
Environmental Scientist

Overview:

This lesson and activity are designed to give students hands-on experience collecting, recording data and understanding the concept of the water cycle.

Grade: 2

TEKS

Scientific processes

2.1(A)

2.2 (A, B, D)

2.4 (A)

Science Concept

2.5 (A)

2.6 (A)

2.7 (B, D)

2.8 (A, B)

2.9 (A)

2.10 (A, B)

Literature

Water Dance

Vocabulary

Evaporation

Erosion

Condensation

Precipitation

Runoff

Materials

Discovery Book

Compass

Thermometer

Rain Gauge

Ziploc Baggies

Dinosaur Water

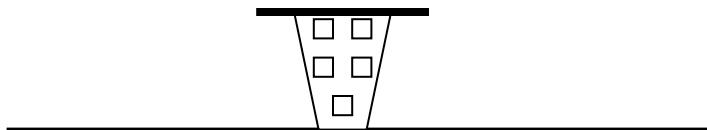
Classroom Activity

1. Remove the label from a 2-liter plastic soda bottle and fill halfway with fresh tap water and secure the plastic cap. With a permanent marker, write on the bottle "Dinosaur Water."
2. To build anticipation, place the "Dinosaur Water" bottle in a central location in your classroom. When children ask, "Is that real Dinosaur Water?" Reply, "Yes!" Let your students' curiosity build for a few days. Save the explanation for the closure of the lesson.
3. If your students ask for additional details just explain the water used to be inside a dinosaur and that you will show them where to get their own at the end of the "Dinosaur Water" lesson.
4. As a pre-test activity, have your students make a "Water Map". Ask your students to draw a map that reflects where water comes from and how it gets into their home. Date and keep these maps to compare and evaluate the effectiveness of the lesson with the post test map.
5. On the overhead projector write the words "Water Map". Spend some time discussing their background knowledge about water and the source of their water. Clear any misconceptions your student may have about their drinking water.
6. To help students understand the concept of the water cycle set up models for evaporation, condensation, precipitation and runoff in your classroom.

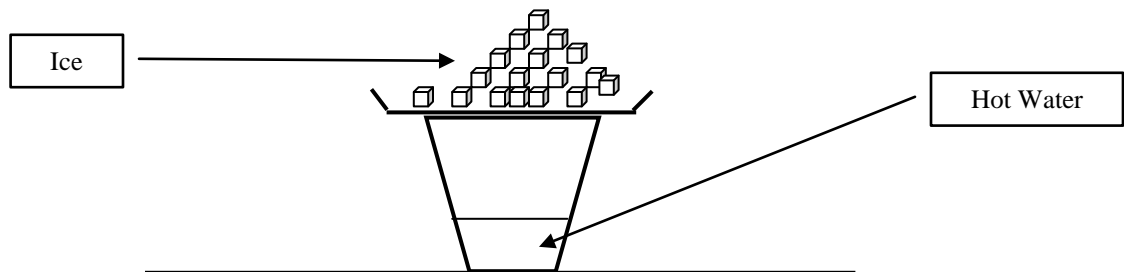
7. For the evaporation model, fill two plastic containers with the same amount of water. Mark the water line with a permanent marker and date the bottle too. Place both containers in a location where all students can observe the evaporation process. Position a lamp over one of the containers of water and turn on the lamp. Explain the definition of evaporation and ask your students to predict which container will evaporate first. Record their predictions and each day make a new mark on the containers as the water evaporates. Create a graph that contrasts the amount of time it takes the two containers to completely evaporate. Did your students get close on their predictions?



8. The condensation model is best explained with ice and a plastic container. Place the container on a table and fill with ice water. Place a cover over the top of the container. With your students gathered around, ask your student to watch for "condensation". Record the amount of time it takes for condensation to develop on the side of the container. Ask your students to explain where the water came from? Use the analogy of a cold winter day and how kids like to sit close together to keep warm. Water molecules come together when the air temperature is cold and show up as condensation. Make the connection between this experiment and the formation of clouds in our atmosphere.

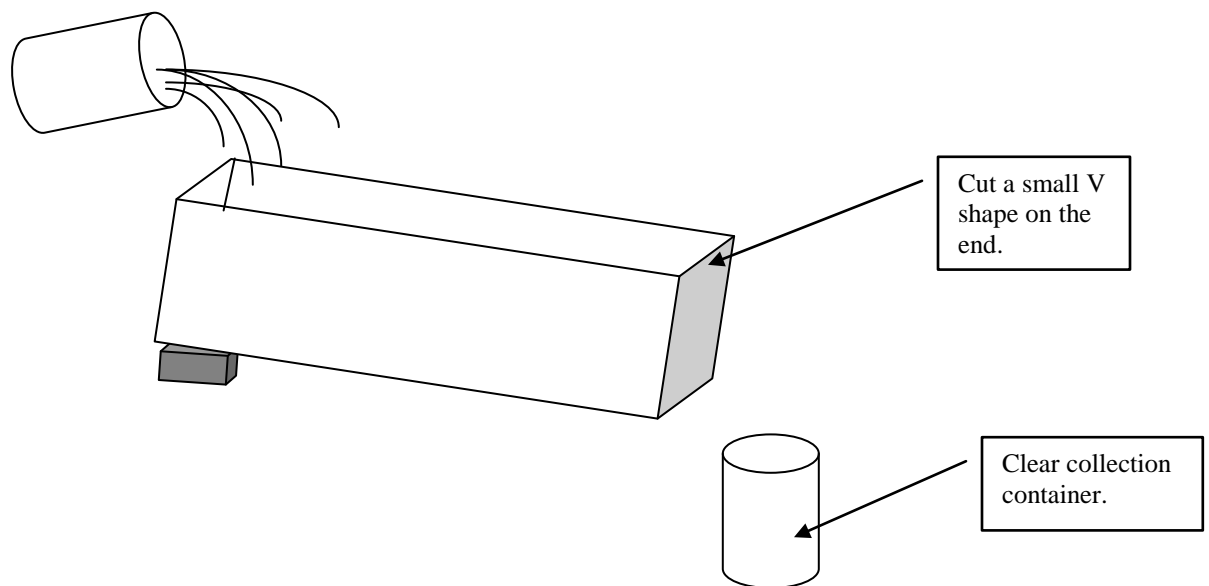


9. Precipitation is another concept easily explained with hot water and ice. Fill 1/3 of a clear container with hot tap water and cover with small pie plate. Cover the pie plate with ice cubes and observe what happens inside the container. Help your students make a connection between this activity and the condensation activity.



10. To get across the concepts of runoff and erosion create two working models of the landscape. Fill two (7-gallon) Rubbermaid storage boxes with soil within an inch of the top of the storage box. In one box, cover the entire surface with grass seed and cover the seeds with a small amount of soil. *Be careful not to over water.* The idea here is to simulate the

landscape in your area. Another alternative is to have your students collect local grass and wildflower seeds instead of using a commercial grass product. When the grass covers the entire storage tube you are ready to begin the runoff and erosion experiment. Use a 2 x 4 block of wood under each end of the storage box. This will create enough slope so that the water will runoff the surface into a catch container. Cut a "V" shape on the end to allow the water to flow into your catch container. Fill a gallon container with water and secure the lid. Punch several holes in the top and pour the water over each model landscape. You may need to pour several gallons before the soil becomes saturated enough to begin to see a good runoff. This is a good opportunity to discuss the concepts of saturation and groundwater. What is the difference between the box with grass and the one without grass? Is there a difference in the color of water between the two boxes? Why?



11. Read *Water Dance* by Thomas Locker to your class. Lead your class in a discussion about the author's point of view. Can your students look in their environment and make similar observations?
12. Close the classroom by showing your students where they can get their own "Dinosaur Water." Tell the class, "Now it is time to show you where I get my "Dinosaur Water". Take the "Dinosaur Water" container over to a sink and fill the container to the top with fresh water. Secure the lid back on top and take the container back to its original location. If the ask questions simply explain that all the water that is on the Earth is all the water there is. It just keeps going through the cycles of evaporation, condensation and precipitation and runoff.

13. Prior to visiting the Eastman Nature and Wildlife Habitat Center, take your class on a virtual tour of the Eastman nature trail at <http://eastmanoutdoortexas.com>. The trail guide developed by Dr. Eric Taylor will give your students an opportunity to learn about the many different trees along the Eastman nature trail. How many of the Eastman Trees are located in your School's backyard?

In the Field

Dinosaur Water

1. Prior to leaving your school make sure you have the following items.
 - Discovery Books
 - Ziploc Baggies (1 gallon size)
 - Pencils (inexpensive mechanical pencils are excellent)
 - Compass
 - Thermometer
 - Water
 - First Aid Kit
 - Sack Lunch or light snack
 - Camera
 - Backpack
2. Before getting on the trail, remind students their observations and data collected will be used back in the classroom to create charts and graphs of their observations.
3. Set your behavior expectations before leaving the parking lot. Explain how students are to behave along the trail and in small groups. State specifically what behaviors you want to see along the trail. Remind students the higher their voices are the less likely they will see wildlife along the trail.
4. Distribute Discovery Books to students and record weather data observations. Teachers a gallon size ziploc baggie make an excellent container for pencils and Discovery Books during lunch or at the end of the day.
5. Walk through the gate and follow the trail. Remember to go slow and listen to your students' observations along the trail.
6. If you have enough adult supervision, divide your class into two groups. Have each group go in opposite directions along the trail. This will help reduce the noise level and also give your students an opportunity to share their observations when the class comes together at the halfway point. This is a good opportunity reinforce the idea that scientists share data too.

Post Eastman Activities

Dinosaur Water

- Repeat the "Water Map" test and compare with the pre-test map. Did your students grow in their understanding of the water cycle?
- Write/draw a narrative about their experiences at the Eastman Nature and Wild life Habitat Center.
- Visit your local freshwater and wastewater treatment plants.
- Students create an "Environmental Report" based on their Discovery Book observations.
- Where's Waldo is an excellent and fun activity to reinforce observation skills. A recent study found that people that can easily find Waldo make good Biologists.
- Student produced books about their water observations.
- Maintain an Environmental Journal for 1 school year.
- Research the amount of water each student's family uses at home. Compare with the school's water bill.
- Create a transformation of Thomas Locker's *Water Dance*.

Weather Data

Date: _____ Time: _____

Location: _____

Present Weather: _____
(Clear, Cloudy, Overcast or Raining)

Air Temperature: _____ Celsius

Air Temperature: _____ Fahrenheit

Wind: _____
(Which direction is the wind coming from?)

Resources

Publications

Water Dance by Thomas Locker

Come A Tide by George Ella Lyon

Dinosaur Tree by Douglas Henderson

The Little Boy who wanted a Dinosaur Tail by Mary Williams

Field Guide for the Eastman Nature Trail by Eric L. Taylor, Ph.D.

My Map Book by Sara Fanelli

The Magic School Bus at the Waterworks by Joanna Cole

Water for Dinosaurs and You by Roma Gans

(*Water for Dinosaurs and You* is out of print, but Amazon.com sells used copies.)

Web Pages

Drippy the Rain Drop

<http://www.drippytheraindrop.com/>

Water Cycle Outdoor Game

<http://teachers.net/lessons/posts/1663.html>

The Water Cycle

http://www.planetguide.net/book/chapter_2/water_cycle.html

EPA Climate Change

<http://epa.gov/climatechange/kids/index.html>

Around the Water Cycle Reader's Theater

<http://teachers.net/lessons/posts/400.html>

EPA Office of Water

<http://water.epa.gov/learn/kids/waterkids/kids.cfm>

Water Science for Schools

<http://www.ga.usgs.gov/edu/>

Drip Calculator

<http://www.awwa.org/advocacy/learn/conserves/dripcalc.cfm>