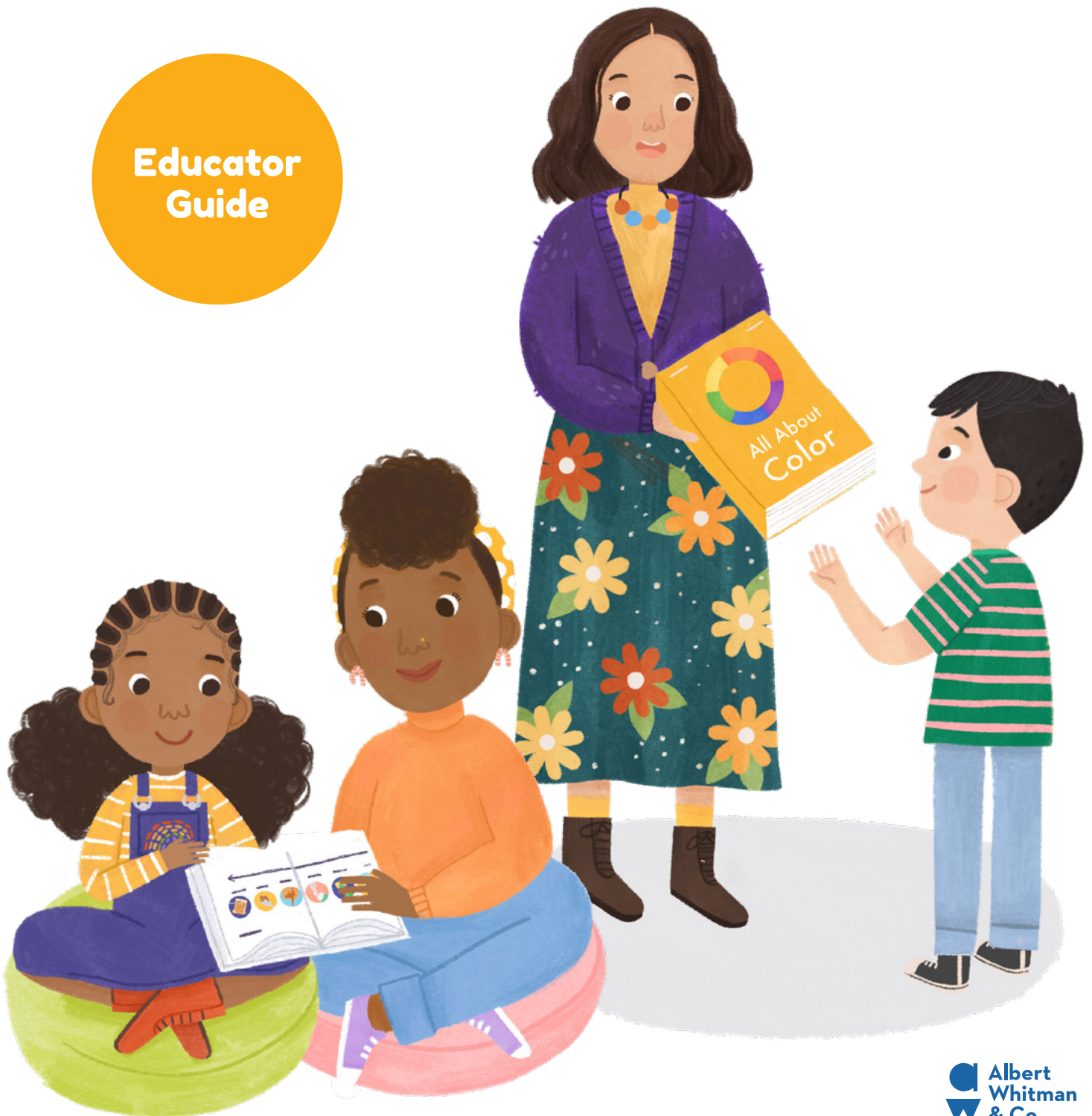


Science Makes It Work

Through experimentation and research,
kids uncover science all around them.

**Educator
Guide**



Refraction Experiment

(Adult supervision required)



This experiment explores the concept of refraction. It demonstrates how the refraction or redirection of light waves passing through a water-filled, round glass bowl will cause objects in the water to appear magnified.

Materials:

- Clear glass or plastic, rounded jar or bowl
- Two matching buttons or pennies
- Water
- Optional: clear glass or plastic, square/rectangular vase or watertight container

Directions:

1. Fill the clear rounded bowl with water.
2. Place one button next to the bowl. Place the other button below the surface of the water.
Does the button appear larger than the button that is still outside the bowl?

Optional: fill a clear square/rectangular vase with water, and hold one penny or button below the water's surface. Does it look larger than usual – or not?

Make Your Own Snow Globe

(Adult supervision required)

Follow these simple steps to create a homemade snow globe!

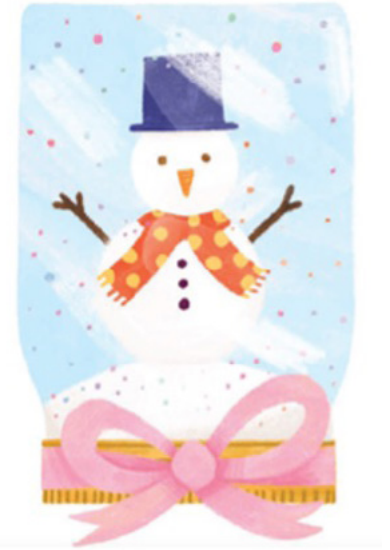
Materials:

- Clean, clear, plastic jar with a water tight lid
- Plastic figurine or object – this will be the “star” of your snow globe
- All-purpose glue
- Water
- Glycerin (available at most drug stores)
- Optional: decorative bow or ribbon

Directions:

1. Attach the plastic figurine or object to the inside of the jar lid with all-purpose glue. This will be the bottom of the snow globe. Make sure the glue has thoroughly dried before proceeding.
2. Fill the jar at least $\frac{3}{4}$ with water.
3. Add glycerin until the water/glycerin mixture reaches the top. Stir gently with a spoon.
4. Add a pinch of glitter to the jar to serve as the snow-like “flitter” inside your globe.
5. Carefully screw the lid onto the jar. Tip or shake the jar slowly, and watch the flitter fall.

Optional: Glue a small, decorative bow to the lid (now the base) of your snow globe.



Create New Colors

(Adult assistance suggested)



With this activity, you can explore how combinations of primary colors create new colors, called secondary colors.

Materials:

- Washable paints in the three primary colors: red, blue and yellow.
- Paintbrushes
- Cup of water (to rinse paintbrushes)
- Paper plate (thick paper or posterboard will also work)
- Optional: White paint



Directions:

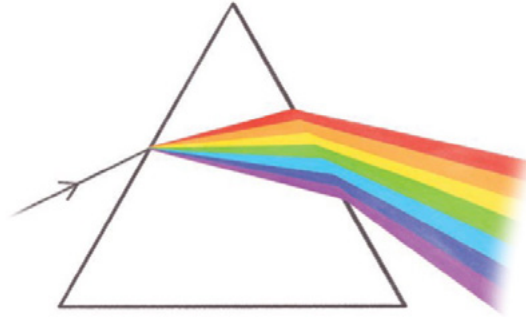
1. Dab a bit of each color paint onto the paper plate, rinsing the paintbrushes between each color.
2. With a paintbrush, mix two primary colors together. What color did it make? Can you find it on the color wheel above? The combination of two primary colors creates what is called a secondary color.
3. Continue mixing two and three primary colors together until you have tried every combination. If you'd like, you can make a chart of the color combinations as shown below.

Optional: Add a little white paint to each primary and secondary color. What happens to the color? Does it appear different?



Make Your Own Prism

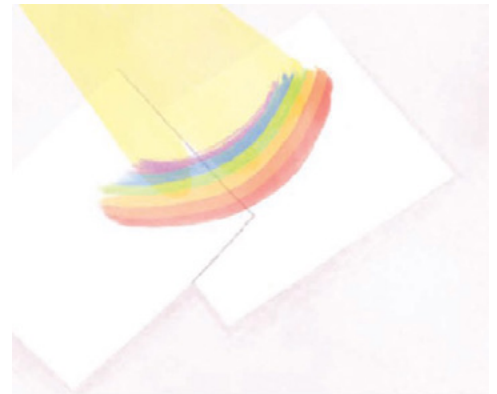
(Adult supervision required)



A prism separates white light into different colors. With a few simple materials, you can create an at-home prism!

Materials:

- A clear drinking glass, filled nearly to the top with tap water.
- A table
- One or two large sheets of white paper or posterboard
- A flashlight



Directions:

1. Ask a grown-up to hold the glass of water so it is a little past the edge of the table.
2. Place white paper or posterboard on the floor, positioned below and just a bit in front of the glass.
3. Turn on the flashlight, angling the beam through the glass. The light should pass through the water in the glass and onto the paper on the floor.
4. Watch for a rainbow to appear!



Photosynthesis Experiment

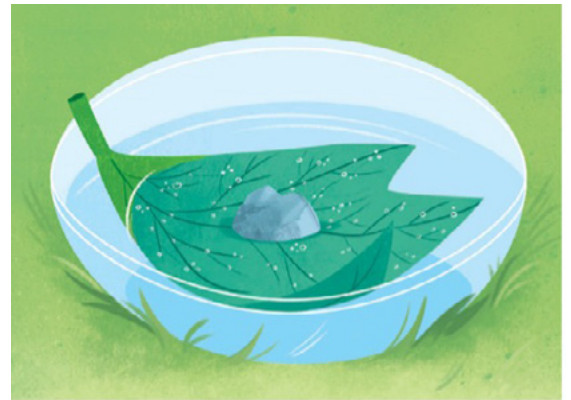
(Adult supervision required)



This experiment demonstrates how plants release oxygen during a process called photosynthesis.

Materials:

- Large bowl
- Water
- Freshly picked, large leaf
- Small rock



Directions:

1. Fill the bowl with water.
2. Place the large leaf at the bottom of the bowl. Weight it down with a small rock so it is under the water.
3. Place the bowl in a sunny spot outside.
4. After an hour, observe the bubbles that have formed on the leaf. This is evidence of the oxygen the leaf releases during photosynthesis.

Flower Transpiration Experiment

(Adult supervision required)



This experiment demonstrates how water moves through a plant by a process called transpiration. During transpiration, a plant releases water vapor into the air and in turn drinks up water through the stem.

Materials:

- Six plastic cups or vases
- Water
- Food coloring
- Six white flowers, such as carnations

Directions:

1. Fill the cups about half full with tap water.
2. Add several drops of food coloring to each cup.
3. Place a single white flower, stem side down, in each cup (an adult may need to trim the end of the flower to fit).
4. Check on the flowers after about an hour. Do you see any color change? Leave the flowers overnight, and check again. Do you notice anything different?



Folding a Paper Plane

(Adult assistance suggested)



Follow these steps to create a “dart” style paper airplane.

Materials:

- A piece of 8.5 x 11 paper such as copy paper (perhaps something you can reuse for this project, such as an old ad, note or flier)
- Optional: newspaper, paper towel, wrapping paper or copy paper of different weights

Directions:

1. Fold an 8.5 x 11 paper in half long ways. Press to crease. Open the paper up, and you'll see a line down the middle of the paper. This is the centerline.
2. Fold the right top edge over until it meets the centerline. Fold the left top edge over in the same way. Your paper should look a bit like a house with a pointy roof.
3. Again fold the right, then the left top edge of the paper until both meet at the centerline (covering up your previously folded edges).
4. Once more, fold the right and left edges over until they line up with the centerline.
5. Flip your folded sheet of paper to the smooth side, with no folds. It should now look like a long skinny triangle on top. Fold in half long ways, until the edges meet.
6. Grasp the underside of the plane, throw it forward and watch it glide through the air!

Optional: Try different kinds of paper to see how it affects the plane's flying ability.



Paper Plane and Paper Clip Experiment

(Adult assistance suggested)



	0ft-10ft	10ft-20ft	MORE THAN 20ft
THROW 1: NO PAPER CLIP			
THROW 2: 1 PAPER CLIP			
THROW 3: 2 PAPER CLIP			

Discover if adding the weight of a paper clip or two to a paper airplane reduces the lift and makes the plane fly farther and/or straighter.

Materials:

- A paper airplane (see folding instructions on previous page)
- Two or more paper clips
- Optional: Tape measure

Directions:

1. Tape a line to the floor in a large, open room (such as a gym) or mark a chalk line outside.
2. Keeping your toes behind the line, throw the paper airplane. Mark the place where the plane landed with a stone or some other marker.
3. Add a paper clip to the underside of the plane, just behind the plane's nose (see illustration above). Throw the plane again and mark where it landed.
4. Add a second paper clip to the plane, and repeat.
5. Consider – did the plane fly farther with one, two or no paper clips?

Optional: Measure the distance from the starting line to each plane's landing spot. Create a chart to record your results.

Soundwaves Experiment

(Adult supervision required)



Follow these simple steps to show how soundwaves traveling through the air can cause other things – like the plastic wrap in this experiment – to vibrate.

Materials:

- Plastic wrap
- Bowl
- Candy sprinkles
- Metal pan
- Large spoon



Directions:

1. Cover the bowl with plastic wrap, so it's pulled tight over the top.
2. Add the candy sprinkles to the top of the plastic wrap.
3. Hold the pan close to (but not touching) the bowl and hit it with the spoon – the sprinkles will “jump” with each bang as sound waves vibrate through the air and make contact with the plastic wrap.

Make Your Own Play Guitar

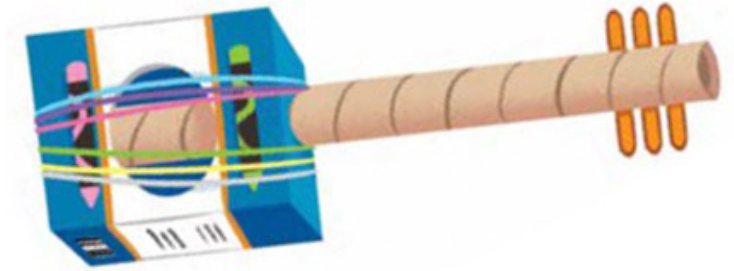
(Adult supervision and assistance required)



With items from the recycle bin and other materials, you can make a rocking, play guitar!

Materials:

- Empty cardboard wrapping paper tube (ask a grownup to cut to the size you prefer)
- Empty box, such as a graham cracker box
- Six rubber bands
- Two crayons
- Three craft sticks
- Glue



Directions:

1. Ask a grownup to cut three round holes – one in the front and center of the box to serve as the sound hole and two smaller holes (a little bigger than the width of cardboard tube) at the top and bottom of the box.
2. Slide the cardboard tube through the round holes at the top and bottom of the box, leaving a longer portion at top to serve as the neck of the guitar.
3. Fit three rubber bands around the box on one side of the guitar's neck, and three rubber bands on the other side.
4. Place the crayons longwise under the rubber bands, one above and one below the sound hole.
5. Glue three craft sticks along the top of the guitar to resemble the tuning keys.
6. Strum or pluck the strings of your play guitar to make a musical sound.