



## **just in case arizona**

A big part of preparedness is being informed about different emergencies that could happen where you live, work, play and learn.

These simple experiments and projects were compiled to complement classroom lessons, and involve students in hands-on activity. They should be performed only when under the watchful supervision of an adult.

### **What Is Lightning?**

#### **Materials:**

- fluorescent light bulb
- rubber balloon

#### **Process:**

1. Turn all of the lights off in the room. (The darker the better!)
2. Rub the balloon on your hair for several seconds.
3. Then hold the statically charged balloon near the end of the light bulb. This will illuminate the bulb.
4. Repeat the demonstration as many times as desired.

#### **Why It Works:**

When you rub the balloon on your hair, the balloon builds up an electrical charge (static electricity). Touching the charged balloon to the end of the fluorescent light bulb causes the electrical charge to jump from the balloon to the bulb. This is what illuminates the light bulb.

(Source: [Weather Whiz Kids](#))

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### **Make Lightning**

Lightning is an electrical discharge within a thunderstorm. As the storm develops, the clouds become charged with electricity.

Scientists are still not sure exactly what causes this, but they do know that when the voltage becomes high enough for the electricity to leap across the air from one place to another, lightning flashes! Lightning can spark within a cloud, from one cloud to another, from a cloud to the ground, or from the ground to a cloud.

**Materials:**

- aluminum pie pan
- small piece of wool fabric
- styrofoam plate
- pencil with a new eraser
- thumbtack

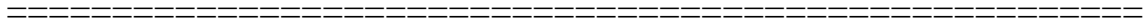
**Process:**

1. Push the thumbtack through the center of the aluminum pie pan from the bottom
2. Push the eraser end of the pencil into the thumbtack.
3. Put the styrofoam plate upside-down on a table. Quickly, rub the underneath of the plate with the wool for a couple of minutes.
4. Pick up the aluminum pie pan using the pencil as a handle and place it on top of the upside-down styrofoam plate that you were just rubbing with the wool.
5. Touch the aluminum pie pan with your finger. You should feel a shock. If you don't feel anything, try rubbing the styrofoam plate again.
6. Once you feel the shock, try turning the lights out before you touch the pan again. Check out what you see! You should see a spark!!

**Why It Works:**

Why does this happen? It's all about static electricity. Lightning happens when the negative charges, which are called electrons, in the bottom of the cloud or in this experiment your finger are attracted to the positive charges, which are called protons, in the ground or in this experiment the aluminum pie pan. The resulting spark is like a mini lightning bolt.

(Source: [Weather Whiz Kids](#))



## Tornado In A Bottle

**Materials:**

- 2 2-liter clear plastic pop bottles (empty and clean)
- water

- duct tape

**Process:**

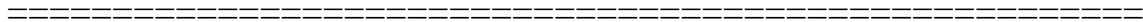
1. Fill one of the bottles two-thirds full of water.
2. Take the Tornado Tube and twist it on the first bottle. Then, grab the second bottle and attach it to the Tornado Tube.
3. Or use duct tape to fasten the two containers. Make sure to tape tightly to make sure that no water will leak out when you turn the bottle over.
4. Turn the tornado maker, so that the bottle with the water is on top. Swirl the bottle in a circular motion. Most tornadoes form counter-clockwise in the Northern Hemisphere. A tornado will form in the top bottle as the water rushes into the bottom bottle.

\*If you want to get creative, you can also use food coloring to make the tornado have a color and glitter to represent debris.

**Why It Works:**

The swirling motion you give the bottle forms a vortex and is a easy way to create your own tornado.

(Source: [Weather Whiz Kids](#))



## **Tornado In A Jar**

**Materials:**

- mayonnaise jar or a canning jar
- clear liquid soap
- vinegar
- water

**Process:**

1. Fill the jar about three-quarters full of water.
2. Put a teaspoon of the liquid soap into the jar.
3. Also, add a teaspoon of vinegar into the jar.
4. Tighten the lid and shake the jar to mix up the ingredients.
5. Now, swirl the jar in a circular motion.
6. The liquid will form a small tornado.

\*If you want to get creative, you can also use food coloring to make the tornado have a color and glitter to represent debris

### Why It Works:

The swirling motion you give the bottle forms a vortex and is a easy way to create your own tornado.

(Source: [Weather Whiz Kids](#))

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## Baking Soda Volcano

### Materials:

- 6 cups of flour
- 2 cups of salt
- 4 tablespoons cooking oil
- 2 tablespoons of baking soda
- dishwashing detergent
- food color
- vinegar
- warm water
- baking dish or pan

### Process:

1. First, make the cone of the baking soda volcano. Mix 6 cups flour, 2 cups salt, 4 tablespoons cooking oil and 2 cups warm water. The mixture should be smooth and firm. Add more warm water if needed.
2. Stand the soda bottle in the baking pan and mold the dough around it into a volcano shape. Don't cover the opening or drop dough in it.
3. Fill the bottle most of the way full with warm water and a bit of red food color.
4. Add 6 drops of detergent to the bottle contents.
5. Add 2 tablespoons of baking soda to the contents.
6. Slowly pour vinegar into the bottle.
7. Watch the eruption!

### Why It Works:

Why does this happen? The red lava is the result of a chemical reaction between the baking soda and vinegar. In this reaction, the carbon dioxide gas is produced, pressure builds up inside the plastic bottle until the gas bubbles out of the volcano. This is a good representation of what happens in real volcanoes.

(Source: [Weather Whiz Kids](#))

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## Soda Bottle Volcano

### Materials:

- roll of mint Mentos (type of candy)
- clear 2-liter bottle of Coke (diet works best)

### Process:

1. Go outside to an area where you have a lot of room. This experiment is messy!
2. Open the bottle of soda carefully, and position it on the ground, so that it will not tip over.
3. Unwrap the roll of Mentos. The goal is to drop the Mentos into the bottle at the same time, which is very tricky. One method is to roll a piece of paper into a tube just big enough to hold the loose Mentos. Put a card under the roll and on top of the bottle top, so you can pull the card and the candies will just drop in at once.
4. Drop all of the Mentos into the bottle at the same time and then move out of the way just as quick as you can.
5. Watch the eruption!

### Why It Works:

Why does this happen? Water molecules attract to other, linking together to form a tight mesh around each bubble of carbon dioxide gas in the soda. When you drop the Mentos in the soda, the gelatin and gum arabic from the dissolving candy break the surface tension.

Each Mentos candy has thousands of pits on the surface. These tiny pits are called nucleation sites, perfect places for the carbon dioxide bubbles to form. As soon as you drop the Mentos in the soda, bubbles form all over the surface of the candy. Couple this with the fact that the candies are heavy and sink to the bottom of the bottle and you're just asking for an explosion.

When all this gas is released, it literally pushes all the liquid up and out of the bottle in an amazing blast.

(Source: [Weather Whiz Kids](#))

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## Easy Earthquake

### Materials:

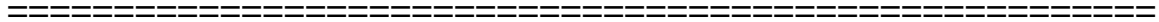
- two rectangular pieces of cardboard
- hole puncher

- tape
- string
- cookie sheet
- dirt ( enough to cover the two cardboard pieces)

**Process:**

1. Punch out two holes on one side of each piece of cardboard. Then put the string through the holes.
2. Tie a knot using the ends of the string for both pieces of cardboard.
3. Tape the cardboard pieces together but lay them so that the ends are not touching.
4. Place the cardboard pieces on the cookie sheet.
5. Put some dirt over top of the pieces. It is better to do this outside.
6. Pull on the strings outward and watch the dirt as it simulates an earthquake.

(Source: [Weather Whiz Kids](#))



## Make It Rain

**Materials:**

- glass mayonnaise or canning jar
- plate
- hot water
- ice cubes
- index cards

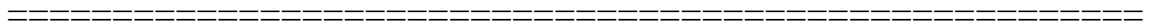
**Process:**

1. Pour about two inches of very hot water into the glass jar.
2. Cover the jar with the plate and wait a few minutes before you start the next step.
3. Put the ice cubes on the plate.

**Why It Works:**

What happens? The cold plate causes the moisture in the warm air, which is inside the jar to condense and form water droplets. This is the same thing that happens in the atmosphere. Warm, moist air rises and meets colder air high in the atmosphere. The water vapor condenses and forms precipitation that falls to the ground.

(Source: [Weather Whiz Kids](#))



## Make A Thermometer

### **Materials:**

- clear, plastic bottle (11 oz. water bottle works)
- water
- rubbing alcohol
- clear plastic drinking straw
- modeling clay
- food coloring

### **Process:**

1. Fill about 1/4 of the bottle full with equal parts of water and rubbing alcohol.
2. Add a few drops of food coloring.
3. Put the straw in the bottle, but don't let it touch the bottom.
4. Use the modeling clay to seal the neck of the bottle, so the straw stays in place. (Make sure the straw does not touch the bottom of the bottle.)
5. Hold your hands on the bottom of the bottle and watch the mixture move up through the straw.

### **Why It Works:**

Like any thermometer, the mixture expanded when it was warmed. This made the mixture no longer fit in the bottom of the bottle. As the alcohol expanded the colored mixture moved up through the straw. If the bottle were to get extremely hot, the mixture would have come up through the top of the straw.

(Source: [Weather Whiz Kids](#))

Find more science fair project ideas at Kids.gov, the “official portal of the U.S. Government with kids in mind.”

**Get emergency preparedness information at [justincasearizona.com](http://justincasearizona.com), and bookmark [www.azein.gov](http://www.azein.gov) for real-time disaster updates.**