



**CAVE OF THE MOUNDS**®  
National Natural Landmark

# Crystal Structure Study Experience

You will need: 2 balloons, 12-inch funnel, salt, sugar, hand lens tray or plate (not white)

1. Fill one balloon with salt, pinch tight, and tie off. Then fill the second balloon with sugar, pinch and tie off.
2. Manipulate the balloons and observe differences between the sugar and salt.
3. Place a pinch of salt and sugar on a tray. Study the crystal using a hand lens. Compare and contrast the crystal shapes and structures.

## WHY?!

**Minerals** have a crystal form (shape) that reflects their **atomic structure**. Salt (NaCl), has angles that lock together more readily when confined by the barriers of a balloon. Sugar has a crystal form, but is not a mineral. **Crystal form** is one technique we can use to identify rocks and minerals. Cave formations are crystals of the mineral **calcite**.



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# Charcoal Briquette Crystal Growing Project

You will need: 1 charcoal briquette, 1 pie tin, **Charcoal crystal solution** (10ml Ammonia, 50 ml laundry bluing, 50ml salt, 100ml water)

1. Mix a batch of crystal solution, stirring well. \*For colorful crystals, add food coloring to the solution!
2. Place a piece of charcoal into the pie tin. Pour crystal solution over the top of the charcoal.
3. Over time, crystals will form on top of the charcoal. \*Add more solution to the pie tin for continued crystal growth.

## How?!?

Charcoal is a very porous and absorbs the solution. Water evaporates from the solution leaving salt crystals behind. Cave of the Mounds is a "living" solution cave. Water brings calcium carbonate into the cave. Crystals of calcite are deposited, creating cave formations called **speleothems**.



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# Grow-Your-Own Geode Replica

You will need: a clean egg shell, paintbrush, glue, food coloring, alum powder, water, paper towels, glass jar, spoon

1. With a paintbrush spread glue over the entire interior surface of a clean, dry egg shell all the way to the edges. Cover completely with alum powder. Set aside and let glue dry **overnight**.
2. The next day, bring two cups of water to almost boiling. Pour into a beaker or glass jar and stir in 40 drops of food coloring and 3/4 cup alum. **Allow solution to cool 30 minutes.**
3. Once cool, with a spoon, push egg shell (opening up) to bottom of solution. Set aside jar undisturbed for 12-15 hours. Then pull egg shell from solution and place on a paper towel to dry. Clean up!

## What is a geode!?!?

**Geodes** are usually formed in "bubbles" and other cavities in both igneous and sedimentary rock. Mineral-rich groundwater or rainwater slowly seeps through the **porous** rock and mineral layers are deposited in its **hollow interior**. Over thousands of years, these layers of minerals **build crystals**, eventually filing the cavity. Some geodes look like miniature caves.



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# Grow-Your-Own Speleothem Replicas

Cave formations like stalactites and stalagmites, collectively known as speleothems, form as water seeps through limestone. As the water moves through the rock, it dissolves small amounts of limestone also called calcium carbonate. When the water drips from a cave ceiling, small amounts of the mineral calcite (also called calcium carbonate) are left behind, eventually leaving an icicle shaped stalactite; water droplets that fall to the cave floor deposit calcite to form stalagmites. Following the instructions below will allow you to simulate and observe how speleothems form in a cave using water and the mineral salt.

You will need: water, thick-natural fiber string (cotton butchers twine works well), cardboard, 2 jars, Epsom salts

1. Fill each jar with water. Add enough Epsom salts in each jar of water to form a thick solution.
2. Place the jars on the piece of cardboard about six inches apart. Soak the string in the solution until it is completely saturated.
3. Place one end of the string in one jar of solution. Place the other end of the string in the other jar of solution. Leave enough slack so there is a bow in the string, but do not let the string touch the cardboard.
4. Leave the jars and the string in an accessible and observable location for several days while a salt "stalactite" and "Stalagmite" begin to form.

**CAUTION: Once these salt "speleothems" begins to form, any movement of the string could cause them to break.**

## Cave Connection!

As the water moves into the cave, it dissolves small amounts of limestone also called calcium carbonate. When the water drips from a cave ceiling, small amounts of the mineral calcite (also called calcium carbonate) are left behind, eventually leaving an icicle shaped stalactite; water droplets that fall to the cave floor deposit calcite to form stalagmites.



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## Create-A-Fossil

### Investigation

Fossils are remains of life from the past preserved in rock. The most common types of fossils are molds and casts. This activity will give you the chance to make modern day molds and casts.

A mold forms when something is pressed into soft mud and removed by decomposition or pulled out, leaving an impression of the object. A cast is a three-dimensional (3-D) example of an object of the past created when a mold fills up with sediment like mud, sand or volcanic ash.

You will need: fine sand, 2 containers (one for the molds/casts, one to mix plaster), quick-set Plaster of Paris and various items to create molds/casts

1. Fill 2/3 of your container with moistened sand.
2. Press found objects into the moist sand - Leaves, plastic dinosaurs or bugs, shells and twigs; other items with interesting textures work well.
3. With the help of an adult, mix Plaster of Paris and carefully pour into the impressions in the sand.
4. Wait patiently for the plaster to dry to the touch, about 30-40 minutes. Then turn container out onto a flat work surface, remove the excess sand, and let the remaining plaster dry. Finally, whisk away dried sand using a small brush and uncover your creation!

## What is a fossil?

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## Make a Dried Flower Bookmark

When Ebenezer Brigham first settled here in 1828, prairie and oak savanna covered much of Southwestern Wisconsin. Here on the grounds of Cave of the Mounds National Natural Landmark, the varied plants that made these areas so unique may be found in our ongoing prairie and oak savanna restoration projects. Birds, butterflies and many other animals and insects make their homes in these diverse environments.

You will need: 1-3 dried flowers, contact/laminating paper, hole punch, ribbon

1. Pick 1-3 flowers that have already been dried.
2. Cut two pieces of contact/laminating paper, each about 6 inches by 2 1/2 inches. Remove the backing of one piece only to lay it on the table with the sticky side facing up. Arrange your chosen flowers on top of it in any pattern you desire.
3. Remove the backing from the second piece of contact paper and carefully place the sticky side down over the other piece, sandwiching the flowers. Line up the edges.
4. Punch a hole in the top of the bookmark about 1/4-inch below the top edge. Cut an 8-inch length of 1/4-inch-wide ribbon and fold it in half. Holding down the two loose ends together, thread through the hole in the bookmark pulling halfway through. Insert the two loose ends held together through the loop of the ribbon, then pull the loose ends tightly to secure the ribbon through the hole. Trim excess laminate as needed.

### Prairie Restoration Project!

The Prairie Demonstration Gardens at Cave of the Mounds is proud to support the ecological restoration of prairies through ecologically friendly land management practices. Little bluestem, sideoats grama, coneflower, and milkweed are common plants in this type of prairie environment.



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## Super Soda Bottle Beads

Recycle your empty plastic soda and water bottles to create a wearable work of art!

Americans throw away 2.5 million single-use plastic bottles every hour - about 42,000 per minute, or about 695 per second. We want to do our part to reduce this staggering statistic. In 2019, Cave of the Mounds eliminated all single-use plastic water and beverage bottles from our business. We are reducing single-use plastic bottles while encouraging new Earth-friendly habits!

You will need: clean dry 16.9 to 20-oz plastic bottles (use a variety of clear and green bottles, made of smooth plastic, flexibility), scissors, permanent marker and/or acrylic paint, plain cotton string (like kitchen twine), aluminum foil and a rimmed baking sheet.

1. Cut the top and bottom off a plastic bottle; cut the resulting cylinder into a rectangle. Remove and discard any parts with glue residue.
2. Following the curve of the bottle, cut rectangle into strips about 1/2 to 3/4 of an inch wide.
3. On the inside curve, decorate the strips with permanent marker and paints.
4. Roll each strip around a pencil and tie with a piece of string to prevent the strip from unraveling. (You may need an extra set of hands for this step)
5. Place the wrapped bead on the foil-lined tray and bake at 300 degrees for 2 - 5 minutes or until the edges start to soften. Beads are done when they stay rolled in a cylinder.
6. Once cool, slip string off the beads and make your own fantastic recycled jewelry!

### Be Green!

75% of America's waste is recyclable, but Americans only actually recycle around 30% of it. Improving our rate of recycling is very important to us! In 2019, Cave of the Mounds put interpretative signage on all of our trash and recycling bins to help our guests learn what items CAN be recycled.



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## Cave Constellations

Here at Cave of the Mounds, we have beautiful clear skies, and at night, you can see the many stars above. While looking up at the sky, it is fun to use the imagination to see epic myths that inspired certain constellations or dream of space exploration.

Looking at the night sky can be a time of calm reflection and imagination.

You will need: 6-8 empty tin cans with labels removed, touchless can opener, aluminum foil, awl/toothpick/large needle, paper, flashlight (with removable lens and reflector form, corrugated cardboard, pencil, painters tape, 2" masking tape

1. Start with a tin can. Cut both the top and bottom off with a can opener. Then trace the outside of the can on a piece of corrugated cardboard.
2. Remove the reflector and lens from the flashlight (they interfere with the projection), then place the flashlight upside down and in the middle of the traced circle, and trace the flashlight as a smaller circle in the center.
3. Add four small tabs to the circle, equidistant apart to the large circle. Finally, cut out the drawing. Place this on top of one side of the tin can and fold the tabs down.
4. Wrap one piece of masking tape around the can, securing the cardboard tabs down and leaving 1" of tape above the tin lip. Cut this extra tape into vertical strips and fold down and around the lip of the cardboard one by one creating a seal.
5. This opening is where you will place the flashlight and the seal will make it easier to 'screw' it in when the threads are exposed after you remove the flashlight's threads.
6. Cover the other open end with a piece of aluminum foil and tape it down with tape. Poke holes in the aluminum foil either randomly or with a star pattern that you would like to project. (Note: if wanting to project a real constellation, poke the reverse pattern.)
7. Finally, decorate the outside of the can as you like it so you can tell the difference between the different constellations.





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## Make a Fire-starter for Camping

Cave of the Mounds National Natural Landmark has many opportunities to experience nature! On the Blue Mounds hilltop where Ebenezer Brigham first broke ground in 1828 and became the first white settler, is where Brigham Park lies. In the 1950s, 8 acres of Brigham Farm was donated by the widow of Charles Isley Brigham, Ebenezer's great-nephew. The land became Brigham County Park named after both Charles and Ebenezer Brigham.

You will need: newspaper, twine/hemp, pine cones, dryer lint

1. Place pine cones stuffed with dryer lint and wrapped in a piece of newspaper, and tie both ends with a twine like tootsie roll.

### Fire Safety!

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## Cave Adventure: Caving at Home

Building a fort is one of the coolest things to do as a kid. No matter what decade you grew up in, forts are a childhood must-have. In "Making an Indoor Cave, essentially you want to get the darkness factor and the rocks. There are options to decorate them with stuffed animals like bears and bats. Or add in some cave formations with soda straws hanging from the ceiling like stalactites or drinking cups on the floor like stalagmites. Even tall wooden dowels can be columns (when a stalactite and a stalagmite meet). If you really want to get technical, try to avoid the formations. However, we will just go over the basics of creating the Indoor Cave.

You will need: Boxes (Large), Packing Tape, Dark Sheets, Lunch Bags, Newspaper

1. Start with a clear area.
2. Use a variety of large boxes to create a circle.
3. These will be the walls of the cave. Tape them together to secure them in place to avoid any unexpected cave collapses.
4. Drape some dark sheets over the boxes to create a ceiling. Be sure to leave an entryway to enter the cave.
5. Fill paper bags with balls of newspaper. Seal them shut with tape or a stapler. Round the bag with your hands to resemble rocks. Scatter throughout the cave.
6. Now you have a cave! Decorate! Explore!

### Cave Knowledge

As a background to your cave adventure, you should probably know about speleothems, which are cave formations. The main types are stalactites that hang tight to the ceiling and stalagmites that might reach the ceiling one day. The formation of any speleothem takes an extremely long time. As each drop of water leaves a tiny amount of mineral residue on a cave ceiling, floor, wall, or other features, it adds to speleothem growth. When a speleothem is broken, it will not be replaced within our lifetime, if ever! Therefore, cavers must be extremely careful while exploring.



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## Cave Adventure: Headlamp and Flashlight

Also check out our "Caving at Home" activity!

Ready to make your headlamp and flashlight using household materials! It's super simple but it will make the experience of caving at home so much better.

You will need: 2 sheets of construction paper (yellow and any color of your choice), 1 paper tube, scissors, ruler, glue or tape

1. With the yellow construction paper, cut two circles that are 2 inches wide.
2. Using a different color of construction paper, cut out 3 strips that are roughly 12 inches long and 2 inches wide.
3. Glue or tape two of the strips together to form a circle. This part is for the headband around the forehead.
4. Lay the circle on its edge and glue or tape the third strip across the circle from end to end to form an arch.
5. Next, take one of the yellow circles and glue or tape it to the front of your paper headlamp. Yay! The helmet is complete!
6. Lastly, take the other yellow circle and glue or tape it to one of the openings on the paper tube. Now, you've made a flashlight!

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# Cave Adventure:

## Exploring Caves in Your House

Also check out our "Headlamp and Flashlight" activity!

If you don't want to build a cave fort, an easy way to explore the cave is using your imagination and exploring your house. A cave has to be three things; a hole in a rock, made by nature, and it has to fit a human. Using these guidelines loosely, there are many places where a human could fit. I never said that a human had to be an adult or comfortable.

If you can curl up in a ball, that works!

You will need: Flashlight, headlamp (optional)

- **The Kitchen Table**: To get into this cave, you'll have to squeeze through the tight gaps between the chairs or maybe even under them. Then you emerge into this big room you've discovered.
- **Under the Bed**: This time you'll have to get onto your belly to get down and dirty with all the wildlife that exists in this dark place.
- **In the Tub**: Sometimes caves can be a bit wet. Cave kisses drip from the shower-head. The entrance into this cave is behind a sheet of water.

## Cave Knowledge

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## Create Your Own Sugar Cube Cave

Adapted from Exploring Caves and Karst - A Cave and Karst Curriculum  
(American Cave Conservation Association, Inc.)

There are two kinds of sedimentary rocks on the Blue Mounds: dolomite (a type of limestone) and chert. Chert is harder than dolomite and is typically found on top of the dolomite. Chert forms a "cap" over the softer dolomite that slows weathering and erosion. The caves in this part of Wisconsin are formed in the dolomite layers!

You will need: modeling clay (4 oz per person or small group), Sugar Cubes (3-6 per cave), warm water, Clear bowl (cutting the top off of 2-liter bottles works well/ 1 per person or small group)

1. Flatten the clay into a pancake.
2. Place the sugar cubes on the clay and make certain they are all touching each other. Be sure that at least one cube touches the edge of the clay.
3. Wrap the clay completely around the sugar cubes, forming a ball or oval shape.
4. Expose at least one of the sugar cubes.
5. When the ball of clay is placed in the bowl filled with warm water, the sugar will dissolve, leaving a "limestone cave" behind.
6. Draw a picture that shows what your cave looks like!

## How Cave of the Mounds Formed!

The limestone (dolomite) at Cave of the Mounds has formed 400-500 million years ago when the area was covered by a warm, shallow sea. This "Ordovician Ocean" was teeming with life: cephalopods, brachiopods, crinoids, and trilobites. As these creatures died, their remains would sink to the bottom of the sea. The leftover bits of animals, plants, and sediments were compacted and cemented together to form limestone. The caves in Southwestern Wisconsin were formed by flowing water that seeped through the natural cracks in the limestone. It has taken huge amounts of water and a long time to form Cave of the Mounds!



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## Erosion with Chalk and Vinegar

This activity will talk about three components erosion, caves, and the rock cycle, that are vital to Cave of the Mounds. Our cave is a limestone/solution cave that was created by an acid eroding away or breaking down limestone, a sedimentary rock. In this activity, you will observe the changes as an acid eats away a rock.

You will need: Ziploc Bags (1 bag per experiment), Chalk (1 piece per experiment, broken in half), Vinegar (2 cups per experiment)

1. Each person, pair, or group will need one Ziploc bag, two cups of vinegar, and one piece of chalk, broken in half.
2. The first piece of chalk will be put into the Ziploc bag. Inside the bag, break it into tiny pieces.
3. Once that is completed, add one cup of vinegar.
4. Then immediately add the other piece of chalk in its whole state.

### Let's Discuss!

How fast does the vinegar erode the chalk? Do you see anything happening between the vinegar and the chalk?

You should notice that the vinegar is eating away the chalk. The whole piece dissolves slower than the broken chalk due to its larger surface area.



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## Sinkholes in a Cup

Sinkholes are found all over the area here at Cave of the Mounds but don't be worried, our sinkholes don't sink very fast. These natural depressions are caused by water removing the underlying subsurface rock and soil. It's apart of our karst landscape.

Sinkholes are common in certain parts of the U.S. and you can usually identify them as a round depression in the earth. Sometimes there can be standing water in them after it rains. We have one sinkhole called "Schools Sink" that often has a disappearing stream in it after it rains. Let's learn more about sinkholes with this fun activity!

You will need: 1 8 oz. Styrofoam cup, Green rust-free scouring pad or very thin sponge, Empty two-liter bottle, One sheet of paper, Tape (I used scotch because it was the one I had closest to me), Sugar, Sand, Scissors, Writing tool (I prefer sharpie to trace out my circles)

1. Start by making a hole in the bottom of the Styrofoam cup, roughly about the size of the tip of a pen.
2. Cut the green sponge into a circle the size of the cup's bottom. Place the circle in the bottom of the cup.
3. Cut the paper into a strip the height of the Styrofoam cup. Roll it into a tube about one half the diameter of the cup, tape it to size, and place it into the center of the cup.
4. Fill the inside of your paper tube with sugar and the outside of the tube with sand at equal heights, almost to the lip of the cup (that protruding edge at the top).
5. Remove the paper tube. Then place a thin layer of sand over the sugar, at least 1 cm thick.
6. Cut the bottom off the two-liter soda bottle at about the same height as the Styrofoam cup. Fill the bottom half about halfway with water. This symbolizes the groundwater.
7. Place the Styrofoam cup in the center of the water to create a moat around the cup.
8. Watch as the water fills into the cup and the sugar dissolves and runs out. A sinkhole will appear in the cup where the sugar dissolved.
9. \*You may need to remove the cup from the water for the water to drain and the sinkhole to form.



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## Stalactite and Stalagmite Paint Drips

Here's an activity that families can do to dive deeper into the work of speleothems or cave formations. Inside a cave, formations that hang "tight" to the ceiling are called "Stalactites". The formations that "might" reach the ceiling are called "Stalagmites". Here at Cave of the Mounds, we have both types of formations. This craft is easy and very simple to do at home.

You will need: Stiff Paper (examples: cardstock, art paper, etc), Thick Paint or Colored Glue, Glitter (Optional), Stickers (Optional), Newspapers (Optional)

1. Lay your piece of paper flat on some newspapers. (I use newspapers to easily clean up the craft at the end)
2. Apply paint or glue to the long end top of the paper
3. Tilt the paper to encourage the liquid to drip
4. These drips will be the stalactites, so it's okay if they're a bit thin
5. Once you have the desired look, set down the page back onto the newspaper
6. OPTIONAL: Decorate glue or paint with glitter to represent all the tiny crystals that help form the solid structures
7. Let the stalactites partially dry for several minutes before beginning on the stalagmites
8. Repeat the process again with the paint or glue on the opposite long end of the paper. It is recommended that you should use a bit more solid drips on this side to represent the sturdy stalagmites
9. Let the artwork dry
10. Now you can draw, color, or use stickers to decorate your own personal cave!





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## Gem Suncatcher

This activity is just fun! You will make a suncatcher using glue and some translucent rocks!

You will need: Lids to Plastic Yogurt Containers (Flimsy is good), Glass Gemstones, Elmer's Glue

1. Fill the bottom of the lid with glue, not too full as you don't want it to overflow.
2. Arrange gemstones of different colors in the lid. Make sure to leave room to put a string through it, whether it's on top or on the sides
3. Let the glue dry (may take a day).
4. Once the glue is dried, pop the sun-catcher out of the lid, put a string through it and hang it in a window!

## What is a GEM?

Not all minerals are gems but all gems are minerals.

To be considered a gem, it must be beautiful, strong (as in the MOH's hardness scale), and it has to be rare.



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## Stream Table

Get ready to learn more about geology, erosion, and rivers within landscapes. Here at Cave of the Mounds, we are on the side of one of the highest points in Southern Wisconsin, which means when there is heavy rainfall, streams produce in softer, muddier areas. We also have disappearing streams that lead underground to help erode away small caves. This activity will demonstrate how water carves out the land it passes through creating rivers and transforming the landscape.

You will need: ½ gallon wax milk cartons, Sand, Rocks, soil, Pebbles, Water

1. Cut a half-gallon milk carton in half from top to bottom to make the stream table.
2. Fill the container about halfway with a variety of sand, rocks, soil, and pebbles.
3. Set the carton at an angle propping up one end and set the other half of the carton at the lowest point to catch the water or do the activity outside and let the waterfall to the ground.
4. Slowly pour water onto the container starting at the highest point and continue pouring until all the materials are wet and the water starts to carve out a stream.
5. Look and see which material eroded or moved the most and what implications this has for future construction on different landforms.



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## Sweet Sedimentary Rock

Learn about sedimentary rock and the different layers of rock. Cave of the Mounds is within limestone rock. In one room we have an upside-down staircase feature that is a great way to show the layers of rock. However, sometimes you need more than just a visual. Rather you need to make a sedimentary rock with its layers of sediment, called strata, that have compacted together. In this activity, we will do just that! Make a delicious sedimentary rock.

You will need: 1 box of vanilla instant pudding,  $\frac{1}{2}$  small container of whipped topping, 1  $\frac{1}{2}$  cups milk, 7oz sweetened condensed milk,  $\frac{1}{3}$  box of graham crackers,  $\frac{1}{2}$  can chocolate frosting, Clear container (like a take-out salad container or glass baking dish), Stirring spoon, Knife (for spreading), 1 large mixing bowl, 1 medium mixing bowl, 1 paper plate per person, 1 spoon or fork per person, Access to a refrigerator

1. Mix milk and pudding together in a large bowl.
2. Add the sweetened condensed milk. Fold in the whipped topping. Mix all the ingredients well.
3. Divide the pudding mixture in half; leave half in a large bowl and put the other half in a medium bowl. Color each half with a different food coloring. Set aside.
4. Cover the bottom of the clear container with whole graham crackers.
5. Cover the graham cracker layer with the pudding mixture from one of the bowls and spread evenly.
6. Place another whole layer of graham crackers on top of the pudding layer.
7. Spread the other pudding mixture on top of the graham crackers and add one final layer of graham crackers.
8. Spread the chocolate icing on the top layer of graham crackers.
9. Refrigerate for at least one hour.



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## Water Filter Activity

Learn about aquifers and watersheds with this activity! The earth has layers of different rocks and minerals to help filter the water. However, the purification of water depends on many factors such as what is in the soil, if there is any natural filtration, chemical absorption, and more. Using different types of materials will show what helps in the filtration process.

You will need: Plastic soda bottles, Coffee filters, Sand, Gravel, Rocks, Grass, Leaves, Charcoal, Muddy water in a gallon milk jug (can add dish soap for added pollutants) , Rubber bands, Clear plastic cups

1. Cut off a soda bottle with scissors or a razor knife at the shoulder of the bottle (typically the top of the label). Flip the top half of the bottle into the lower half like a funnel into a cylinder.
2. Rubberband the coffee filter to the outside of the bottle where the cap would attach.
3. Then have them layer the different materials provided in the bottle. Let each person be creative at this point to show what works and what doesn't. If you have many people or many groups, perhaps assign certain materials to certain groups to show the difference between the filtration process.
4. Pour the muddy water over the layers and see if it comes out clean into the plastic cup. I've found that porous rocks/gravel and charcoal help the best!



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## Build an Underwater Scope

Sometimes the best way to learn is to dive right in. Since people can't breathe below the surface, we need special equipment to discover the underwater world. SCUBA (self-contained underwater breathing apparatus) divers use air tanks or submarines to study the world below the surface of the water. Fun Fact, to be a master scuba diver, you have to be over 12 years old.

In the state of Wisconsin, there are over 15,000 inland lakes ranging in depth from 350 feet to 5 feet. The much easier way to get close to these animals which make their homes in lakes, rivers, and streams is to make your own underwater scope. That is our fun activity for today!

You will need: an Old Coffee Can or Large Juice Can, Plastic Wrap, a Sturdy Rubber Band, Scissors, Safety Can Opener

1. Using the can opener, cut the end off the coffee can, to make a tube. You may need adult help with this as the edges may be sharp.
2. With scissors, cut a circle of plastic wrap to fit over one end of the cut side of the can. This is because you want to use the "not sharp" side to see through. Make sure it overlaps by at least two inches of the side of the can.
3. Stretch the plastic wrap tight like a drum and secure it with the rubber band. You may want to tape the edges of the plastic wrap down with duct tape or another strong tape to make sure it is securely tight.
4. Take it along the next time you head out to a lake, river, or stream, stand in the shallows, and you can watch the minnows swim by your feet. With the open end of your scope facing up, place the covered end of the tube about one inch below the surface of the water. Look down into the water through the scope to discover a whole new world!



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## Compass Plant Craft

The Compass Plant is a small budded yellow flower with many of its friends gathered along a long stem-like a ladder. Its scientific name is *Silphium laciniatum* but is more commonly known as "Compass Plant" for the belief that the leaves pointed north and south. This may be true most of the time but it is not a reliable way to indicate direction. In our prairie at Cave of the Mounds lives this beautiful plant of pioneers.

Don't mistake this sunny looking yellow flower for a sunflower. You can tell the difference by breaking a stem to find a sap or "rosin." This plant is part of the "rosinweed" family. Also, the seeds grow where the petals were, not in the flat disk at the center of the plant like the sunflower. Like the sunflower, the compass plant grows high in the sky measuring 5-10 feet tall. The flower heads can be 2-5 inches wide. They bloom from July to September. Stems on the compass plant are thick and hairy with flower buds forming opposite each other. The leaves of this plant grow mostly clumped at the bottom near the ground.

You will need: Frozen juice can lid, Yellow tissue paper, Sunflower seeds, Glue, Green construction paper, Tall straight sticks or dowel rods

1. Carefully glue the sunflower seeds onto the lid of the juice can.
2. Next, use the yellow tissue paper to create petals and glue to the juice can lid forming the compass flower.
3. Add green paper leaves to the stick with glue.
4. Finally, glue the flower head to the stick.
5. Parade around the room with your compass plants and talk about what a compass tells us and how the compass plant got its name!



# CAVE OF THE MOUNDS®

## National Natural Landmark

## Cone Bird Feeder

If you are a birdwatcher or someone interested in wildlife, this activity is for you! Birdwatching has been traced back to the late 18th century when it was the first-time people started to gaze upon a bird for their aesthetic rather than food. While watching these birds, you may learn something more than you expected! In this activity we will draw them closer by creating a pinecone bird feeder, a classic nature craft.

You will need: Wax Paper, Pine or other Cone, String (about 12 to 24 inches long), Peanut Butter, Butter Knife, Bird Seed

1. Start by using a butter knife to spread the peanut butter inside the openings all around the center and bottom of the cone and fill up the spaces. Just go nuts!
2. Spread bird seed of your choice on the wax paper in an even layer.
3. Take the buttered-up cone and roll it in the bird seed so that the seeds stick to the peanut butter all around the outside. You may also want to sprinkle seeds inside any openings.
4. Measure your string to hang down from a branch of a tree or bush so that it is far enough from the branch to keep any squirrels from eating your feeder. Tie your string to the top of the pine cone and then to the tree branch.
5. Watch and record who comes to visit your cone feeder.

## Birds of Blue Mounds

Birds of all kinds can be found throughout the grounds, in the gardens, along the Interpretive Trails, and even around the edges of the buildings. Red Tail hawks can often be seen and heard soaring on thermals high above, while Northern Flickers (top right) and Red Headed Woodpeckers enjoy the oak savanna. American Woodcocks were observed recently and our hope is that they are returning to the mixed deciduous forest along the Oak Valley Loop. Migratory flyovers are common in the spring and fall when Great Blue Herons, Tundra Swans, and Bald Eagles have all been spotted.



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National Natural Landmark

## Cupcake Core Sampling

Jules Verne's "Journey to the Center of the Earth" is a science fiction novel about traveling through lava tubes down into total darkness until some explorers find the center of the Earth.

Trying to discover what is beneath the surface of the Earth is one of the many tasks of a geologist. Rather than digging up a hole to expose an oil field or to explore lava tubes as in Jules Verne's novel, instead core samples can be taken and analyzed to determine the likely composition of the Earth's interior. In this activity, we will model core sampling techniques to find out what sort of layers are in a cupcake. How delicious!

You will need: White Cupcake Mix, Plastic Knife, Drawing Paper, Frosting, Food Coloring, Foil Baking Cups, Toothpicks, Transparent Plastic Straws (Straws can be cut to a length slightly longer than the depth of the cupcake)

1. Prepare cupcakes according to the package directions, but use at least three different colors of batter. To do this, separate the plain batter into three bowls and add food coloring. You could make it more attention grabbing by making a rainbow with the batter. Using foil baking cups and frosting on top (brown or green like earth?) will prevent the students from seeing the interior of the cupcake, (aka cheating) in the same way that a geologist can't see the interior of the Earth.
2. Provide each participant with the tools to create a "core sampling". A cupcake, a straw, a toothpick, and a piece of paper will do. Ask the participants to fold a piece of drawing paper into four sections and in one of the sections draw what they think the inside of the cupcake up would look like. Ask how they might get more information about the cupcake without peeling the foil or cutting it open with a knife.
3. Someone may suggest using the straw to take a core sample. If not, show them how to push the straw into the cupcake and pull out a sample. Remind the participants not to shoot the core sample at fellow learners. Remember to use the straw like a drill, rotating it through the cupcake. If they try and stick it straight in, there may be some crumbing involved.
4. The participants should make a second drawing of the cross section of their cupcake based on the information from three core samples. Each new drawing should be carefully labeled and placed in a different section of the recording paper.
5. Finally, they should cut open the cupcakes with a knife to compare them to the drawings.





# CAVE OF THE MOUNDS®

## National Natural Landmark

## Edible Aquifer

Did you ever wonder where all of the water you use comes from? Or where the water from Cave of the Mounds goes? In Wisconsin, most of us get our water from under the ground. Groundwater doesn't flow like an underground river. Instead, groundwater is stored in and moves slowly through layers of soil, sand and rocks called aquifers. It has been theorized that the groundwater from Cave of the Mounds leads to the Wisconsin River. Now this can be kind of hard to imagine how this works, so to help you out, we're going to make an aquifer. In this case, it will be an edible aquifer. (Which is AWESOME!) This will show you how groundwater is stored and how what we do above ground can affect the water underground.

You will need: Clear Cups, Drinking Straws (Plastic Disposable), Spoons, Colored Soda (Pepsi, Cola, Dr. Pepper), Clear Soda (Sprite, 7-up), Vanilla Ice Cream, Different Size Chips (peanut butter chips and mini chocolate chips), Sprinkles, Colored Sugar (Optional)

1. The first step to making our edible aquifer starts with filling a small, clear cup about one-third full with your chocolate chips. This represents all of the sand, gravel, and rocks in the aquifer.
2. Now, cover the chocolate chips with clear soda. This is supposed to be our groundwater. See how the "water" fills in the spaces around the "gravel, sand, and rock." We are now finished with the bedrock layer.
3. The second layer of our aquifer is called the confining layer, which is usually clay or dense rock. The water is confined below this layer. Today our confining layer is going to consist of ice cream! Spread a layer of ice cream over the bedrock layer. Top the ice-cream with another layer of "gravel and sand," chocolate chips.
4. The next layer is our porous, top layer of soil. Using sprinkles and some colored sugar can be used to represent this layer. Now add a small amount of colored soda. The coloring represents pollution. Can you think of some pollutants that can affect groundwater? Watch what happens when we pour it on the land.
5. Now, using your straw, "drill a well". To do this, push the straw down toward the bottom of the cup into the center of your aquifer. Slowly begin to pump the well by sucking on the straw. Watch as the water table goes down. But watch out for those water contaminants! See how much has seeped into the groundwater.
6. Continue the cycle by pretending it's raining and replenish the aquifer by adding more soda. A real aquifer takes a lot longer to recharge. When you're done playing with your aquifer, dig in!



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National Natural Landmark

## Leaf Mobile

One of the most common items to find on a nature walk through our Oak Valley Loop here at Cave of the Mounds. Leaves are easy to use and abundant, especially in Fall. This craft is a recreation of the leaf since they do dry out fast and get crumbly which is not fun to clean up. Enjoy the rustic vibe this leaf mobile will give off. There are multiple options on how to build this mobile or make it a hanging display along your wall. It is up to you!

You will need: 5 Leaves (similar size), White Foam Sheets, Sponge Paint (yellow, orange, red), Sponge Paint Brush (Foam Round Preferred), Two Sticks (5-6 inches long), Glue (Hot Glue or Wood Glue), Raffia, Ribbon, or Twine, Hole Punch

1. Start by tracing outlines of five leaves onto white foam sheets (Foam sheets are bought like poster board and can be found in craft supply stores). Cut out the shapes, and punch a hole in each cutout.
2. You can now sponge paint your leaves! Dab your sponge lightly into the paint and then onto your leaf shape and press the sponge all over both sides.
3. While these are drying you can make the mobile. Glue two sticks together so they are crossed at the center.
4. Punch a hole in each of the foam leaves. Tie raffia ribbon or twine through the hole of each leaf through your hole and then knot the other end onto the end of each stick and the fifth one in the center.
5. Balance the mobile by adjusting the length of each leaf if it hangs crooked. Tie a final ribbon or piece of twine to hang the mobile!

## Side Project

You can also make leaf magnets the same way as above by gluing a small magnet on the back of each leaf instead of making the mobile. You can write each family member's name in the middle of the leaf after sponge painting for a more personal touch.



# CAVE OF THE MOUNDS®

## National Natural Landmark

## Milkweed Bracelet

Milkweed is one of those really cool plants that serves a lot of purposes. It's the host plant for the monarch butterfly. It is very sensitive to ozone and can be used to detect air pollution. We have an abundance of it in our prairie for the many butterflies that migrate through Cave of the Mounds area. And now you can use it to make a bracelet. Here's how!

You will need: Milkweed, Rubber Mallet, Time (There is a step that takes a few days), Water

1. The first thing you'll need is the main material, milkweed--you'll be using the stems. To find milkweed, it grows in fields, meadows, prairies and along roadsides. \*\*\*Please do not use the ones at Cave of the Mounds\*\*\* We are trying to create a beautiful place for our butterflies.
2. Take a freshly cut milkweed plant, remove the leaves and lay it on a hard surface. Lightly tap the stem with a rubber mallet to break the outer layer. This will make it easier to create the bracelet.
3. Next, separate the strands. Try to keep the strands as long as possible. Find a warm, dry place to let them dry. You'll need to give the strands a few days to dry.
4. When the strands are dry and you're ready to start making your bracelet! Sprinkle the strands with water or soak them to make them more flexible. Take three pieces of milkweed cording about the same length and make a small loop or knot. This will be one end of the bracelet. If you are familiar with making braided bracelets, you may see where this is going.
5. Now get something to hold the knot end down, like a heavy rock or a friend.
6. Start braiding your milkweed cord. Keep braiding until your bracelet is the right length for your wrist. (If you're tying knots at both ends, you'll want to leave it long enough to slip over your hand.) Leave a little extra to tie a knot at the end. When you're near the end, make a knot that will fit through the loop at the other end of the cordage. This knot and the loop make the clasp for your bracelet. Or, if you tied a knot at the other end, simply tie another knot, connect both ends together and slip the bracelet over your hand.



**CAVE OF THE MOUNDS®**  
National Natural Landmark

## Pressed Leaf Bookmarks

Leaves are wonderful! Here at Cave of the Mounds we love looking at our large oak trees in wonder and awe. Leaves are great for many things besides crafting. They provide shade on hot days, create camouflage for animals that reside in the tree's branches. Leaves turn sunlight into starches and sugars, which is food for the mighty tree through the process called photosynthesis. When the leaves fall off the branches, they create a thin layer on the ground that helps the ground absorb moisture, and when they start to decompose, they release nutrients into the soil that are used by other plants to grow. Aren't leaves beautiful! That's why artists like Isaak Ilyich Levitan or Oscar-Claude Monet painted leaves in artworks like "Autumn Leaves" or "The Avenue". In this craft you will press leaves into a bookmark!

You will need: 9 leaves (small is good), Phone Book or Dictionary, 2 clean sheets of paper, White Poster Board, Scissors, Glue, Markers, Clear Contact Paper, Hole Punch, Ribbon or String

1. Collect your leaves and press them between two clean sheets of paper in a large book like a phone book or dictionary. After 2-4 weeks they will be dried and flat.
2. Next with your white poster board, cut several bookmark shape rectangles out with scissors. I usually cut them about 2 inches by 8 inches.
3. Place the leaves on the bookmark with a touch of glue. Allow to dry for a few minutes. You may decorate with marker too, or simply write the person's name on the bookmark at the bottom or top, or in between the leaves. You can also use dried flowers for this.
4. Cut a section of clear contact paper that is twice as big as your bookmark, plus some extra. So roughly about 5 inches by 17 inches. Lay your bookmark upside down very carefully on one edge of the contact paper so you can fold over the rest of it on the back of the bookmark. Carefully smooth down the contact paper so there are no bubbles then trim the contact paper to the edge of the bookmark.
5. You then may put a hole in the top with a paper punch and tie a ribbon through the hole. This makes a wonderful gift!



# CAVE OF THE MOUNDS®

## National Natural Landmark

## Suet Feeder

By putting up a bird feeder in your yard, you can easily attract a variety of wintering Wisconsin birds. Not only will you spot some of these winter-ready birds, but you will help them survive the harsh winter conditions when food is scarce.

Identifying birds isn't as difficult as you may think. Noting just a few characteristics of the bird, such as shape and color as well as the habitat in which you see the bird can tell you a lot about what type of bird you may be seeing or hearing. Listening to bird songs is a wonderful way to expand your enjoyment of nature. Often you won't be able to see the birds, but you will be able to hear their calls. Some of the rarer, and harder to spot birds you may see here include the Scarlet Tanager, Eastern Bluebird and Great Horned Owl.

You will need: Plastic Onion or Potato Sack, Wax Paper, String, Scissors, Suet (ask for this at the meat counter at your local grocery store), Bird Seed

1. Cut a piece of wax paper to about 8" x 10." Sprinkle birdseed on the wax paper in an even layer. Then take out your suet and roll it onto the seeds, completely covering it.
2. Now make a ball out of your suet and place it into the plastic onion or potato sack. If you chose to use the potato sack, cut the sack to fit the size of your suet ball and tie off the top with your string.
3. \*\*Be sure to leave a long end on it in order to hang it from the tree.\*\*  
(Recommend 12-24 inches long)
4. Hang the suet feeder far from the tree trunk to keep other critters from making off with the entire feeder because it happens. Wait and watch to find out who will visit your suet sack feeder this winter using the tips above.

## Identifying Birds

- Bird size- Ask yourself, is the bird bigger or smaller than a robin?
- Bird markings- Look at the coloration of the feathers, what is unique? Does the bird have any distinct markings like eye streaks, caps or bib?
- Bird beak- What is the shape? Is it short and wide to crack seeds, is it long and narrow to eat suet, is it sharply curved as if to eat meat?
- Bird legs- What type of legs does it have? Are they short and narrow, long with webbed feet, long strong talons on its feet?



# CAVE OF THE MOUNDS®

## National Natural Landmark

## Tasty Trees

A lot of people don't realize that here at Cave of the Mounds we have wonderful nature trails. One is called "Oak Valley Loop" that takes you through a savanna woodland forested habitat where birds and small mammals abound. The trail loops down into the valley and twice across Chert Creek, an intermittent stream that carries water from the top of the East Mound toward the Pecatonica River to the south. It is beautiful to walk through the winding paths with sounds of faint water running in the distance. In this activity, we will make a dough forest. Before we begin, close your eyes, think about a forest you have visited. What did you see? Did you see different plants? What did they look like? Was there enough sunlight? Was there water?

You will need: 2 cups of peanut butter, 2 cups of corn syrup, 2-4 cups of powdered milk, Plastic bowls, Spoons, Pieces of wax paper, 2-4 1/4 measuring cups, soap and water.

1. To create a forest, you need three basic items, soil, water, and sunlight for the trees to grow.
2. Measure out 1/4 cup of peanut butter which represents soil, 1/4 cup of corn syrup which represents water. The measurement is 1/4-1/2 cup of powdered milk which represents sunlight. Mix ingredients with a spoon in a plastic bowl.
3. Roll this dough into a ball. That ball is like a seed. All seeds need water, sunlight, and soil to grow. Since our seed is a mixture of all of these ingredients it can grow into a plant.
4. Take the dough and shape it into a forest plant and then place it on the wax paper.
5. Once complete EAT THE DOUGH!



# CAVE OF THE MOUNDS®

## National Natural Landmark

## Water Cycle in a Bag

One of the main components of hydrology that sticks in my mind is the water cycle. Water is amazing! It changes form over and over again. As creatures on this Earth, we observe water in its different forms almost every day. Whether it's raining or in clouds, moisture on windows, or pools of water built up. In this activity, we will try to identify the components of the water cycle and observe the water cycle by constructing a simple, miniature model.

Little itty bitty water molecules are always on the move in what is called the water cycle or hydrologic cycle. The heat from the sun causes the water to evaporate and become a vapor. As the water vapor cools down, it condenses, forming tiny droplets that gather to form clouds. Have you seen those before? I told you you'd witness the water cycle every day. As the droplets get larger, they become heavier causing them to fall to the ground as precipitation (like rain, sleet, or, my least favorite, snow). Some of this precipitation joins lakes and streams. This is called surface water. Other times some of it soaks into the ground where it becomes groundwater. The process of water soaking into the ground is called infiltration, or recharge. Knowing this will help in explaining the process to those who are not familiar or children.

You will need: Clear Plastic Bag (zipper stule, sandwich size), Water (2 Tbsp), Tablespoon, Rubberband or twist-tie, Masking Tape.

1. Prepare your supplies all together so the process goes quicker and smoother. I'd have a cup of water to the side to make it easier to scoop the water, especially with smaller children.
2. Pour 2 tablespoons of water into a clear plastic bag.
3. Blow air (not spit) inside the bag with your mouth and quickly seal the bag closed with a rubber band, twist-tie, or zipper-closure. **DO NOT POP THE BAG!** It may be tempting but it ruins the whole experiment.
4. Place the bag on a sunny window ledge or tape directly to the window pane using that masking tape. Duct tape will be too sticky and scotch will not support the weight very well. . Periodically look at the bag throughout the day. What changes do you see? Jot down the results into a notebook.
5. For instant results, make two bags. Put cold water in the first bag and hot water in the second bag. Compare the two bags. Again, document the observations in your science journal.



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National Natural Landmark

## Window Ornament

Here at Cave of the Mounds, we have found many small pine cones, chestnuts, walnuts, and tree seeds in our Oak Valley this year. We seem to just keep collecting them! Our staff notices that kids like to collect them in their pockets because they are fascinated by items found in nature. Before you begin, go on a nature walk and explore the world. This is a neat craft for the whole family using these nature finds.

You will need: A large Styrofoam ball (6 cm to 12 cm), [Raffia, Twine, or Ribbon], Small pinecones, Gumball (spiky pods), nuts of any kind, Acorns, Seedpods, Hot glue gun, Gold spray paint (optional)

1. Use a low temp glue gun or the lower temperature on a glue gun with multiple settings and glue a doubled section of ribbon (two ribbons stacked on top of each other), twine or raffia to the top of your ball for hanging.
2. Now simply hot glue your nature finds very close together until the entire ball is covered. If you are more particular about how to arrange the items, either plan them out by tracing the items with a pencil on the Styrofoam ball or you could work your way through sizes starting with large to small items or vice versa.
3. You could also spray with gold paint or leave natural. Hang in a window for a natural decoration!





# CAVE OF THE MOUNDS®

## National Natural Landmark

## Oreo Tectonics

Have you ever noticed that South America and Africa fit together like puzzle pieces?  
*Paleontologists and Geologists noticed that similar fossils are found across these continents.*  
Where do we find earthquakes and volcanoes? Are there any patterns? *Earthquakes and volcanoes tend to occur in the same place around plate boundaries.*  
How fast do you think these plates move? *They move about 0 to 150mm annually depending on the boundary. On average, they move about as fast as your fingernails grow.*  
What are some ways that the plates could move relative to each other? *Come together, move apart, slide past.*  
What are some examples of this? *Oceans, Mountains, Volcanoes, Earthquakes, and Fault Lines.*

Divergent Boundary: Moving apart. The Atlantic Ocean is a good example, the ocean is getting wider & new crust is created.

Convergent Boundary: Coming together. Continental vs Continental= mountains ex. Himalayas or Appalachian (Continental vs Ocean= ocean sinks creating "Convergent Subduction Zone" ex. Deep Ocean Trench, earthquakes (because it could catch), volcanoes (because mantle is hot))

Transform Boundary: Slide Past ex. San Andreas Fault in CA producing earthquakes.

You will need: Oreos, Plates, Globe/Map

1. Explain the activity first and make sure that it is clear that oreos cannot be eaten until told
2. Pass out Oreos (3 per person) and ask everyone to carefully pull off one cookie from each oreo
3. The cookies without frosting should be carefully broken in half
4. Talk about continents fitting together & earthquakes and volcanoes.
5. First make a divergent boundary, then two types of convergent boundaries, and last the transform boundary
6. Before eating, ask if campers know where any of these boundaries are... Mid Atlantic Ridge, Ring of Fire, San Andreas Fault
7. As you go through these examples, campers can eat the appropriate oreo



# CAVE OF THE MOUNDS®

## National Natural Landmark

## Making Mountains

What is Geology? The study of the Earth

What part of Earth do people live on? The crust.

What are the layers of the Earth? What are they made of? Solid or liquid? Inner core is solid.

Outer core is liquid. Mantle is like silly putty. We have learned what the layers are by monitoring earthquakes. They produce an S-Wave that can not travel through liquids. It leaves a shadow behind when we try to hear the wave from the other side of the world.

What are some things we know about the earth's crust since we live here? Has it always looked the same?

In sedimentary rock, there are layers of sediment and often fossils form in this sedimentary rock from the burying of animals or plants. Are the older layers on the top or the bottom?

Bottom (Dirty laundry Example) This is the law of superposition which helps scientists date fossils because the deeper we dig, the further back in time we see.

You will need: Dough of different colors, Shells

1. Roll the first dough into a flat pancake. Sprinkle with shells(fossils).
2. Repeat this for another layer.  
(dough/shell/dough/shell/dough/dough/dough)
3. Push the sides together to make an arch.
4. This happens when rocks are squeezed together.
5. Adult will use a butter knife to slice off the top at an angle to reveal the layers.



# CAVE OF THE MOUNDS®

## National Natural Landmark

## Soda Bottle Terrariums

Since the Cave of the Mounds first opened to the public in 1940, our gardeners have been hard at work cultivating a stunning array of perennial flowers. Nature provides a dazzling array of blooms from early spring through late fall among the myriad of interesting rock formations found naturally in this area - coupled with specialized plantings designed to "catch" water. We invite you to wander the gardens that have been lovingly tended for generations.

You will need: Permanent Black Marker, 1 cup peat (optional), Very sharp scissors or craft knife, Seeds or Dried beans, 5-10 small rocks, Plastic 2 liter soda bottle with cap, 2 cups dirt or potting soil, 1/4 cup water

1. **Prepare bottle:** Remove the label from the bottle. Discard label. Save cap! Wash and rinse out the bottle and cap. Draw a line on the bottle about 1/3 of the way up with the marker. Cut along that line so the bottle is in two pieces.
2. **Put in rocks, peat and soil:** Put a few rocks in the bottom for drainage. Then pour in the peat. Peat is optional but it does give the roots more space to breathe. Lightly pour in the dirt or potting soil.
3. **Plant the seeds or beans:** Push down with your finger in the soil to make a hole at an appropriate depth for the seeds or beans. It says on the seed packet whether to just sprinkle the seeds on the surface or put them deeper down. For dried beans, they need to be just below the surface of the soil.
4. **Water the soil and close the bottle:** Lightly spray the soil with water.
5. Slide the top of the bottle over the bottom, so they overlap slightly. Make sure you have left the cap on the bottle to keep a moist environment in the bottle.
6. **Place in sun:** Place in a sunny spot and watch for your seeds to grow! If you chose dried beans, you should see at least a tiny plant growing within two days.
7. Remember to spray a bit of water in the terrarium if it looks dry, but it should have enough water for a week.
8. **Transplant your plant outdoors when it is too big for the terrarium:** If you chose a dried bean, your plant will grow too large for the terrarium in less than a week. You could eat the sprout that comes off - it's a yummy bean sprout.



# CAVE OF THE MOUNDS<sup>®</sup>

## National Natural Landmark

## Colorful Carnations

When Ebenezer Brigham first settled here in 1828, prairie and oak savanna covered much of Southwestern Wisconsin. Here on the grounds of Cave of the Mounds National Natural Landmark, the varied plants that made these areas so unique may be found in our ongoing prairie and oak savanna restoration projects. Birds, butterflies and many other animals and insects make their homes in these diverse environments.

You will need: White Carnations, Food Coloring, Floral Water Tubes, Sharp Scissors

1. Add 10 drops of food coloring into a container
2. Fill with water. Add more drops if necessary to achieve a nice dark color.
3. Cut each stem of carnations at an angle and place inside a vase.
4. Wait & watch! Within a few hours, you'll begin to see the carnations change color.

## Dig Deeper

Flowers and plants drink water through their roots. In cut flowers, since there are no roots, water travels from the cut directly into the stems and travels to the petals and other parts of the plant. Through three properties, color water is transported to the petals and the color shows up in the xylem cells on the petals.

Three factors contribute to the transportation of water:

1. **Capillary action** Inside the stem, there is tube-like transport tissue, called xylem, that brings water and nutrients to different parts of the plant. Water molecules are attracted to the surface of the xylem cells by weak electrical attractions. This sticky property is called adhesion. Water automatically moves up the xylem due to adhesion and the resulting movement is called capillary action.
2. **Cohesion** Water molecules are not only attracted to the surface of xylem (adhesion), but they are also attracted to one another. This property is called cohesion. Because of cohesion, water molecules fill the column in the xylem as they move up and act as a continuous stream of water.
3. **Transpiration** Water evaporates from the plant through transpiration. As water evaporates in the petals or any part of the plant exposed to air, a negative pressure is created in the xylem, resulting in suction pulling the water upward just like you draw water upward when you suck on a straw



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## Sound Map

What is a sound map? A sound map is a piece of paper with an "x" in the middle. That "x" is you. You use a Sound Map to draw what is around you just by listening to your surroundings.

Make a map of the sounds in nature you hear, like birds chirping or squirrels jumping on branches.

How do I make one? Find a comfortable spot. Close your eyes. Listen closely to all the sounds around you. Draw what you've heard on a Sound Map and where you think it's coming from.

Keep listening and drawing. Compare your map with your friends. Go exploring to see if you were right about the directions the sounds came from.

You will need: Pencils & Clipboards, Pieces of Paper

1. Go to a Grassy Space
2. Close eyes. Listen to nature. Draw what you hear. Investigate.