

Is it Work?

Work has a very special meaning for scientists.

Work is done when a force causes something to move.

When an object does not move, even though there is a force exerted on it, no work has been done. Something must be moved for work to be done.

The amount of work done depends upon the amount of force used and the distance that an object is moved.

1. A boy holds a heavy package for one hour. He is very tired but has not done any work. Explain why he did not do any work.

The package is not moving.

2. A girl is coasting on a bicycle. The bicycle is moving very fast but she is not doing any work. Explain why no work is being done.

There is no longer a force being applied.

3. Why is no work being done when a rocket ship moves through space?

The force that started the rocket in motion was the firing of the rocket thrusters. This has stopped and the rocket is just keeping on doing what it was doing.

4. Would you do more work pushing open an unlocked door or pushing as hard as you can against a locked door? Explain.

Pushing (forcing) a door open = movement in the direction of the force.

5. You push a shopping cart and cause the cart to move. Have you done any work? How do you know?

The shopping cart is moving in the direction of the horizontal component of the force applied to the handle.

6. Suppose you stop pushing on the cart, but the cart keeps moving. Are you doing any work now? How do you know?

No--there is no longer a force being applied.

7. If Mary studied for four hours, did she do any work? Explain.

No--no force--no movement.

8. Circle the letter of each sentence below that describes work being done.

~~a~~ John is thinking about his math test.

b Joe is rowing a boat across the lake.

~~c~~ Sue is standing in line holding her groceries.

~~d~~ A pillar is holding up the ceiling.

~~e~~ Kathy handed a pencil to Sam.

No if she passes the pencil horizontally.

Yes if she has to raise the pencil to hand it off--then she is fighting against the force of gravity.