

Wheels Rolling Along

Station 1

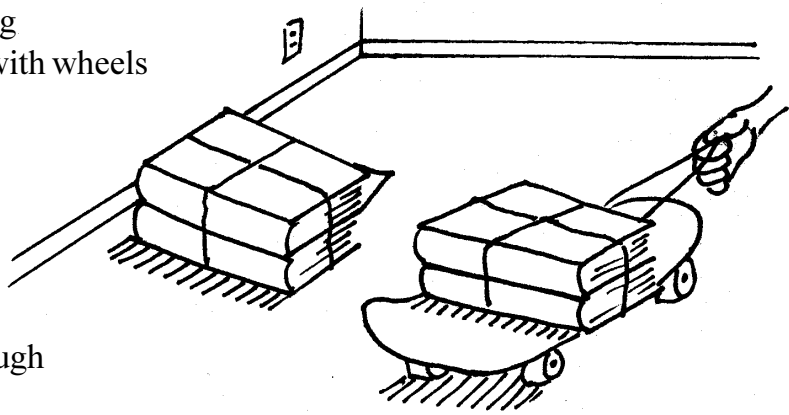
The wheel is one of the most important machines. It allows things to roll instead of slide when a force is applied. In this activity, you will observe how wheels help move an object.

Materials

- Books tied together with string
- Skateboard or similar object with wheels
- Rubber band
- Ruler

Procedure

1. Make a handle with the rubber band by looping it through the string.
2. Place the books on the floor and use the handle to pull them a short distance.
3. With the ruler, measure how far the rubber band stretches as you pull the books.
4. Place the books on the skateboard and use the handle to pull it a short distance. Use the ruler to measure how far the rubber band stretches.
5. Take turns doing steps 1-4 and discuss what you observe.



Levers Lifting the Load

Station 2

A lever makes it easier to move heavy things. Levers concentrate a force around a pivot point. A cattle rancher needs to use fences around the pasture. The heavy gates open and close easier because they have hinges that are levers. The gate fasteners are often levers too!

Materials

- Light book tied with string
- Rubber band
- Ruler
- Yardstick marked at 24 inches
- Fulcrum or balance point of some kind such as metal bookend

Procedure

1. Make a handle with the rubber band by looping it through the string.
2. With the ruler, measure how far the rubber band stretches as you lift the books off the table with your hand. This demonstrates the amount of force necessary to lift the books.
3. Place the fulcrum or bookend under the yardstick at the mark and put the books onto the short end of the yardstick. Attach the rubber band to the long end of the yardstick. Use the rubber band to pull the long end of the yardstick down, lifting the books on the short end of the yardstick. With the ruler, measure how far the rubber band stretches as you pull down.
4. Take turns doing steps 1-3 and discuss what you observe.

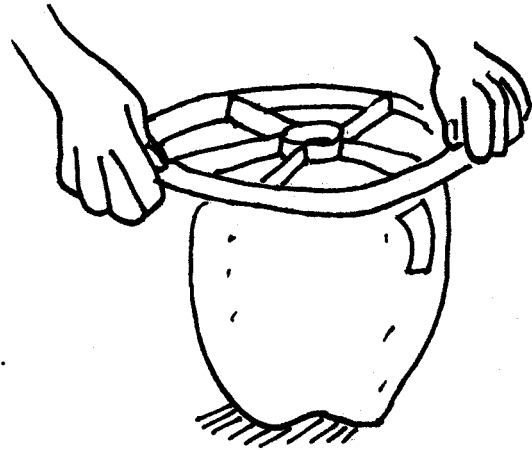
The Wedge Forces Apart

Station 3

A wedge makes it easier to split things apart. When the wedge is pushed down, the object pushed upon splits apart. For example, after a farmer harvests apples and sells them, the apples are often peeled, cored and sliced to be used in pies. The knife, apple peeler, and cutter used to prepare the apples are wedges. You will use a wedge in this activity.

Materials

- Apple
- Paper towels
- Plastic knife or metal apple cutter



Procedure

1. Wash your hands and the apple before starting.
2. Put the apple on the paper towel.
3. Position the wedge (knife or apple cutter) on top of the apple and push down with a lot of force to cut the apple into sections.
4. Discuss your observations with the group as you enjoy eating your apple wedges.

The Pulley Has Pull

Station 4

Pulleys make lifting easier for people by changing the direction of a pull. There are many different kinds of cranes that lift and move heavy loads. Imagine what it would be like if pulleys were not used to raise and lower flags or to place hay in a barn. In this activity, you will observe how pulleys make work easier for people.

Materials

- Paperback books tied together with string
- Pulley
- 3 feet of string
- Rubber band

Procedure

1. Tie a string around the books. Make a handle with the rubber band by looping it through the string.
2. Lift the books with your hand using the rubber band as a handle. Measure how far the rubber band stretches.
3. Remove the rubber band, and pass the string through the pulley.
4. Attach the rubber band to the end of the string, and pull down on the rubber band to lift the books up. Measure how far the rubber band stretches as you pull.
5. Take turns pulling down on the rubber band, and discuss your observations.

Inclined Plane Going Up

Station 5

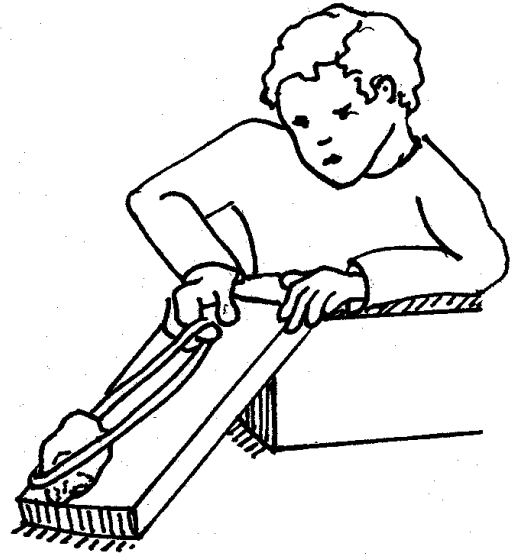
It is much easier to move a heavy weight up or down if an inclined plane is used. A ramp (a type of inclined plane) is very useful when a cattle rancher loads cattle onto trucks to move them from one pasture to another. In this activity, you will observe the usefulness of inclined planes.

Materials

- Several books
- Rock tied with a string
- Rubber band
- Ruler
- Shoe box lid

Procedure

1. Make a handle with the rubber band by looping it around the string.
2. With the ruler, measure how far the rubber band stretches as you use one hand to lift the rock straight up from the desk to the top of the books.
3. Stack three books on the desk. Rest the shoe box lid, top side up, against the books to make an inclined plane or slope. Use the ruler to measure how far the rubber band stretches as you pull the rock up the inclined plane. Stack more or less books to vary the steepness of the slope.
4. Take turns doing steps 1-3 and discuss your observations.



Screw a Firm Hold

Station 6

A screw is very useful because it attaches things together. Screws also can be used to raise and lower things. In an agricultural machine called a “combine,” an auger, or moving screw, pushes grain into a container.

Materials

- Wood with holes (2 pieces)
- Screw
- Screwdrivers

Procedure

1. Stack the two pieces of wood together.
2. While holding the screw over the top piece of wood, use the screwdriver to turn the screw through the pieces of wood. They will be held together firmly.
3. Your teacher may have used a drill to pre-make holes for you.
4. Take turns using the screwdriver and discuss your observations.

