SCIENCE FUSION Grade 3

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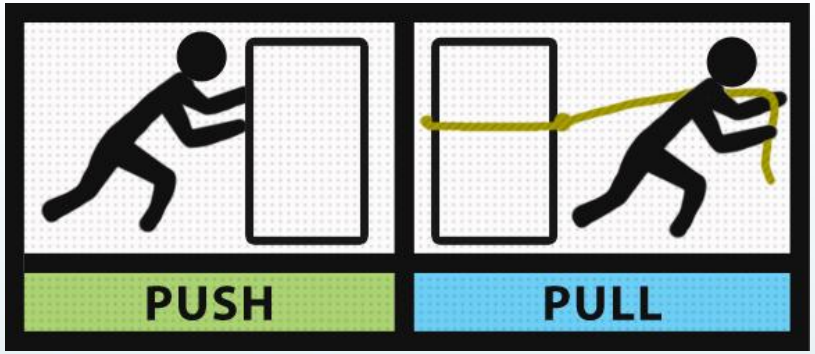
PowerNotes

Unit 10 **Lesson 1** What Are Simple Machines?

How Can We Use Simple Machines?

- Think of the work you do every day. Scientists define work in a certain way.
- **What is force?**
- **What is work?**

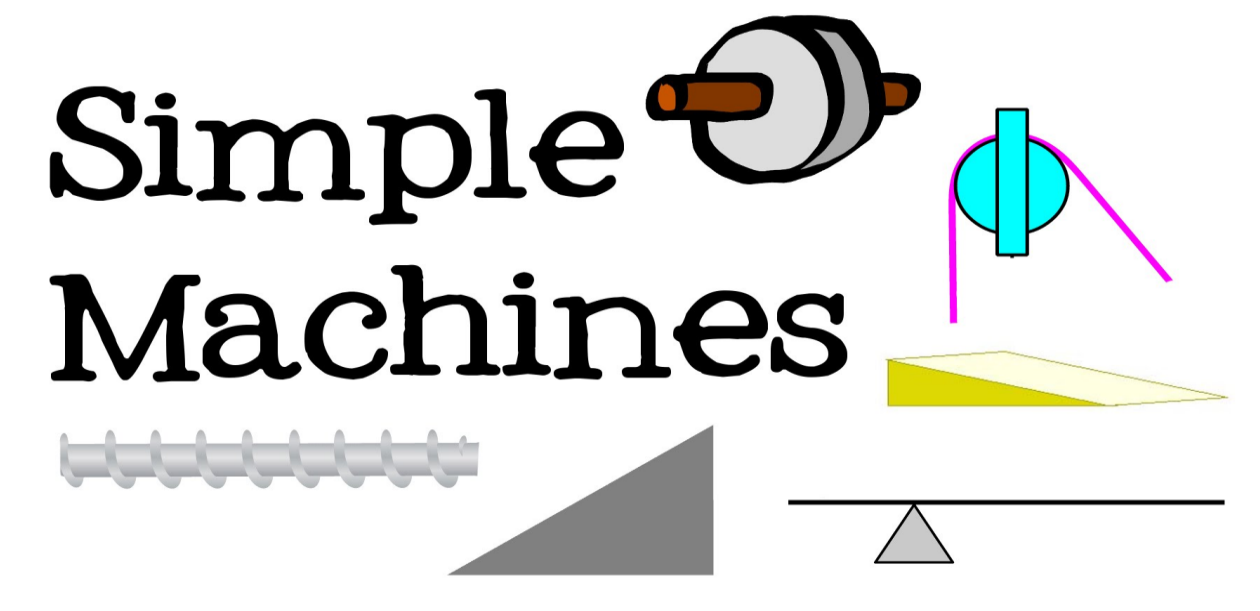


How Can We Use Simple Machines?

- Digging in sand uses force to move the sand, so digging in sand is work.
- **Work** is the use of a force—a push or a pull—to move an object across a distance.

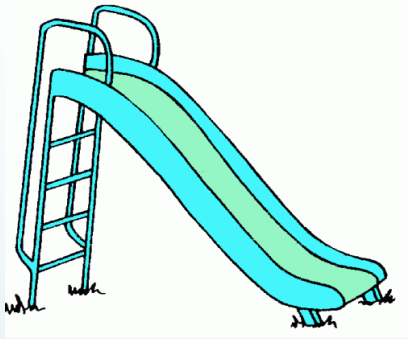
How Can We Use Simple Machines?

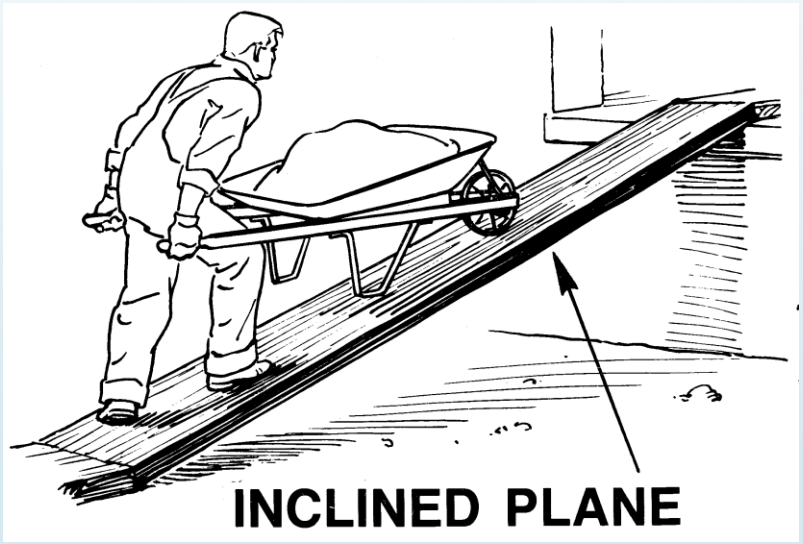
- What is simple machine?
  A **simple machine** is something that makes work easier. A simple machine has few or no moving



How Can We Use Simple Machines?

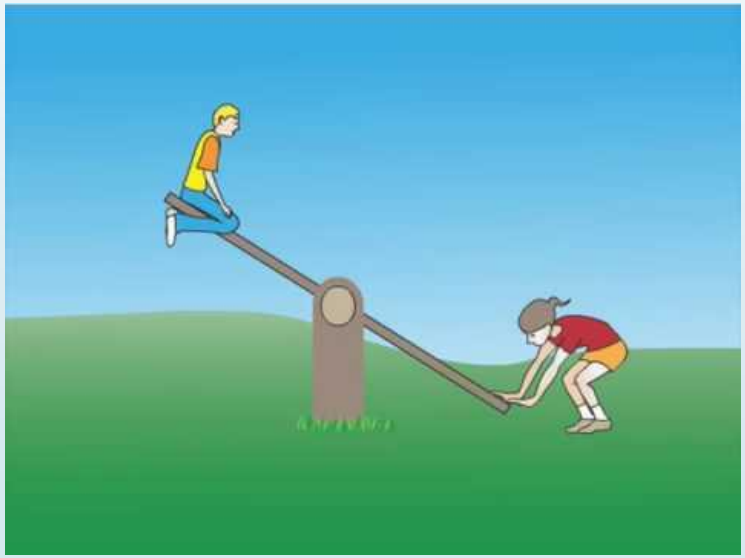
An inclined plane is a simple machine with a flat, sloping surface that makes moving and lifting things easier.

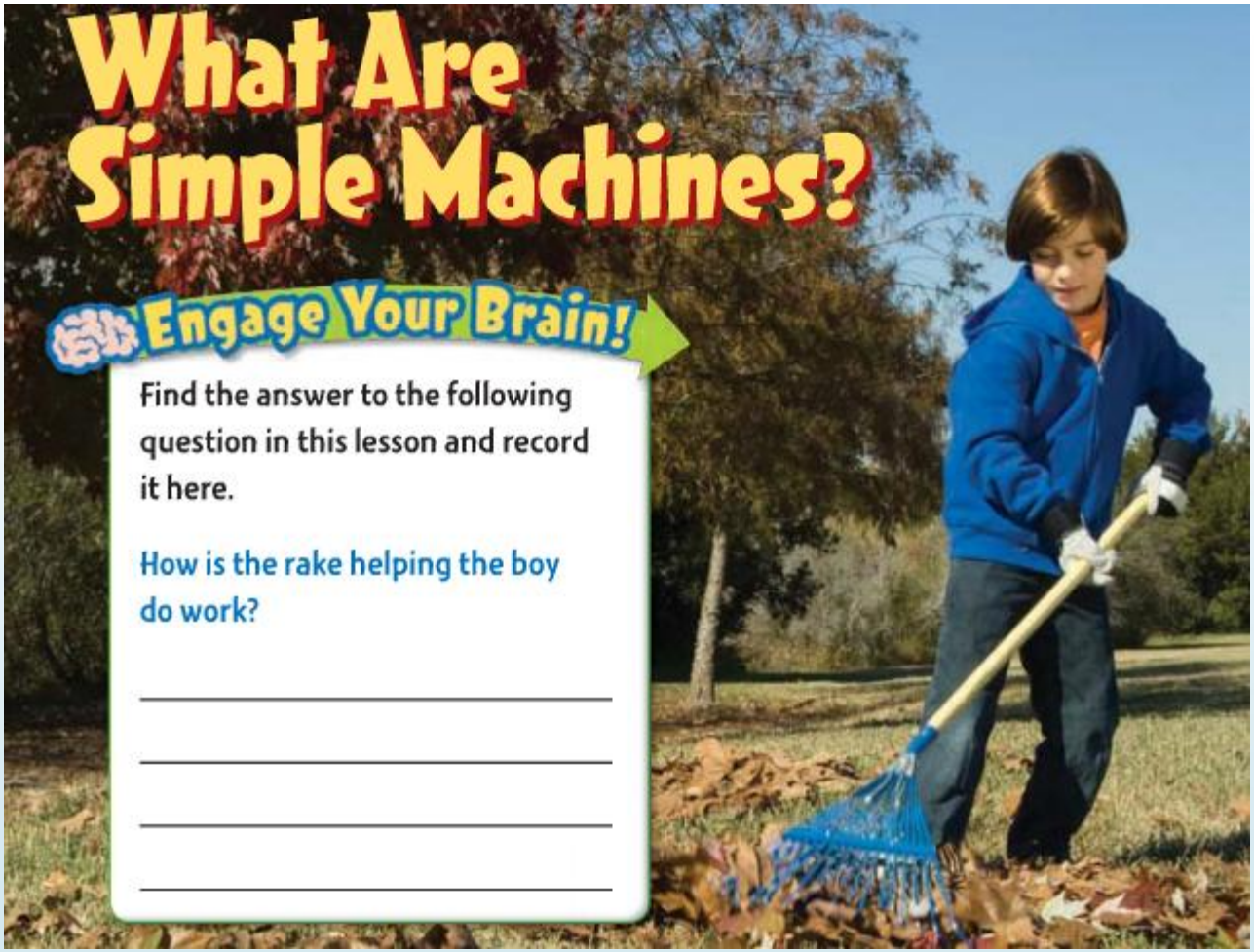




Levers Help You Lift

- A **lever** is a bar that pivots on a fixed point called a **fulcrum**. A fixed point is a point that doesn't move.



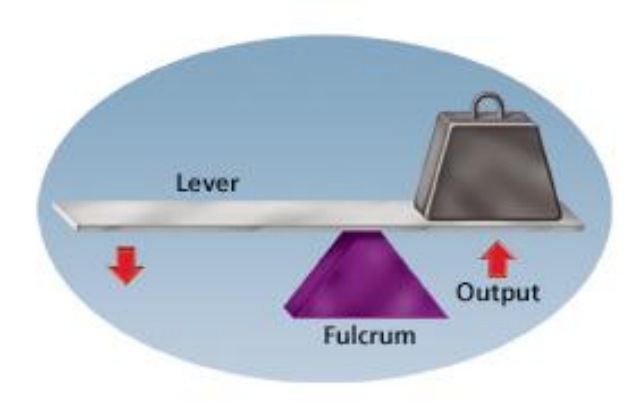


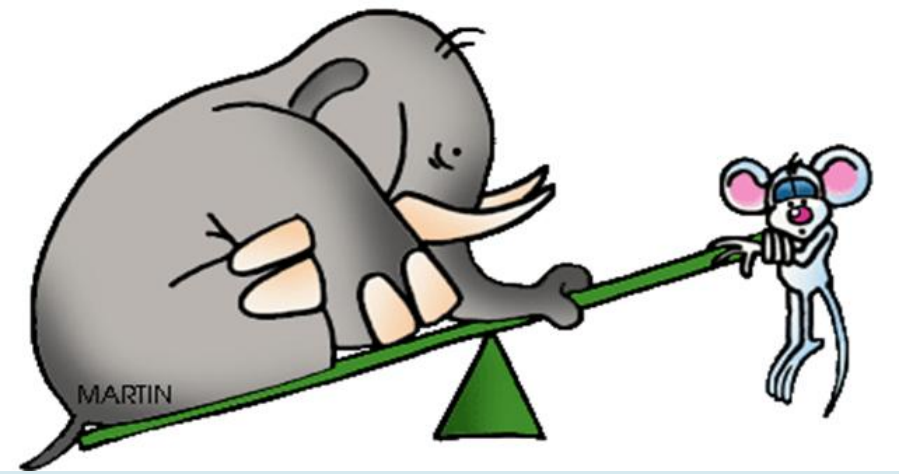
Simple Machines

Look at the shovels below. Why are these shovel handles simple machines?

Levers Help You Lift

The load—what you are moving—is on one end of the lever. As you move the other end of the lever, the lever moves the load.





Levers Help You Lift

- A fork is one kind of lever. As you lower your hand, the fork lifts the food—the load—to your mouth.
- A seesaw is another kind of lever. Its fulcrum is in the middle.

Levers Help You Lift

Rakes and brooms are another type of lever. Your hands move when you rake leaves or sweep a floor, but the load—the leaves or dirt—moves farther than your hands do. This makes your job easier.

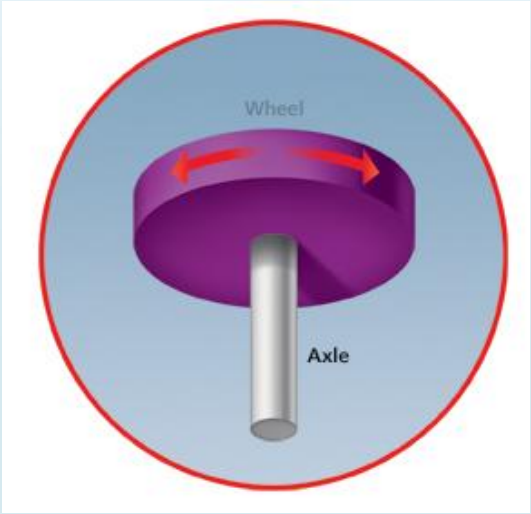
Levers Help You Lift

The Parts of a Lever

Draw a lever. Label the fulcrum, the load, and the applied force.

Using a Wheel-and-Axle

- A **wheel-and-axle** is made up of a wheel and an axle that are connected so that they turn together.
- A wheel-and-axle uses a circular motion to increase force. If you turn the wheel, the axle turns with greater force.



Using a Wheel-and-Axle

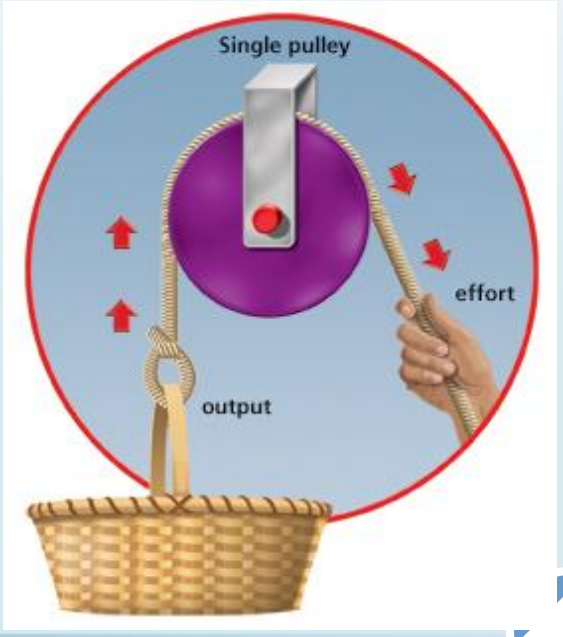
- The handlebars of a bike are an example of a wheel-and-axle.
- The handlebars of a bike are connected to the shaft, or axle.
- The shaft then connects to the wheel, allowing you to turn the bike without having to move the wheel with your hands.

Another Wheel-and-Axle

A doorknob is another example of a wheel-and-axle. When you turn the knob, the axle turns, too. As it does, it pulls back the catch, and the door opens. Which part of the doorknob is the wheel?

Pulley Power

- A **pulley** is a wheel with a rope, cord, or chain around it.
- A pulley makes work easier by changing the direction of the force.



Pulley Power

- An example of a pulley is at the top of the mast on a sailboat.
- One end of a rope is attached to the sail. The rope then goes through the pulley and back down to the boat.
- You can pull on the rope to raise the sail without having to climb to the top of the mast.

Pulley Power

Make a list of simple machines in your school. Tell which type of simple machine each is.

Pulley Power

Label each simple machine.