

# Soil, Water and Weather

An Integrated Thematic Unit



Developed for Alabama Agriculture in the Classroom  
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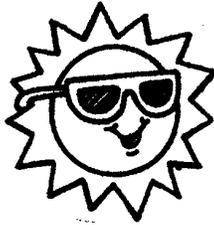
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# Water and Weather



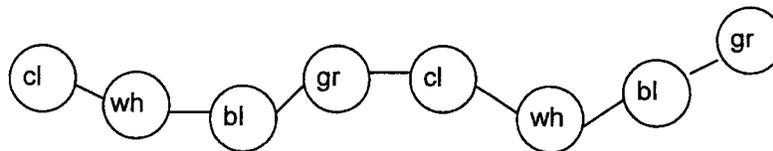
# The Water Cycle Song

(tune: My Darling Clementine)

Evaporation, condensation, precipitation,  
That's the way,  
We call it the water cycle,  
And it happens everyday.

Oceans, streams, lakes, and bays,  
This is where it all began,  
We call it the water cycle,  
And it happens every day.

## Water Cycle Bracelets



WATER CYCLE BRACELET

**Objective:** Students will list the stages in the water cycle.

**You'll need:** For each student: plastic beads (3) blue, (3) white, (3) clear, (3) green; string or twine.

**Procedure:**

1. Review the stages of the water cycle with the water cycle song.
2. Connect the stages of the water cycle to the colored beads as follows:  
evaporation - clear beads represent water vapor  
condensation - white for clouds, dew, frost  
precipitation - blue for the water that forms rain, snow, hail, sleet  
ground water & runoff - green for growing
3. Have students string beads to reflect the steps in the water cycle starting with evaporation. Example: clear, white, blue, green.
4. Continue with the pattern until all beads have been used.
5. Tie the string around the wrist loosely.
6. Sing the water cycle song.

## Do Plants Sweat?

As leaves manufacture food (a process known as *photosynthesis*), they take in carbon dioxide and give off water and oxygen. A mature tree can release more than 200 gallons of water per day. This easy demonstration is designed to give students a first-hand look at the process known as *transpiration*.

**Objective:** Students will observe plants for signs of transpiration.

**You'll need:** Plants (choose several different varieties to compare and contrast), clear plastic bags, twist-ties.

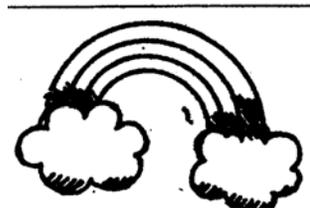
### Procedure:

1. Cover a group of leaves on each plant with a plastic bag and secure with a twist-tie.
2. Set plants in a location where they receive light but are out of the direct sunlight.
3. Observe for several days and record changes.
4. Try varying the location of the plants and observe to see if this affects the process of transpiration.

### Questions To Think About:

Do the following variables affect the rate of transpiration: the size or type of leaves? the location of the leaves (shade or sun)?

## Wild Water Facts



Approximately two-thirds of your body is made up of water.

Water is the only thing in nature that occurs in all three states: solid, liquid, and gas.

In twenty minutes, a thunderstorm can send down over 125,000,000 gallons of water.

About 70% of the earth is covered by water. Does it make you wonder why Earth isn't called the water planet instead??

Raindrops are not shaped like teardrops. Small raindrops are spherical and larger ones are shaped like a hamburger bun.

# Charting the Weather



**Objective:** Students will create a weather graph.

**Standards :** Students will read and interpret information from a graph.

**You'll need:** Class weather graph, crayons or markers

**Procedure:**

1. Copy the weather graph and display it in the classroom.
2. Have students check the weather daily and color the appropriate square on the graph.
3. Question students about the information on the graph.

**Questions To Think About:**

- \* Which type of weather have we had the most of? Least of?
- \* How many days have been sunny? partly sunny? rainy? cloudy? snowy?
- \* How many days have been either cloudy or partly cloudy?
- \* Have there been more sunny days or rainy days?

WHAT'S THE WEATHER TODAY?											
 SUNNY											
 PARTLY CLOUDY											
 CLOUDY											
 RAINY											
 SNOWY											
OTHER											

# Measuring Rainfall

Humans must have fresh water to survive. However, 97% of the earth's water supply is too salty to use. Most of the other 3% is comprised of glaciers and icebergs. Fresh water available for our use is LESS than 1%. Rain is a primary source of fresh water.

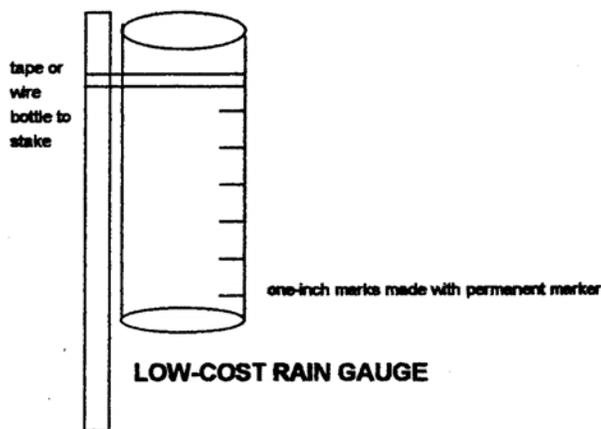
Students can make a rain gauge and keep a log of the amount of rain over a selected period of time by measuring the amount of water in the gauge after each rainfall. This data can become the basis of student-created graphs.

**Objective:** Students will measure rainfall over a given period of time.  
Students will gather and graph data.

**You'll need:** Tall olive jar or pill bottle, 12" wooden stake, wire or duct tape, pliers, ruler or meter stick, permanent marker, rainfall journal

**Procedure:**

1. Tape or wire bottle to 12" stake.
2. Mark the bottle in one-inch increments with a permanent marker.
3. Place in an open area by driving the stake into the ground.
4. Measure rainfall and record data in journal.
5. Create graphs on daily, weekly, monthly amounts of rainfall.



**Questions to Think About:**

- \* Place several rain gauges in different locations around the school. Is the same amount of rain collected in each? Why or why not?

## Easy Rainsticks

Create the sound of a rainstorm in the classroom

**Objective:** Students will create rain sticks to simulate the sound of a storm.

**You'll need:** Cardboard mailing tube, chicken wire, assorted bean seeds and small shells or pebbles, white glue, paint, sponge applicator, markers.

**Procedure:**

1. Have students print their names in permanent marker on one end of the mailing tube.
2. Pour an assortment of bean seeds, shells, and pebbles into the mailing tube (about 1/4 cup).
3. Roll a 6"x8" piece of chicken wire up tightly and slide it into the tube.
4. Glue the end of the tube shut with white glue or a hot glue gun and allow time for it to dry.
5. Decorate the outside of the tube with paints and markers.



## Evaporation Painting

**Objective:** Students will observe the effects of evaporation.

**You'll need:** 2 cups warm water, 1 box salt, food coloring, paper, paintbrushes, container for mixing paint

**Procedure:**

1. Mix equal parts of salt and warm water, stirring until all the salt has been absorbed.
2. Pour the mixture into several containers and add food coloring to each.
3. Paint a picture with the mixture.
4. Allow time to dry. Observe. (The water will have evaporated, leaving behind the colored salt)
5. Discuss the students' observations.

# A Water Cycle Play

This is a fun way of learning about the water cycle

**Objective:** Students will participate in a dramatization of the water cycle.

**Props:** yellow poster board sun, clouds created from white bulletin board paper, vegetable and flower headbands, raindrop hats, umbrella.

**Cast:** five water drops, sun, wind, cloud, 2 children, vegetables and flowers.



## Act I

**Narrator:** It's high in the sky on a partly cloudy fall day.

*(cloud is stage center -water drops #3-4-5 behind the cloud)*

**Water drop #1:** *(wishfully)* Here I am, just hanging around the clouds. I wish I were big enough to be a real raindrop.

**Water drop #2:** Come join me. We still won't be a raindrop, but at least we'll be on our way.

**Water drop #3:** *(peeking out from behind the cloud)* Where have you been? We've been waiting for you.

**Water drop #1:** I was floating around the lake watching the sailboats.

**Water drop #2:** I was sitting in a puddle in the middle of a pumpkin patch.

**Water drops #3-4-5:** *(standing behind the cloud)* We're up here in this big cloud.

It's getting cooler and we're condensing. *(As they join hands)* Hurry, we're almost a raindrop.

*Water droplets #1,2, join all the others, linking hands and circling around the cloud,*

**All together:** We're a raindrop now. It's almost time for some precipitation.

## Act II

**Narrator:** Down on earth two children are walking in the garden.

*(children enter stage right)*

**First child:** Look at the big clouds. I think it's going to rain.

**Second child:** *(opening an umbrella)* Let's get under the umbrella.

**Water drop #3:** Look out, Earth. Here we come!

*(Water drops circle around the children)*



**Water drop #4:** *(in an excited voice)* PRECIPITATION! This is the part I like best!!

### Act III

*(Water drops sit down on the stage)*

**Narrator:** The rain shower is over and the children run off to play.  
*(Children exit stage left)*



**Water drops #4-5:** Here we are sitting in this puddle in the garden. This is boring.

**Vegetables & Flowers:** We think that rain felt great! We were so thirsty and it helps us grow.  
*(Cloud exits and the sun and wind enter the stage)*

**Water drop #1:** The air feels warm and I can see the sun. You know what that means.

**Water drop #3:** EVAPORATION!

**Water drop #2:** I feel a gentle breeze blowing. You know what that brings.

**Water drop #4:** EVAPORATION!

**Water drop #5:** It's time to go. We're turning into water vapor.

*(Sun and wind move stage left and right. The cloud moves stage center)  
All five water drops begin to move in a circle around the cloud.*

**Water drop #1:** What will we be next hail, sleet, snow, or more rain?

**Water drop #2:** Where will we go next? Atlanta? New York? London? Maybe the middle of the ocean?

All cast members move to the front and sing the Water Cycle song.

*(tune: Oh, My Darling)*



Evaporation, condensation, precipitation,  
that's the way,  
We call it the water cycle,  
And it happens every day.

Oceans, streams, lakes and bays,  
This is where it all began,  
We call it the water cycle,  
And it happens every day.

## What Kind of Cloud is That?



### Cumulus, Cirrus, & Stratus Clouds



**Objective:** Students will be able to identify and draw examples of cumulus, cirrus, and stratus clouds.

**You'll need:** Blue construction paper (1 piece per student), cotton balls (10-15 per student), pencils, glue

**Procedure:**

1. Study the clouds over several days, identifying as many different types as is possible. Read about and discuss the different types of clouds.
2. Tell students that they will be making their own clouds.
3. Review the different types of clouds and sketch examples of each on the board.
4. Demonstrate how to use cotton balls in creating a cloud.
5. Pass out light blue construction paper and direct students to use pencils in sketching a cloud of their own.
6. Use glue to attach cotton to cloud shapes.
7. After the glue has dried, label the cloud and write one or more sentences describing an attribute of the cloud.

**Math Connection:** Observe cloud formations daily and record the types seen during the week. Create a graph with your data.

**Questions to Think About:**

- \* Will the results of your graph be the same during different seasons of the year? Why or why not?

## Crazy Cloud Shapes

**Objective:** Students will identify different types of clouds and create imaginative paintings.

**You'll need:** Blue construction paper, white tempera paint, straws

**Procedure:**

1. Study the clouds for shapes the students recognize (for example: a favorite animal or dinosaur).
2. Return to the classroom and pass out paper and straws.
3. Place a "blob" of white paint in the center of each students paper.
4. Direct them to use their straws to move the paint to create shapes.
5. After drying, label the shapes.

# Songs for All Kinds of Weather

Oh Rainbow  
(tune: "Oh Christmas Tree")

Oh, rainbow, oh, rainbow,  
How lovely are your colors.  
Oh, rainbow, Oh, rainbow,  
How lovely are your colors.  
Purple, red, and orange, too,  
Yellow, green, and blue so true.  
Oh, rainbow, oh, rainbow,  
How lovely are your colors.

Weather Song  
(tune: "Oh My Darling")

What's the weather?  
What's the weather?  
What's the weather, everyone?  
Is it windy?  
Is it cloudy?  
Is there rain?  
Or is there sun?



Weather  
(tune: "Bingo")

Today the sun is in the sky,  
And sunny is the weather.  
S-U-N-N-Y, S-U-N-N-Y, S-U-N-N-Y  
And sunny is the weather.

Other verses:

Today the rain falls from the sky. . R-A-I-N-Y  
Today the clouds are in the sky. . C-L-O-U-D-Y  
Today the fog hangs in the sky. . F-O-G-G-Y  
Today the snowfalls from the sky. . S-N-O-W-Y  
Today we have to wear a coat. . C-O-L-D



Thunder and Lightning  
(tune: "Pop Goes the Weasel")

(1)

When a storm begins in the clouds,  
It sometimes may look frightening.  
You see a quick electrical spark  
Flash! Goes the lightning!

(3)

When a storm begins in the clouds,  
It truly is a wonder.  
You hear a rumble loud in the sky  
Clap! Goes the thunder!

(2)

Long and thin and streaky and fast,  
Its glow is oh so brightening.  
Watch for the electric spark  
Flash! Goes the lightning!

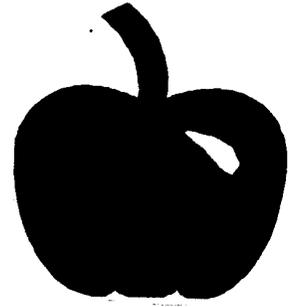
(4)

Lightning bolts are heating the air,  
Over clouds and under.  
When the air expands enough  
Clap! Goes the thunder!



Soil

## A Slice of Soil



One of the most important natural resources that covers the earth's land surface is soil. All living things depend on soil as a source of food either directly or indirectly. The amount of land that produces our food remains the same even though the world's population grows larger every year. Because of this, each person's food portion becomes smaller and smaller. We must all use our soil wisely so that it will be safe and available for future generations to feed the world's people.

The following activity will show how little of the earth's surface is actually used for food production.

**You'll need:** A large apple, a paring knife

**Procedure:**

1. Cut the apple into 4 equal parts. Set 3 parts aside and label them as oceans. The 4<sup>th</sup> part represents the land area of the earth.
2. Cut the land area in half lengthwise. Now you have two 1/8 pieces of the earth. One piece represents land such as deserts, swamps, arctic areas, and mountainous areas that are unsuitable for growing food. Label this piece and put it aside.
3. Cut the other 1/8 piece crosswise into 4 equal parts. Each of these represents 1/32 of the earth. Put 3 of these 1/32 pieces aside and label them as areas that are too hot, rocky, or wet or where soils are too poor for food production. Also included in this category are areas man has used for buildings, parking lots, etc.
4. Carefully peel the remaining 1/32 piece. This small piece of peeling represents the soil of our earth upon which we depend for food production.

# What is Your Soil Made Of?

**Objective:** Students will investigate the components of soil.

**You'll need:** Soil samples, water, dish washing liquid, five 2-liter bottles, funnels.

**Procedure:**

1. Assign 5 students the role of geologists. They will each collect three cups of soil from their home or neighborhood.
2. Divide the class into five working groups.
3. Give each group one of the collected soil samples.
4. Direct the group to spread the soil on newspapers and allow to dry.
5. Examine the soil with hand lenses, identifying and sketching components (small rocks, sand, clay, organic material, etc.);
6. Direct each group to pour the dried sample into their 2-liter bottle.
7. Fill the bottle 3/4 full of water, add several drops of dish washing liquid, fasten top tightly, and shake well.
8. Observe as the layers of soil begin to settle. Note: This may take several hours or overnight.
9. Sketch the layers that are visible after the process is complete.

**Questions to Think About:**

- \* Are all of the samples brought from home identical? Why or why not?
- \* Would soil samples from other areas of the country be the same as those studied? Why or why not?

**Math Connection:**

Calculate the percentage each component comprises of the total soil sample by:

1. Measuring the total height of the settled material in the 2-liter bottle.
2. Measuring the height of each layer in the bottle and dividing by the total

height. For example:

$$1" \text{ clay} / 4" \text{ total} = .25 \times 100 = 25\% \text{ clay}$$



# Experiment:

## Which Soil Is Best for Growing Beans?



**Objectives:** Students will compare the rate of growth of beans in different types of soil.  
Students will graph data collected in an experiment.  
Students will read and interpret graphs.

**You'll need:** 2 cups each of different types of soil, such as sandy, clay, or loam (potting soil can be used ) NOTE: A minimum of three types should be collected.  
6-8 planters (recyclables, such as small plastic cups, cafeteria milk cartons, or yogurt containers are great)  
bean seeds (choose one variety: pinto, lima, or soybean)  
spoon  
well-lit window sill or a plant light

### Procedure:

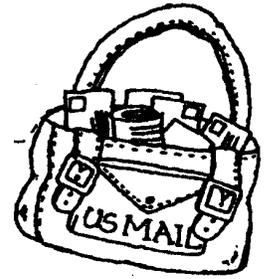
1. Assign students the task of bringing two cups of soil from home.  
This should be procured from their yard rather than purchased.
2. Examine the soil samples and categorize by type (sandy, clay, loam).
3. Fill containers with soil. Label each container with the date, soil type, and variety of seed to be planted.
4. Plant the seeds according to directions.
5. Place planters on a well-lit windowsill or under a plant light.
6. Add water until the soil is moist but not soaked. Water lightly as needed throughout the course of the experiment.
7. Observe and watch for signs of growth. Record data.

**Math Connection:** Graph the data gathered on growth rates in different types of soil.

### Think About It:

- \* In which type of soil did the beans show the first signs of growth?
- \* Were the results at the end of the first week the same as at the end of week #2? Why or why not?
- \* If you had planted a different variety of beans, would your results have been the same?
- \* Do your conclusions have any implications for farmers around the world? If so, What are they?

## Soil, Soil, Everywhere!



**Objective:** Students will categorize and compare soil samples from different areas of the country.

**You'll need:** Ziploc freezer bags (small), envelopes, magnifiers, stamps, information letter (see sample), 3"x5" index cards, Elmer's glue, U.S. map, willing friends and relatives around the country.

**Procedure:**

1. Send a letter home providing parents with details about the class soil project. Ask for names and addresses of friends and relatives living in other states who would be willing to participate. Compile a list of volunteers.
2. Have each student copy the sample letter providing detail about the soil project.
3. Mail letters and Ziploc bags to volunteers on the list asking them to provide a local soil sample (no more than 1/4 cup). Ask respondents to send a photograph if possible.
4. Display a large United States map on the classroom bulletin board.
5. As the soil samples arrive in the mail, label them with the name of the city and state from which they came.
6. Label index cards with soil information. Spread a small amount of white glue on the card and cover with a sample of the soil. Set aside to dry.
7. Attach the Ziploc bag soil samples around the edges of the map bulletin board and use yam to connect the samples to the location on the map.
8. Using hand magnifiers, study the soil samples. How are they alike? different? What type of crops are grown in each area?
9. Write thank you notes to all the volunteers who sent soil samples.

Sample Letter:

Dear \_\_\_\_\_,

Our class is working on a study of soils from around the country and we would like to include a sample from your area. If you are willing to assist us with this project, put several tablespoons of soil from your yard or field into the enclosed bag and return it in the envelope we have provided. Please tell us about the soil in your area. If you live in an agricultural area, we would be interested in learning about the kinds of crops that are grown. Thank you for your help with our class project.

Sincerely,

# Gardening on the Rocks

Amaze your students by growing plants without soil.

**Objective:** Students will investigate alternate ways of growing plants.

**You'll Need:** Shallow containers, clean rocks or pebbles, plant or root tops (carrots, beets, turnips, parsnips, or radishes).

**Procedure:**

1. Wash and rinse rocks in warm water. Air dry.
2. Fill several shallow containers with small rocks or pebbles.
3. Add water to cover the layer of rocks.
4. Cut off the top 1/2 -1" of the root vegetable. If leaves are present, pinch off all but 1/8" or tiny buds.
5. Place several vegetable tops cut side down on the layer of rocks, making sure that the cut side is covered by water.
6. Place in a well-lit location and observe for signs of growth.
7. Add water as needed.

**Try this too:**

Grow your own pineapple plant.

Cut the top off a pineapple leaving about 3/4" of the fruit attached. Place on stones for 2-3 weeks until roots appear. Then move the plant to a pot filled with soil (pineapples prefer a potting soil mixed with sand). Cover the base well with soil and place on a well-lighted windowsill.

How about a sweet potato plant?

Fill a deep container with rocks or pebbles to within 1" of the top, adding water until the rocks are covered. Choose a sweet potato that has small roots or buds and cut off 2" from the rounded end. Place the rounded piece, cut side down, on the rocks. Place on a well-lighted windowsill. Check the water level daily, keeping the cut edge always under water.

**NOTE:** In purchasing vegetables to use for this demonstration, look for those with signs of growth at the top. These will produce a showy garden sooner than those without signs of growth.

# Dirt Cake: A Tempting Tasty Treat

## Ingredients:

### Ingredients:

- 1 -1/4 lbs. Oreo cookies
- 1 -12 oz. container Cool Whip
- 1 stick margarine, softened at room temperature
- 2 small packages of instant pudding (any flavor)
- 8 oz. cream cheese, softened
- 3 1/2 cups milk
- 1 cup powdered sugar
- gummy worms or bugs
- 8" plastic flowerpot (new)
- artificial flowers

### Procedure:

1. To create the "soil," grind the cookies coarsely in a food processor or blender.
2. In a large bowl, blend together the margarine, cream cheese, and powdered sugar. Slowly add the milk and pudding mix, beating well.
3. Fold in the gummy worms or bugs.
4. Layer the "soil" and filling mixture in the plastic pot, starting and ending with layers of oreo "soil."
5. Freeze overnight. Thaw and decorate with artificial flowers before serving.

## Cool Soil Facts

Soil makes up the top layer of the earth.

Five tons of topsoil spread over an acre is only as thick as a dime.

It takes 100 years for nature to create one inch of topsoil.

There are over 70,000 kinds of soil in the United States.

Between five and ten tons of animal life can live in one acre of soil.

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## Soil Websites

National Resources Conservation Service (NRCS).  
Download a coloring book about Sammy Soil.  
<http://www.tx.nrcs.usda.gov/class/sammy.htm>

USDA National Resources Conservation Service.  
Department of Agriculture site for kids. Information about soil.  
[www.nhq.nrcs.usda.gov/CCS/squirm/skworm.htm](http://www.nhq.nrcs.usda.gov/CCS/squirm/skworm.htm)

NASA.  
site for kids: information on soil types, activities, songs.  
<http://tpwww.gsfc.nasa.gov/globe/index.htm>

Field Museum of Natural History/Underground Adventure  
discover the world of soil, includes a virtual terrarium.  
<http://www.flinnh.org/ua/>

## Water Websites

U.S. Geological Service (USGS). Great site for background information and educational facts on precipitation and the water cycle.  
<http://wwwga.usga.gov/edu/earthwherewater.html>

National Resources Conservation Service (NRCS). Download The Story of Wendy Water coloring book.  
<http://www.tx.nrcs.usda.gov/class/wendy.htm>

