

Essn of Physics

Calculating Power and Work

Name

Date

Hr.

FORMULAS

Work = Force X Distance

Power = $\frac{\text{Work}}{\text{Time}}$

1. How much work does a 25 N force do to lift a potted plant from the floor to a shelf 1.5 meters high?
2. A father lifts his daughter in the air 2.0 meters and exerts an average force of 190 N. How much work does he do?
3. A crane uses an average force of 5200 N to lift a girder 25 meters. How much work does the crane do on the girder?
4. An apple weighing 1 N falls for a distance of 1 meter. How much work is done on the apple?
5. The brakes on a bicycle apply 125 N of frictional force to the wheels as the bicycle travels 14.0 meters. How much work have the brakes done on the bike?
6. While rowing in a race, John uses his arms to exert a force of 165 N per stroke while pulling the oar 0.800 meters. How much work does he do in 30 strokes?
7. A mechanic uses a hydraulic lift to raise a 1200 kg car 0.5 meters off the ground. How much work does the lift do on the car?

8. Your family is moving to a new apartment. While lifting a box 1.5 meters straight up to put it on a truck, you exert an upward force of 200 N for 1.0 seconds. How much power is required to do this?
9. You lift a book from the floor to a bookshelf 1.0 meters above the ground. How much power is used if the upward force is 15.0 N and you do the work in 2.0 seconds?
10. While rowing across the lake during a race. John does 3960 J of work on the oars in 60.0 seconds. What is his power output in watts
11. Every second, a certain coal-fired power plant produces enough electricity to do 900 J of work. What is the power output of this power plant in units of watts?
12. Using a jack, a mechanic does 5350 J of work to lift a car 0.500 meters in 50.0 seconds. What is the mechanic's power output?
13. Suppose you are moving a 300 N box of books. Calculate your power output in the following situations:
- You exert a force of 60.0 N to push the box across the floor 12.0 meters in 20.0 seconds?
 - You lift the box 1 meter onto a truck in 3 seconds?
14. Anna walks up the stairs on her way to class. She weighs 565 N and the stairs go up 3.25 m vertically.
- Calculate the power output if she climbs the stairs in 12.6 seconds?
 - What is her power output if she climbs the stairs in 10.5 seconds?