

**SIMPLE  
MACHINES  
STUDY  
GUIDE**

**VOCABULARY REVIEW**

# ESSENTIAL VOCABULARY

1. **Input force** – A force you apply to a simple machine.
2. **Efficiency** – Ability of a machine to convert work input into work output.
3. **Mechanical advantage** – Ratio of output force to input force.

4. Output force – Force you overcome when using a simple machine.
5. compound machine – Device made of more than one simple machine.
6. Fulcrum – The pivot point of a lever.

Remember you should be able to describe the following simple machines and give an example of each:

- A. **Inclined plane** – A slanted surface used to raise an object. ex: wheelchair ramp
- B. **Wedge** – An inclined plane with one or two sloping sides. ex: knife
- C. **Lever** – A bar that is free to pivot about a fixed point. ex: a rake
- D. **Wheel and axle** – Simple machine that consists of two circular objects. ex: potter's wheel
- E. **Screw** – An inclined plane wrapped around a cylinder post. ex: threaded bolt
- F. **Pulley** – A grooved wheel with a rope or chain wrapped around it. ex: flagpole

# Can you explain

**What is work?** Work is when a force causes an object to move in the same direction that the force is applied.

**Give 3 examples of work being done.**

1. Pushing a box from the bottom of a hill to the top of the hill.
2. Pulling a sled across a field covered with snow.
3. Lifting a book bag off the floor.

Give 3 examples of work not being done.

1. The Moon orbiting Earth.
2. Standing still.
3. Pushing on a refrigerator that doesn't move.

Explain if it is possible to get more work out of a machine than you put into it? No- Why not?

The unit for power is \_\_\_\_\_. Watt

Describe the relationship between distance and work in reference to simple machines. The amount of work needed decreases as the distance between the fulcrum and the force you apply increases.

The thread that wraps around a screw can be classified as what type of simple machine? Inclined plane

Describe how a fixed pulley makes doing work easier. A fixed pulley makes work easier by changing the direction of the input force.

Describe how a screw makes doing work easier. A screw makes work easier by changing the size or direction of a force with one movement.

The rate at which work is done is called \_\_\_\_\_. Power

Explain mechanical advantage. Mechanical advantage occurs when a machine allows you to do less work to complete a job.

Next to each situation write work or no work. Then explain your answer.

Work is done on an object when an object moves in the same direction as the force being applied.

- A. Studying for this test. N
- B. Lifting a bag of groceries W
- C. Walking a dog on a leash N
- D. Sleeping N
- E. Pressing a stamp onto an envelope N

# Can you explain

What is the purpose of a machine? The purpose of a machine is to make work easier.

A winding mountain road would be an example of what type of simple machine.  
Inclined plane

What type of simple machine is a doorknob?  
Wheel and Axle

# ANSWER THE QUESTION

All forms of energy can do

\_\_\_\_\_ . Work

The unit for work is \_\_\_\_\_ .

Joules

What is the formula for work?

Work = Force x Distance

What is the formula for  
power?

Power = Work / Time

What is the formula for mechanical advantage? Mechanical Advantage = Output / Input

A rock weighing 2 newtons was lifted 3 meters. How much work was done?

$$2\text{N} \times 3 \text{ Watts} = 6 \text{ Joules}$$

How much power was used in question 27 if it took 2 seconds to lift the rock?

$$6\text{J} / 2 \text{ S} = 3 \text{ Watts}$$

To pry the lid off a paint can, you apply a force of 50 newtons to the handle of a screwdriver, what is the mechanical advantage of the screwdriver if it applies a force of 500 newtons to the lid?

$$500\text{N} / 50\text{N} = 10$$