

Breathless Balloon

Tools:



Extras: Baking soda; 12" Round balloon; Vinegar

Key Science Concept:

Acids and bases react to make a gas called carbon dioxide.

Caution: Perform this experiment only under adult supervision.

What to do:

- 1** Put on the safety goggles.
- 2** Place the funnel in the flask.
- 3** Fill the beaker to the halfway line with vinegar.
Pour the vinegar through the funnel and into the flask.
- 4** Remove the funnel from the flask. Insert the funnel into the mouth of a balloon.
- 5** Pour enough baking soda through the funnel to fill the bulb of the balloon.
- 6** Stretch the mouth of the balloon over the flask opening. Make sure the balloon is securely attached over the neck of the flask. The bulb of the balloon should hang down at the side of the flask.
- 7** Now, hold the balloon straight up to make the baking soda pour into the flask.
- 8** Stand back and watch closely: the baking soda and vinegar combine to create carbon dioxide. This gas inflates the balloon!



Quick Butter

Tools:



Extras: Heavy cream; spoon; plate

Key Science Concept:

The fat and protein in a liquid (cream) can mix together to create a solid (butter).

What to do:



- 1** Using the funnel, pour heavy cream into the tall test tube until it is about halfway full.
- 2** Remove the funnel and twist the lid tightly onto the test tube.
- 3** Shake the test tube very well until the liquid turns into a large glob. This may take several minutes. If you get tired, pass the container to a friend!
- 4** You just made butter! Any leftover liquid is buttermilk.
- 5** Scoop out the butter onto a plate. What does it look like?
- 6** Go ahead—give it a taste! Does it taste like the butter you have at home? If you really like it, try spreading it on a cracker for a light snack.
- 7** Cream contains fat and protein. When you shook the cream, the fat and protein stuck together, creating a new substance—butter!

Putty Peel-Off

Tools:



Extras: Epsom salt; Water; All-purpose white glue (non-washable); Food coloring; Paper towels; Plate

What to do:

- 1** Put on the safety goggles.
- 2** Pour 2 tablespoons of water into the beaker.
- 3** Add 1 tablespoon of Epsom salt and mix well until the salt dissolves.
- 4** Add 3 tablespoons of liquid glue and stir thoroughly.
- 5** Pour some food coloring into a small test tube. Use the eyedropper to squirt five drops of food coloring into the beaker. Stir again.
- 6** Fold several paper towels in half lengthwise and place them in the center of a large plate.
- 7** Pour the goop from the beaker into the towels. As the liquid settles, take a close look with the magnifying glass: a solid mass begins to form in the center.
- 8** Fold the towels over the liquid and press down lightly to drain the excess water.
- 9** Open the towels. It's putty!
- 10** Peel the putty off the paper and roll it into a ball. Does it bounce? Does it stick to your hands?



Liquid Layers

Tools:



Extras: Water; Vegetable oil; Dark corn syrup

Key Science Concept:

When two or more liquids don't mix, each liquid has a different density. Density measures how compact something is within the space it takes up.

What to do:

- 1** Place the funnel in the flask.
- 2** Fill the beaker with water to the $\frac{1}{2}$ -cup line and pour the water through the funnel into the flask.
- 3** Now, fill the beaker with vegetable oil to the $\frac{1}{2}$ -cup line. Pour the oil through the funnel and into the flask. Then, do the same with the corn syrup (tip: pour the syrup slowly into the funnel—it drains more quickly this way!).
- 4** Make a prediction about what will happen to the liquids. Will they mix?
- 5** Give the liquids a minute to settle. Look closely with the magnifying glass, at about eye level. What do you see?
- 6** The liquids layer on top of each other!
- 7** The syrup settles at the bottom because it has greater density than either water or oil. Oil has the least density of these liquids, so it stays on top of the water and the syrup.
- 8** Try tilting the flask on its side—do the liquids still layer?



Crystal Clear

Tools:



Extras: Water; Salt; Thread; Paperclip; Tape; Pencil

Key Science Concept:

Water contains molecules that evaporate over time. When water evaporates from saltwater, the salt atoms come together to form crystals.

What to do:



- 1** Fill the flask with warm water.
- 2** Place the funnel in the beaker. Pour the water from the flask into the beaker halfway between the 1/2-cup and 1-cup lines. Remove the funnel.
- 3** Stir in 1 tablespoon of salt at a time until the salt stops dissolving. You may need to add several tablespoons. Set the beaker aside.
- 4** With the help of an adult, tie one end of the thread around a paperclip and knot the other end around a pencil.
- 5** Lay the pencil across the mouth of the beaker so the paperclip hangs down into the water without touching the bottom. Tape the pencil in place.
- 6** Put the beaker in a dark, dry place such as a cupboard. Crystals should form on the string after 2 days!
- 7** Inspect your crystals closely with the magnifying glass.
- 8** For a sweeter version of this experiment, substitute sugar for salt and make rock candy!

Orange Float

Tools:



Extras: Clementine orange; Water

Key Science Concept:

The skin of an orange contains air that gives the orange buoyancy, or the ability to float.

What to do:



- 1** Fill the flask with water. Use the flask to fill the beaker with water slightly below the 1-cup line.
- 2** Place the clementine (small orange) in the beaker. Does it sink or float?
- 3** Remove the clementine from the beaker.
- 4** Now, with the help of an adult, peel the skin off the clementine.
- 5** Predict whether the clementine without the skin will sink or float.
- 6** Place the clementine in the beaker. Did you predict correctly?
- 7** A clementine's skin contains air pockets that help it float. Without the skin, the clementine sinks because it no longer has enough air to stay afloat.

Egg Preserver

Tools:



Extras: Drinking Glass; Egg; Water; Salt

Key Science Concept:

Water increases in buoyancy, or allows objects to float, when salt is added.

What to do:



- 1** Fill the flask with water.
- 2** Pour water from the flask into the beaker, filling it halfway between the $\frac{1}{2}$ -cup and 1-cup lines.
- 3** Predict whether an egg will sink or float in the water.
- 4** Place an egg in the water. Did you predict correctly?
- 5** Remove the egg from the water, add 3 tablespoons of salt and stir.
- 6** Make another prediction about whether the egg will sink or float in the saltwater.
- 7** Add the egg to the water. Did you predict correctly?
- 8** Perform the experiment again, using different quantities of salt.

Sparkling Citrus Delight

Tools:



Extras: 2 Lemons; Water; Baking soda, Spoon; Sugar; Drinking glass

Key Science Concept:

Carbon dioxide is a gas that creates fizz and bubbles in drinks such as soda.

What to do:

- 1** Fill the flask with water and set it aside.
- 2** Have an adult cut two lemons in half.
- 3** Put on your safety goggles.
- 4** Squeeze the halves of both lemons into the beaker. Keep squeezing until the juice is gone!
- 5** Pour water from the flask into the beaker. Add twice the amount of water to the lemon juice.
- 6** Stir in a half teaspoon of baking soda. Notice the fizzing and bubbles in the liquid.
- 7** Taste the mixture with a spoon. If it's too sour, add some sugar until it tastes like sparkling lemonade.
- 8** When the taste is just right, pour the liquid into a drinking glass and enjoy!



Lava Lamp

Tools:



Extras: Vegetable oil; Water; Food coloring

Key Science Concept:
Oil and water do not mix.

What to do:

- 1** Fill the flask with water and set it aside.
- 2** Pour water from the flask into a small test tube, filling it nearly to the top.
- 3** Fill the other small test tube with vegetable oil.
- 4** Using the eyedropper, add one drop of blue food coloring and one drop of yellow food coloring to the water in the test tube.
- 5** Add the same colors to the vegetable oil in the other small test tube.
- 6** What happens to the food coloring in each test tube?
- 7** Food coloring is partially made of water. Therefore, the two primary colors of blue and yellow mix in the water to make green. However, because water and oil don't mix, the colors remain separate in the oil, floating as droplets near the surface before sinking to the bottom.
- 8** Examine the differences more closely with the magnifying glass!



Oil Cauldron

Tools:



Extras: Water; Red food coloring;
Vegetable oil; Salt

Key Science Concept:
Salt dissolves in water.

What to do:

- 1** Fill the flask with water. Use the flask to fill the beaker slightly more than halfway.
- 2** Add enough red food coloring to fill the bulb of the small test tube. Dip the eyedropper into the test tube, and then squirt 5 drops of red food coloring into the beaker.
- 3** Pour a tablespoon of vegetable oil over the colored water. Do the oil and water mix?
- 4** Now, spread 2 teaspoons of salt over the oil.
- 5** You will soon notice that the oil bubbles up—just like lava!
- 6** Use the magnifying glass to take a closer look.
- 7** The salt sinks through the oil and dissolves in the water, causing the oil to rush back into place. The oil's quick movements create lava-like bubbles on its surface.

