

Bernoulli's Principle

Floating Ball

You will need:

--a straw

--a ping-pong ball, or a small styrofoam ball

Instructions:

1. Take the straw, hold it in your mouth and point it straight up.
2. Blow pretty hard through the straw to make a good air stream.
3. Set the ball gently in the air stream. The ball should float in the stream! Make sure you do not chase the ball, and just let it float in a steady stream. It won't go anywhere if you keep it pointed up in one place!!

Soda Cans

Materials and Equipment:

- 2 soda cans, emptied and rinsed out
- String, several feet
- scissors
- Clear tape or masking tape
- Hairdryer

Station will be ready.

Instructions:

1. Turn hairdryer on low.
2. Aim hairdryer between cans.
3. Use Beroulli's principle to explain why the cans move together and not apart.
4. Try it at High speed.

Have Scouts make their own to take home.

Pascal's Law

Matchstick Bottle

Materials needed:

- Matchsticks
- Bottle
- Rubber Balloon

Instructions:

1. Cut off the heads of the 5 matches and drop into the bottle.
2. Fill the bottle to the brim with water.
3. Cover the mouth of the bottle tightly with the balloon.

The match heads will float on top of the water but when the finger is pressed on the balloon diaphragm they will sink slowly to the bottom. When the finger is lifted, the match heads will float again.

This is because pressure is transmitted through the water, forcing a small quantity of water to penetrate the edge of each match head. This adds enough weight to the match head to make it sink and when the finger is removed, there is enough air pressure inside the heads to force out the water and make the match heads rise.

Balloon Blower

Materials needed:

- 2 tsp. Baking soda
- 1/4 Cup Vinegar
- Large soda bottle
- String

Instructions:

1. Pour baking soda into soda bottle.
2. Add Vinegar
3. Slip a balloon over the mouth of the bottle and tie it tightly with string
4. Shake bottle vigorously

What Happened???

The baking soda and vinegar produce carbon dioxide, which increases the pressure inside the bottle and makes the balloon expand.

Newton's 1st Law of Motion

Penny Drop Experiment

Materials needed:

- jars
- pencils
- pennies
- paper clips
- cardboard loops

Instructions:

1. Balance the loop on top of the jar
2. Place the penny on top of the loop.
3. Hold the jar with your non-dominant hand and a pencil in your other.
4. Place the pencil in the loop and roll the loop off the jar.
5. Your penny should have went inside the jar.
6. Try a paper clip

Newton's Law— an object that wants to rest stays at rest.

Egg Spin

Materials needed:

- Hard boiled eggs
- raw eggs

Instructions:

1. This is to be done on the floor.
2. Spin a hard boiled egg.
3. Spin a raw egg.
4. Which spins faster?

Answer?

The fresh egg should stop first. Why? The raw egg's contents are loose and it tends to stay at rest, slowing down the egg.

The hard boiled egg's contents are cooked and are solid, so it

spins as a whole.

Bucket Swing

Materials needed:

--bucket
--water

Instructions:

1. This is to be done outside.
2. Fill bucket half way with water.
3. Taking turns, swing pail of water back and forth at arm's length.
4. After a few times, swing it over your head in a full circle.

What Happens?

Do you know why??

Atmospheric
Pressure

Egg in the Bottle

Materials needed:

- glass container
- newspapers
- hard boiled eggs
- matches

Instructions:

1. Place torn newspaper into the bottom of container.
2. Light with match.
3. As soon as the fire gets going, place the hard-boiled egg on top.

What Happens?

Air Barometer

Materials needed:

- Glass or clear plastic quart bottle/jar (wide-mouth)
- water
- saucer or pie tin
- permanent marker
- ruler

Instructions:

1. Fill quart jar with water

2. Put saucer/pie tin over the top and flip over quickly
3. Allow a little water to escape into the saucer
4. With a marker, draw 8 or 10 marks on the jar $\frac{1}{4}$ inch apart
5. Check water level each day

Results:

- If the water level is higher, the atmospheric pressure is higher and fair weather is coming.
- If it's lower, look for unsettled weather.

Air Pressure

Balloon in Glass

Materials Needed:

- Balloons
- Paper/glass cups

Instructions:

1. Put a balloon into a glass. Have the bottom of the balloon touching the bottom of the glass.
2. Blow up the balloon. Hold balloon shut.
3. Lift the glass by the neck of the balloon.

Results:

--The air pressure inside the balloon holds the balloon against the glass.

Vinegar Rocket

To be done outside!!

Materials Needed:

- 1-quart soda bottle
- cork that fits tightly
- paper towels
- 1/2 Cup water
- 1/2 Cup Vinegar

--1 tsp. Baking soda
--Funnel

Instructions:

1. Pour vinegar and water into soda bottle
2. Put 1 tsp. Of baking soda in the center of a 4x4 inch piece of paper towel
3. Roll up the paper towel and twist the ends so the baking soda will stay inside
4. Drop the paper towel with the baking soda into the bottle
5. Put the cork on as tightly as you can and stand back and watch.
6. Make sure rocket is not pointing at anyone.

Results:

--The baking soda reacts with the vinegar to produce carbon dioxide gas.
--As the gas forms, pressure builds up and pushes out the cork with the thrust similar to a rocket being launched into outer space

Water & Atmospheric C Pressure

Water Balloon In Bucket of water

May want to do this one outside.

Materials Needed:

- Balloon
- water
- 2 gallon bucket

Instructions:

1. Fill 2 gallon bucket half-way with water
2. Slip a balloon onto a faucet. Fill it, supporting the weight with your hand
3. Hold the neck of the balloon tightly and remove from faucet
4. Set the balloon in a bucket of water and let go of the neck of the balloon

Results:

--Atmospheric pressure pushing on the surface of the water around the balloon forces a fountain of water out.

Crystals

Crystal Candy

Materials Needed:

- Sugar
- Water
- saucepan
- hot plate/microwave
- spoon for stirring
- clean white string
- pencils
- glass jars

Instructions:

1. Bring 1 Cup of water to a boil in a saucepan
2. Turn off heat and add 2 Cups of sugar
3. Stir until sugar is dissolved
4. Let it cool
5. Pour solution into glass jar
6. Tie a clean white string to a pencil
7. moisten the string in the water and drag it through dry sugar so that some sugar crystals stick to it
8. hang the string in the glass
9. store in cool place

Results:

- In the next few days, you will see Crystals forming on the sides of the glass
- By the next den meeting, big hard Crystals will have formed on the string
- Look at them through a magnifying glass

--enjoy

Optical Illusions

Have Scouts Read Pages 424-428 in their
Webelos Book.

Show Powerpoint on Optical Illusions

Rain Gauge

Make a Rain Gauge

Materials Needed:

- 2 Liter Bottle
- Pebbles/gravel
- Tape
- permanent marker
- Ruler

Instructions:

1. Cut top off the bottle
2. Place some stones on the bottom of the bottle
3. Turn the top of the bottle(which was cut off) upside down and tape it to the bottle
4. Use a ruler and marker to mark a scale on the bottle
5. Pour water in the bottle to the 1st marker on the bottle
6. Put the rain gauge outside to collect water when it rains
7. After a rain shower, see how far up the scale the water has risen and record results

