

Work Worksheet 1

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

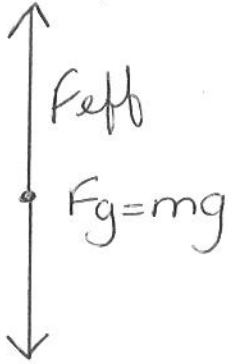
What is the work?

\emptyset work = no displacement

2. A boy lifts a 30N dragon 2 meters above the ground. How much work did the boy do on the dragon? Sketch!!

What is the work?

$$W = F \cdot d = 30\text{N} \cdot 2\text{m} = 60\text{J} = W$$



3. Which of the following is having work done on it?

Not multiple choice!! Circle all that apply.

- i. a grocery bag as you lift it up ✓
- ii. a crane moving dirt ✓ at an \angle
- iii. a crate as you push it along the floor ✓ at an \angle
- iv. a person sitting on a bench ✗ no displacement

4. Suppose you want to calculate how much work it takes to lift a 160 N barbell. Besides the mass of the barbell, what other information do you need to know?

- i. the ~~shape~~ of the weights
- ii. how high the barbell is being lifted ✓
- iii. the ~~strength~~ of the person doing the lifting
- iv. None of the above

5. In the equation for work, F is the force applied to the object and d is the displacement through which the force is applied.

6. If you are in a car that is being pulled horizontally along a 56.0 m path with a force of 12.5 Newton's, what is the "work" done on the car?

$$W = (12.5 \text{ N}) \cdot (56.0 \text{ m}) = 700 \text{ J}$$

7. A crane does work of 13,500 J with a force of 5200 N to lift a beam.

How far can the beam be lifted (in meters)?

start w formula & rearrange

$$\frac{W}{F} = \frac{F \cdot d}{F}$$

$$\frac{13500 \text{ J}}{5200 \text{ N}} = d = 2.6 \text{ J}$$

8. A 600 kg great white shark is lurking below an observation cage. His movement is being studied from a series of motion sensors below the boat. The shark leisurely charges the cage, strikes it and makes the cage rattle. Later, the shark returns for another run at the cage. The shark strikes the cage with 12,800 N of force. The shark traveled for 10 m in making its run. The cage is designed to withstand 124,500 N-m of "work" before it breaks.

Should the man in the cage be worried? Explain using a sketch and math.

$$\begin{aligned} W &= F \cdot d \\ &= (12800 \text{ N})(10 \text{ m}) \\ &= 1.28 \times 10^5 \text{ J} \end{aligned}$$

$1.245 \times 10^5 \text{ J}$
to withstand
 \therefore be afraid!
be very afraid!