

Grade 6th

Topic Water Supply and Water Cycle

Title "Where Does the Water Go?" - Part One of Six (45 min. each Lesson)

Standards:

- 6.3.8** Explain that fresh water, limited in supply and uneven in distribution, is essential for life and also for most industrial processes. Understand that this resource can be depleted or polluted, making it unavailable or unsuitable for life.
- 6.3.9** Illustrate that the cycling of water in and out of the atmosphere plays an important role in determining climatic pattern.
- 6.5.4** Demonstrate how graphs may help to show patterns, such as trends, varying rates of change, gaps, or clusters, which can be used to make predictions.

Objectives:

Affective

Students will follow instructions as they participate in the "Incredible Journey" Activity.

Cognitive

Students will summarize the water cycle in their journals.

Psychomotor

Students will diagram the water cycle.

Materials:

For student - pre-assessment sheet

- Science journal
- Incredible Journey water card and water sheet (from Project Wet)

For lesson (prepared ahead of time)

- 9 different colors of beads for Incredible Journey activity (container of large quantities)
- 9 different colors of pipe cleaners, one for each student (to tie beads on)
- 9 cubes/dice, circles with a numbered dice, or spinners (one at each station at Incredible Journey)-see Project Wet website for labels
- 9 labels for each station (clouds, river, lake, plants, soil, ocean, ground water, animals, glacier)
- 3 graduated cylinders (1 liter, 100 ml, 10 ml)
- 1 eyedropper
- 1 small metal bucket

Procedure:

1. Give students the pre - assessment to complete.
2. Demonstrate water availability - do "A Drop in the Bucket" activity.
 - a. Show class the one liter (1000 ml) of water in graduated cylinder. This represents all of the water on Earth.
 - b. Ask where most of the water on Earth is located - refer to a globe or map. Pour 30 ml of water into a 100ml graduated cylinder. This represents the fresh water, 3% total. Pour salt

into the remaining 970 ml (in the 1000 ml cylinder) - this is the ocean, 97%, and is unsuitable for human consumption.

c. Ask students what is at the Earth's poles. 80% of the Earth's fresh water is frozen in ice caps and glaciers. Pour 6 ml of the fresh water in the 10ml cylinder - this represents the non-frozen fresh water. Only about 1.5 ml is surface water, the rest is underground.

d. Use an eyedropper to remove a single drop of water. Release this one drop into a small metal bucket. This is the clean, fresh, non polluted water that is available for use, about 0.003% of the whole that was started with.

3. Complete “The Incredible Journey” activity (by Project Wet).

a. Ahead of time, lay out the materials for the activity (beads, cubes/spinners, station labels in a circle, no order is needed).

b. Hand out “Incredible Journey” sheet - have students fill out the prediction section (where they would go after rolling dice or spinning spinner).

c. Hand out the 6 inch yarn lengths to students (the color for the student would be where they predicted first) - this is where they will put their beads from each station. Hand out water cards to students.

d. After students complete the prediction, take students to where the activity is set up (outside, or other large area). Give students instructions before going to the activity location.

e. Each student starts at the first station on their prediction sheet. At that station, they roll the dice or spin the spinner. They go to the station listed on the dice or possibly stay where they are. Collect a bead from the second station. Record journey on the handout. Students should have rolled the dice 8 times and collected 8 beads.

f. When students have completed the journey, they are to report to the designated area outside of the circle. Students should then tie their yarn to make a bracelet or loop to prevent beads from being lost.

g. Return to classroom and collect the water cards, water sheets, and bead loops from students. These will be used at a later time for class data.

4. After completing the “Incredible Journey” activity, have students record in their science journals the journey they took. They should highlight where they thought they would go (Did they think they were going to all of the stations? Why did they not go to each station? ...etc).

Assessment:

Pre-Assessment Sheet

Prediction / Journey Sheet

Journal

Resources:

Project Wet <http://www.montana.edu/wwwwet>

Authors:

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Grade 5th / 6th

Topic Water Supply and Water Cycle

Title "Where does the Water Go?" Part Two of Six Parts (45 minutes each lesson)

Standards:

5th Grade

- 5.1.2 Begin to evaluate the validity of claims based on the amount and quality of evidence cited.
- 5.2.4 Keep a notebook to record observations and be able to distinguish inferences from actual observations.
- 5.2.7 Read and follow step-by-step instructions when learning new procedures.
- 5.2.8 Recognize when and describe that comparisons might not be accurate because some of the conditions are not kept the same.
- 5.3.4 Investigate that when liquid water disappears it turns into a gas(vapor) mixed into the air and can reappear as a liquid when cooled or as a solid if cooled below freezing point of water.
- 5.5.8 Realize and explain that predictions may be more accurate if they are based on large collections of objects or events.

6th Grade

- 6.2.5 Organize information in simple tables and graphs and identify relationships they reveal. Use tables and graphs as examples of evidence for explanations when writing essays or writing about lab work, fieldwork, etc.
- 6.2.6 Read Simple tables and graphs produced by others to describe in words what they show.
- 6.3.8 Explain that fresh water, limited in supply and uneven in distribution, is essential for life and also for most industrial processes. Understand that this resource can be depleted or polluted, making it unavailable or unsuitable for life.
- 6.3.9 Illustrate that the cycling of water in and out of the atmosphere plays an important role in determining climatic pattern
- 6.5.4 Demonstrate how graphs may help to show patterns, such as trends, varying rates of change, gaps, or clusters, which can be used to make predictions.

Objectives

Affective

Students will work together to design a class diagram of the Incredible Journey Activity.

Cognitive

Students will verbally explain their journey from the Incredible Journey Activity as they are mapping it.

Students will explain the process of water cycle using key terms from each lesson.

Students will explain why the water cycle is not always a complete circle.

Students will explain why each student's journey was not the same.

Psychomotor

Students will create a visual map of the water cycle, using student data from the Incredible Journey.

Materials:

For student –

- MacMillan McGraw Hill (chapter 4, Lesson1)
- Science journal
- Incredible Journey bead loop and water sheet (from Part 1)

For lesson (prepared ahead of time) -

- Bulletin Board title "Where Does the Water Go"
- 9 colors of yarn to map with (same colors as pipe cleaners and beads) (We used only 3 colors as students chose only 3 places where they thought the water cycle started)
- 9 push pins, removable hooks, or magnetic hooks
- Scissors
- McMillan McGraw Hill teachers' manual

Prepare:

- Prepare ahead of time: A bulletin board with the title.
- Prepare copies of the 9 individual stations for the students to use on the graph.

Procedure:

1. Read in science text about water cycle (MacMillan McGraw Hill – chapter 4, lesson 1). This water cycle will be more traditional than the Incredible Journey activity. Discuss the differences and introduce terms (transpiration, condensation, sublimation, respiration, evaporation, run off, and water shed).
2. Hand back the Incredible Journey bead loops, and water sheets from Day One.
3. Compare / Contrast their individual journey and what they just read in journals. Have them draw a picture of the water cycle in their journals.
4. Have the students discuss and develop a plan to map their individual journeys on the Bulletin Board. (Allow about 10 minutes for them to develop their plan)
5. Conclude the lesson with the students creating the Bulletin Board of their journey. As they put their individual journey on the board, have them explain their journey to the class using terms discussed in the two lessons.

Assessment:

Journal

Map their journey on the board

Explain their journey using new terms as they map it on the board

Resources:

MacMillan McGraw Hill Science Textbook (Indiana)

Project Wet: <http://www.montana.edu/wwwwet>

Authors:

Amanda Collier and Mary Stephens

Pre-assessment

Where Does the Water Go?

What do you know about where the water goes?

Answer the following questions.

1. Agree or Disagree Water turns from liquid to gas and then back to liquid during the water cycle.

Explain your answer.

2. Agree or Disagree Evaporation and Precipitation are the only way water travels within the water cycle.

Explain your answer.

3. What percentage of the earth's water supply is consumable?

4. What are the different places water can go as it moves through and around the earth?

5. Draw a picture of how you think the water cycle looks.

Grade 6th

Topic Water supply and the natural and constructed water cycle

Title “Where Does the Water Go?” - Part Three of Six (45 min. each Lesson)

Standards:

- 6.3.8** Explain that fresh water, limited in supply and uneven in distribution, is essential for life and also for most industrial processes. Understand that this resource can be depleted or polluted, making it unavailable or unsuitable for life.
- 6.3.9** Illustrate that the cycling of water in and out of the atmosphere plays an important role in determining the climatic patterns.
- 6.3.13** Identify, explain, and discuss some effects human activities, such as the creation of pollution, have on weather and the atmosphere.

Objectives:

Affective

Students will work cooperatively and follow instructions as they participate in the "Blue Traveler" Activity.

Cognitive

Students will illustrate their water journey.

Students will compare and contrast the natural water cycle with the constructed water cycle.

Psychomotor

Students will record the two water journeys.

Students will explain in paragraph form the differences between the two journeys using the new terms introduced in the lesson.

Materials:

For student - Scott Foresman Science (Chapter 7, Lesson 5)

- Science journal,
- Blue Traveler Map
- Colored Pencil or marker
- Copy of Gallons of Water Worksheet

For lesson (prepared ahead of time) -

- 19 large pieces of paper with labels for each station (see Water Journey Map Part II)
- 19 cubes/dice, circles with a numbered dice, or spinners (one at each station at of Water Journey)-see Project Wet website for labels
- Create the Blue traveler map
- (Use the map from Incredible Journey as an example. Place the stations in the following order on the card - Recreation, Desalinization, Urban, Waste Water, Irrigation, Spetic System, Industry, Well, Ocean, Rural, Animals, Lake, Glacier, Groundwater, Soil, Plants, Clouds, Rivers, and Water Treatment)
- 1 gallon container

Procedure:

1. Hand out Gallons of water worksheet at the beginning of the day for the next day's activity. (Have the students keep track of their use of water for the day.)
2. Read in science text about human impacts on the water cycle (Scott Foresman – chapter 7 lesson 5 pg. 186-189).
3. Discuss what a constructed water system is, how water is used in his system, and the differences between rural and urban water systems. Introduce terms (desalinization, septic system, filtration, chlorination, and reclaimed water).
4. Hand out Blue Traveler Map (created ahead of time).
5. Students complete The Blue Traveler activity (by Project Wet). (allow about 20 - 25 minutes)
 - a) Ahead of time, lay out the materials for the activity (cubes/spinners, station labels in circle, no order is needed).
 - b) Have students start where they started for the Incredible Journey (or where they think the water cycle begins if did not do the Incredible Journey). Students should make a star on their paper where they begin.
 - c) Take students to where the activity is set up (outside or other large area). Give students instructions before going to the activity location.
 - d) Each student starts at their first station (same as Incredible Journey beginning). At that station, they roll the dice or spin the spinner. They go to the station listed on the dice or possibly stay where they are. Keep track of journey by drawing a line from station to station. If they stay, have them draw a circle around the station each time. Students should have rolled the dice 19 times.
 - e) When student have completed the journey, they are to report to the designated area outside of the circle.
 - f) Return to classroom and discuss this water journey with the Incredible Journey.
6. Have the students trace, in a different color, on their Blue Traveler sheet their Incredible Journey route.
7. Discuss the similarities and differences between the natural water cycle and what happens when you add in the constructed (human use) cycle.
8. Have the students reflect the days discussion and activity in their science journals by writing, in paragraph form, and using the new vocabulary..
9. Remind students to continue keeping track of their water usage on the Gallons of Water worksheet until they get to school the next day.

Assessment:

Journal
Blue Traveler Map

Resources:

Scott Foresman Science Textbook (Indiana)
Project Wet: <http://www.montana.edu/wwwwet>
Bob Jones Heritage 6 Teacher Edition

Authors:

Amanda Collier and Mary Stephens

Gallons of Water

I estimate my daily water use is _____ gallons of water.

Record a tally mark in the "occurrences" column to show how many times you do each activity.

Activity	Today Occurrences	x gallons	=
washing hands			
washing face			
flushing toilet			
showering			
taking a bath			
brushing teeth			
washing car			
washing dishes - by hand			
washing dishes - by machine			
washing laundry (one load)			
watering lawn (30 minutes)			
drinking water			
	Total		

Multiply the number of occurrences by the gallons to find the total gallons used.

Add the total gallons to find how many gallons you use in one day.

Predict how much water you need for a week and for a month.

I predict that I will use _____ gallons in one week.

I predict that I will use _____ gallons in one month.

Bonus question:

How many gallons of water will your immediate family use in the coming month?

_____ gallons

Gallons of Water (Teacher Copy)

I estimate my daily water use is _____ gallons of water.

Record a tally mark in the "occurrences" column to show how many times you do each activity.

Activity	Today Occurrences	x gallons	=
washing hands		0.25	
washing face		2	
flushing toilet		5	
showering		30	
taking a bath		40	
brushing teeth		1	
washing car		20	
washing dishes - by hand		10	
washing dishes - by machine		15	
washing laundry (one load)		30	
watering lawn (30 minutes)		240	
drinking water		0.1	
		Total	

**Multiply the number of occurrences by the gallons to find the total gallons used.
Add the total gallons to find how many gallons you use in one day.**

Predict how much water you need for a week and for a month.

I predict that I will use _____ gallons in one week.

I predict that I will use _____ gallons in one month.

Bonus question:

How many gallons of water will your immediate family use in the coming month?

_____ gallons

Grade 6th

Topic Water supply and human effect on the natural and constructed water cycle

Title “Where Does the Water Go?” - Part Four of Six (45 min. each Lesson)

Standards:

- 6.2.5 Organize information in simple tables and graphs and identify relationships they reveal. Use tables and graphs as examples of evidence for explanations when writing essays or lab work.
- 6.3.8 Explain that fresh water, limited in supply and uneven in distribution, is essential for life and also for most industrial processes. Understand that this resource can be depleted or polluted, making it unavailable or unsuitable for life.
- 6.3.9 Illustrate that the cycling of water in and out of the atmosphere plays an important role in determining the climatic patterns.
- 6.3.13 Identify, explain, and discuss some effects human activities, such as the creation of pollution, have on weather and the atmosphere.

Objectives:

Affective

Students will propose ways they can help to prevent pollution.

Cognitive

Students will calculate their individual water usage and the class's water usage.

Students will compile a list of ways they can conserve and preserve natural resources.

Psychomotor

Students will create a bar graph of the class's use of water.

Materials:

For student

- Scott Foresman Science (Chapter 7, Lesson 5)
- Science journal
- Copy of Gallons of Water Worksheet
- Graph paper

For lesson (prepared ahead of time) -

- Large (or Transparency) Basic Graph of Water Usage - Gallons and Types
- Transparency of Gallons of Water worksheet

Procedure:

1. Have students complete the Gallons of Water sheet. Have them write the number of gallons used for each activity. Then have them multiply the number of tally marks they had for that activity and the number of gallons used for that activity.
2. Have the students total their gallons to see the total number of gallons they used in one day.
3. Hand out graph paper and have the students copy the axis titles on their paper.

4. Have the students report to the class the number of gallons they used for each activity. Add the individual totals to compile a class total.
5. Have the students create a bar graph of the class's use of water as it is created on the graph you prepared.
6. Read Scott Foresman Science (Chapter 7, Lesson 5 pages 190 - 191).
7. Highlight the vocabulary conserve and preserve regarding water.
8. Discuss conserving and preserving resources other than water. Discussion the effect we as humans have on the water and land; and how our actions inevitably affect the atmosphere.
9. Have the student compile a list of ways they can help to preserve and conserve the earth's natural resources in their journal. Also propose ways they can help to prevent pollution.

Assessment:

Journal
Student graphs

Resources:

Scott Foresman Science Textbook (Indiana)
Bob Jones Heritage 6 Teacher Edition

Authors

Amanda Collier and Mary Stephens

Grade 6th

Topic Water supply and human effect on natural resources.

Title “Where Does the Water Go?” - Part Five of Six (45 min. each Lesson)

Standards:

- 6.3.8 Explain that fresh water, limited in supply and uneven in distribution, is essential for life and also for most industrial processes. Understand that this resource can be depleted or polluted, making it unavailable or unsuitable for life.
- 6.3.9 Illustrate that the cycling of water in and out of the atmosphere plays an important role in determining the climatic patterns.
- 6.3.13 Identify, explain, and discuss some effects human activities, such as the creation of pollution, have on weather and the atmosphere.

Objectives:

Affective

Students will respond to questions presented by the District Science Specialist.

Cognitive

Students will observe the effects of water contamination.

Students will predict the path the contaminated water will take.

Students will recognize and identify that their actions can effect another unintentionally.

Psychomotor

Students will describe the effects of water contamination.

Materials:

For Student

Science Journal

For lesson (prepared ahead of time) -

Groundwater Model (brought by District Science Specialist)

Procedure:

1. Invite the District Science Specialist to come demonstrate and share about the effects of contamination on the groundwater
2. Have students record the effects of water contamination on groundwater in their journals.

Assessment:

Journal

Resources:

ETHOS

Authors:

Amanda Collier and Mary Stephens

Grade 6th

Topic Water supply and human effect on natural resources.

Title “Where Does the Water Go?” - Part Six of Six (45 min. each Lesson)

Standards:

- 6.3.8. Explain that fresh water, limited in supply and uneven in distribution, is essential for life and also for most industrial processes. Understand that this resource can be depleted or polluted, making it unavailable or unsuitable for life.
- 6.3.9 Illustrate that the cycling of water in and out of the atmosphere plays an important role in determining the climatic patterns.
- 6.3.13 Identify, explain, and discuss some effects human activities, such as the creation of pollution, have on weather and the atmosphere.

Objectives:

Affective

Students will respond to questions presented by the District Science Specialist.

Cognitive

Students will observe the effects of water contamination.

Students will predict the path the contaminated water will take.

Students will recognize and identify that their actions can effect another unintentionally.

Psychomotor

Students will describe the effects of water contamination.

Materials:

For Student - Science Journal

For lesson (prepared ahead of time) -

Groundwater Model (brought by District Science Specialist)

Procedure:

District Science Teacher will lead

Assessment:

Journal

Student graphs

Resources:

Scott Foresman Science Textbook (Indiana)

Bob Jones Heritage 6 Teacher Edition

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Science Review

Water, Carbon, and Nitrogen Cycles

Terms

transpiration	recycle
precipitation	
runoff	Water cycle
groundwater	
sublimation	Carbon Cycle
respiration	
water shed	Nitrogen Cycle
evaporation	
condensation	compost
absorption	

Water Cycle:

Where does energy needed for the changes in the water cycle to take place comes from?

Be able to draw a water cycle

Carbon Cycle: be able to determine where the carbon is stored

Why is carbon so important to humans?

In what form is carbon found in the atmosphere?

How do people and other living things get carbon?

What processes release carbon dioxide?

Nitrogen cycle: Where is nitrogen found in living things?

What do nitrogen – fixing bacteria in the soil turn the nitrogen gas into?

How do animals add nitrogen into the ecosystem?

How is nitrogen fixed in the nitrogen cycle?

Recycling: What is recycling?

What are renewable resources?

What are nonrenewable resources?

Why is it important to recycle natural resources?

How does composting replenish the soil?

How can farmers replace the nitrogen in their soil?

1.

2.

3.

Amount of Water to be used:

What is the percentage of fresh water?

What is the percentage of salt water?

Interpret Data Describe the diagram of the water cycle on the board.

Where did most of the students spend their time? Why is that?

Science Test
Water, Carbon, and Nitrogen Cycles

Name _____ Date _____ Score _____

I. Matching: Match the words below with their definitions. Each word may be used only once.

Recycle	Nitrogen cycle	Compost
Transpiration	Precipitation	Runoff
Sublimation	Respiration	Water shed
Absorption		

1. A mixture of dead organic materials. _____
2. Water goes through plants from the roots to the atmosphere.
_____.
3. Water goes into the atmosphere with carbon dioxide from animals and humans.

4. Involves trapping a gas into compounds in the soil. _____
5. Reusing items instead of throwing them away. _____
6. Any form of water that falls from the atmosphere. _____
7. Heating of a solid into a vapor. _____
8. Soaking into something completely. _____
9. Area from which water is drained. _____
10. Precipitation that flows into rivers, lakes, and streams. _____

II. Multiple Choice: Write the letter of the best answer for each question.

- _____ 1. The energy needed for the changes in the water cycle to take place comes from.
a. wind b. green plants c. nitrogen d. the sun
- _____ 2. Nitrogen - fixing bacteria in soil turns nitrogen gas into

- a. water b. ammonia c. oxygen d. carbon dioxide

_____ 3. The diagram shows the carbon cycle.

Where is carbon stored in the cycle?

- a. A,B,C,D b. B,C,D,E c. A,C,E,F d. B,C,D,F

_____ 4. The changing of a liquid into a gas is called

- a. evaporation c. precipitation
b. condensation d. transpiration

_____ 5. What processes release carbon dioxide?

- a. photosynthesis, respiration c. respiration, decomposition
b. photosynthesis, burning oil d. photosynthesis, decomposition

_____ 6. How do people and other living things get carbon?

- a. from the air c. eating animals
b. eating plants and the air d. eating plants and animals

_____ 7. Where is nitrogen found in living things?

- a. muscles b. blood c. skin d. muscles, blood, skin

_____ 8. How does composting replenish the soil?

- a. it puts nitrogen back into the soil
b. it takes nitrogen out of the soil
c. it doesn't replenish the soil

_____ 9. Animals add nitrogen into the ecosystem when they

- a. eat plants b. excrete waste c. breathe d. burn sugars

_____ 10. How is nitrogen fixed in the nitrogen cycle?

- a. photosynthesis c. nitrogen fixing bacteria
b. nitrogenation d. animal waste

III. Identify the Cycles: Write the name of the cycle that matches the definition.

Water Cycle

Carbon Cycle

Nitrogen Cycle

1. Involves trapping a gas into compounds in the soil. _____

2. Is the continuous movement of water between Earth's surface and the air.

3. Involves the continuous exchange of carbon among living things.

IV. Short Answer: Write the answer to the following questions.

1. What are renewable resources? _____
2. What are nonrenewable resources? _____
3. Why is it important to recycle natural resources? _____
4. Why is carbon so important to humans? _____
5. In what form is carbon found in the atmosphere? _____

V. Critical Thinking: A farmer's crops are less healthy than in previous years. What can the farmer do to get better crops?

VI. Interpret Data: Describe the diagram of the water cycle on the board. Where did most of the students spend their time? Why is that?

VII. Diagram: Draw a simple model of the water cycle. Explain the basic process of the water cycle.

