

NTTI Media-Rich Lesson

Rita Bailey

NAME

THE NEVER ENDING STORY

LESSON TITLE

Fourth Grade

GRADE LEVEL

60 MINUTE CLASS

TIME ALLOTMENT

OVERVIEW

Water covers about 70 percent of Earth's surface. It can be found in different places on the surface as well as in the atmosphere. All of the earth's water goes through a cycle in which the water changes its location or physical state through different processes. In accordance with the law of conservation of matter, water is not created or destroyed. It just changes form.

Water moves continuously from place to place. This on-going movement of Earth's water through evaporation, condensation, and precipitation is called the **hydrologic cycle or water cycle**. As water particles absorb heat energy, these moving water particles go through the process of **evaporation**. This means that the water particles change from a liquid to a gas, known as water vapor. From there, they can escape from the water's surface into the air. The humidity level rises as more water vapor enters the air. When the molecules cool down and move slower, the attraction among them takes over, drawing molecules together to form liquid water. This process is known as **condensation**. Tiny drops of condensed water in the atmosphere form clouds. When droplets of water in the clouds come together, they get bigger and heavier. Gravity, the force that pulls things toward the Earth, causes the heavy droplets to fall as **precipitation** (rain, sleet, or hail).

This lesson will give students the opportunity to explore the water cycle using, videos, Internet websites, games, and standards based inquiry hands-on activities.

SUBJECT MATTER

Science and Technology



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LEARNING OBJECTIVES

Students will be able to:

- Demonstrate and describe the following main components of the water cycle: condensation, precipitation, and evaporation.
- Compare and contrast an experimental water cycle model to the earth's water cycle.
- Examine the process of change as it relates to water in the atmosphere.
- Use technology to explore the water cycle components.
- Make Observations.
- Collect and record data.

STANDARDS

Georgia State Quality Core Curriculum - Science Standards for grade four

<http://www.glc>

Strand: Earth Science

S.4.28 Topic: Earth Processes: Weather and Climate

Demonstrates and describes the water cycle and the role of evaporation, precipitation and condensation. Examines the process of change as it relates to water in the atmosphere.

Strand: Inquiry

Topic: Inquiry, Process Skills, and Problem Solving

Asks questions, makes inferences and predictions, uses estimation and measurement, uses evidence to construct explanations, makes sketches and diagrams to explain ideas, organizes data into tables and charts for interpretation, reads and interprets various types of graphs, formulates simple hypotheses, identifies and controls a limited number of variables, and designs a simple experiment.

Georgia State -Quality Core Curriculum – Technology Standards for grade four

<http://www.glc>

Strand: Research

13 Topic: Research

Standard: Uses basic research techniques with teacher guidance.

Topic: Activities/Tools

Standard: Actively engages in the learning process via hands-on/minds-on science activities and experiences. Uses appropriate tools to collect and analyze data and solve problems.

MEDIA COMPONENTS



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thirteen
WNET NEW YORK



Video

Fresh Water Wetlands

Episode Title / Descriptions:

#106 Water: A User's Guide

Examine the hydrologic cycle and water conservation.

By Environmental Media Corporation

Internet Websites

“Brain Pop” – Website: **Water Cycle Game/Movie** www.brainpop.com

This site offers students an opportunity to test their prior knowledge about the water cycle. It consist of an Interactive Quiz, that is comprised of nine questions related to the water cycle . After the participants answer each question, if their response is wrong, try again will pop up, until the correct answer is given. After every three questions, facts are given that are linked to the next set of questions. This web site also contains a three minute animated movie about the Water Cycle. To see the questions and correct responses for each question see **Appendix A** at the end of this lesson. Students will try out an experiment demonstrating the water cycle.

“Educate The Children” –Website: [Dropletta Virtual Book](http://www.educate.org.uk/teacher_zone/classroom/science/5d_book/index.htm) www.educate.org.uk/teacher_zone/classroom/science/5d_book/index.htm

The story of Dropletta, a water droplet, as she travels through the water cycle. An entertaining cartoon story that makes the science behind the Water Cycle accessible to all. Hear Dropletta speaking at every stage. Hold the mouse over the pictures to see a scientific explanation of the events of each picture, or scroll down to read it written under the pictures. **Appendix C**

MATERIALS

For the class

- 1 Chart of the Water Cycle
- 2 Light sources
- Newspaper
- Paper towels
- 1 Pitcher
- 1 bag Seed, alfalfa
- 1bag Seed, clover
- 2bags Soil, potting

- 1 Spoon, plastic
- 1 roll Tape, masking
- Water, tap

For each team of four

- 1 Containers, plastic, 1-pt
- 1 Cup, plastic, 1-oz
- 2-4 Rocks, small

For each student

- 1 Science Journal
- 1 Terrarium Activity Sheet
- 1 Experiment With Bob Water Cycle Lab Sheet
- 1 mirror

Chart paper, color makers, Internet Explorer 6.0 Or Netscape Navigator, one computer with internet connection per group or use one computer and the LCD projector with whole group, TV, VCR, and “Fresh Water: Wet Water- User Guide” video. If there are no windows a lamp will be needed for light. Each student should be provided with a science journal.

PREP FOR TEACHERS

Divide the class up into cooperative learning groups of four. Give students in each group tasks as reporter, recorder, materials manager, and observer. Set up a materials center/ table with all the necessary components and materials and have them in place before the start of the activity.

Divide the class up into cooperative learning groups of four. Give students in each group tasks as reporter, recorder, materials manager, and observer. Set up a materials center/ table with all the necessary components and materials and have them in place before the start of the activity.

Set up the light sources where the terrariums can be left undisturbed until the end of the module. Make sure they are in a place where the students can make regular observations without difficulty.

Each team of team of four will need two plastic containers, a small plastic cup containing seeds, a few small rocks, access to the masking tape, pitcher of water, paper towels, and enough soil to fill one container three-fourth full.

Each student will need a copy of **Experiment With Bob Water Cycle Lab Sheet** (Appendix A) and **Terrarium Activity Sheet**. (Appendix B)

Write the key vocabulary on the chalk board or display them as they are used in the lesson.

Key Vocabulary

evaporation condensation solid hydrologic cycle collection



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clouds water vapor liquid terrarium
precipitation water cycle gas transpiration

INTRODUCTORY ACTIVITY: SETTING THE STAGE (Engage)

Step 1

Tell the students that they are now going to take a pre- lesson quiz to test their knowledge about the water cycle. Using a LCD projector connected to a computer as a whole group activity **or** have students to use computers in cooperative learning groups. Take them to the “**Brain Pop**” – Website www.brainpop.com. Provide your students with first **FOCUS FOR MEDIA INTERACTION**, asking your students to take the quiz to see what they already know about the water cycle. (The site consist ten 9 questions related to the water cycle. If the question is not answered correctly, there will be a try again pop up until the correct answer is chosen. After every three questions, a water cycle fact will pop up. Click on the Science Movies icon, then click on the Science icon go the States Matter and play the Water Cycle Quiz. Ask the students to answer the 9 questions about the water cycle pre-assessment. Tell students to write the answers to the Quiz in their science journals. **(Appendix A)**

Step 2

Take the students back to the “Brain Pop” – Website www.brainpop.com. Provide your students with a **FOCUS FOR MEDIA INTERACTION**. After your students have completed the Water Cycle Quiz, as a whole group discuss their results. Play the Water Cycle Movie for background information. Tell students to watch the Brain Pop, Water Cycle movie and take notes on the important terms and key vocabulary needed to understand the Water Cycle. Direct the students to do the Water Cycle experiment with Bob. **(Appendix B)**

Tell the students that they will set up a mini- water cycle and observe it over time. Write the word **terrarium** on the board. Ask your class, **has anyone ever seen a terrarium?** Pre-assess students by directing students to discuss in small groups what they think they know about the questions listed below. Also, ask them what they might want to know about the water cycle as it relates to terrariums and record their responses in their science journals. Ask the reporter from each group to report answers.

1. When is water in a gas state?
water vapor
2. What is the difference between evaporation and condensation?
Evaporation: liquid water to water vapor with addition of heat.
Condensation: water vapor to liquid with loss of heat.

3. What is precipitation?
water in the atmosphere
4. What happens to water after it falls as rain?
It may soak into the ground, evaporate, run off into the stream.
5. Does the water cycle continue at night, when the Sun is not shining?
Why and why not? **Yes,**
The sun's heat is retained in the air, ground, and water.
6. Where do you think water would complete this cycle more quickly in the Arctic or in Mexico? Why? **Mexico,**
Warmer temperatures would speed up evaporation.
7. What do you see when you look at a cloud?
water droplets or ice
8. Plants lose water through their leaves by which process?
Transpiration

Explain to your students that water will cycle through the terrarium. Water given off by the plants due to transpiration, and water that evaporates from the soil and the miniature pond, enter the air as water vapor. The water vapor condenses on the inside walls of the terrarium, and trickles down the sides, like rain. The water seeps back into the soil or flows back into the pond, from where it again evaporates. Some of the water that enters the soil will be taken up by the plants through their roots, and taken up by the plants through their roots, and given off during transpiration or used during photosynthesis.

Direct the students to construct their terrariums. Give each student a copy of Terrarium Activity Sheet. To each team of four distribute two plastic cups containing seeds, and several small rocks.

Have the materials manager collect the needed materials from the materials.

Tell them to fill one plastic container three fourth full with potting soil, slope the soil to form a hill, and place the rocks near the top of the hill. The students should then dig a hole for the plastic cup at the of the container, to make a pond.

Have students to sprinkle their seeds from the plastic cup evenly on the soil, and gently press them in.

After using the pitcher to fill each small plastic cup three-fourths full with water. Have them carefully position the cup in the small hole.

Instruct the students to observe their terrariums and record their observations, as instructed on the activity sheet. Have them place their finished terrariums under the light sources in the designed area.

Direct the students to observe their terrariums every 2-3 days for the next 6-10 days and record any change that they see in the table on their activity sheets.

Step 3

CHECK FOR COMPREHENSION

Show the video “Water: User Guide” #106 clip.

Show the video **PLAY** from the beginning of the tape. **Visual cue**, thunder rain dark clouds and lake, audio cue “After it falls to Earth from a cloud fresh water...” **PAUSE** right after the illustration of the water cycle, visual cue “rain falling on a lake and audio cue” and the never ending cycle starts anew. **FOCUS FOR MEDIA INTERACTION**, Ask students to pay close attention to the explanation of the water cycle.

After completing their terrariums and watching the Water: User Guide Video, ask students the following questions.

From where does water evaporate in nature?

Ask, **Where does the evaporating water go?**

Ask, **What happens to the water vapor?**

Ask, **What happens to the precipitation when it reaches the earth?**

Ask, **How does the terrarium you built compare to the natural world?**

Ask, **Why was it important that your terrariums were taped shut?**

Have students to describe how the water cycle through the terrarium?

Discuss with the students ways the water cycle in the terrarium is different from the water cycle in nature?

Discuss with the students ways the water cycle in the terrarium is the same from the water cycle in nature?

Step 3

Review the Water Cycle

Tell the students that they are now going to review the water cycle by following the story of Dropletta, a water droplet, as she travels through the water cycle. An entertaining cartoon story that makes the science behind the Water Cycle accessible to all. Using a LCD projector connected to a computer as a whole group activity **or** have students to

use computers in cooperative learning groups. [Take the student to the “Educate The Children” –Website:](#) As we travel with Dropletta’s list her adventures as she travels through the water cycle.

[Dropletta Virtual Book](#)

www.educate.org.uk/teacher_zone/classroom/science/5d_book/index.htm

(At this site students will make a book to review the water cycle.) **(Appendix B)**

Culminating Activity

Illustrate It:

Tell students that now that they have knowledge of the water cycle we want them to use that knowledge to play a game. Each group will choose one person to draw what is on the card that will be given to them. The cards will contain the words evaporation, condensation, transpiration, clouds, precipitation, water vapor gas, liquid, solid and water cycle. One at a time chosen student will go to the front of the class and draw on the chalkboard or chart paper an illustration of one of the given words. The students will raise their hands to guess what the drawing is an illustration of. **(Appendix)**

CROSS-CURRICULAR EXTENSIONS

SCIENCE AND LANGUAGE ARTS

As an extension of Science and Language Arts below, suggest the students write and perform a skit about the water cycle. This could be done in cooperative learning groups, with one group writing the script, another group performing as actors, a third group design the props and costumes, another group recording and playing sound effects an music, and so forth. Coach the scriptwriters to include several water drops traveling different routes through the cycle- one drop evaporating from a puddle, another leaving a plant through transpiration, etc. Invite parents to come to see the skit when complete during PTSA or the like.

Appendix A

Brain POP QUIZ

Water Cycle

Questions and Answers Pre and Post Test

What is evaporation?

B The change from liquid to water to water vapor

What is condensation?

C The combining of vapor droplets

What is precipitation?

B When water falls from the sky

What is collection?

C the process by which water returns to river and oceans

What is the proper order of the water cycle?

A Evaporation, condensation, precipitation, and collection

How much of the Earth is covered in water?

A 2/3

Some types of precipitation are:

C rain, sleet, and snow

What part of the water cycle acts as a filter?

C Dirt

How long can a person survive without water?

A 2-4 days

How much water does it take to fill a 7 gallon bucket?

B 7 gallons

www.brainpop.com

Terrarium Activity Sheet**Appendix B**

1. Observe your terrarium. Record your observations and findings in the table below.

Day	Appearance of Terrarium
1-2	
3-4	
5-6	
7-8	

2. Continue to observe your terrarium every 2-4 days. Record all of your observations in the table.

Appendix C

**DROPLETTA
THE WATER DROPLET**

[Dropletta Virtual Book www.educate.org.uk/teacher_zone/classroom/science/5d_book/index.htm](http://www.educate.org.uk/teacher_zone/classroom/science/5d_book/index.htm)

FOLDING BOOK

Appendix D

ILLUSTRATE IT

PREFORMANCE ASSESSMENT



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Evaporation



Transpiration



Water Cycle



Clouds





Liquid



Condensation



Precipitation



Solid

HANDOUT

(Appendix E)

TERRARIUM PRE AND POST –TEST

1. When is water in a gas state?
2. What is the difference between evaporation and condensation?
3. What is precipitation?

4. What happens to water after it falls as rain?
5. Does the water cycle continue at night, when the Sun is not shining? Why and why not?
6. Where do you think water would complete this cycle more quickly in the Arctic or in Mexico? Why?
7. What do you see when you look at a cloud?
8. Plants lose water through their leaves by which process?
9. What causes evaporation?
10. Describe an experiment that would test if fresh water or salt water.
Form a hypothesis then describe an experiment that would test it.

(Appendix F)

TERRARIUM PRE AND POST -TEST

Answer Key

1. When is water in a gas state?
water vapor
2. What is the difference between evaporation and condensation?
Evaporation: liquid water to water vapor with addition of heat.
Condensation: water vapor to liquid with loss of heat.
3. What is precipitation?
water in the atmosphere
11. What happens to water after it falls as rain?
It may soak into the ground, evaporate, run off into the stream.

12. Does the water cycle continue at night, when the Sun is not shining?
Why and why not? **Yes,**
The sun's heat is retained in the air, ground, and water.
13. Where do you think water would complete this cycle more quickly in the Arctic or in Mexico? Why? **Mexico,**
Warmer temperatures would speed up evaporation.
14. What do you see when you look at a cloud?
water droplets or ice
15. Plants lose water through their leaves by which process?
transpiration
16. What causes evaporation?
heat energy
17. Draw an illustration of how does water travel?

HANDOUT

(Appendix G)

EXPERIMENT WITH BOB

W



1. Put two teaspoons of water in a small plastic bag.

2. Blow air in and seal the bag with a heavy rubber band.

3. Place the bag in a sunny window.



What do you see?

The sun provides the energy to make the water cycle work.

* Heat from the sun makes water evaporate from surfaces, here it's the mini "lake" in your plastic bag, in the real world we're talking about lakes, rivers and oceans.

* As the water vapor cools, it condenses forming tiny droplets that attach to the sides of the plastic bag - in the atmosphere water vapor forms clouds.

If you want to wait enough, the droplets will eventually fall back into the pool of water, and the cycle starts over.

www.brainpop.com

(Appendix H)

Reporter

Materials Manager



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Recorder

Observer



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