

Worcester Goes Green

Ten Climate and Weather Themed Activities

Suggested Morning Activities:

• **Baking Soda and Vinegar Volcano**

This is a classic example of a reaction between acids (the vinegar) and bases (the baking soda). Later in the week there will be another activity looking at acids and bases, but this is great to start. Once you have done the experiment once or twice, test out different ratios to see the different reactions.

You Will Need:

- Baking Soda
- Vinegar
- A container to hold everything and avoid a big mess!

To Begin:

1. Place some of the baking soda into your container.
2. Pour in some of the vinegar
3. Watch as the reaction takes place!
4. What's happening? The baking soda, or sodium bicarbonate, is a base. The vinegar is an acid. When they are mixed together they form carbonic acid and carbon dioxide. These reactions create the fizzing as they escape the solution on the bottom.
5. After everyone has seen the experiment try again using different quantities of vinegar and baking soda. Can you figure out a way to have them react with the least amount of baking soda possible?

• **Cloud Key**

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Weather patterns are constantly changing all over the earth, and can easily be witnessed from a backyard. All air contains water, but closer to the ground, it appears as visible water vapor. However, cooler air cannot hold as much water, so the vapor condenses onto tiny pieces of dust that float in the air. When billions of these droplets come together, they form a visible cloud. There are three types of cloud groups: high clouds (cirrus), middle clouds (alto), and low clouds (stratus). Cirrus clouds are the whitest, thinnest clouds that often spread across most of the sky. Alto clouds are grey or blue-grey in color and usually cover the entire sky. These clouds often indicate a rain storm approaching. Stratus clouds are lower in the sky, puffy, and grey in color. These can easily turn into thunderheads. For this activity kids will make their own cloud keys and identify the clouds they see.

You Will Need:

- "Cloud Key" worksheets
- Scissors
- Fastener

To Begin:

1. Talk about the different types of clouds that exist. Tell kids they will make their own cloud keys to help identify the types of clouds they see throughout the week.
2. Pass out the cloud keys.
3. Have kids cut out keys and fasten them with a fastener.
4. Practice using the cloud keys to identify various types of clouds. Are there certain types of clouds that are more popular at certain temperatures? What about certain times of the day?

• **Sun Dial**

Sundials were used to tell time before the inventions of watches and clocks. Remaining stationary, the sundial told time based on where the sun cast a shadow on the dial. For this activity kids will make their own sun dials that they will use to help tell time.

You Will Need:

- Paper plate

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- Marker
- Straw

To Begin:

1. Distribute materials.
2. Mark the plate like a clock.
3. Poke a hole in the middle of the plate and insert the straw.
4. Exactly at noon, the sun should be directly overhead. Line up the straw's shadow with the number 12.
5. Keep the sundial in the same position, while the sun (and the straw's shadow) moves around it.



• **Leave no Trace**

The purpose of this activity is to help participants understand their role in nature and see that everything connects.

You Will Need:

- Paper
- Pens

To Begin:

1. Distribute materials
2. Participants make three columns on a sheet of paper: Things in Nature, Things we Have in Common, and How it Helps Me

THINGS IN NATURE	THINGS WE HAVE IN COMMON	HOW IT HELPS ME
TREE 	We both have an outer layer to protect us (bark/skin).	A tree gives me oxygen.
SOIL 	We both contain minerals.	Soil helps grow my food.
ANT 	We both need shelter.	Ants loosen the soil.

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3. To fill in the columns, have participants think about things they have seen, how they are alike, and how it helps them (e.g. trees, both have outer layer for protection (skin and bark), and they help create oxygen for us to breathe).
4. As a group, compare charts. What do some have in common? Do some charts have the same object but it helps in different ways?

• **Measuring Shadows**

This hands on activity has kids measuring shadows, which then helps them understand proportion. Note that this activity should be done within a twenty minute time span so the shadow measurements stay the same. If you don't finish in time don't worry, but be aware that you may need to recalculate a little. Lesson taken from education.com.

What You Need:

- Tape measure
- Notebook
- Calculator
- Pen or pencil

What You Do:

1. Go to a sunny spot outside where you can clearly see your shadow. This is easiest if done earlier or later in the day when the sun is not directly overhead.
2. Using the tape measure, calculate your shadow in inches from the toes to the top of the head. Record this number in a notebook.
3. Using the tape measure again, measure your actual height in inches. Record this number in your notebook.
4. Divide your height by the length of your shadow and write that number down. This is the proportion, and you'll need to use in step 7.

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5. Locate an object that is too tall to measure, but not so tall that you can't see its entire shadow. A few good examples of this are a basketball hoop, tree, or flagpole.
6. Measure the object's shadow in inches and record the number in your notebook.
7. Multiply the length of the object's shadow by the proportion from step 4. This will tell you the object's height in inches. Divide by 12 to find the object's height in feet.

Suggested Afternoon Activities:

• **Making Quicksand**

Quicksand is a soupy mixture of sand and water where sand is floating in and on top of the water. It is both a solid and a liquid at the same time, making it a trap for moving animals and people. Quicksand occurs when water has flooded an area of sand and then is trapped in that area. Floods, underground springs, or an earthquake can create ideal environments for quicksand, and it usually occurs around river beds. In this science experiment, children will make her own quicksand to better understand how it can be fluid and solid at the same time. Lesson taken from education.com.

You Will Need:

- 1 box of cornstarch
- 1-2 cups water
- Large mixing bowl
- Pitcher of water
- Spoon
- Gallon size zip-top bag
- Toy animal

What You Do:

1. Have kids pour $\frac{1}{4}$ of the box of cornstarch into the bowl, add $\frac{1}{2}$ cup of water and stir. It might be easier to mix with your bare hands.

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2. Continue adding cornstarch and water in small amounts until the mix is roughly the consistency of honey. You should use the entire box of cornstarch and 1-2 cups of water in all.
3. Now have kids move their hands through the “quicksand.” Have them move their hands slowly, then quickly. What's the difference? Is it harder to move quickly?
4. Now have them sink their whole hand into the mix and try to pull it out. That's the sensation of being trapped in quicksand!
5. Finally, drop a object into the quicksand (a penny or something small that can get dirty), then try to pull it out. What happened?
6. Is there any way out of quicksand? Did you find the best way to get across the quicksand? Thrashing around in quicksand is instinctive but it's the worst thing you can do. Instead you should try to level out and float on your back in order to paddle to firmer ground.

• Testing Acids and Bases

Many plants in nature work like litmus paper, changing color in the presence of acids or bases. Called acid-base indicators, these plants are usually mildly acidic or alkaline themselves, and they change color when mixed with a substance that has an opposite ph. Conduct a simple science experiment using an acid (vinegar) and a base (baking soda) to see if flowers from your garden pass the acid-base indicator test. It's chemistry, but it looks like magic! Lesson taken from education.com.

What You Need:

- 3 or more different kinds of red, pink, orange, blue, or purple flowers (gather flowers that have fallen, leaves, grass, or anything else you can collect. Gather as many colors as you can, because not all flowers will react. **Do not pick the flowers!**)
- White vinegar
- 3 or more spoons (you'll need one spoon per kind of flower)
- 5 or more clear plastic cups
- Baking soda
- Water

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- Permanent marker

What You Do:

1. This may be easier to do in small groups if there are a lot of kids. Have one child label one plastic cup with the word "acid" and another with the word "base".
2. Pour about half a cup of white vinegar into the "acid" cup. Mix about half a cup of water with a few teaspoons of baking soda in the "base" cup.
3. Ask the children to choose one kind of flower and crush its petals into a pulp using their fingers or a spoon. Have them divide the crushed petals into the other three plastic cups and add a drop or two of water in each one.
4. Using a spoon, help your child add a few drops of acid to one cup and a few drops of base to another.
5. Compare the contents of these two cups with the contents of the third, which contains just the flower pulp. If the flower is an acid-base indicator, you'll see an immediate reaction in at least one of the cups. Red flowers turn bluish or greenish in a base, and become more vividly red in an acid. Blue flowers, on the other hand, turn red or pink in acids, and more intensely blue in bases.
6. Repeat steps 2-4 with the other kinds of flowers you gathered. Wash the plastic cups thoroughly or use new cups when you change from one kind of flower to the next.
7. After the experiment encourage kids to use different amounts of acids and bases to see if this changes the reaction. You can also try to reverse the reaction. After they add baking soda to red flower pulp and see it turn blue, they can add vinegar and watch it turn red again!

- **Habitat Maps**

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This activity teaches kids what habitats are and how these different habitats influence the life around them. Kids will walk around the park and look at the different habitats, and then map out the habitats in small groups.

1. Divide children into small groups and have them make an outline of the park.
2. When they have an outline have the groups walk around the park and list all of the common habitats (ponds, woods, grassy areas, contrast park with sidewalks and city streets...). Look for differences in plants and try to find animals or bugs that may live in certain areas. Write down everything you discover so you can map it later!
3. When the kids are done exploring have them make a map based on the different habitats they found. What lives in those different habitats? Compare maps!

• **Making Rain Gauges and Hanging Clouds**

Rain gauges are used to measure the amount of rain fallen over a period of time. Participants will make their own rain gauge to take home and place outside to measure rain fall. Then for the Cloud Hanging activity, participants will cut out weather related objects to hang where they wish.

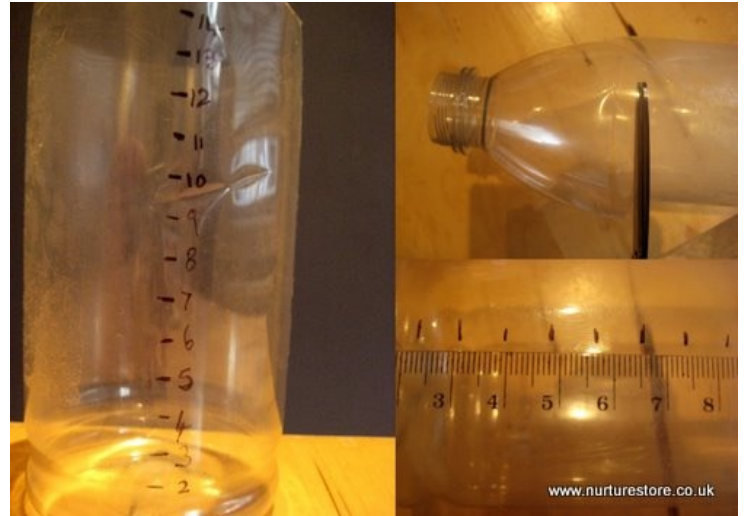
You Will Need:

- For rain gauge:
 - Plastic bottle
 - Markers
 - Ruler
 - Scissors
- For Cloud Hangings:
 - Paper
 - String
 - Scissors
 - Markers

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To Begin:

Begin with the rain gauge first, then move on to the cloud hangings. A rain gauge can help kids see how much it actually rains in a day. Allow them to make the gauges and take them home to use. Each time it rains the bottle will fill with water. Try to predict how many inches you think it will rain, and check later in the day to see if you were right.



1. Distribute materials for rain gauge activity,
2. Using scissors, carefully cut the top of bottle off. You will not need the top anymore.
3. Using the ruler and marker, label intervals on the bottle (in inches or centimeters, depending on the size of the bottle).
4. Distribute materials for cloud hanging activity
5. Participants may cut the paper into different shapes (clouds, rain drops, lightning, snowflakes, etc.)
6. Make a small hole in the top and thread string through to hang
7. Using the marker, label one side of the object so they know what it is when they take it home

• **Nature Hunt**

This culminating activity is a fun way to get the kids moving and collaborating in small groups. Hand out the Nature Hunt worksheet and see how many items each group can find. Of course, some items may be impossible to find at your park site.

You Will Need:

- Nature hunt handout
- Something to write with

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To Begin:

1. Hand out a list to each group. Explain to each group that they will have 45 minutes (or however long you think is necessary) to find as many items as possible
2. When an item has been found have the kids call a staff person over to verify
3. When time is up compare findings as a whole group. Which small group found the most items? Did they use a specific strategy?