



Lever Station

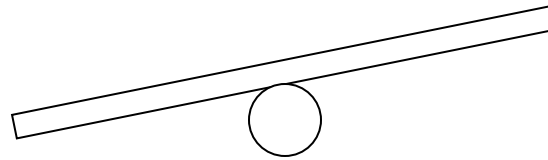
Levers have 3 parts. The part where the lever is supported is called the **FULCRUM**. The part from the fulcrum to the weight you want to lift is called the **WEIGHT ARM**. The part from the fulcrum to where you are pushing or pulling is called the **FORCE ARM**.

Question:

Is a weight easier to move when the force arm is longer, shorter, or the same length as the weight arm?

Materials:

Juice can, board, books



Procedure:

1. Make a lever using the board and juice can as shown.
2. Put four books on one end of the lever. This will be the weight you need to lift.
3. Adjust the board on the fulcrum to make the force arm shorter than the weight arm.
4. Add books one at a time to the force arm. Record how many books it takes to move the weight arm.
5. Repeat steps 3 and 4 with a longer force arm and a force arm the same length (the fulcrum, juice can will be in the center.)

Results:

1. Is a weight easier to move with a shorter, longer, or same length force arm?
2. Is that what you thought?
3. What did you learn?



Pulley Station

A PULLEY lets us change the direction of the force we use to do work. This lets use force less to do the same amount of work.

Question:

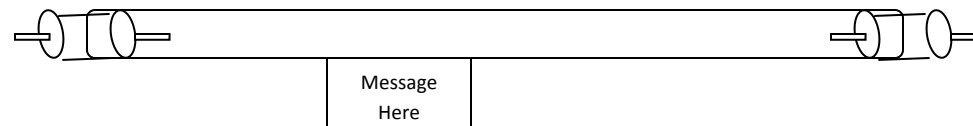
Can you use a pulley to help you send messages across the room?

Materials:

2 thread spools, 40 feet of string, 2 round pencils, paperclips, messages

Procedure:

1. Place the pencils through the thread spool centers. Tie the ends of the string together to make a loop. Have one person hold the ends of one pencil (allowing the spool to turn freely). Have one person hold the other spool. Wrap the string around the spools to create a pulley system.
2. Write a message, attach it to the pulley with a paper clip. Have a third person pull the string to move the message.



Results:

1. Did your message travel across the classroom by pulley?
2. Is that what you thought would happen?
3. What did you learn?



Wheel and Axle Station

A WHEEL and AXLE help us turn something more easily or move something across a surface more easily. That is, with a wheel and axle, you use less force.

Question:

Which needs less force to be moved, a roller skate on its side or on its wheels?

Materials:

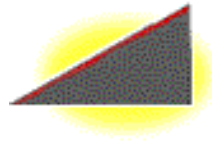
2 roller skates, 2 rubber bands the same size, yard stick

Procedure:

1. Attach rubber bands to the roller skates.
2. Measure the length of the rubber bands before you pull.
3. Put the skate on its side. Measure the rubber band during the pull.
4. Pull the skate on wheels. Measure the rubber band during the pull.

Results:

1. Which skate needed less force to be moved?
2. Is that what you thought?
3. What did you learn?



Inclined Plane Station

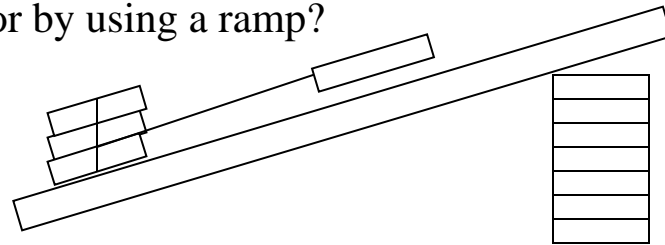
An **INCLINED PLANE** (or ramp) is a flat surface with one end higher than the other end. An inclined plane lets us raise heavy things without having to lift straight up.

Question:

Which is the easier way to lift 3 books—straight up, or by using a ramp?

Materials:

Board, 10 books, string, spring scale



Procedure:

1. Tie 3 books together. Stack 7 books in a pile.
2. Lift the 3 books to the top of the seven book pile with a spring scale. Record the weight.
3. Use the board and seven books to make an inclined plane.
4. Pull the 3 tied books up the ramp with the spring scale. Record the weight.

Results:

1. Which was the easiest way—straight up or using the ramp?
2. Is that what you thought?
3. What did you learn?



Wedge Station

A WEDGE is like two incline planes (ramps) put back-to-back. But, there is a difference in how they work. The wedge moves through the material, while the material is moved over an inclined plane. A wedge is used to split, cut, or go through materials such as wood, metals and other hard materials. A nail is one example of a wedge.

Question:

What is easier to pound into a board, a nail with a point (wedge) or a blunt nail?

Materials:

Large nails without and without points, hammers, board, rulers

Procedure:

1. Measure the nails and record.
2. Hammer the nail with the wedge five times. Measure the part of the nail you can see and record.
3. Hammer the nail without the wedge five times. Measure the part of the nail you can see and record.

Results:

1. Which nail was easier to pound?
2. Is that what you thought?
3. What did you learn?



Screw Station

A SCREW is used to hold things together. It has a line that goes around it called THREAD (actually a twisting inclined plane).

Question:

What type of screw takes more turns to go into a block of wood - one with more or less thread?

Materials:

Wood block, same size screws with different sized threads, screwdriver, masking tape

Procedure:

1. Wrap a screwdriver handle with a piece of masking tape. Make a mark on the tape. YOU WILL COUNT ONE TURN EACH TIME THE MARK COMES BACK TO THE PLACE IT STARTED.
2. Place the screw driver into the slot of one screw. Watch where the mark is and start turning the screw to the right.
3. Count how many turns it takes to get the screw all the way into the wood.
4. Repeat for the other screw or screws.

Results:

1. Which screw took more turns to go all the way into the wood?
2. Is that what you thought would happen?
3. What did you learn?