CALCULATING POWER

Name _____

Power is the amount of work done per unit of time. The unit for power, joules/second, is the watt.

$$\text{Power} = \frac{\text{work}}{\text{time}}$$

work = joules
time = seconds

Solve the following problems.

1. A set of pulleys is used to lift a piano weighing 1,000 newtons. The piano is lifted 3 meters in 60 seconds. How much power is used?

   Answer: _____

2. How much power is used if a force of 35 newtons is used to push a box a distance of 10 meters in 5 seconds?

   Answer: _____

3. What is the power of a kitchen blender if it can perform 3,750 joules of work in 15 seconds?

   Answer: _____

4. How much work is done using a 500-watt microwave oven for 5 minutes?

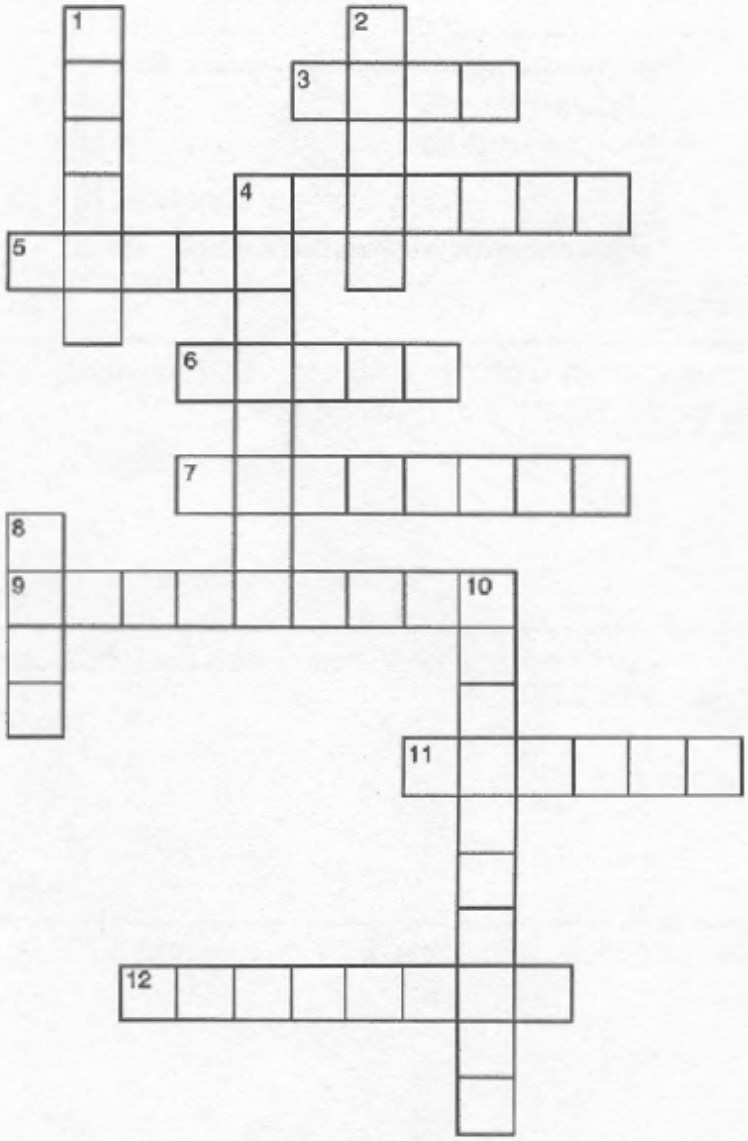
   Answer: _____

5. How much work is done using a 60-watt light bulb for 1 hour?

   Answer: _____

FORCE AND WORK CROSSWORD

Name _____



Across

3. Force times distance
4. Point around which a lever rotates
5. Amount of work done per unit of time
6. Can be considered a type of inclined plane wrapped around a cylinder
7. A machine makes work easier by reducing force and increasing _____ .
9. How many times a force is multiplied by a machine is the mechanical _____ .
11. An inclined plane is an example of a _____ machine.

Down

1. Unit of force
2. Unit for work (newton-meter)
4. Force that reduces the efficiency of a machine
8. Joule per second
10. Work output divided by work input.
12. An automobile is an example of a _____ machine.

POTENTIAL AND KINETIC ENERGY

Name _____

Potential energy is stored energy due to position. Kinetic energy is energy that depends on mass and velocity (movement).

Potential Energy = Weight x Height (P.E. = w x h)

Kinetic Energy = $^1/_2$ Mass x Velocity^2 (K.E. = $^1/_2mv^2$)

The units used are:
- Energy = joules
- Weight = newtons
- Height = meters
- Mass = kilograms
- Velocity = m/s

For a closed system, the sum of the potential energy and the kinetic energy is a constant. As the potential energy decreases, the kinetic energy increases.

Solve the following problems.

1. What is the potential energy of a rock that weighs 100 newtons that is sitting on top of a hill 300 meters high?

   Answer: _____

2. What is the kinetic energy of a bicycle with a mass of 14 kg traveling at a velocity of 3 m/s?

   Answer: _____

3. A flower pot weighing 3 newtons is sitting on a windowsill 30 meters from the ground. Is the energy of the flower pot potential or kinetic? How many joules is this?

   Answers: _____ _____

4. When the flower pot in Problem 3 is only 10 meters from the ground, what is its potential energy?

   Answer: _____

5. How much of the total energy in Problems 3 and 4 has been transformed to kinetic energy?

   Answer: _____

6. A 1200 kg automobile is traveling at a velocity of 100 m/s. Is its energy potential or kinetic? How much energy does it possess?

   Answers: _____ _____