

Name: \_\_\_\_\_

# Simple Machines

by Sandie Lee

We use simple machines every day. They help us lift, pull, transport, and hold objects together. Without these very basic machines our lives would be much harder.

## Amp Up Your Ramp - *Inclined Plane*

Imagine trying to carry a heavy box up a ladder. It would probably be difficult and perhaps even dangerous. But if you were to place a long sheet of plywood on the ladder and push the box up, it would take less effort and energy.

You can see people using inclined planes, or ramps, all the time in their daily lives. Have you ever seen a delivery truck with a long ramp? The ramp helps people load or unload products more easily. Have you ever seen a building with a ramp that leads to a door? This is an inclined plane for people using wheelchairs.



A ladder leaning on a wall is an inclined plane. Stairs are sloped to make an inclined plane. The bottom of your bathtub is also an inclined plane because it is sloped to force water toward the drain.

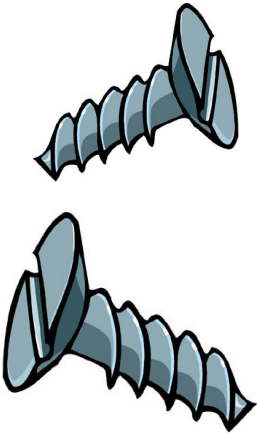
## Get the 'Wedge' Edge



What has at least one slanting side and ends in a sharp edge? A wedge. A wedge is similar to a ramp, but instead of moving an object from here to there, it pushes it apart. The narrower the wedge is, the easier it is to divide something.

Wedges can be sharp like axes, knives, or shovels. They can also be round, like the tip of a nail or the tines of a fork. Just imagine how difficult it would be to eat dinner without the help of knives and forks to cut and pick up your food.

### Simply Screwy



Even a basic screw is a simple machine. A screw is made of two simple machines combined together. An inclined plane is wrapped around a wedge to form a screw. This wrapped inclined plane is called a thread.

When the thread of a screw is wide, it will be harder to turn. If it is narrow, it will be easier to turn but it will take longer to fasten.

Jars, bottles, and their lids are also considered screws. Drill bits are screws too.

### The Clever Lever

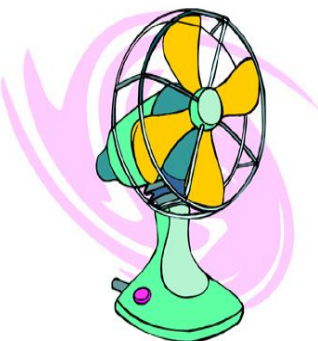
Levers are able to help us lift heavy objects. It's easy to recognize a lever - many tools with a handle attached are considered one.

Levers consist of a stick and a fulcrum (*fuul-kruh-m*). The fulcrum is the point on which the lever moves. By changing the position of the fulcrum you will either gain or lose power - the closer the fulcrum is to the object the easier it is to lift.

Seesaws, shovels, and crow bars are all levers.



### The Wheel Deal



The wheel and axle is one of the oldest simple machines around. In fact, a wheel was found dating back 5,500 years. A true simple wheel and axle machine consists of a rod (axle) secured to a wheel.

A water faucet has a wheel and axle on it. The knob that you turn is the wheel. When you turn the knob, you are also turning an axle that it's attached to.

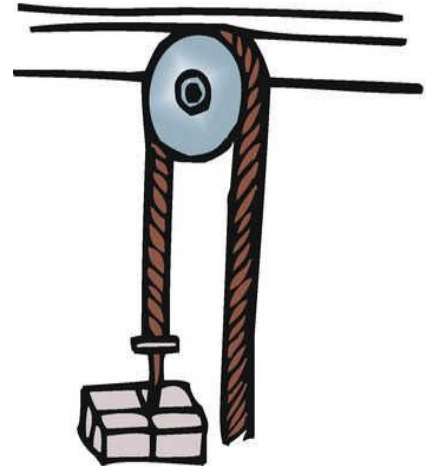
A fan is another example of a wheel and axle. The fan blades (wheel) are attached to a rod (axle). When the motor is turned on, the fan blades will spin and produce a nice cooling breeze on a hot day.

### **Pull That Pulley**

Take a wheel with a groove running around and it. Add an axle and a rope or cable. Put them together and you have a pulley.

When you work with a pulley, lifting becomes a cinch. Why? The rope on each side of the pulley supports half of the entire weight of the object being lifted. With one pulley, you only need to use half the force required to lift the object.

Imagine raising a flag to the top of the pole without a pulley. How would you do it? You could take a ladder and climb to the top and fasten the flag. You could use a ramp and push it to the top. The easiest way would be to simply attach it to a pulley and hoist away. Letting pulleys do the job is safe, simple, and fun!

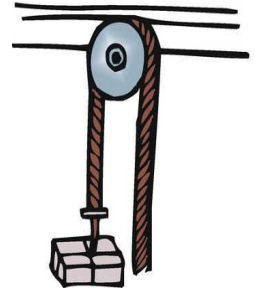


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1. What type of simple machine is found on a water bottle cap?

- a. lever
- b. pulley
- c. wheel and axle
- d. screw

2. How is a wedge like an inclined plane? How is it different?

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3. On which type of simple machine would you find a fulcrum? Explain what a fulcrum is.

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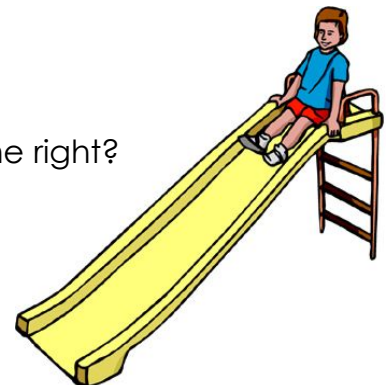
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4. Which is an example of a wheel and axle?

- a. shovel
- b. water faucet knob
- c. seesaw
- d. crow bar

5. What type of simple machine is shown in the picture to the right?

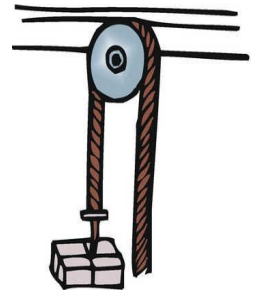
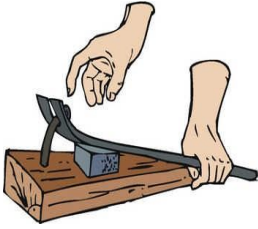
- a. inclined plane
- b. pulley
- c. wheel and axle
- d. wedge



# ANSWER KEY

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1. What type of simple machine is found on a water bottle cap? **d**
- |                   |                 |
|-------------------|-----------------|
| a. lever          | b. pulley       |
| c. wheel and axle | d. <b>screw</b> |

2. How is a wedge like an inclined plane? How is it different?

**A wedge has a slanted edge like an inclined plane. The difference is in how it's used. An inclined plane is used to move things from here to there, while a wedge breaks things apart.**

3. On which type of simple machine would you find a fulcrum? Explain what a fulcrum is.

**A fulcrum is found on a lever. It's the point on which the lever moves.**

4. Which is an example of a wheel and axle? **b**
- |           |                             |
|-----------|-----------------------------|
| a. shovel | b. <b>water faucet knob</b> |
| c. seesaw | d. crow bar                 |

5. What type of simple machine is shown in the picture to the right? **a**
- |                          |           |
|--------------------------|-----------|
| a. <b>inclined plane</b> | b. pulley |
| c. wheel and axle        | d. wedge  |

