Simple Machine Station Guide For the Teacher

Students will spend five minutes completing activities at each station in an attempt to explore simple machines. Set a timer for five minutes, and let the fun begin!

Station 1 Lever – The students will make a lever out of the given materials and explore the relationship of the fulcrum to the load. The students will discover that it is easier to move an object when the fulcrum is closer to the load.

Materials: wooden ruler, object to lift, tape, can, Simple Machine worksheet

Station 2 Inclined Plane – The students will make inclined planes with boards varying the slope of the board. There will be rubber bands around the book. The students will tie the string to the rubber bands and pull the books up the different inclined planes. They will also pull the books straight up without using the inclined planes. The students will find that it takes more work to move an object up an inclined plane with the steepest slope

Materials: 2 boards varying in lengths, string, rubber bands, ruler, heavy book, Simple Machine worksheet

Station 3 Wheel and Axle – The students will push one car on its side and the other on its wheels. They will note the difference in distance traveled.

Materials: 2 matchbox cars, rulers, wheel and Simple Machine worksheet

Station 4 Screw – The students will make a screw out of an inclined plane. Student will cut the square diagonally to make an inclined plane. Tape one of the short edges of the triangle to a pencil. Wrap the triangle around the pencil. They will actually see the inclined plane as part of the screw.

Materials: 9 inch paper square, tape, pencil, scissors, tabletop, Simple Machine worksheet

Station 5 Wedge – The students will cut paper with both sharp scissors and dull scissors. They will observe that the sharp scissors will cut better than the dull scissors.

Materials: paper, dull scissors, sharp scissors, zipper, Simple Machine worksheet.

Station 6 Pulleys – The students will make a pulley with a sewing spool, string, and a pencil. They will use this pulley to lift an object. They will compare lifting the object with the pulley and without the pulley. They will find that it is easier to lift an object with the use of a pulley.

Materials: Sewing spool, string, pencil, object to lift, Simple Machine worksheet

Simple Machine Worksheet

Welcome to the simple machine exploration lab. Your group spends five minutes at each station. Read the directions, and work through the activity. Pay close attention to the questions at each station, you will complete a lab report when you are done. When you hear the timer ring, move to the next station. Have Fun!

1. Lever

Lets make a lever!

A lever is a rigid bar resting on a fulcrum, used to help move a heavy or firmly fixed load with one end when pressure is applied to the other.

1. Use the supplies at this station to make a lever.
   - the ruler is the rigid bar
   - the can is the fulcrum
   - the book is your load

2. Change the location of the fulcrum, what happens? Is it harder to move your book or easier?

2. Incline Plane

Lets make an incline plane!

An inclined plane is a flat supporting surface tilted at an angle, with one end higher than the other, used as an aid for raising or lowering a load.

1. Use the supplies at the station to make an inclined plane.
   - tie the string to the rubber bands and pull the books up the different inclined planes.
   - pull the books straight up without using the inclined planes.

2. What was the difference?

3. Screw

What is a screw?

An inclined plane wrapped around a shaft or cylinder. This inclined plane allows the screw to move itself or to move an object or material surrounding it when rotated.

1. Use the scissors to cut a square diagonally.
2. Tape one of the sides of the inclined plane you just made to the pencil
3. Wrap the paper around the pencil, and tape it at the end.
4. Did you make screw?

4. Wedge

What in the world is a wedge?

Two inclined planes joined back to back. Wedges are used to split things.

1. Cut the paper with scissors A
2. Cut the paper with scissors B
3. What was the difference?
4. Look at the zipper. Is it a wedge? Why or Why not?

5. Pulley

Let's try out a pulley!

A pulley is a wheel that usually has a groove around the outside edge. This groove is for a rope or belt to move around the pulley. Pulling down on the rope can lift an object attached to the rope. Work is made easier because pulling down on the rope is made easier due to gravity.

1. Use the pencil, the string, and the spool to make a pulley.
2. Try to lift the objects at the station
    a. First with the pulley
    b. Next without the pulley (use your hands)
3. What was the effect of the pulley?

6. Wheel and Axle

Let's look at wheels…

A wheel and axle has a larger wheel (or wheels) connected by a smaller cylinder (axle) and is fastened to the wheel so that they turn together. When the axle is turned, the wheel moves a greater distance than the axle, but less force is needed to move it. The axle moves a shorter distance, but it takes greater force to move it.

1. Use the supplies at the station to explore wheels and axles.
2. Can a wheel work without an axle?

Simple Machine Lab Report

Now that you have completed your lab, answer the following questions. Be sure that you use complete sentences.

1. How do levers make work easier?

2.What effect does moving the fulcrum have on the work done by the lever?

3. Do we have any inclined planes here at the school?

4. What type of simple machine is a knife?

5. Give me two example of a pulley from your everyday life.

6. What two types of simple machines are combined to make a screw?

7. Compare and contrast: How are a pulley, and a wheel and axle different? How are they the same?

8. What joint/part of your body is similar to a lever?

9. List two new things that you experienced today.

10. What part of this lab was most difficult for you?