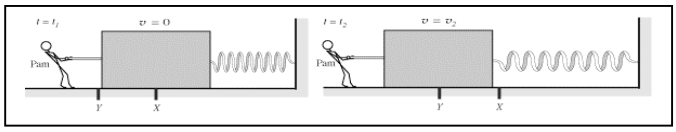


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***They are equal as the size changes are vastly different, but so are the masses, evening out the two.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is zero.***

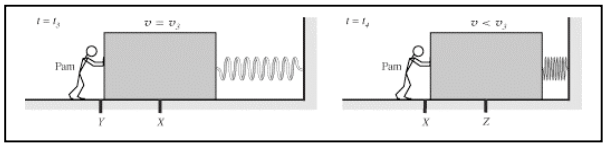
Explain. ***The forces such as weight and normal force don't involve any work.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***There is energy involved in these scenarios.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is zero.

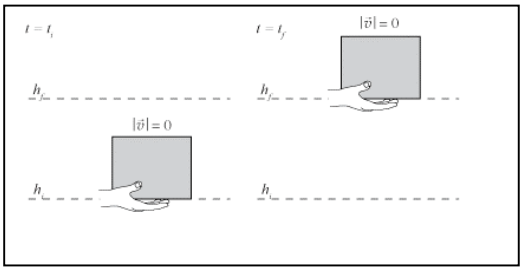
Explain. ***The normal force and weight still do not participate in work.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. ***This is negative because it is going the other direction.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

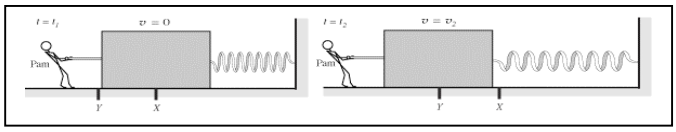


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***It would be the same because the absolute value of both values would equal the same number.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

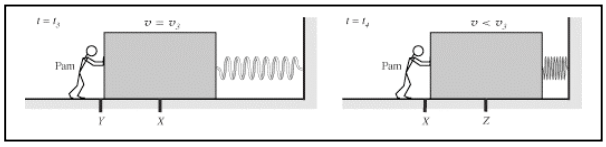
Explain.

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain.

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

777

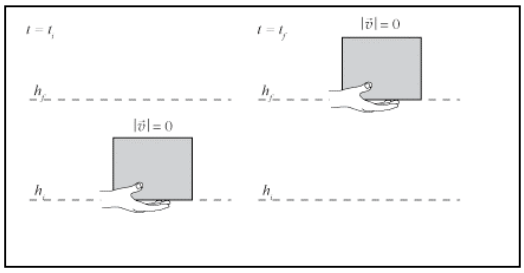
Explain. *777*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

777

Explain. *777*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

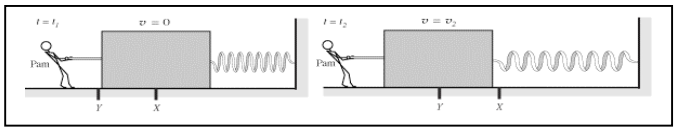


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

777

Explain. *777*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

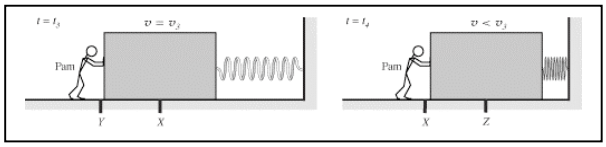
Explain. ***As the spring extends, the work potential of the spring builds up.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***Same as above***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

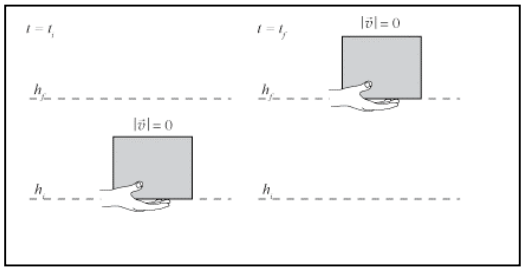
Explain. ***As the spring is compressed, the work potential of the spring increases.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***Same as above***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

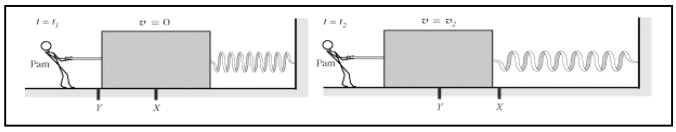


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***Even though the book moves upwards it is not an acceleration. This means that the forces on the book must be equal.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

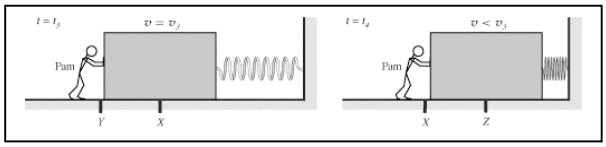
Explain. ***because the it is moving in the same direction as the force***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***the conservartion of energy says it has the same initial and final no energy is lost***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

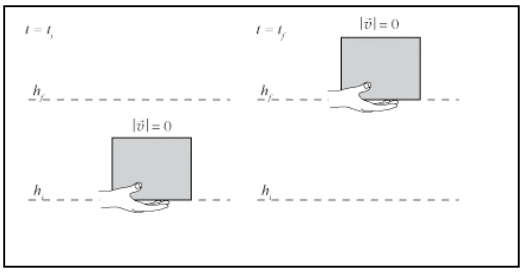
Explain.

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***conservation of energy***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

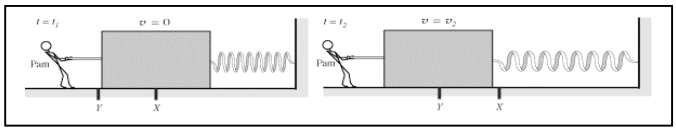


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain.

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

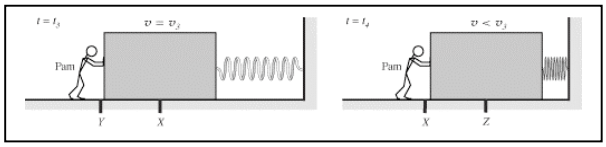
Explain. ***because its stretched not compressed***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***banana pancakes***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

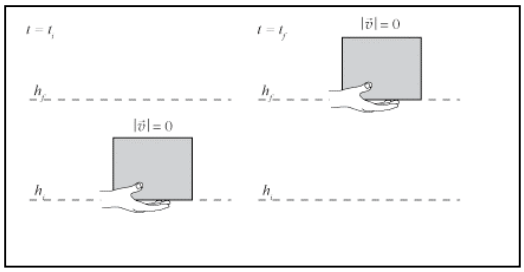
Explain. ***because it is compressed***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. ***compressed***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

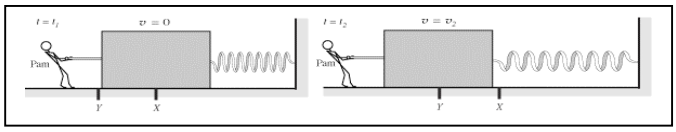


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***because the book is raised into the air***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

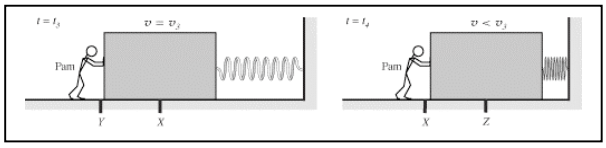
Explain. ***The spring is being stretched which is proof of work being done.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***the kinetic energy is 1/2mv^2 plus zero potential energy equals a positive number***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

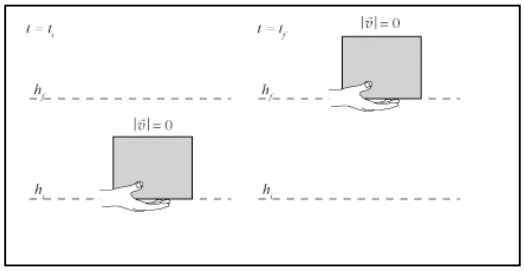
Explain. ***the block is going backwards***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***the kinetic energy again is positive plus zero potential energy equals a positive value.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

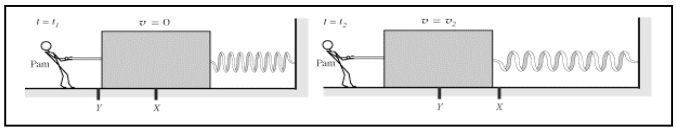


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***because newtons third law states that for every force there is an equal but opposite force so the work can be looked at as a force and therefore the law applies to the this problem.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

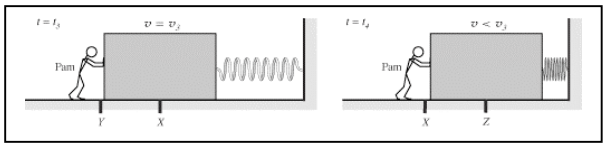
Explain. ***Its negative force and negative displacement so the two wrongs make a right.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***There is no change in energy only changing form. As pam slows down the kinetic energy decreases but at the same time the potential energy increases.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

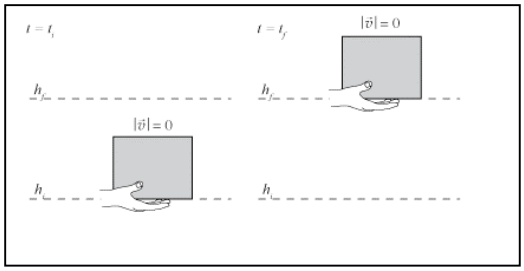
Explain. ***It is negative while the spring slows down while moving to the left but then it goes positive with more force and displacement to the right.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***Once again the change is zero, as the block is moved energy transfers from kinetic to potential***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

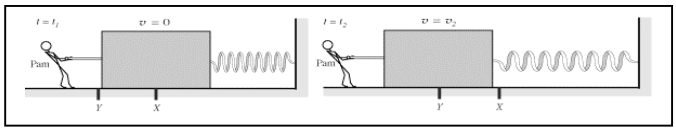


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***Its greater than since the block is moving upward away from the earth.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

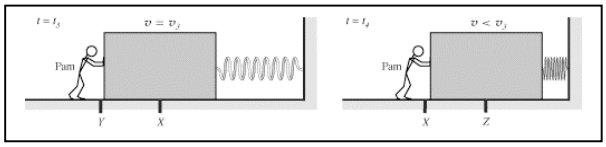
Explain. ***pam pulls to the left and the system moves to the left - therefore the work is positive***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***energy is conserved. The only different between t1 and t2 is that potential energy has been converted to kinetic energy.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

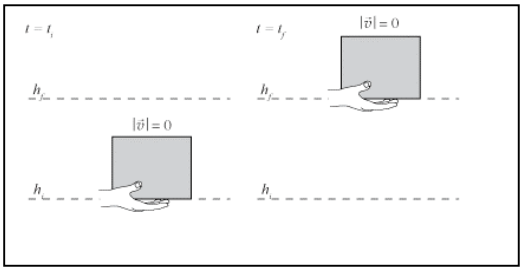
Explain. ***the net work done on the system was to the right, and the system was displaced to the right, therefore the work is positive.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***total energy is conserved. kinetic energy is converted to potential energy, but not energy is lost.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

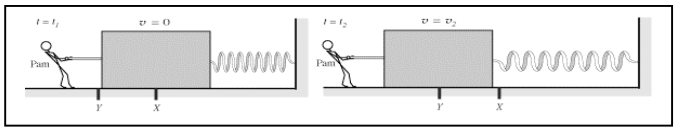


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***the work done by the student must exceed the work done by the earth to get the book to move up. If the work of the earth and the student were equal, the book would remain stationary.***

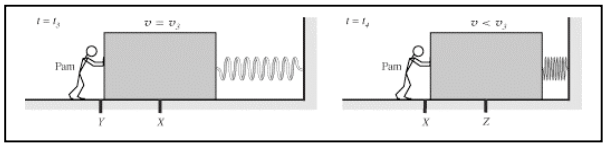
A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***
Explain. ***Pam is exerting a force on the block.***
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.
Explain. ***The spring gains potential energy.***

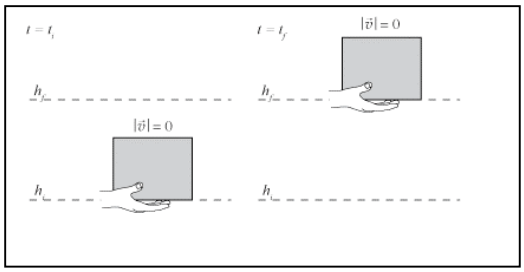
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*
The net work on system 1 is positive.
Explain. ***Pam is exerting a force on the block***
Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.
Explain. ***The spring gains potential energy***

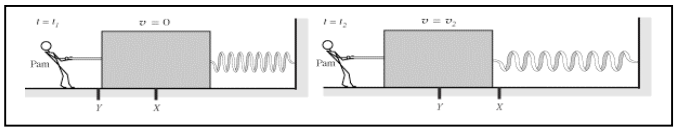
A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.
Explain. ***Work is equal to force times distance and the hand is overpowering the gravity of earth to move it upwards***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

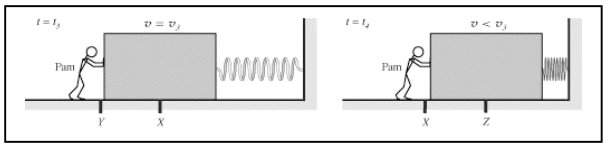
Explain. ***It is possible to define this system in the manner which i please and i define it as positive.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***It changes from PE to KE, and KE = - PE.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

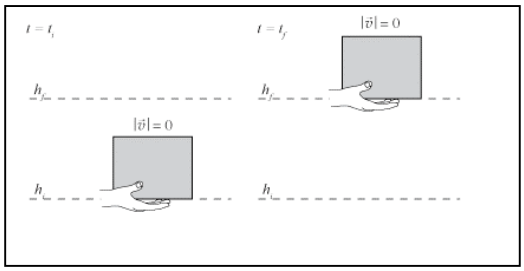
Explain. ***The net work is in the right direction which i defined as negative so it moves in the negative direction.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. ***A neg plus a neg is neg***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

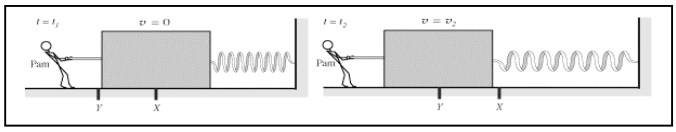


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***The amount of work done by the earth is less than what is done by the earth because the bock is moved upwards***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is negative.*

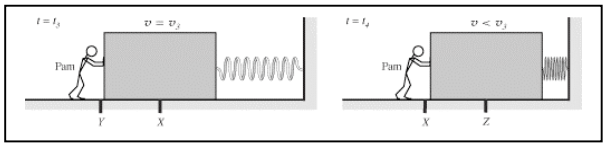
Explain. *because if the left is neg then the work to the left would be negative*

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. *becasue work is negative*

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

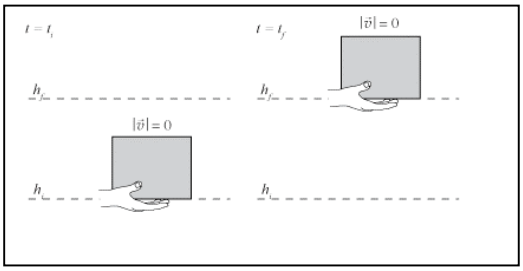
Explain. *if d to the right is positive then work to that direction would be positive*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. *because of the potential energy is in the positive direction*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

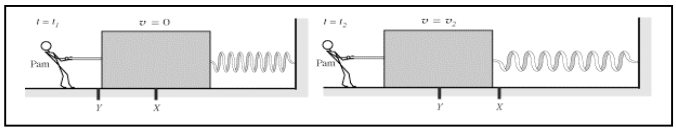


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. *the block does just as much work on the earth as the earth does on the block*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

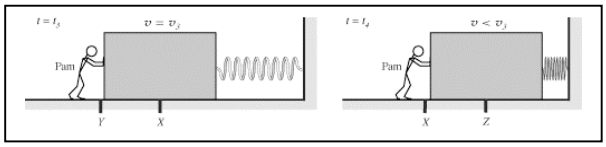
Explain. ***because the system is traveling in negative, left, direction***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***beacuse energy is conserved and converted***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

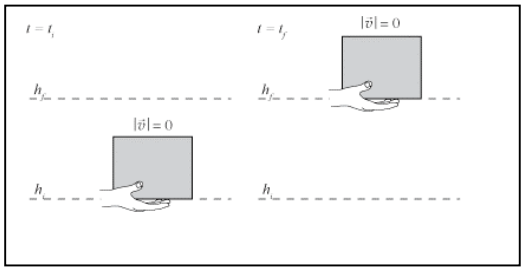
Explain. ***work is converting energy in potential energy***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***energy is conserved***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

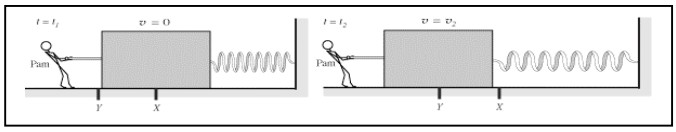


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***because it is a positive work, ie energy is being converted to potential***

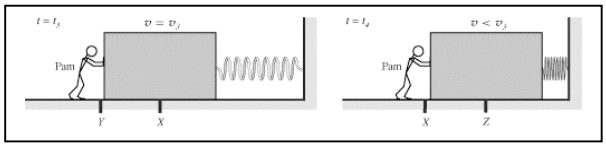
A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is positive.*
Explain. *positive in the right direction*
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.
Explain. *thats right*

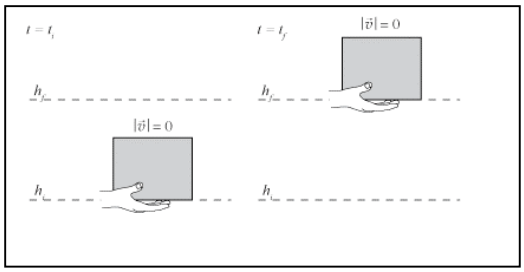
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*
The net work on system 1 is zero.
Explain. *thata why*
Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.
Explain. *not sure*

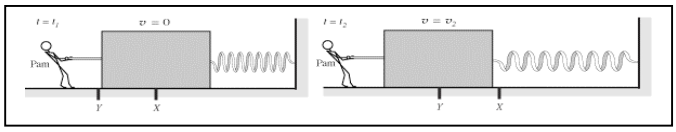
A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is less than the absolute value of the work by the Earth.
Explain. *thats the value*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is positive.*

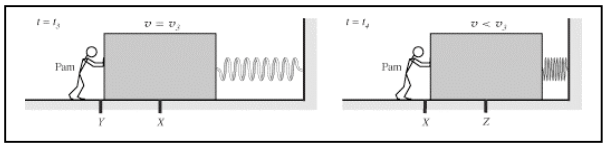
Explain. *because your making the spring tighter. and applying force to the rope. just like if you raze a book, its positive, and if you lower it, it is negative.*

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *the block has higher V, and higher potential because the spring is wider.*

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

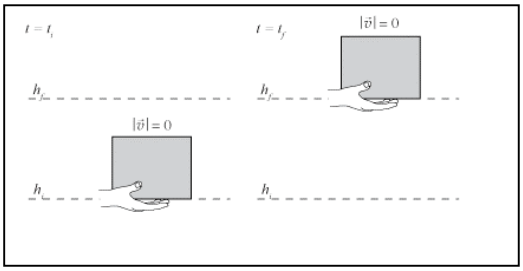
Explain. *now your going in the opposite direction, but your still pushing the spring in a way it doesnt want to go. and there for it is positve.*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. *even though the block is slowing down, it is being pushed by the compressed spring back to the left. and if let go would travel to the left*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

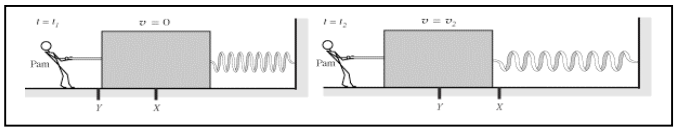


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. *because you have moved the book against gravity, and the direction is doesnt want to go. so it is positive.*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

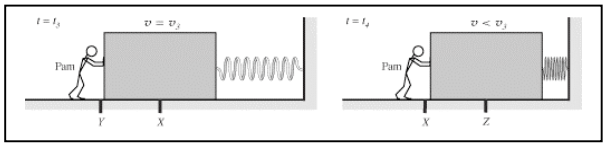
Explain. ***the work is negative because both the force and the displacement are in the negative direction so a negative times a negative is a positive.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***energy of the system is conserved since potential energy of a spring is positive and kinetic energy is negative they have to add to 0.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

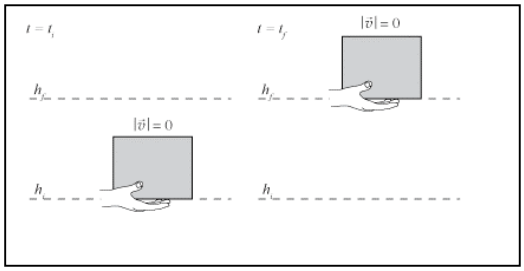
Explain. ***it is positive because they the force and displacement are in the same direction so it is positive.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***the potential energy in the spring is increasing so it is positive and the KE is increasing so it is positive.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

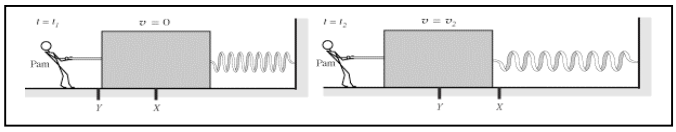


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***it is greater because it is overcoming the force of gravity so the force is greater and there is a displacement so it is greater.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

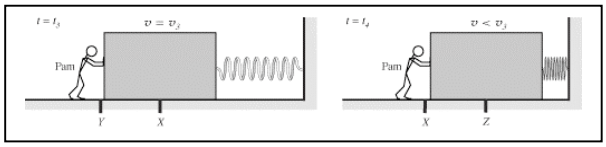
Explain. ***work is always pos***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***potential energy increases but the kin energy stays 0***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

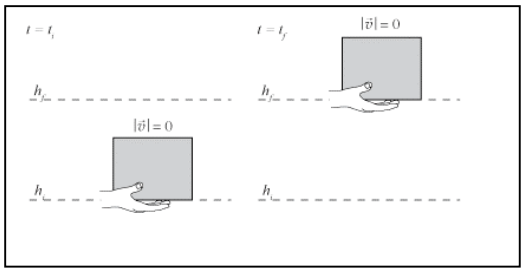
Explain. ***it requires effort***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***same as with spring extended***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

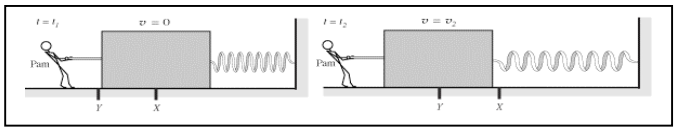


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***it balances when you consider the earth as part of the system***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

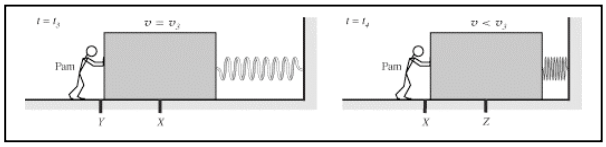
Explain. ***Because the direction of force on the block, and the direction of velecity/distance traveled were the same***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***the potential energy of the spring would be greater than the kinetic energy of the block moving and in opposite directions***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

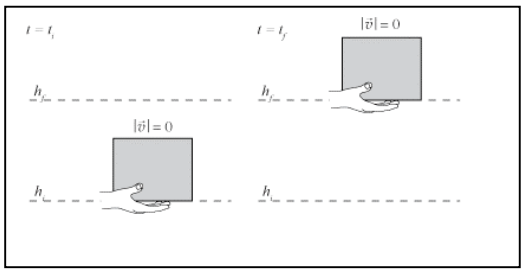
Explain. ***Positive, because pam is the doing the external work and the force she applies is in the direction of velocity/distance traveled for the block***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***the change in energy is positive because the system has more energy at t4 than at t3, and change in energy is final-initial.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

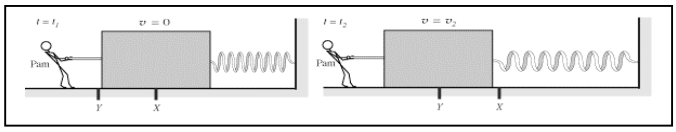


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain.

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

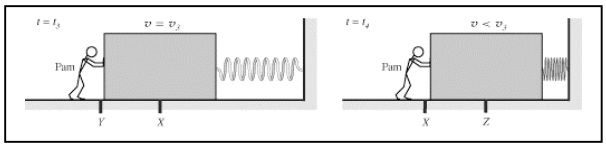
Explain. ***Work is done against the direction the block wants to go so it's positive.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***It's gaining PE as the spring is stretched and it is also gaining KE since the block is speeding up.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

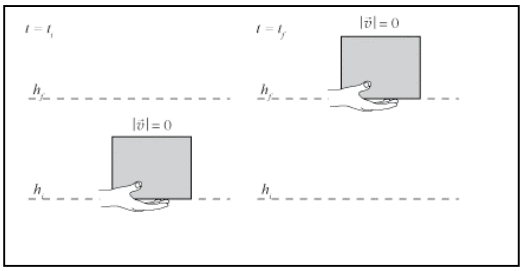
Explain. ***Even though work is done in the opposite direction, it is still against where the block wants to go so it's positive.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***As PE increases, KE decreases, so it must be zero.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

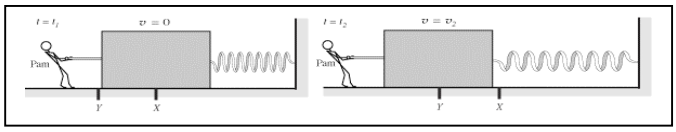


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***The force of the hand must be greater than that of the earth since the hand is overcoming the force of gravity to lift the block.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

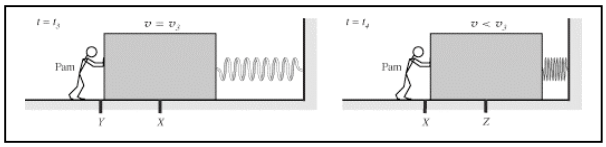
Explain. ***It is positive because the force and the distance moved are in the same direction.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***The energy change is positive because there is a velocity gain, making .5mv^2 higher.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

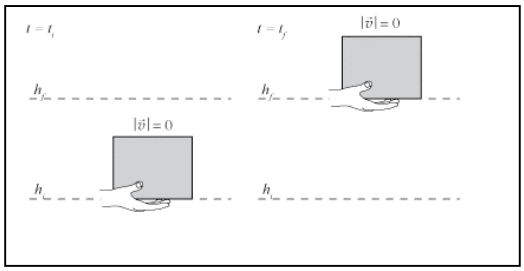
Explain. ***The force and distance moved are oin oposite directions.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. ***The velocity is decreasing so the total KE is lower.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

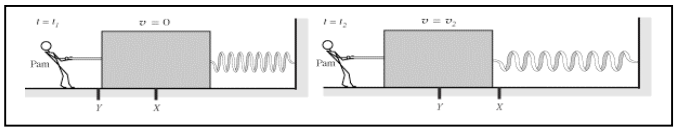


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***If the force from the hand upward and the Weight force from the earth are equal and opposite the absolute values of their work are equal.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *999*

Explain.

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

999

Explain.

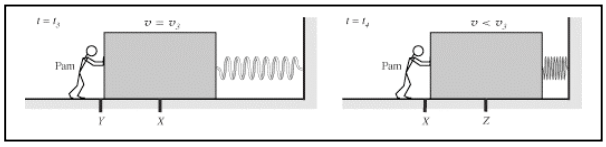
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

999

Explain.

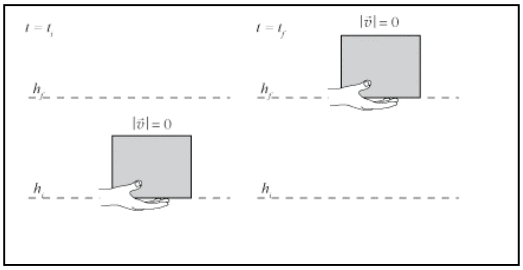


Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

999

Explain.

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

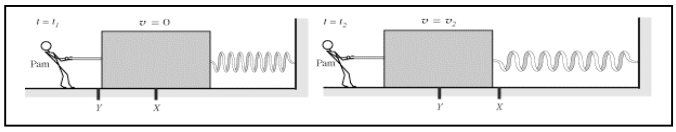


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

999

Explain.

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

Explain. ***restrictive forces***

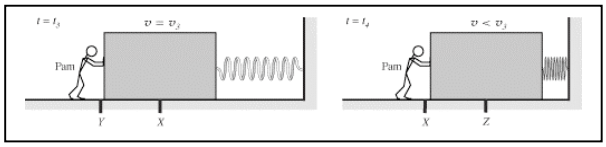
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***potential spring energy***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.



Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is zero.

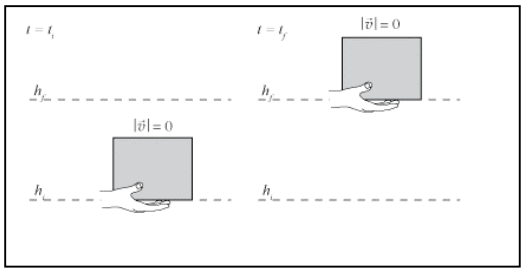
Explain. ***wwall=wblock***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. ***same as above***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

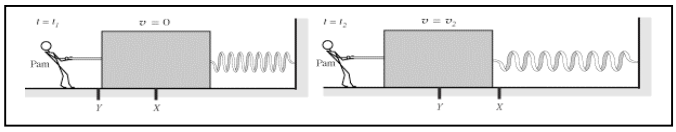


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***moving up***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is negative.*

Explain. *work is force times distance, the distance is in the negative direction while the force is positive. therefore the net work is negative.*

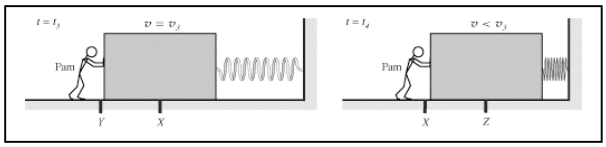
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *The mass had work done on it and the kinetic energy increased*

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*



The net work on system 1 is positive.

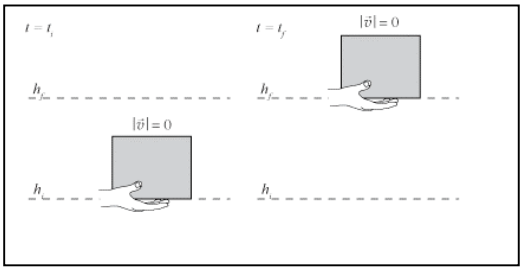
Explain. *work is force times distance, now that both the force and the distance are in the positive direction the work is in the positive direction.*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *upon realizing i made a mistake on the last page, as the spring is pushed inwards, the amount of potential energy is increased.*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

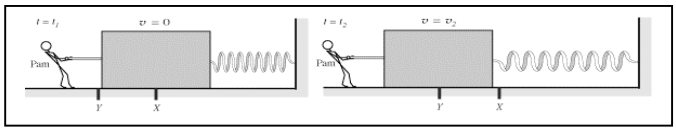


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. *if the earth did equal or greater work on the block it wouldnt move or would move backwards.*

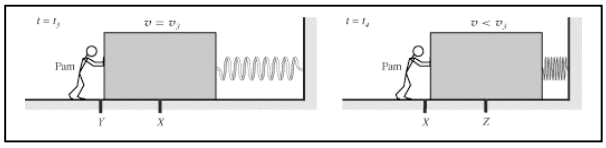
A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is positive.*
Explain. *Force and distance are in the same direction*
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.
Explain. *the energy in the spring is converted into kinetic energy*

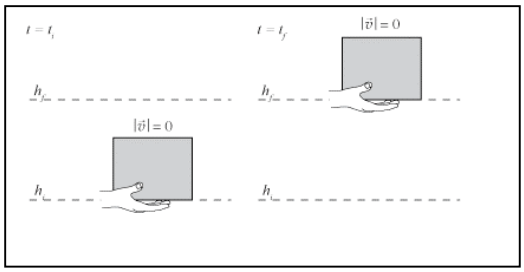
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*
The net work on system 1 is positive.
Explain. *force and distance in same direction*
Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.
Explain. *spring takes kinetic energy and converts it to potential energy*

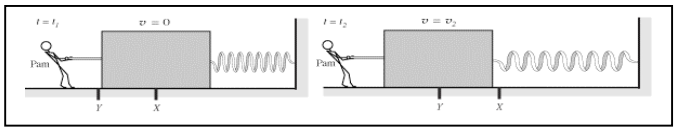
A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.
Explain. *the hand does work against gravity to raise it up. gravity does negative work to oppose the force of the hand.*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

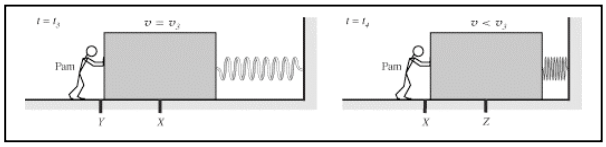
Explain. ***it is moving to the left which i usally think of as negitive so if it is moving to the left therfore the mostion is to the left***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***petential is going up ang therefore the energy is being increased because energy is being stored into the spring by pulling it back***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is zero.

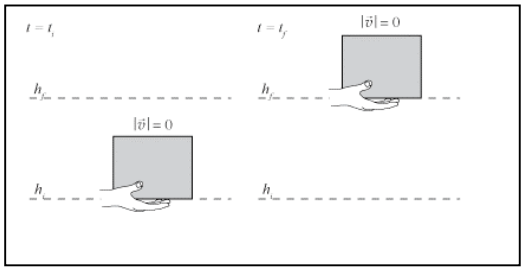
Explain. ***the energy put into the spring to move right goes to mushing it together.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***it goes tot he right so it is positive***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

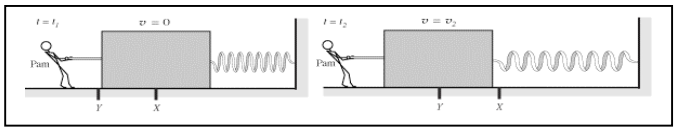


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***you cannot create energy only be tranfered or chained***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

Explain. ***external force is pulling to left, box moving to left. both in same direction --> positive work***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

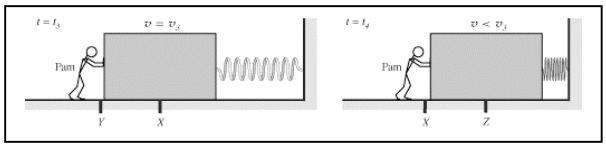
Explain. ***PE increases as you stretch the string and KE increases as the box begins to move***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

Explain. ***I have no idea***

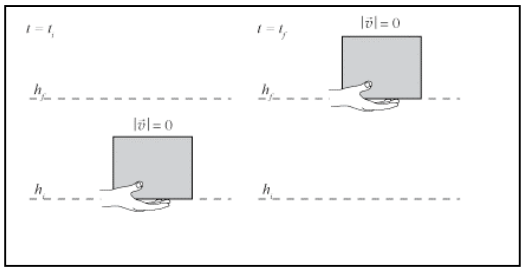


Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. ***Velocity is slowing thus KE is decreasing, and PE is decreasing as the string is returning to its natural unstretched position***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

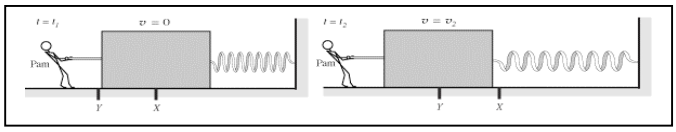


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***W=Fd. d=Hf-Hi=the same in both situations. F of the hand is greater than that of Weight as the system is moving in the direction that the hand is exerting a force. hence the work done by the hand is greater than the absolute value of the work done by gravity***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

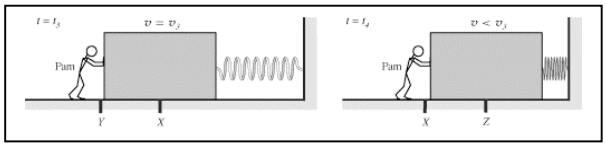
Explain. ***force and displacement in same direction***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***the velocity is greater***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

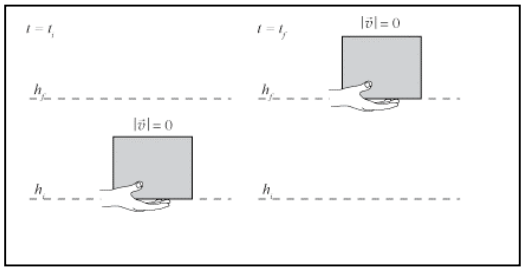
Explain. ***force and displacement in the same direction***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***v3 is greater than v so E3 - E is positive***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

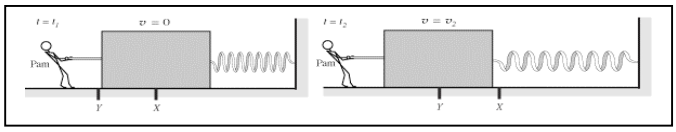


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***the force and displacement for the hand and the earth are the same so the work for both is the same.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is zero.***

Explain. ***I dunno.***

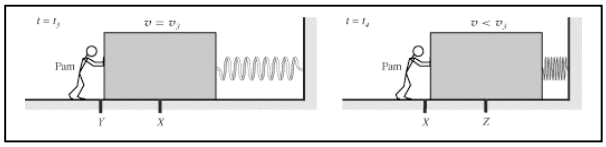
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. ***Beats me.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.



Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

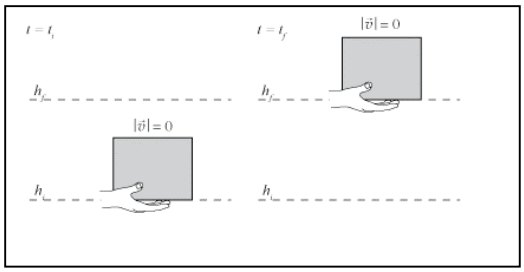
Explain. ***No se?***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***You tell me.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

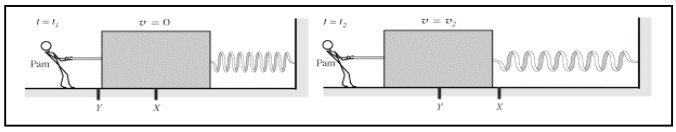


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is less than the absolute value of the work by the Earth.

Explain. ***My buddy told me.***

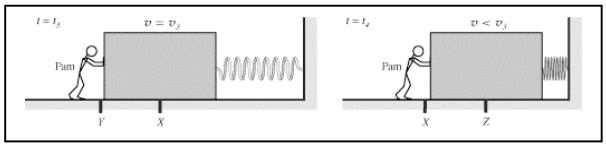
A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is positive.*
Explain. *The force and displacement are in the same direction.*
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.
Explain. *It has a lot of potential*

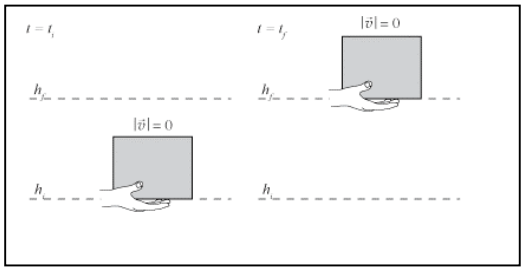
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*
The net work on system 1 is negative.
Explain. *The force is in the opposite direction of the displacement*
Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.
Explain. *There is a lot of Kinetic*

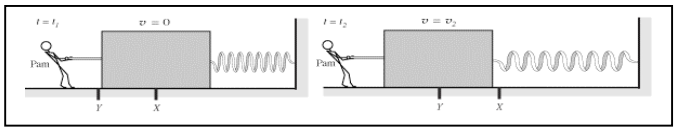
A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.
Explain. *it is moving up so it has a greater work than the gravitational*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

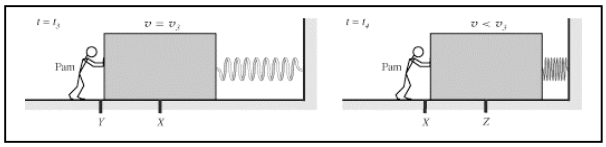
Explain. ***The work on the system is definately negative. The net work by the external forces is negative.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

It is not possible to define a single system consisting of the block and the spring.

Explain. ***There's not a way to define a single system consisting of the block and the spring.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is zero.

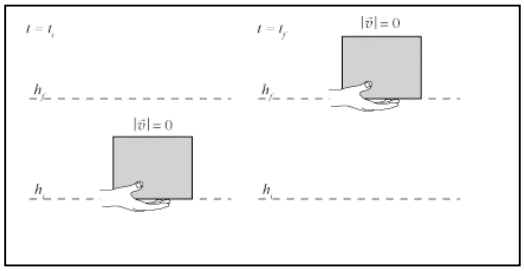
Explain. ***The net work on the system is zero.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***The total energy of the system is positive.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

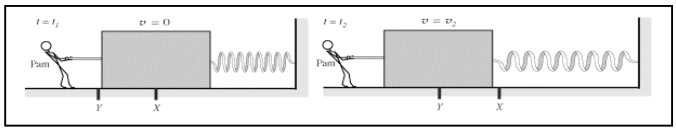


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

There is not enough information to answer this question.

Explain. ***I need more info to determine the work.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

Explain. ***you are pulling the block in a direction it doesnt want to go***

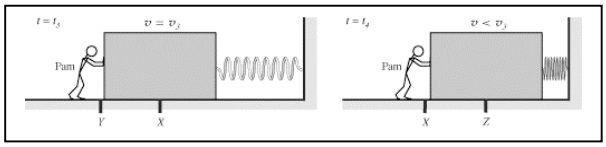
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***the kenetic energy is getting bigger if it was negative it would be losing ke***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.



Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

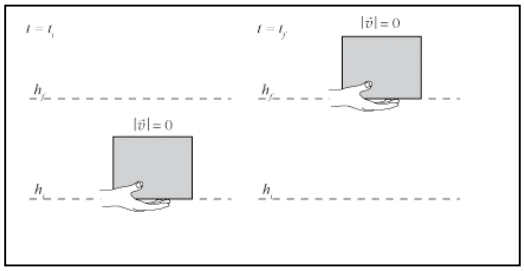
Explain. ***he is pushing the block in a way it doesnt want to go***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***the ke is getting larger***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***the earth is pulling down but the person pushed it up, canceling that out and still gaining some.***

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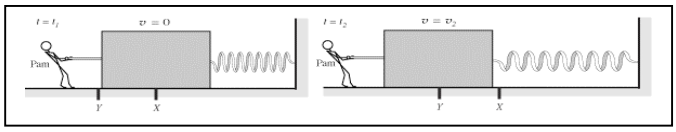
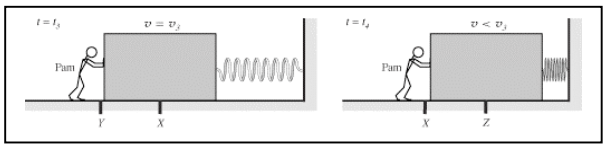


Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***
Explain.
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.
Explain. ***The energy was stored in the spring***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

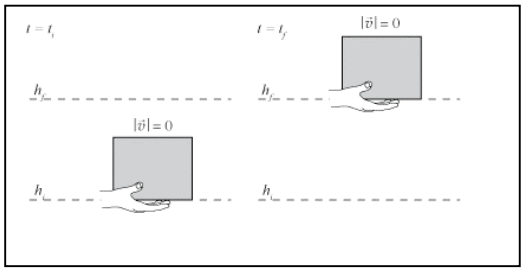
Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*
The net work on system 1 is positive.
Explain. ***the spring was pushed back compressing it to the right***



Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.
Explain. ***more energy was put back into the system***

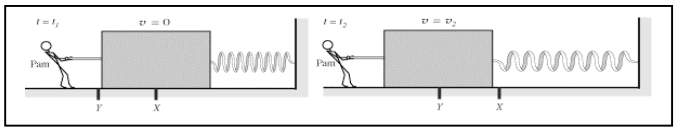
A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.
Explain. ***the student was able to move the block in the oppsite direction of gravty***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



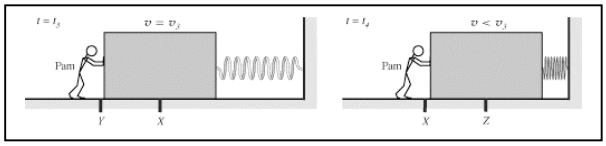
Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***
Explain. ***because i think tht is the answer***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.
Explain. ***because i think tht is the answer***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

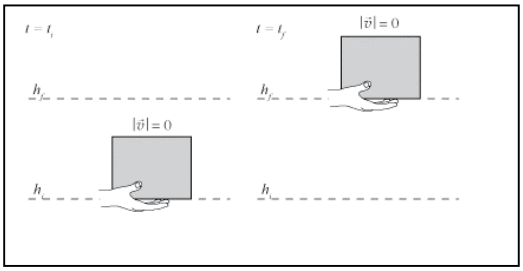
Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*
The net work on system 1 is negative.
Explain. ***because i think tht is the answer***



Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.
Explain. ***because i think tht is the answer***

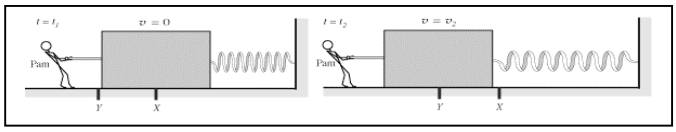
A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.
Explain. ***because i think tht is the answer***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is negative.*

Explain. *the net work is occuring in the negative direction*

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. *since net work is in the negative direction so must the total energy of the system be in the negative direction*

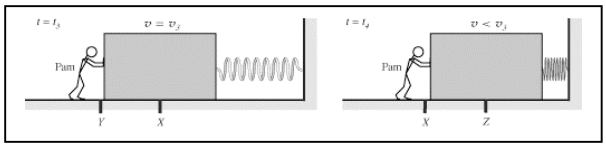
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

Explain. *the net work of the system is in the positive direction*

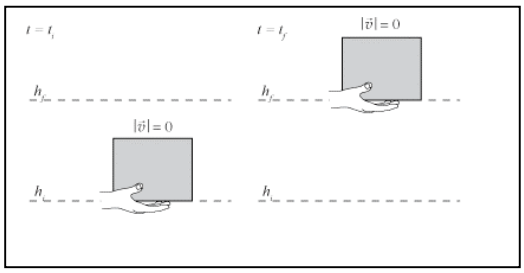


Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *since the net work of the system is in the positive direction so to must be the total energy of the system*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

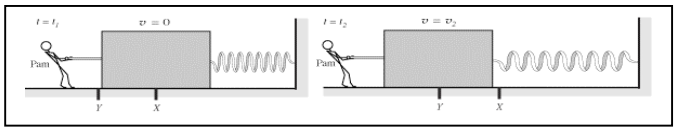


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. *because net work must be in the same direction as net force since there is more work being done by the hand then gravity for the block to move up the absolute value of the work by the student is greater than the absolute value of the work by Earth*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

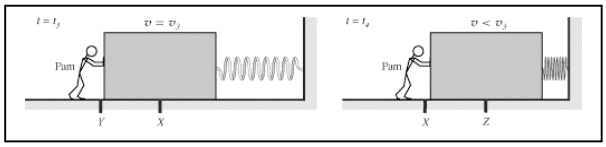
Explain. ***The block moves in the negative direction.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***Energy in a system always stays the same.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

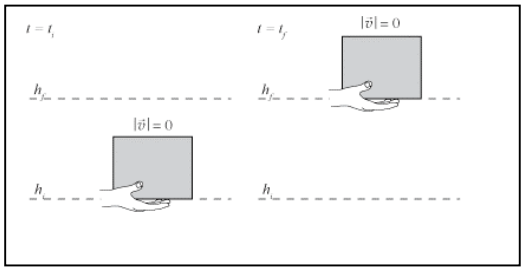
Explain. ***Moving in the positive X direction. Also, force and velocity are the same direction.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***Energy is always conserved.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

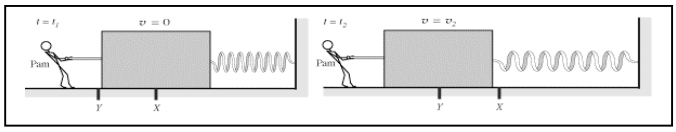


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***The forces of gravity and the normal force from the hand are equal and opposite forces. Gravity does negative work, the hand does positive, but both have the same magnitude.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

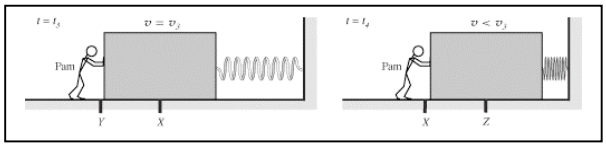
Explain. ***The work goes against what the spring wants to do, so it's negative.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***You will have a negative minus a negative which gives you a positive.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

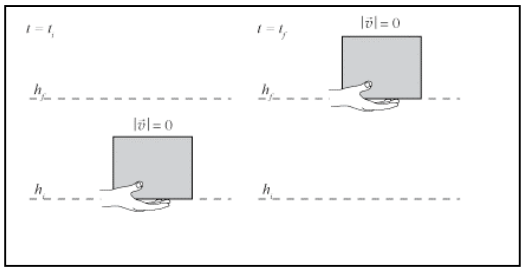
Explain. ***The work is going in the same direction that the spring would want it to go.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***Have much more total energy in the end because there is a lot of potential energy compared to the potential energy when you begin.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

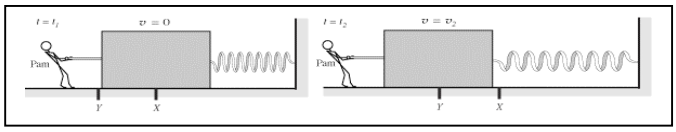


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***Newton's third law***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

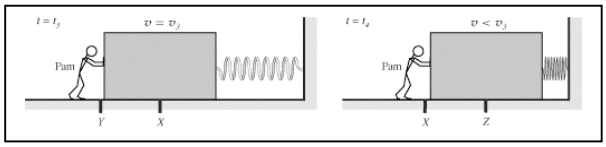
Explain. ***change in postion, force applied, work done***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***spring has gained PE, ready to spring back***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

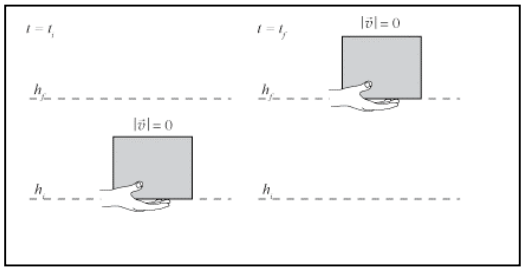
Explain. ***change in position to the right, force applied to the right***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***spring has gained PE, ready to release***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

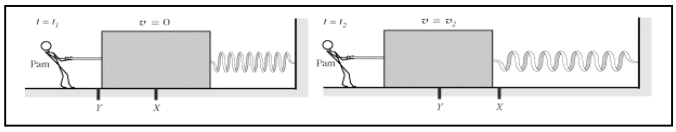


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***student has to counteract work of earth on block***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

Explain. ***Since Pam is trying to move it left and it moves left her work is positive.***

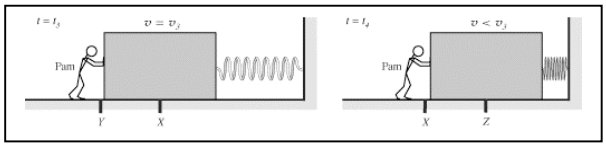
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***Energy can not be created or destroyed.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.



Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

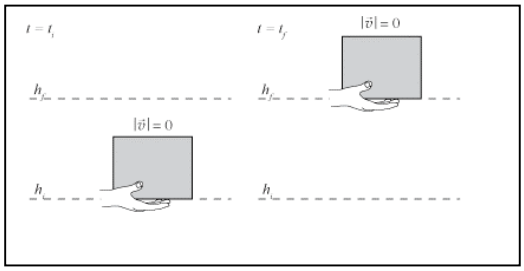
Explain. ***Pam tries moving it left and it moves left so the force is positive.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***Energy can not be created or destroyed.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

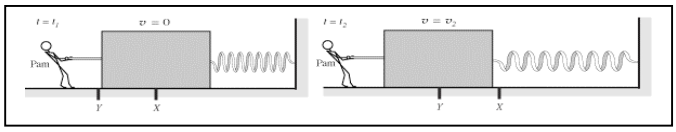


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***The work is the same but the student's is positive and the earth's is negative.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

Explain. ***Force is in the same direction as displacement.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***The energy change is positive because there is more porential energy in the spring than there was initially.***

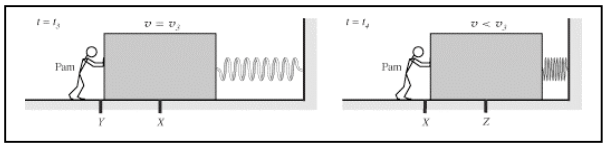
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

Explain. ***Force and displacement are in the same direction.***

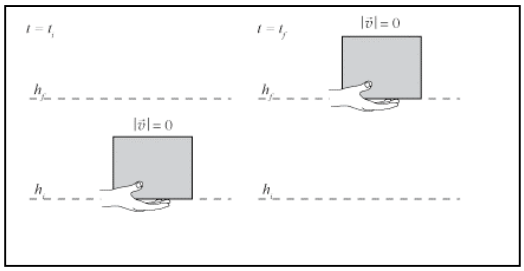


Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***All of Pam's kinetic energy is stored as potential in the spring.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

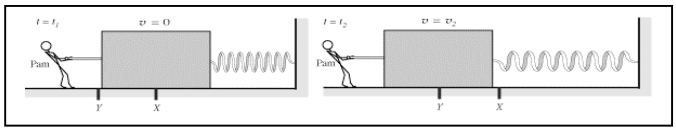


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***Energy is the same in both directions***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is zero.*

Explain. *The work which equals force times distance in this case would be zero because the distance traveled would be zero*

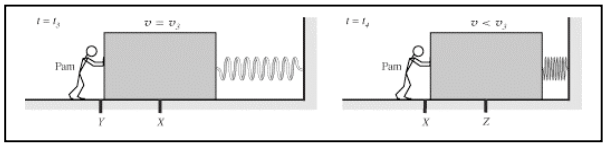
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *Change in kinetic energy for the system is equal to the final KE minus the initial KE...there is no initial KE and the final KE is positive so the change in KE is positive*

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*



The net work on system 1 is positive.

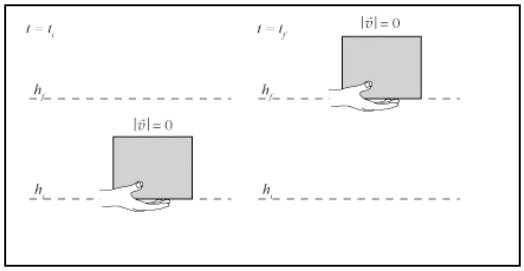
Explain. *The force is negative because the distance or displacement of the system is positive*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. *The change in KE is negative because there is no initial KE and the final KE is in the negative x direction therefore the change in KE is negative*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

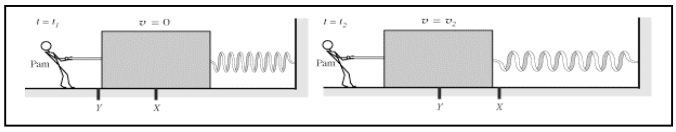


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is less than the absolute value of the work by the Earth.

Explain. *While the value of work done by the student is greater than the value of work done by the earth because the work done by the earth is negative...the absolute value of the work done by the earth is greater than the absolute value of the student*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

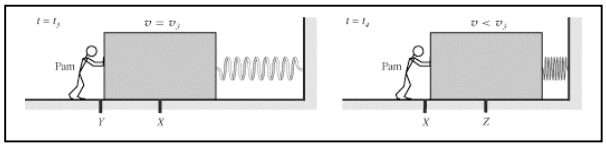
Explain. ***force and distance are in the same direction***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. ***energy is greater at t2***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

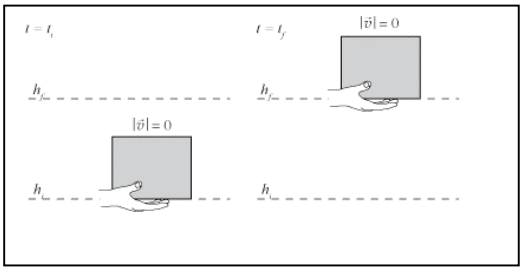
Explain. ***force and distance are in opposite directions***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***energy at t3 is greater than t4***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

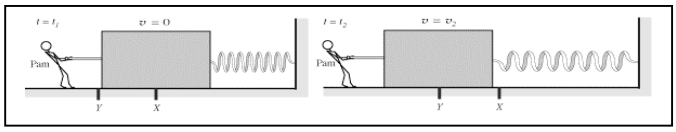


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***because the work done by the student is positive and the work done on earth is negative thus making the work dont by the student greater***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

Explain.

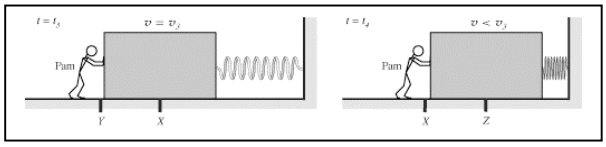
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain.

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.



Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

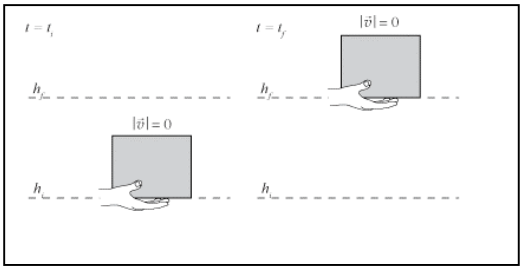
Explain.

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain.

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

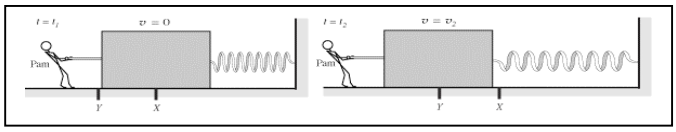


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain.

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is negative.*

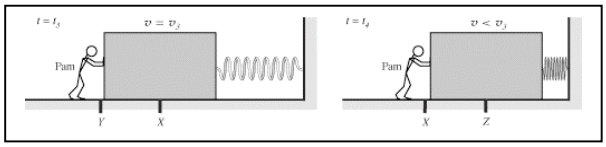
Explain. *its negative because the spring is being stretched in a negative direction.*

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *it is positive because the velocity of the block is being squared so it is positive.*

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

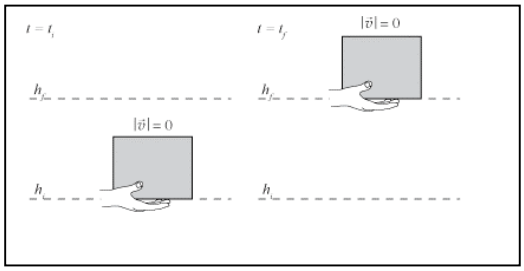
Explain. *the work is positive because the block is being pushed in the positive x direction*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *it is still positive because of the velocity.*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

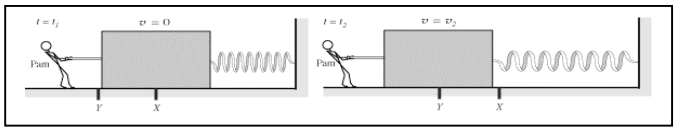


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. *it is greater because the student is lifting the block despite the earths force on it*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

Explain.

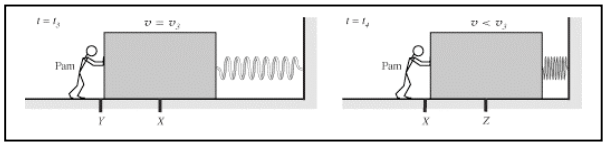
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain.

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.



Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

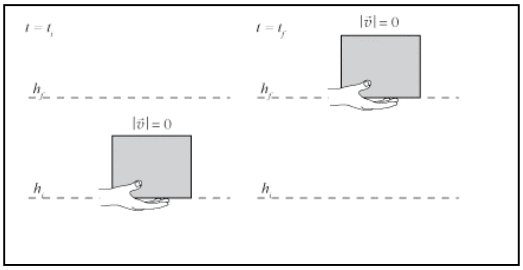
Explain.

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain.

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

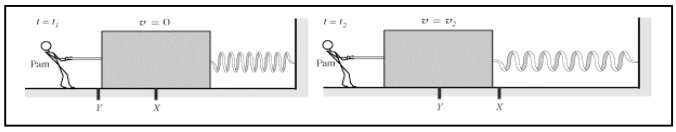


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain.

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

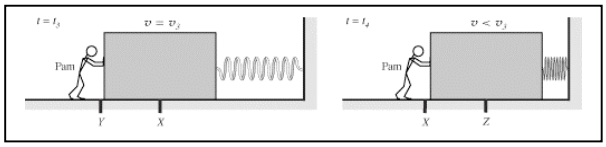
Explain. ***Because the acceletion is to the left along x-axis***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***Because there is no change in speed***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

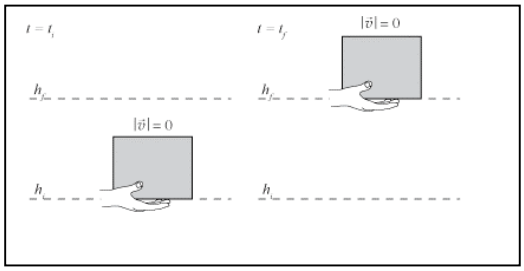
Explain. ***Because the acceleation is heading to the right***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***because there is no change in speed***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

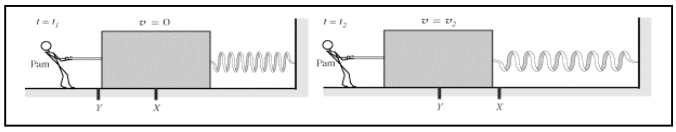


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***Because the book raises above its original ht, then the work by student must have been greater than the work applied by the earth***

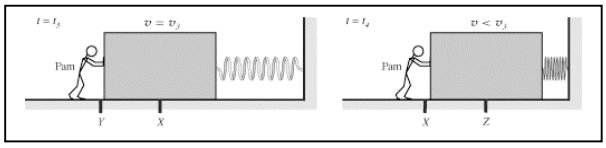
A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***
Explain. ***Force and displacement is in the same direction***
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.
Explain. ***Kinetic energy increases***

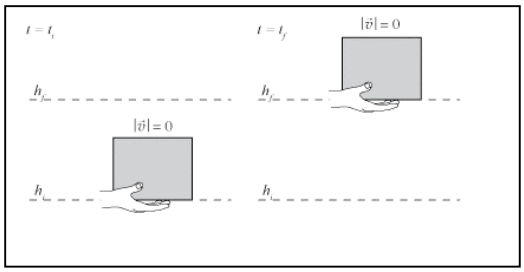
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*
The net work on system 1 is positive.
Explain. ***force and direction in same direction***
Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.
Explain. ***potential energy increaes***

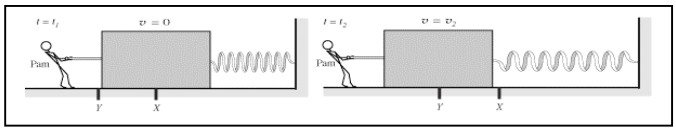
A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.
Explain. ***earth does not have work because book does not move on earth***

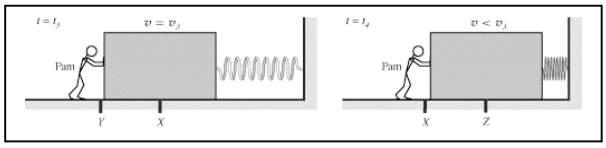
A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is negative.*
Explain. *work is opposite of displacement*
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.
Explain. *the energy is increased by stretching the spring*

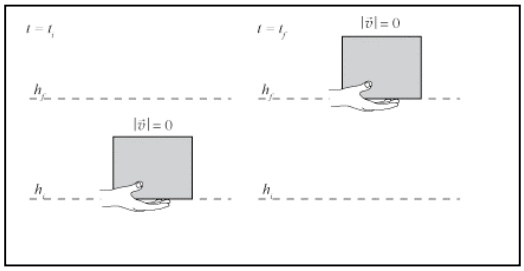
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*
The net work on system 1 is positive.
Explain. *work is in the same direction as force*
Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.
Explain. *the difference has to do with change in force and the force is moving equally in positive direction both ways so the net force is equal*

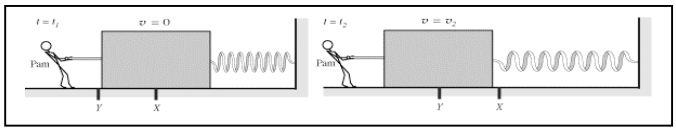
A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.
Explain. *the work was done upward in the same direction as the motion so the work was positive it was not a NIII force because there was no contact mother fucker.*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

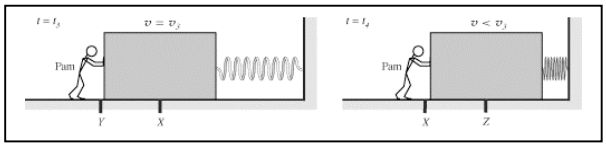
Explain. ***The X-axis is not specified***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***flava flave!***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

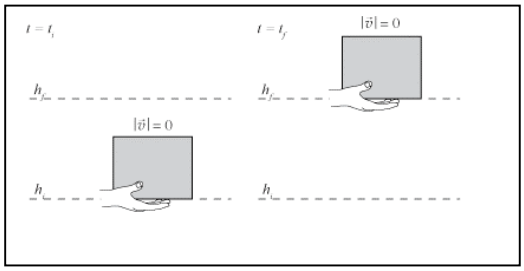
Explain. ***the work is done in the negative direction***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

It is not possible to define a single system consisting of the block and the spring.

Explain. ***I'm not quite sure how to do this one... so i took a guess***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

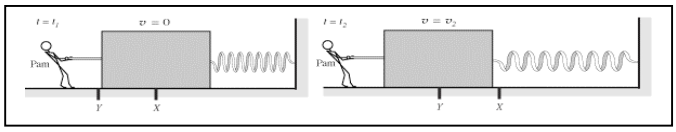


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***If the force was greater than it would be more than***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

Explain. ***Positive because the force is acting to the left and the block goes to the left.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

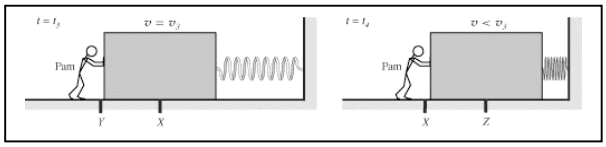
Explain. ***PE is stored up because the spring wants to go back to its original shape.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

Explain. ***Force goes right and that is the direction the block goes.***

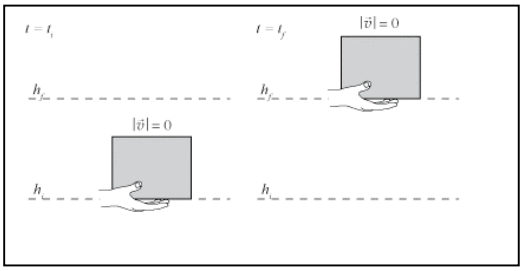


Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***PE is built up because the spring wants to expand.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

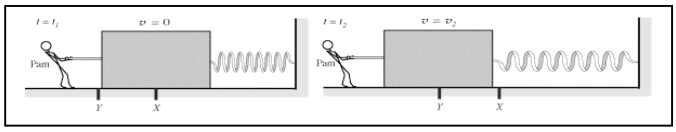


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***The block is moving upward so the work by the student is greater than the earth on the block.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

Explain. ***Work equals force times distance and pam is applying a force over a distance. X-axis is not specified***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

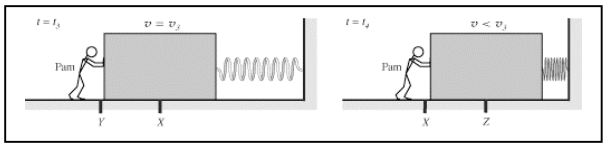
Explain. ***energy cant be created or destroyed***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.



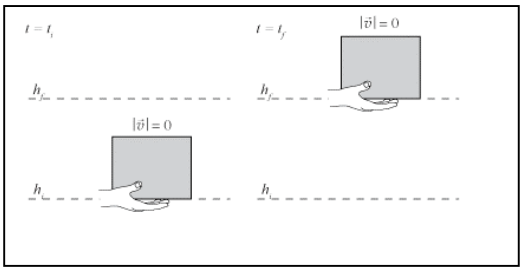
Explain. ***moving in the same direction that force is applied***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***energy cant be created or destroyed. friction is negligble.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

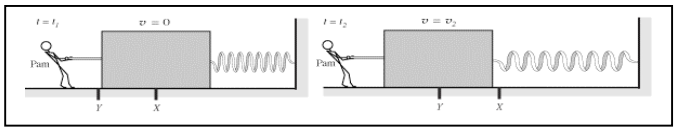


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***the student applies positive work and the earth applies negative work but the studen applies more because the block moves in the direction of the force the student applied***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

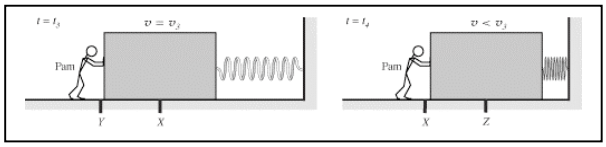
Explain. ***When the string is stretched, the external force is pulling it in a positive direction.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***the potential energy greatly increased because of the tension of the spring.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

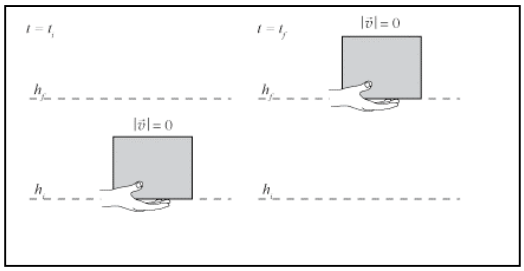
Explain. ***When pushed, the force is considered negative***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***this is also positive beause the spring is being compressed and wants to spring back outwards.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

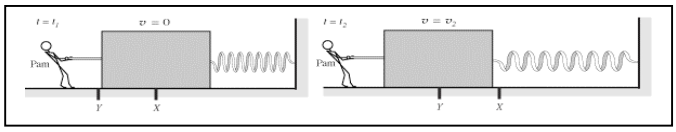


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***The student is pushing the book upward, counteracting gravity, this being larger than the force of gravity.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

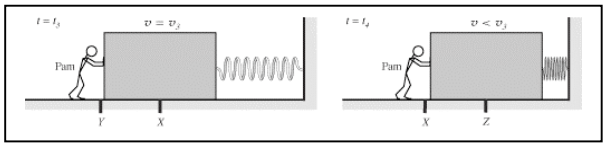
Explain. ***displacement and force are the same***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***same***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

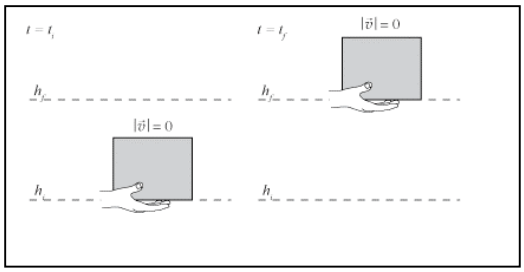
Explain. ***same***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***same***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

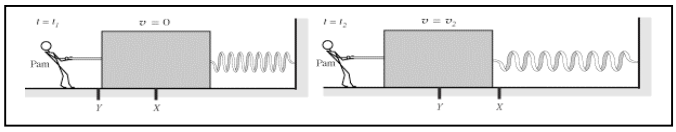


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is less than the absolute value of the work by the Earth.

Explain. ***true***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

Explain. ***Block and springs are both moving in the positive direction in which the force is being exerted.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. ***Because the block speeds up and then slows back down because of tension.***

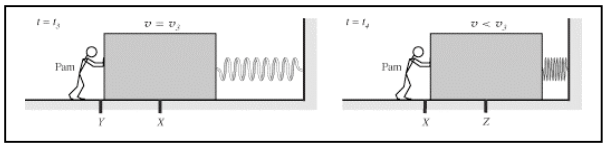
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

Explain. ***The spring exerts a force on the block and makes it accelerate, hence there is positive net force.***

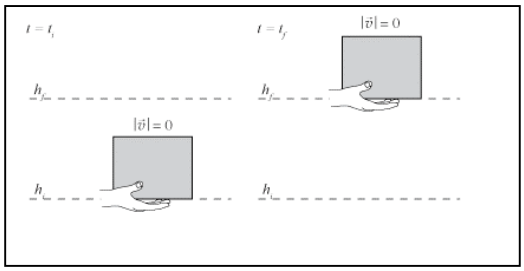


Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***Its speeds up more during the given time than it slows down.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

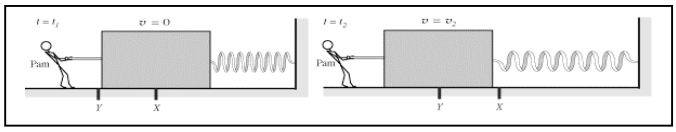


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***If the work was the same by both the hand and the earth then the block wouldn't move. It goes against the definition of work.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

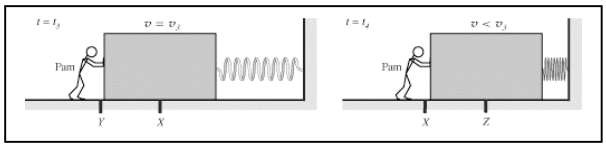
Explain. ***You are stretching the spring out. If you were doing compression then the work would be positive. -kx=W.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***conservation of energy***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

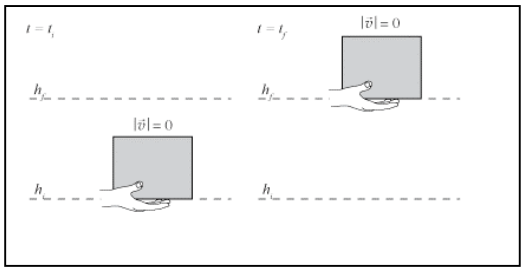
Explain. ***Compressing a spring will cause a positive work. work=-kx and x=-number so work=+***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***conservation of energy***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

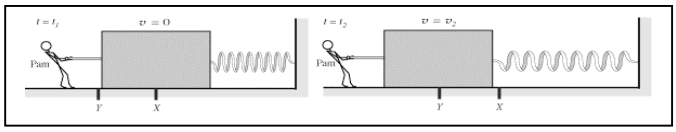


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***The block is going upward, opposite of the force due to gravity. The student has to put extra force on the block to overpower the force due to gravity***

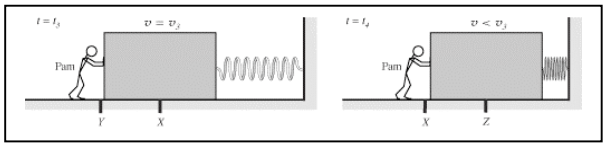
A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is positive.*
Explain. *displacment is negative and force is negative so negative x negative is positive*
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.
Explain. *distance moved is negative*

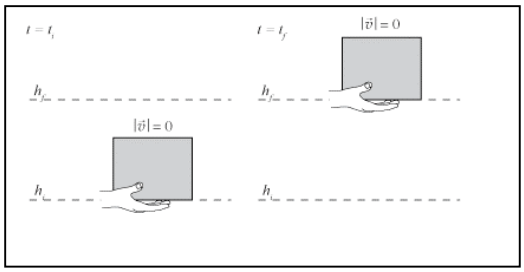
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*
The net work on system 1 is positive.
Explain. *moving forward*
Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.
Explain. *becaouse it is moved in the positive direction*

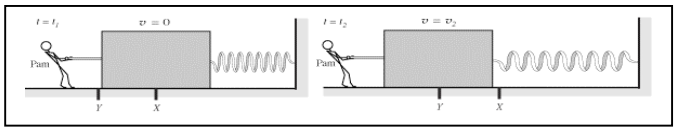
A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.
Explain. *oposite and equal forces*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

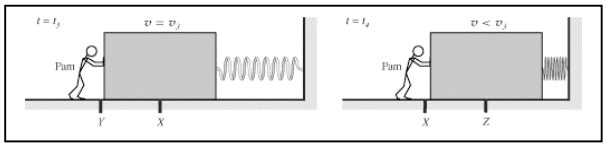
Explain. ***because the force is increasing***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***although the kinetic energy changes the potential energy in the spring equals it out***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

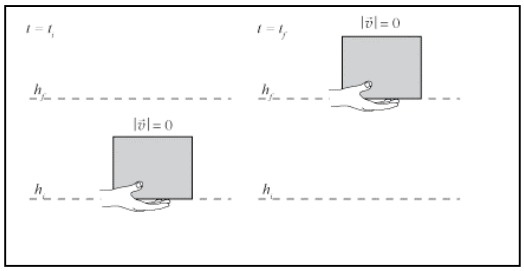
Explain. ***because the force done and the distace traveled are in different directions***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***the kinetic energy decreases but the potential energy in the spring increases to balance it out***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

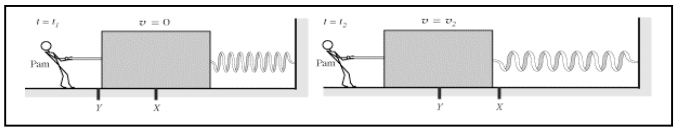


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***because the force applied on the book by the earth and the direction traveled are in different directions the work is negative where as the work done by the hand is positive so the work done by the hand must be greater***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

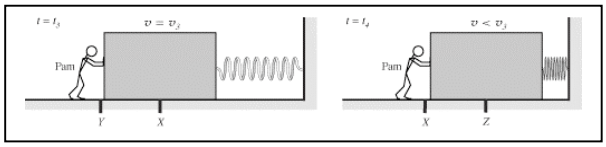
Explain. ***Because otherwise physics would not exist.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***That truly is self-evident.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

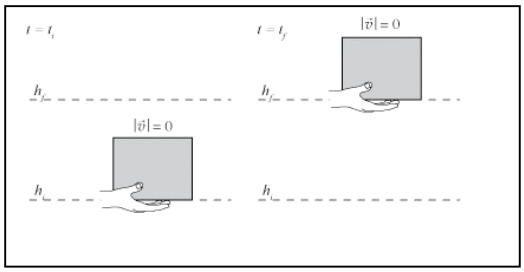
Explain. ***Because it just makes sense.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***The block will move.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

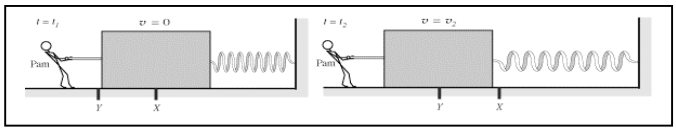


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***Because otherwise the book would not move up.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

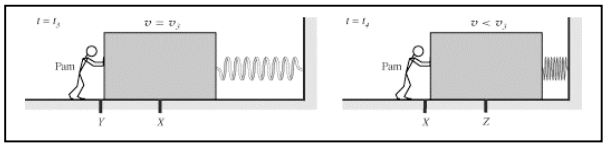
Explain. ***It displaced in the same direction as the applied external force.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***Pam is putting energy into the system (the spring).***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*
The net work on system 1 is positive.

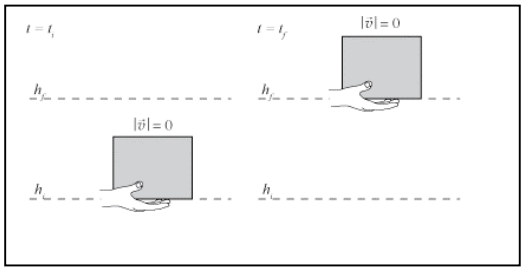
Explain. ***The displacement and force are in the same direction.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***Pam is putting energy into the system (spring).***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



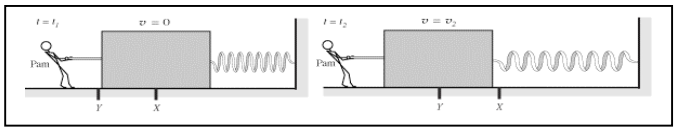
Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***The absolute value of the displacement is equal as far as the earth and hand are concerned.***

The hand has to use the same force as the earth in order to move the block, so they have equal absolute value force amounts. Work is force times displacement, and the absolute values of those two are equal, so the absolute value of the work is equal.

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

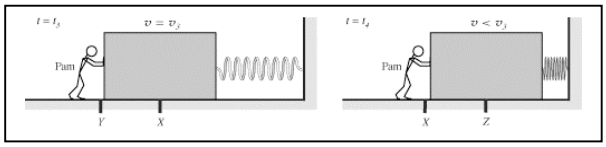
Explain. ***it is against the direction the spring wants to go***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***There is no change in how much energy is in the system conservation.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

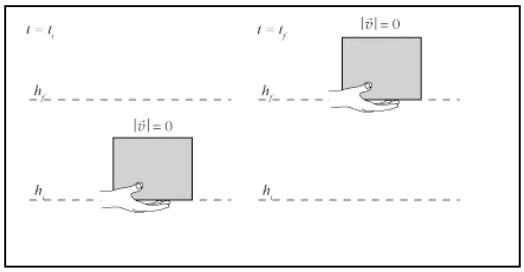
Explain. ***i dont really understand the sinario***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***the energy remains constant***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

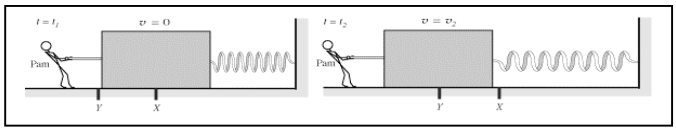


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***he has to overcome the gravity force to lift the book***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

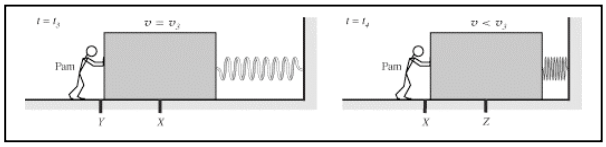
Explain. ***The force and the direction of the force are in the same direction and so the work is positive.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***The potential energy is larger because the spring is stretched and this causes the spring's potential energy to be greater.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

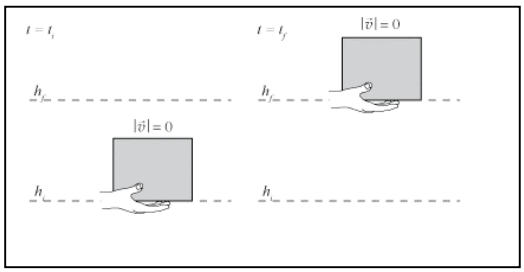
Explain. ***The work on the system is positive because the force put on the system by Pam is in the positive direction and the direction of the motion is positive so the sign of the work is also positive.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***The change in energy of the system is positive because energy is put into the system giving it more potential energy.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

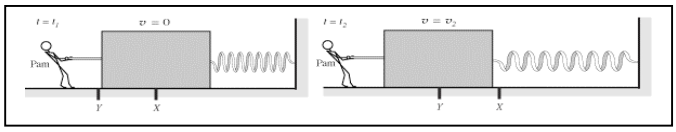


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***The absolute value of work by the hand on the book is greater than the work on the book than the earth because the book is moving in the same direction of the force an because it's moving up the force is greater than that by the earth.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

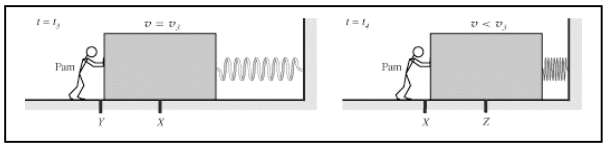
Explain. ***The net work is positive because the work is in the direction of motion***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***There is an increase in energy in the system because it was initially at rest, then a force was applied to obtain both kinetic and elastic potential energy***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

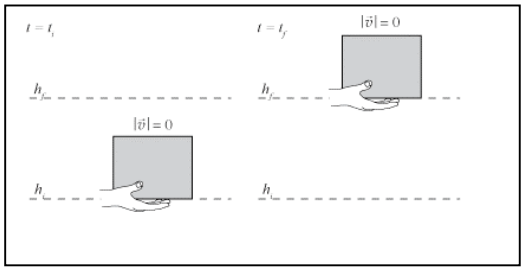
Explain. ***Pam is exerting a force in the direction of motion, and not restraining the block.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***Because pam is still pushing on the spring, adding more energy into the system in addition to the original KE that was converted to ElasticPE***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

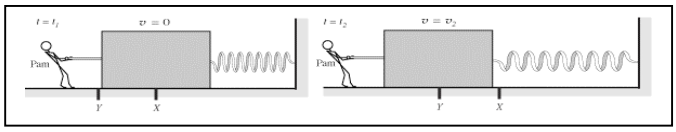


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***PEnis***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

Explain. ***There is a positive force and a positive distance, so work done is positive.***

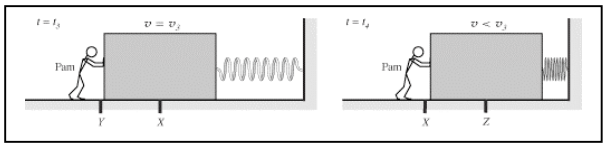
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***there is more potential energy as well as kinetic energy due to the spring being pulled and the system moving.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.



Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

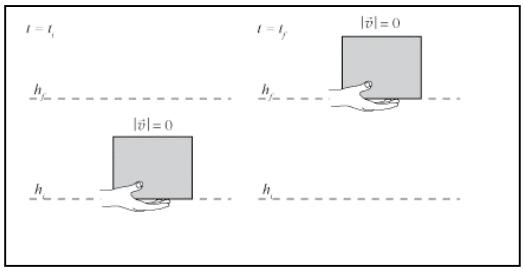
Explain. ***there is still a positive force in a positive direction.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***the block is gaining potential energy from the spring***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

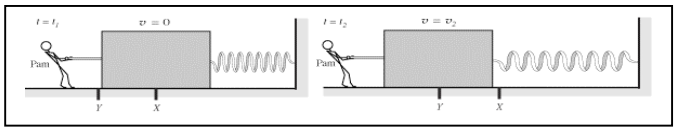


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***the same positive work done by the student is counteracted by the negative work of the earth.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

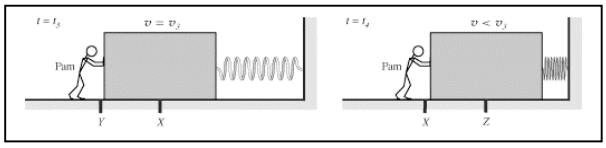
Explain. ***the force goes against the spring force***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***conservation of the energy***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

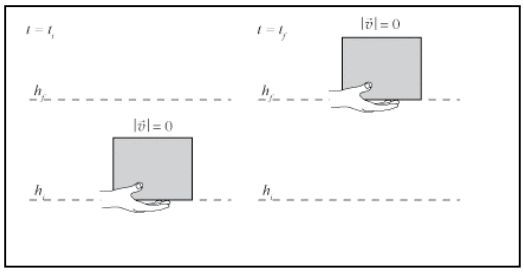
Explain. ***positive force, thus positive work***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***conservation of the energy***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

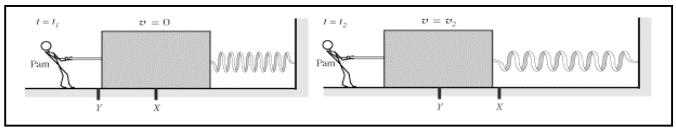


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***the object is moving upward, thus the hand force is greater than the weight force, therefore the absolute value of the work by the student is greater than the asolute value of the work by the earth.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is zero.***

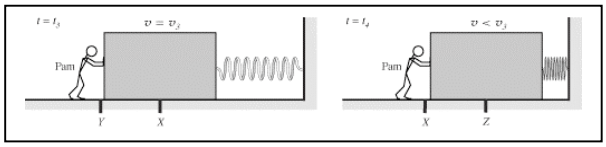
Explain. ***the work the spring does equals the work the person does***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***the block is not moving in either***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is zero.

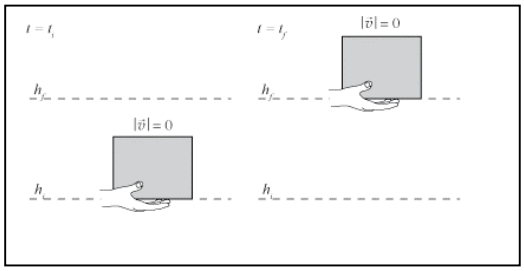
Explain. ***the work done by the person equals the negative of the springs work***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***work is zero***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

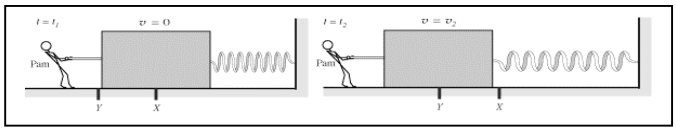


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***this is an action reaction pair***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is positive.*

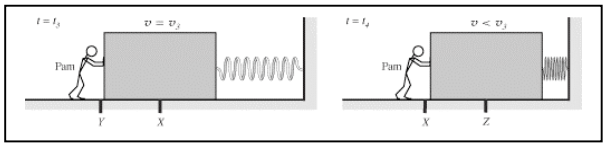
Explain. *object moving in direction of force*

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. *The potential and kinetic will cancel out each other*

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

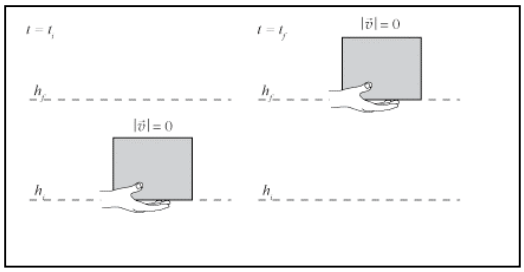
Explain. *object moving in direction of push*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. *they cancel*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

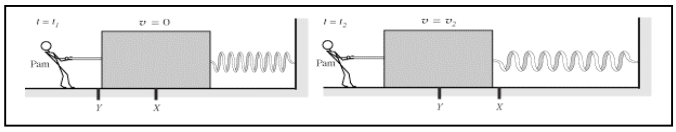


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. *The block is moving upward which is the same direction of the force that the student is applying.*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

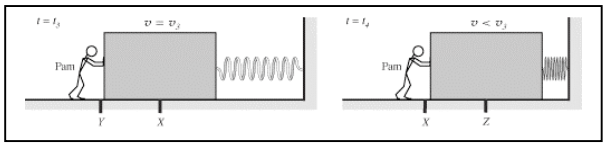
Explain. ***Pam is exterting a force to the left on system 1, and system 1 is moving in the same direction of pam's force. Therefore work is being doin by an outside force on system 1.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***System 1 has Pam's outside force acting on it and her work has increased both kinetic energy, increased speed, and the potential energy, distance from the spring and original position.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

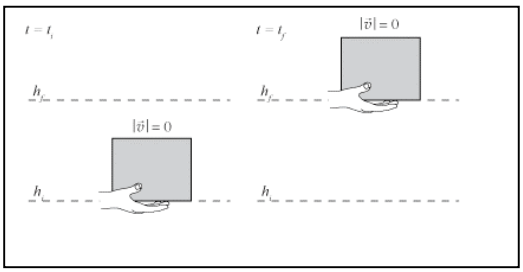
Explain. ***Again system 1 moves in the same direction as pam's force, therefore the net work is positive.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***System 1 gained kinetic energy as it sped back toward original position x, but soon lost mist of its kinetic energy and is now maximizing its potential energy in the spring.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

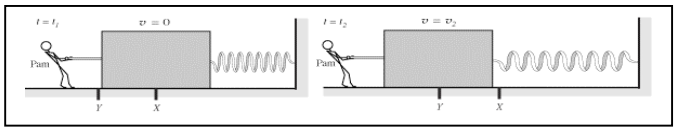


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***the force of the book on the earth has negative work***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

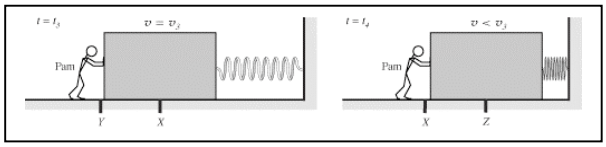
Explain. ***The displacement and force are in the same direction.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***There is no potential energy to begin with and after the spring is stretched there is.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*
The net work on system 1 is positive.

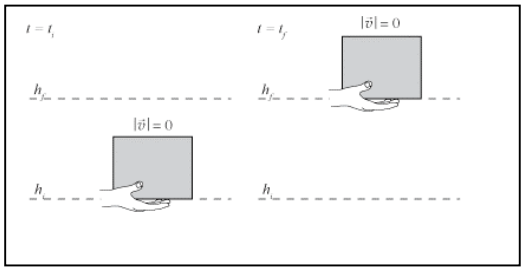
Explain. ***Displacement and force are in the same direction.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***Energy is conserved.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

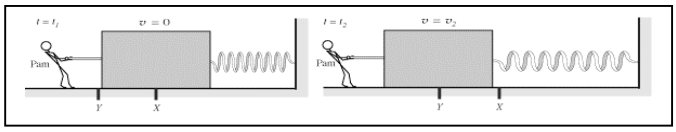


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***The block moves upwards because the force is bigger so it overcomes the work of the earth.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is zero.***

Explain. ***equal and opposite***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***same***

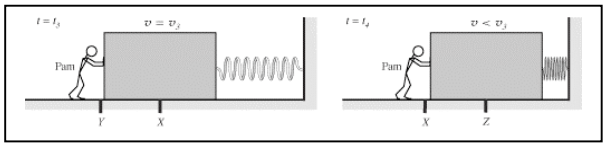
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

Explain. ***it has to be more than 0***

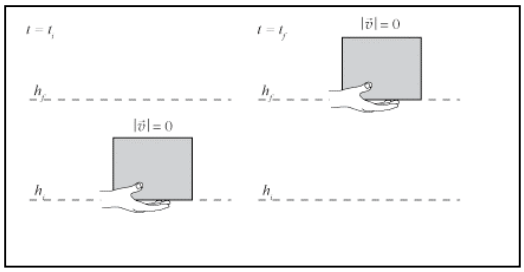


Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***they cancel out***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

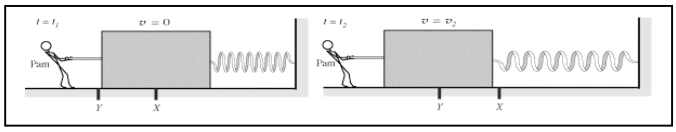


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

There is not enough information to answer this question.

Explain. ***You need more info***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is positive.*

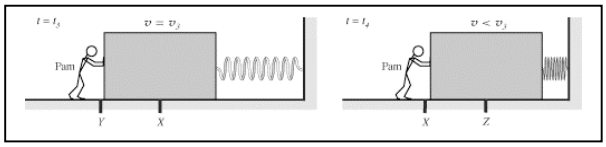
Explain. *force is in the direction of displacement making it positive.*

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *energy is stored in the spring adding to potential energy.*

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

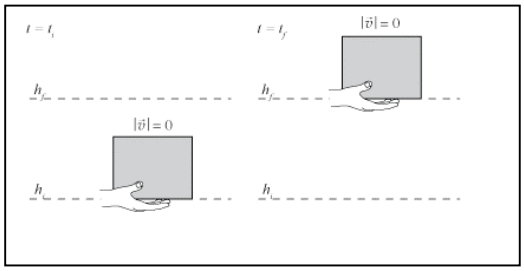
Explain. *positive b/c the force from push is in the same direction of the displacement.*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *stored energy in the spring will add to the total energy in the system.*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

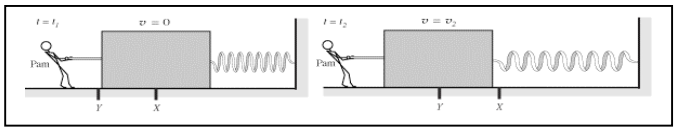


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. *the student is opposing the force of the earth so his force is greater than the earth.*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

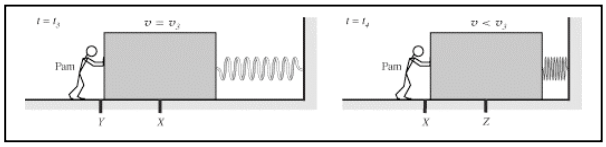
Explain. ***The block is accelerating to the right, and also moving to the right, meaning its work must be positive, as both are in the same direction.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***The change in energy is equal to the work, so if the work is positive, so is the change in energy.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

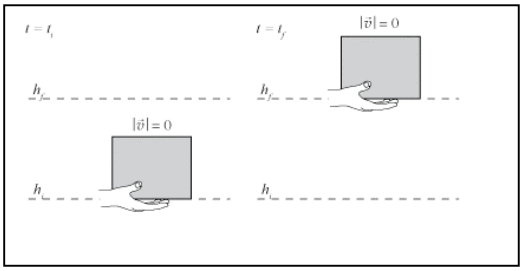
Explain. ***The block is accelerating to the left, but is moving to the right. As these two are in opposite directions, the work is negative.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. ***As the change in energy equals work, and the work is negative, it must be negative as well.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

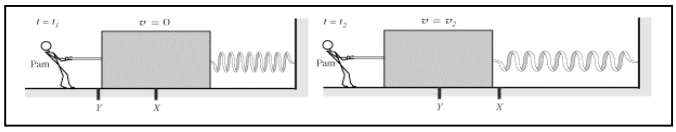


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***As the block moves the same distance and its average acceleration is zero (its initial and final velocities are each zero), this means that each force exerted the same amount over the same space. Thus, they are equal.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is positive.*

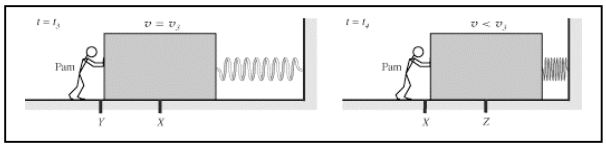
Explain. *The Force applied by the person is in the same direction as the motion*

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *It has a higher KE because it's moving and higher PE because the spring is not at its equlibrium*

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

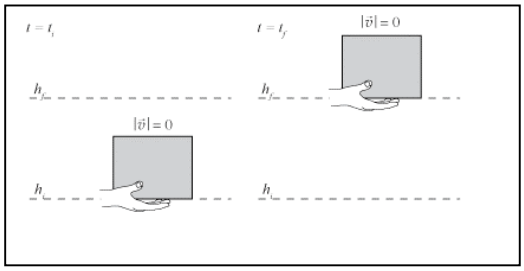
Explain. *The acceleration is not in the same direction as movement*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *The KE is lower because its not moving as fast, but PE is higher because the spring is compressed*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

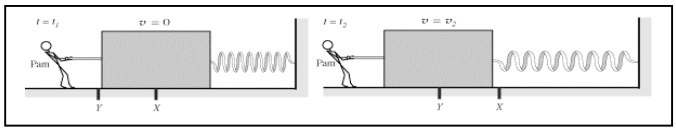


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. *the direction of movement is against gravity*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

Explain. ***same direction as displacement***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***always positive***

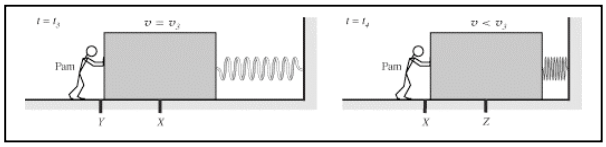
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

Explain. ***opposite direction***

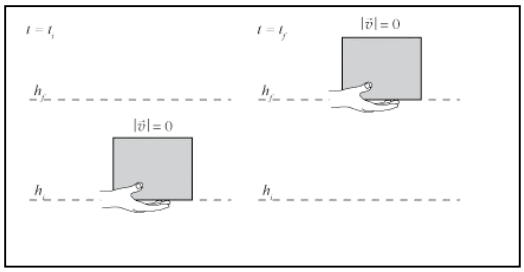


Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***conservation of energy***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

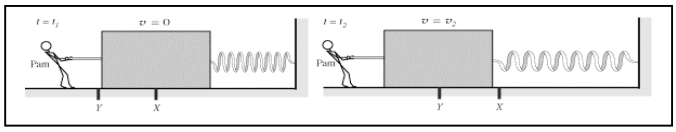


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***works must be equal and opposite***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

Explain.

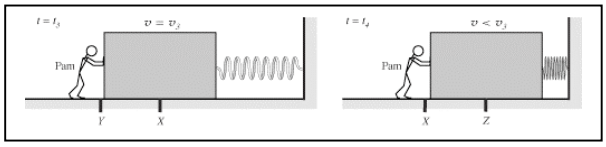
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain.

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.



Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

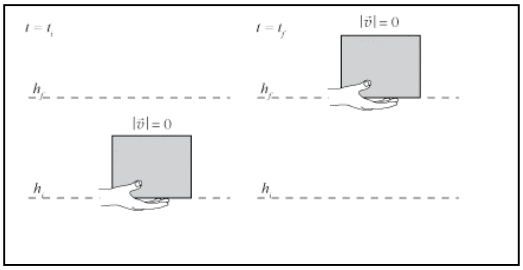
Explain.

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain.

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

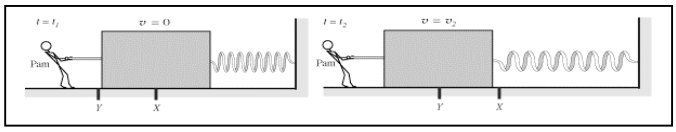


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is less than the absolute value of the work by the Earth.

Explain.

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is positive.*

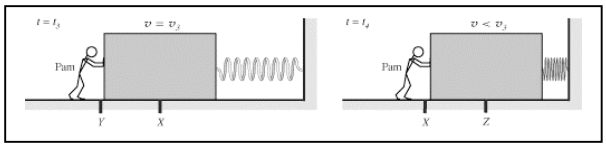
Explain. *The force acting on the block and spring is in the same direction as their movement.*

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *You put energy into the system*

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

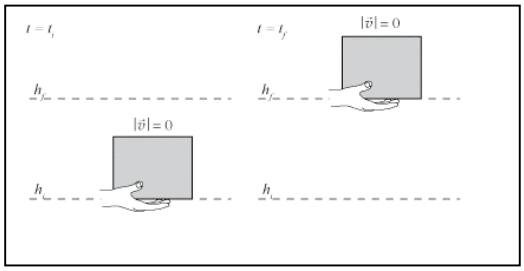
Explain. *Same reason as before*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. *opposite direction as before*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

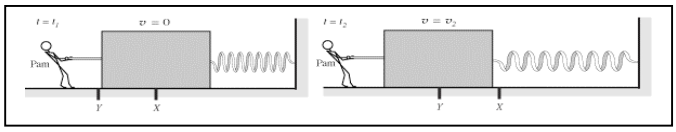


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. *The both act the same mag of force but the distances they move are completely different*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is zero.*

Explain. *force and displacement give work, but there is also a gain in potential energy in the spring.*

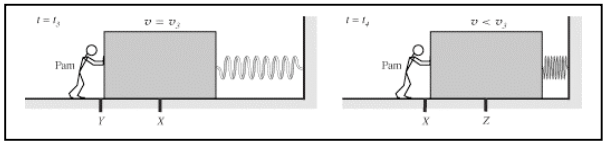
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. *kinetic energy must be equal and opposite of potential energy because of conservation of energy*

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*



The net work on system 1 is zero.

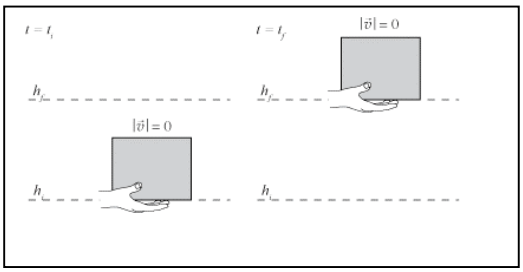
Explain. *same as before*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. *kinetic and potential cancel eachother out.*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

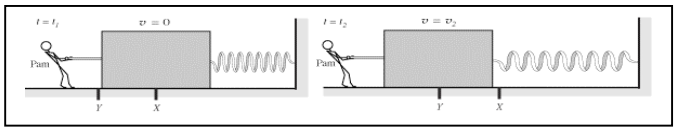


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. *to move up against gravity there must be a force greater in magnitude than gravitys force on the block. since they both act under the same distance, work by the hand must be greater.*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

Explain. ***Because***

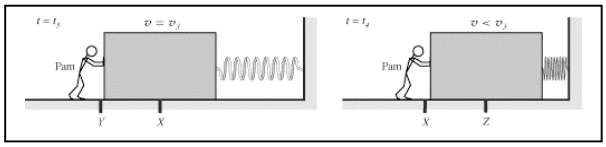
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***Because***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.



Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

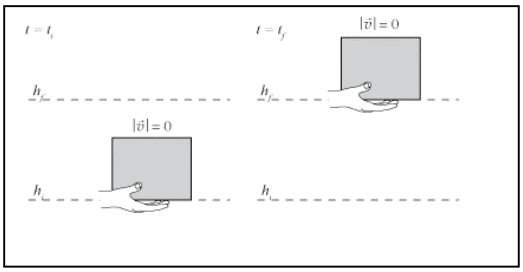
Explain. ***Because***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***Because***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

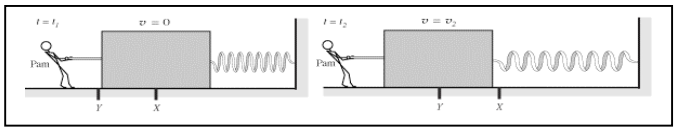


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***Because***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is positive.*

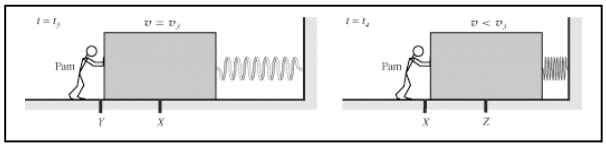
Explain. *bc thats the way shes pulling and its going*

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. *kenitic and potential always cancel out*

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

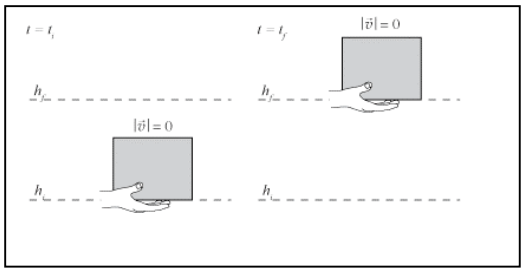
Explain. *its moving the way shes pushing*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. *same reason as i said before*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

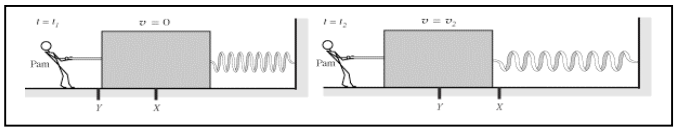


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. *it has to be. its science.*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is zero.***

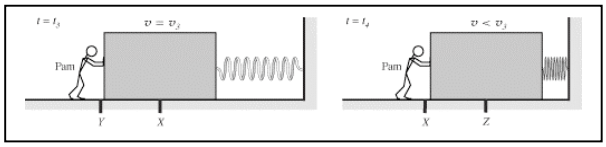
Explain. ***No work is being done in the systems. spring is at equilibrium.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***Final speed is greater than zero, therefore it is positive energy***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

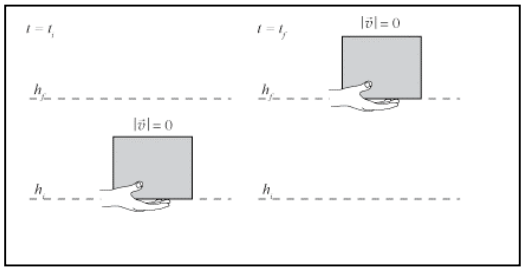
Explain. ***It is coming to a rest, acceleration is negative.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. ***It comes to a stop and begins accelerating in the opposite direction.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

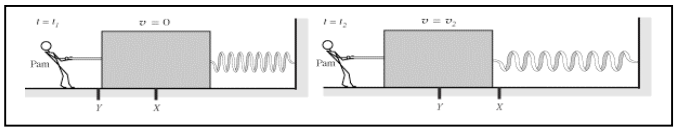


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***Both exert the same force on eachother***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

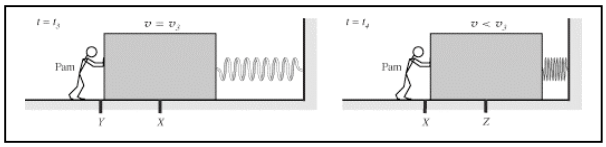
Explain. ***Net force is in same direction as motion***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***Excluding the external force from Pam, as kinetic energy decreases (increases negatively), potential energy of the spring increases***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

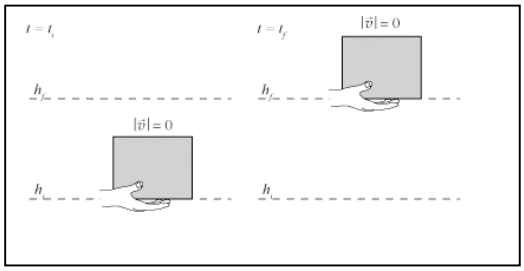
Explain. ***Force again in direction of motion***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***considering only block and spring, energy is conserved***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

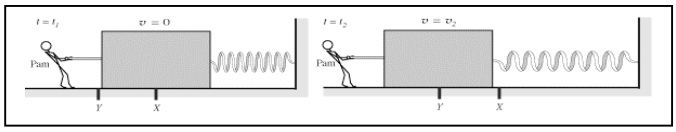


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

There is not enough information to answer this question.

Explain. ***If book is moving at constant velocity, then net force is zero, in which case force of gravity = -force of the hand, and absolute value is equal. However, we do not know if it is constant or accelerating***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.

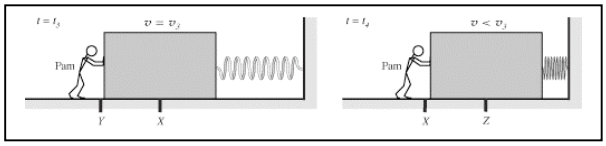


Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***
Explain. ***because he is pulling against the spring***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.
Explain. ***because it is positive***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

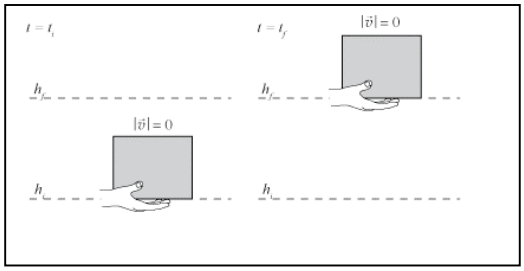


Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*
The net work on system 1 is negative.
Explain. ***the spring is pushing against us***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.
Explain. ***becaause thar thing is going inward***

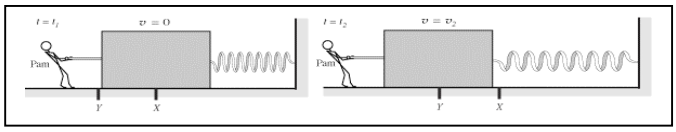
A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.
Explain. ***equal because the man is holding it equal to the direction***

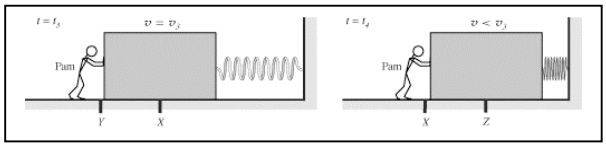
A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***
Explain. ***negative velocity and distance -*- =+***
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.
Explain. ***kinetic energy increases so does potential engery***

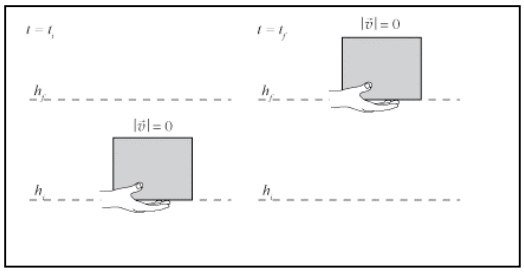
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*
The net work on system 1 is positive.
Explain. + * + = +
Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.
Explain. ***change in energy is negative potental has decreased as well as kenetic energy***

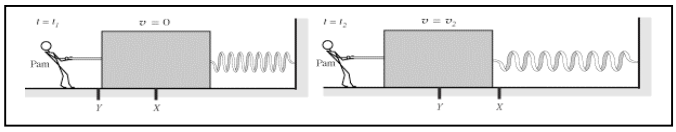
A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.
Explain. ***force pairs***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is zero.***

Explain. ***because the network should be zero***

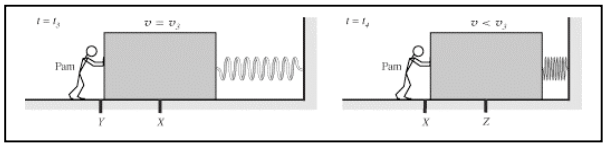
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***because it speeds up.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.



Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

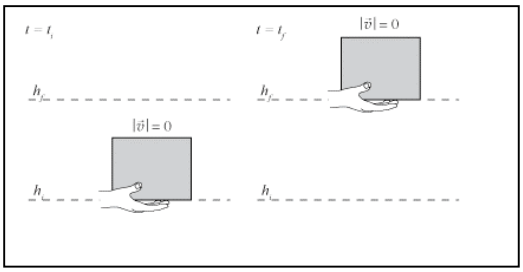
Explain. ***because the work is against the motion.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. ***because the velocity is decreasing.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

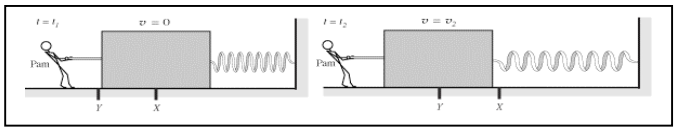


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is less than the absolute value of the work by the Earth.

Explain. ***because i liked this answer better than the others.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

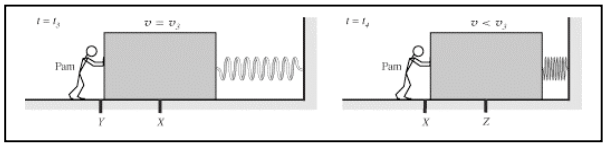
Explain. ***force of the spring is oppisit that of the direction the block is moving, so is a negitive force, they are not allined***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***before force there is no energy potential, now there is becuase the block is moved against the force of the spring.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

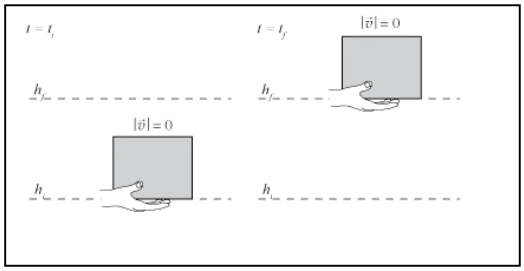
Explain. ***pam's push is the external force and is in the same direction as the change in distance.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***more potential energy in the block as it is being pushed agest the spring, the spring provides the spring's potential energy.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

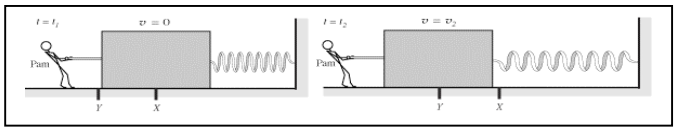


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***same amount of work due to the earth pulling and the person lifting. although the block moves in the same direction as the force of the person. work is the same for both.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is negative.***

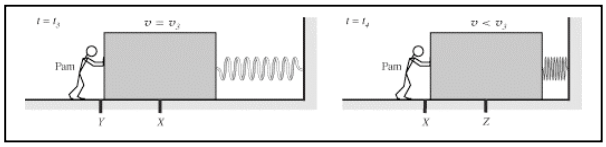
Explain. ***i guessed***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***haha***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

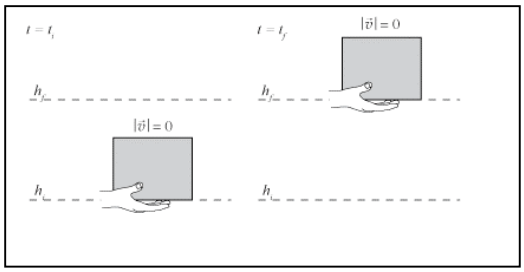
Explain. ***i dont know***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

It is not possible to define a single system consisting of the block and the spring.

Explain. ***:)***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

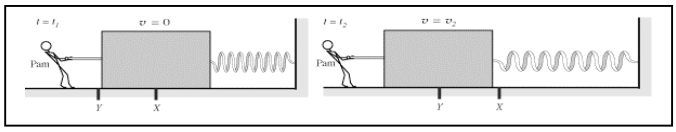


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

There is not enough information to answer this question.

Explain. ***because i didn't read it***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* *The net work on system 1 is positive.*

Explain. *the block is accelerating, so there's positive work*

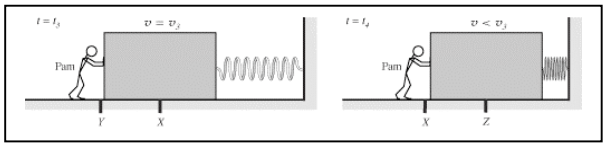
Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *the block accelerates, so the energy changes*

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.



Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

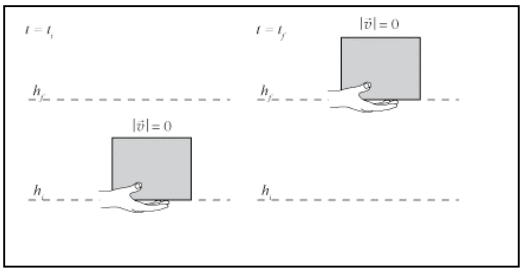
Explain. *the block moves in the positive direction*

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. *the block moves in the positive direction*

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

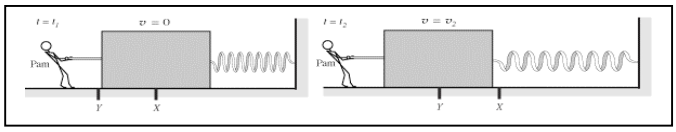


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. *newton's 3rd law*

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

Explain. ***cause the motion is the same direction of the movement***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***because that it is close to the maximum***

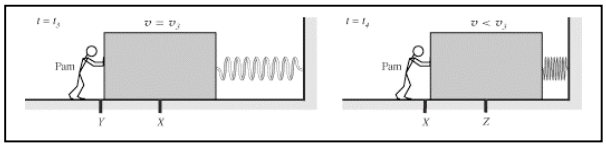
Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.

Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

Explain. ***force in the same direciton as the spring***

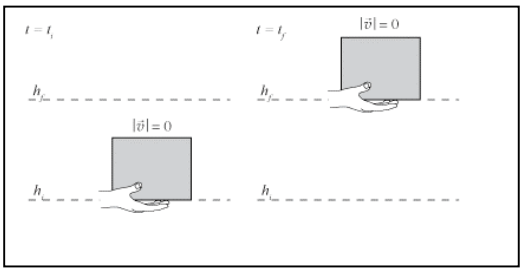


Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is negative.

Explain. ***Because potential is high***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

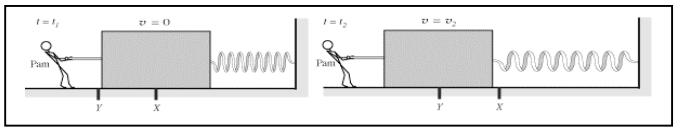


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***because the student has to counter act the weight of the book and the force from the earth.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

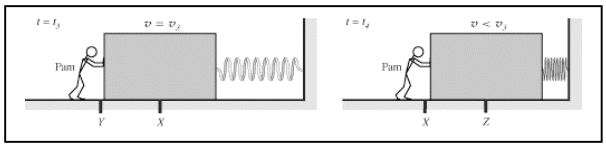
Explain. ***You can think of this as the same as lifting a book through a gravity field. Spring is analogus to gravity and you lift, move the block to the left.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***By stretching the spring you are adding energy to the system.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

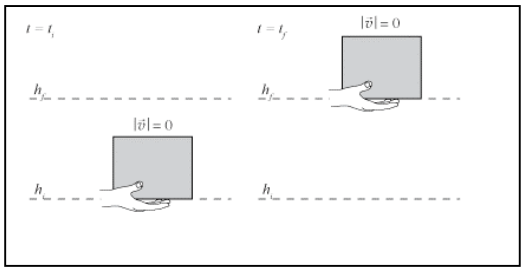
Explain. ***Same as before but opposite.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***you are still adding energy to the system, when you release the block is when you get it back.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

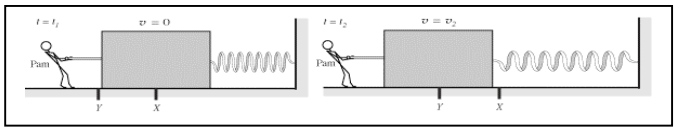


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is equal to the absolute value of the work by the Earth.

Explain. ***I really don't have a good way to respond here. Not enough time.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.
Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

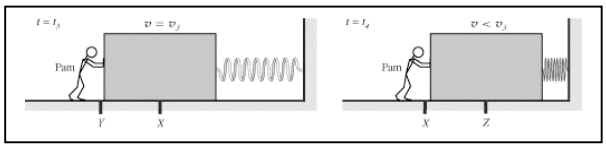
Explain. ***It is positive because the person is pulling left and the displacement is left. so it positive***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***because kinetic energy is positive and KE is bigger than PE***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.
Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

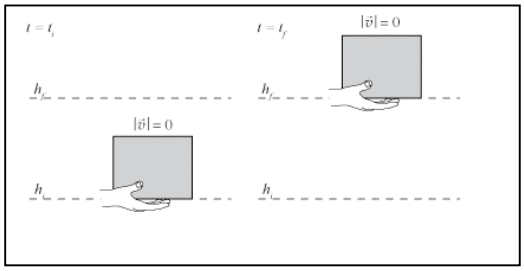
Explain. ***Because the force is negative so f times d = work so w is negative.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is zero.

Explain. ***Because PE and KE will cancel out***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

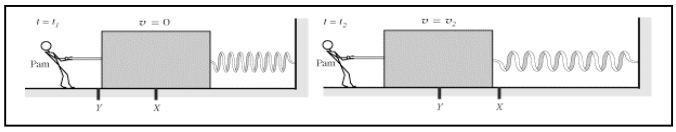


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***this is because the box is moving a certain distance with the assistance of a force from the student on the box.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

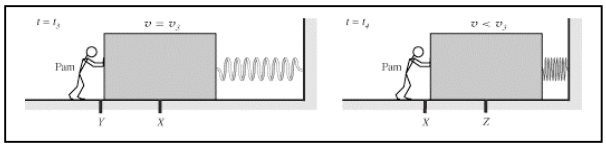
Explain. ***Since the tension is pulling the block against where it wants to go, it is positive work.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***The spring is being pulled farther out, so it has a greater potential energy.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is negative.

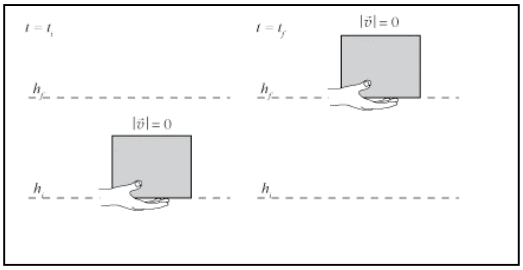
Explain. ***The work is negative because the block is being restrained from its original position.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***The potential energy is increased, so the change in kinetic energy is zero.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

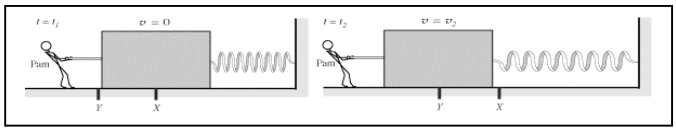


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***Since the student is restraining the book from falling towards the earth, and the earth does not actually make the book move any distance, then the work done by the student is greater then that done by the earth.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

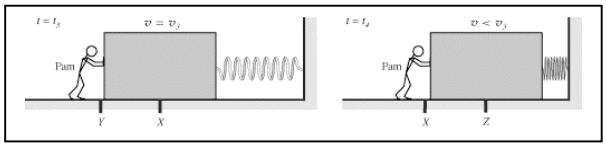
Explain. ***the force is in the same direction as the motion.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***the spring moves from equilibrium to stretched.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is positive.

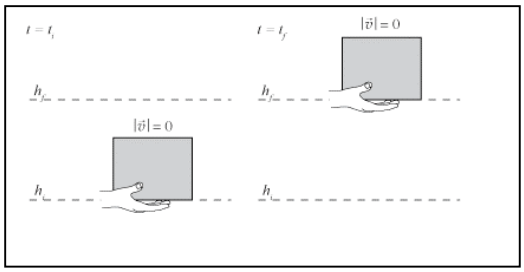
Explain. ***force is in the same direction as motion.***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***the spring moves from equilibrium to compressed.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.

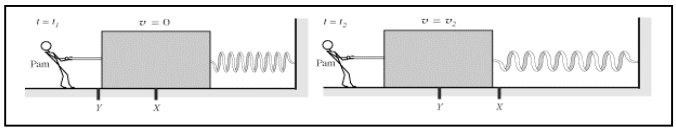


Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***the student is exerting more force.***

A block of mass *m* is attached to an ideal (massless) spring with coefficient *k,* as shown. Friction between the block and surface is negligible. The block starts at rest at point *X* and the spring is at its equilibrium length. At t_1, Pam begins to pull the block to the left, stretching the spring. The block speeds up until t_2, when it passes point *Y* with speed v_2.



Let System 1 be the block & spring.

Q4. Between t_1 and t_2, is the net work on system 1 by external forces *positive, negative,* or *zero?* ***The net work on system 1 is positive.***

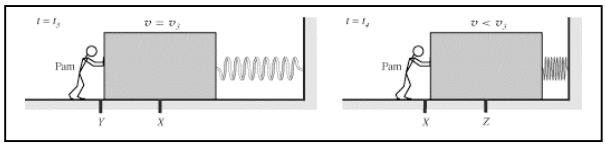
Explain. ***The work done on the system is positive, since it increases the elastic potential energy of the spring.***

Q6. Between t_1 and t_2, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***Both the kinetic energy and potential energy increase, so the total energy change must be zero. The kinetic potential energy goes from zero to 1/2mv^2, while the elastic potential energy increases from zero to 1/2 x.***

Pam now releases the block. It continues to move to the left, slowing to a stop, then begins to speed up to the right. At t_3, the block passes point *X,* moving with speed v_3 to the right. Pam now *pushes* the block until it reaches point *Z* at t_4, compressing the spring, as shown below. The speed of the block at point *Z* is *less than* v_3.



Let system 1, be the block and spring.

Q8. Between t_3 and t_4, is the net work on system 1 by external forces *pos, neg,* or *zero.*

The net work on system 1 is zero.

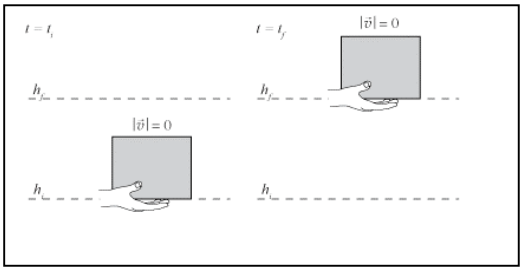
Explain. ***SHES NOT TOUCHING IT ANY MORE!!!***

Q10. Between t_3 and t_4, is the change in total energy (kinetic plus potential) of system 1 *positive, negative,* or *zero?*

The change in total energy of system 1 is positive.

Explain. ***The net work is positive because Pam is putting energy into the system.***

A student lifts a book upward from height h_i to h_f. The block begins and ends at rest.



Q12. As the block moves from h_i to h_f, is the absolute value of the work on the block by the student *greater than, less than,* or *equal to* that on the block by the Earth?

The absolute value of the work by the student is greater than the absolute value of the work by the Earth.

Explain. ***It ends with greater PE, so the W done on the block is positive over all.***