

Name: _____

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Science 7

Work and Machines

Aim: I can identify what activities scientifically constitute as work.

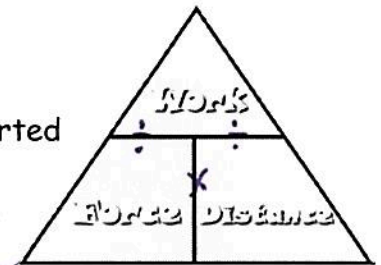
Do Now: Identify if work is being done in each situation.

1. A scientist delivers a speech to an audience of his peers. (~~Work~~ / No Work)
2. A body builder lifts 350 pounds above his head. (Work / ~~No Work~~)
3. A mother carries her baby from room to room. (~~Work~~ / No Work)
4. A father pushes a baby in a carriage. (Work / ~~No Work~~)
5. A woman carries a 20 kg grocery bag to her car. (~~Work~~ / No Work)

Notes:

Work

- The transfer of energy through motion
- Work depends on the amount of force exerted and the distance over which the force is applied.
- Something needs to move and in the direction of the applied force.



Example Questions:

1. On a warm day, a climber does 3,000 J of work to get his backpack up a mountain. On a snowy day, he adds equipment to his pack. If he climbs to the same height, he would do (more) / less / same amount of) work. Has to apply a greater force
2. If the climber's pack stayed the same weight and the climber only climbed halfway up, he would do (more / less) / the same amount of) work. Half the distance
3. A waiter carries a 5 N tray of food while he walks a distance of 10 meters. Is work done on the tray? Why or why not?

No work - Force and tray are not moving in same direction.

4. A 45N girl sits on a 8N bench. How much work is done on the bench?

None - there is no distance

5. How much work does the climber do on his backpack if his pack weighs 90 N^f and he climbs to a height of 30 m^d?

Formula: $W = f \times d$

Substitute:

$$W = 90 \text{ N} \cdot 30 \text{ m}$$

Final Answer with Units:

$$W = 2700 \text{ joules}$$

6. How much work do you do when you push a shopping cart with a force of 50 N^f for a distance of 5 m^d?

Formula: $W = f \times d$

Substitute:

$$W = 50 \text{ N} \cdot 5 \text{ m}$$

Final Answer with Units:

$$W = 250 \text{ joules}$$

7. A boy lifts a 30N^f dragon 2 meters^d above the ground. How much work did the boy do on the dragon?

Formula: $W = f \times d$

Substitute:

$$W = 30 \text{ N} \times 2 \text{ m}$$

Final Answer with Units:

$$W = 60 \text{ joules}$$

Units

work - joules

force - Newtons

distance - meters



Heigh-ho, heigh-ho. It's off to work we go...