

**Project Focus
Best Lesson**

Grade Level: 4th grade

Title of Lesson: Simple machines

Unit Title: Physical Science

Performance Standard(s) Covered:

Students will demonstrate the relationship between the application of a force and the resulting change in position and motion on an object.

S4P3. Students will demonstrate the relationship between the application of a force and the resulting change in position and motion on an object.

a. Identify simple machines and explain their uses (lever, pulley, wedge, inclined plane, screw, wheel and axle).

Essential Question: What is force? What is a simple machine? Identify the different types of simple machines and their uses.

Objective: Students will learn different types of simple machines

Key Words and Terms:

simple machine: basic mechanical devices for applying a force

lever: A lever is a stiff bar that rests on a support called a fulcrum which lifts or moves loads.

pulley: A pulley is a simple machine that uses wheels and a rope to raise, lower or move an object

wedge: A wedge is an object with at least one slanting side ending in a sharp edge, which cuts material apart.

Inclined planes: An inclined plane is a slanting surface connecting a lower level to a higher level.

screw: A screw is an inclined plane wrapped around a pole which holds things together or lifts materials.

wheel and axle: A wheel with a rod, called an axle, through its center lifts or moves loads.

Learning Activity

Abstract (limit 100 characters): Students will learn what simple machines are. They will as well specifically construct an Archimedes screw and learning about the function.

Materials Needed

One plastic bottle (a water bottle)

One dowel (a pencil)

One Tape

Six Cardstock (index cards work just fine)

One tack

One bag of cereal
One scissors
One Bowl
One paper towel
One Plastic sandwich bags

Prepare the materials in advance:

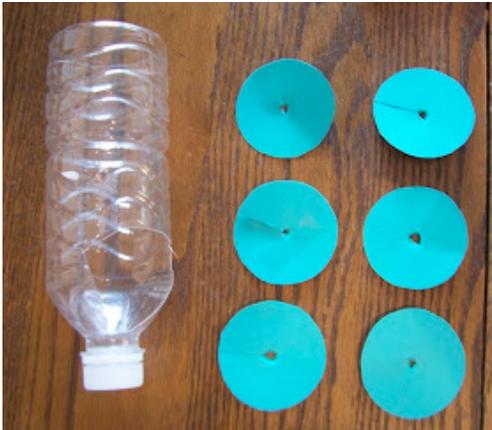
- 1) Have a little plastic sandwich bags where you will place the materials when you are done
- 2) Trace the circles on the index cards (6 circles)
- 3) Place a tack in the bag
- 4) Cut open the plastic bottles as shown below
- 5) Place a pencil in the plastic bag
- 6) Place all materials in the plastic bag

Safety Concerns:

- Don't allow the kids to use the scissors inappropriately
- Don't allow them to use the tacks inappropriately
- The bottle may have sharp edges (be careful when handling)

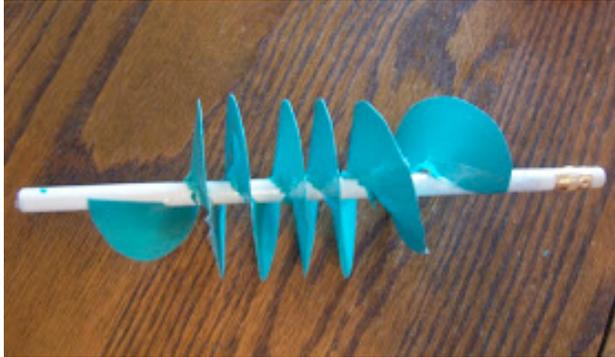
Directions

- 1) You have already cut off the bottom of the bottle, and cut a triangular hole in the top, like in the picture. Pass each bottle to the students in the class as well as the plastic bags filled with the material. Place one tape dispenser in each group. (What does the water bottle represent?)
- 2) Tell the students to cut out the six circles that is traced on the index cards in their bags. What does the circles represent?



- 3) Once the students have cut out the traced circles. Tell them to cut a smaller circle by folding the circle in half. Cut a hole big enough for the dowel to fit through in the center of each circle.
- 4) Next cut a slit from the edge of the circle to the hole (total of 6 circles)

5) Remove the pencil from the bag. Tape the circles together to form a spiral/screw onto the pencil. To do this, you need to attach one side of the cut of each circle to the opposite side on the next circle.(figure below)



6) Push the dowel (pencil) through the holes, and stretch out the spiral along its length. Tape the ends of the spiral to the dowel (pencil)

7) Slide the screw into the bottle, and tack it to the lid (at the top and bottom). You should now be able to move popcorn, cereal, etc. from one bowl to a bowl at a higher level by turning the dowel. (The bottle shouldn't turn - just the screw inside.)

8) Once the students has created their own screw. Tell them to form teams. Each team uses one screw to go against the other team. Place the cereal into a bowl for each team. Have them try to move as much cereal as they can use their screw onto the paper towel. Whoever moves the most cereal wins.

Questions: What are other examples of screws? What does the circles represent? What is the purpose of a screw? What is the purpose of simple machines?

Modification: In my lesson the main thing that I would modify is to have the students make their own screws individually. That way everyone is participating in the lesson and nobody is left out. I would also add a video clip into the lesson so that the kids better understand how the screw is supposed to look versus the screw that they made.

Reference: <http://sporschool.blogspot.com/2010/04/making-archimedes-screw.html?m=1>