

Guam Water Kids

Learning About Guam's Fresh Water

Module 3

Fresh Water

**A High School Service Learning Project
for
Guam Public Schools**



The Water and Environmental
Research Institute
of the Western Pacific
University of Guam

Module 3: Fresh Water

Lesson Topic: Fresh Water

Grade level: 9th – 12th

Subject: Earth Science / Physical Science

Length of lesson: 5 class periods

Content Standard(s): (Located in Section 1, Resources for All Modules)

Understandings/Goals:

Students will understand:

- Fresh water is an essential natural resource that people, plants and animals need to survive.
- On Guam, we use both surface water and ground water for the fresh water that meets our daily needs.
- Surface water is stored in rivers, lakes, and wetlands. Ground water is stored underground.

Enduring Understandings:

- Water is found almost everywhere on Earth but only a tiny fraction of the water is available for human consumption.
- Our lives rely on the availability of fresh water.
- Natural collection of surface water and ground water supplies are important.
- Surface water and ground water are vulnerable to natural and manmade pollution.

Essential Questions:

- Could life on Earth exist without water?
- Why is water important?
- Why is water essential to all life?
- What are the earth's two types of water?
- What are the sources and uses of water?

Student objectives (outcomes)

Students will be able to:

- Define and describe surface water and ground water, river system, watershed, pond, lake, wetlands, aquifer, and natural resource.
- Tell where surface water and ground water are found on Guam.
- Discuss the importance of the fresh water supply found in the Northern Guam Lens Aquifer

Performance Task(s):

Service Learning Performance Tasks

- 1. Create An Educational Presentation about Fresh Water on Guam** – Design an exhibit that can be use when you travel to schools with the purpose of teaching young children about fresh water on Guam. The presentation will
 - a. provide something visual with detailed images to help demonstrate surface water and groundwater such as a poster or a model;
 - b. explain surface water and groundwater in detail and include locations on Guam; and
 - c. show the importance of habits that will help to preserve our limited water source.

- 2. Create a script about the continuing journey of “Drip the Raindrop” into the Northern Guam Aquifer or from “Ridge to Reef” along a watershed to the ocean** – You are a writer and producer for the theater that hosts educational productions for elementary students. You are to write a script for a play performed by high school students that presents the further adventures of Drip the Raindrop.
<http://water.usgs.gov/edu/followadrip.html>
 - a. Present a journey that illustrates either how rain infiltrates and collects in the Northern Guam Aquifer or a journey that illustrates the path of rain falling on a a mountain top and making its way through the Ugam watershed to the ocean.
 - b. Identify the characters to represent the important elements in nature that play a role in his journey.
 - c. Your play should creatively explain the journey of “Drip the Raindrop” and persuade the children in the audience to help preserve our limited water source.

Differentiated Service Learning Performance Tasks:

- 1. Create a flyer to promote the Fresh Water on Guam Educational Presentation or the play about Drip the Raindrop’s Aquifer or Watershed Journey.** Put a picture of the fresh water and two facts about it on the flyer so that people will be curious to learn more.

- 2. Create a poster with pictures showing where fresh water can be found on Guam.** These pictures may be from a book, the Internet, photographs you or your family have taken, or pictures you draw.

- 3. Create captions for the items you have put on your poster.** You should write at least one sentence telling about each item you have on your poster.

Other Evidence:

- Observation – Socratic Dialogue to serve as pre-assessment
- Brain Check – quick student self-assessment of their understanding of concepts so far
- Venn Diagram – compare surface water and ground water
- T-Chart – distinguish between surface water and ground water
- KWL Chart

Learning Activities

Background

Please note that the supporting **Background** information for all modules is located in Section 1: Resources for All Modules, Resources for Module 3.

Overview

Water is a limited natural resource and knowing where usable water can be found on the Earth is vital to survival. In this module, students will learn where fresh water is found on the Earth's surface.

Vocabulary

Aquifer –underground saturated rock through which water can easily move and collect. The limestone found in northern Guam is both permeable and porous.

Coastal wetlands - contain both fresh and salt water.

Divides – a ridge of land that separates watersheds. The Continental Divide follows the line of the Rocky Mountains.

Groundwater – water that exists below Earth's surface in underground aquifers of porous, permeable rock.

infiltration – water that falls on ground that is permeable and porous passes through the surface and is trapped underground.

Lakes - Bodies of fresh, still water that are deeper and bigger than ponds.

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Mangrove forests – mangrove trees have thick, tangled roots and grow in flowing waters in the tidal areas of coast lines.

Marshes – grassy areas covered by shallow water.

Northern Guam Lens Aquifer – A rock formation under northern Guam that holds the island's natural supply of fresh water. About 100 water wells have been drilled in this resource; the water pumped out is used to supply homes, agriculture and other fresh water needs.

Permeable – of a material or membrane allowing liquids or gases to pass through it.

Ponds - Bodies of fresh, still water that are smaller and shallow.

Porous – having spaces or holes through which liquid or air may pass.

Process – a series of events or changes that happen from start to finish.

River system - All of the streams and small rivers that drain a watershed and flow into one main river.

Rivers – a natural flow of fresh water that flows towards an ocean, a lake or another river.

Runoff - the overland flow of water that occurs when excess water from precipitation or other sources flows over the earth's surface.

Surface Water - includes rivers, ponds, lakes, and wetlands

Swamps – look like flooded forests with trees and shrubs sprouting from the water; usually in warm, humid climates.

Tributaries – streams and small rivers that feed into a main river.

Watersheds – the land surrounding a main river that feeds water to that river. Also known as drainage basins.

Wetlands – an area that is covered by water during part or all of the year.

Materials

- Guam Water Kids presentation **Available on the DVD provided or online at: www.Guamwaterkids.com*
- Projection device, computer with speakers
- Pencil (1 per student)
- Projection device
- Computer with speakers
- Chart Paper
- K-W-L Large charts
- Large 2 Circle Venn diagram
- Graphic Organizer worksheets (1 set per student)

Learning Engagement

Activity: **Surface Water/Ground Water K-W-L** **Accessing Prior Knowledge**

Show Visual: Large K-W-L

Teacher Pass Out: K-W-L worksheet (1 per student)

Teacher Asks:

1. What is surface water?
2. Where do you find surface water on Guam?
3. What is groundwater?
4. Where do you find groundwater on Guam?
5. What percentage of Earth's water is drinkable?

Teacher Records: The class responses on the board

Students Take Notes: The class responses on their K-W-L worksheets.

Use: Surface Water/Ground Water K-W-L (Worksheet)

Activity:



Guam Water Kids Narrated Slide Presentation **Where is the Fresh Water? Surface Water and Ground Water**

Teacher: Show the **Guam Water Kids** presentation* Slides showing Surface and Ground Water.

*Available on the DVD provided or online at: www.Guamwaterkids.com

Part 1- Surface Water: slides 47-56

Part 2 - Ground Water: slides 57-72

Students Take Notes: Students take notes on two work sheets in the Advance Organizer.

Part 1- Surface Water: Surface Water Graphic Organizer

Part 2 - Ground Water: Ground Water Graphic Organizer

Part 1 – Surface Water

Surface Water Graphic Organizer with Rivers Map

Visual: Show Guam Water Kids' surface water portion only – slides # 49-56 (surface water).

Record: Students take notes on the Guam Water Kids Graphic Organizer.

Show Visual: Large map of Guam with the rivers indicated.

Teacher Pass Out: maps of southern Guam with the rivers indicated (1 per student)

Teacher Asks:

- Why are rivers important?
- Why are lakes important?
- Why do people want to live near rivers or lakes?

Teacher Records: The class responses on the board

Students Take Notes: The class responses on their graphic organizer worksheet

Use: Surface Water /Rivers*(Worksheet)*
and
Southern Guam Rivers *(Map)*

Part 2 Ground Water

Ground Water Graphic Organizer *(worksheet)*

Teacher Asks: *(Answers will vary. Encourage students to explain their answers.)*

- What is ground water?
- How does the fresh water move from the Earth's surface to under the ground?
- Do you know of any other source of ground water on Guam? If so, where are they? What are they like?
- How can people harm the ground water?
- What would happen if the ground water gets full of oil or other pollutants?
- Is groundwater important for Guam? If so, how?

Use: Ground Water Graphic Organizer *(worksheet)*

Activity: Thirstin's Groundwater Movement

Summary: Here's an activity that high school students can do with younger students to demonstrate how water moves underground.

Introduction: Ground water must be able to move through underground materials at rates fast enough to supply useful amounts of water to wells or springs in order for those materials to be classified as an aquifer. For water to move in an aquifer, some of the pores and fractures must be connected to each other. Water moves through different materials at different rates, faster through gravel, slower through sand, and even slower through clay. Gravels and sands are possible aquifers; clays usually are not aquifers. The following activity demonstrates how different sizes of rock materials that make up an aquifer affect water movement.

Objectives:

Students will:

1. Identify several sources of rock materials that make up an aquifer.
2. Discuss how water moves through gravel, sand, and clay.

Materials

- At least 10 students.
- Large area to conduct activity

Teacher Preparation: This activity can be conducted in the classroom, gymnasium, or outside the school building. If conducted in the classroom, move all furniture to allow for sufficient room for the movement of students. This is a three-part demonstration that may create some excitement.

Procedures: Select two or three students to be molecules of water. The remaining students will be rock materials. Conduct these three activities and follow up with the questions below.

1. **Activity One:** Water movement through gravel. The students represent gravel by holding arms outstretched, leaving a 15- to 30- centimeter (cm) space between their outstretched arms. Locate these students in the center of the activity area. The students representing water molecules are to start on one side of their "gravel" classmates and move through them, exiting on the other side. The water molecules will move easily through the gravel.
2. **Activity Two:** Water movement through sand. The students represent sand by extending arms, bending them at the elbows and touching their waists with their fingers. Locate these students in the center of the activity area, spacing them

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approximately 15cm apart. Once again, have the water molecules slowly make their way through their "sand" classmates. The water molecules will experience some difficulty, but should still reach the other side.

3. **Activity Three:** Water movement through clay. Students become clay particles by placing their arms straight down the sides of their bodies and standing approximately 10cm apart. Locate these students in the center of the activity area. It will be a formidable task for water molecules to move through the clay. The water molecules may not be able to move through the clay at all.

Interpretive Questions

- Which one of the materials - gravel, sand or clay - was the easiest for the water molecules to move through? (Answer: Gravel, then sand, then clay.) Why? (Answer: Because there are larger spaces between the gravel particles.)
- If there were three rock units, one of gravel, one of sand, and one of clay, all containing the same quantity of water, in which would you drill a well? (Answer: Gravel. Water moves easier through gravel than sand or clay.)

Extension:

Materials

- 250 milliliters (mL) or 1 ¼ cups of sand,
 - 250 mL or 1 ¼ cups of pea-size gravel,
 - 250 mL or 1 ¼ cups of clay, and
 - water, 6 cups
 - three identical funnels (top diameter approximately 12cm (or 4 ½ to 5 inches)
 - 3 clear containers (2 liter soda bottles will work)
 - timer or stop watch
1. Force a piece of cheesecloth into the top of the spout of each funnel. This will prevent material from going through the funnel spout. Put each funnel into separate clear containers so that the spout of the funnel is at least 5cm above the bottom of the container.
 2. Pour the sand into the first funnel, pea-size gravel into the second funnel, and the clay into the third funnel.
 3. Pour equal amounts of water (approximately 200 mL or 2 cup) onto the materials contained in the funnels. Select three students to pour the water, creating a permeability race.
 4. Time how long it takes the water to flow through the materials. Record on a data sheet. Ask "Which material did the water flow through the fastest?" Why?

*This activity was adapted from "Get the Ground Water Picture," National Project WET.
http://www.epa.gov/safewater/kids/grades_k-3_groundwater_movement.html*

Activity:
Thirstin Builds an Aquifer in a Cup

Summary: Here's an activity that high school students can do with younger students to demonstrate how ground water can be polluted.

Introduction: Many communities, including most on Guam, obtain their drinking water from underground sources called aquifers. Water wells are drilled through soil and rock into aquifers and the ground water contained is pumped out to supply the public with drinking water. Ground water can become contaminated by harmful chemicals, such as lawn care products and household cleaners that were used or disposed of improperly, and any number of other pollutants, that can enter the soil and rock. Pollution of the aquifer and eventually the well can pose a significant threat to human health. The measures that must be taken water plant operators to either protect or clean up contaminated aquifers are quite often costly. *Note: This demonstration should follow a class discussion on potential sources of pollution to drinking water supplies.*

Objectives:

- Illustrate how water is stored in an aquifer, how ground water can become contaminated, and how this contamination ends up in a drinking water well.
- Illustrate of how the careless use and disposal of harmful contaminants above the ground can potentially end up in the drinking water below the ground.

Materials needed per student. This experiment can be done by each student at their work stations.

- 1 clear plastic cup that is 2 3/4" deep x 3 1/4" wide for each student.
- 1 piece of modeling clay or floral clay that will allow a 2" flat pancake to be made by each student for their cup.
- White play sand that will measure 1/4" in bottom of each student's cup.
- Aquarium gravel (natural color if possible) or small pebbles (approximately 1/2 cup per student). *Rinse and dry rocks on a clean towel prior to remove any powdery residue.*
- Food coloring.
- Paper towels.

Procedure. Each student will preform these steps

1. Pour 1/4" of white sand in the bottom of each cup completely covering the bottom of the container. Pour water into the sand, wetting it completely (there should be no standing water on top of sand). Let students see how the water is absorbed in the sand,

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but remains around the sand particles as it is stored in the ground and ultimately forming part of the aquifer.

2. Have each student flatten the modeling clay (like a pancake) and cover 1/2 of the sand with the clay (have each student press the clay to one side of the container to seal off that side). *Explain: The clay represents a "confining layer" that keeps water from passing through it. Pour a small amount of water onto the clay. Let the students see how the water remains on top of the clay, only flowing into the sand below in areas not covered by the clay.*
3. Use the aquarium rocks to form the next layer of earth. Place the rocks over the sand and clay, covering the entire container. To one side of the cup, have students slope the rocks, forming a high hill and a valley. *Explain to students that these layers represent some of the many layers contained in the earth's surface.*
4. Now pour water into your aquifer until the water in the valley is even with your hill. Students will see the water stored around the rocks. *Explain that these rocks are porous, allowing storage of water within the pores and openings between them. They will also notice a "surface" supply of water (a small lake) has formed. This will give students a view of both the ground and surface water supplies which can be used for drinking water purposes.*
5. Use the food coloring and put a few drops on top of the rock hill as close to the inside wall of the cup as possible. *Explain to students that chemicals, trash, and used motor oil. This practice can show up in the ground water and their drinking water. They will see that the color spreads not only through the rocks, but also to the surface water and into the white sand at the bottom of their cup. This is one way pollution can spread throughout the aquifer over time.*

Follow up:

Discuss with students specific activities that could pollute the Northern Guam Lens Aquifer reminding them that the aquifer that serves the whole island is located under the Villages of Yigo, Dededo and Andersen Air Force Base. What community activities could cause pollution of the aquifer.

Assign students to locate activities around the school or their own homes that could pollute their drinking water sources if not properly maintained. Discuss what steps they can take as a household to prevent water pollution. Allow students to drain off the water in their cups and take home to refill with water and show their families how pollution activity above their aquifer can affect all water.

Source:

http://water.epa.gov/learn/kids/drinkingwater/upload/2005_03_10_kids_activity_grades_k-3_groundwatermovement.pdf

**Activity:
Venn Diagram**

Compare and Contrast: surface water and ground water

Show Visual: Large 2 Circles Venn Diagram

Teacher Pass Out: 2 Circles Venn Diagram (1 per student)

Teacher Asks:

What is surface water?

What is ground water?

How are surface water and ground water the same?

Teacher Records: The class responses on the board

Students Take Notes: The class responses on their 2 Circles Venn Diagram.

Surface and Ground Water Venn Diagram Worksheet

**Activity:
Gallery Walk**

Sentence Frame on Chart Paper - What I really liked about your project was...

Students can do a gallery walk to look at classmates' projects. Next to each project, post a graffiti board (chart paper) where students can provide positive feedback to each other's products

Explain

What is the Difference between surface water and ground water?

Student Reflection:

Why is Fresh water important to life on Earth?

Why do we have a global challenge to protect and keep our water supply clean?

Evaluate

Students' Service Learning Products: USE: Performance Task Rubrics:

Fresh Water on Guam Educational Presentation Rubric

'Drip the Raindrop' Journey on Earth Script Rubric

Fresh Water Flyer Rubric

Fresh Water Poster Rubric

Resources

Guam Resources

WERI: Water & Environmental Research Institute of the Western Pacific at the University of Guam, www.WERIGUAM.org

Natural Resources Atlas of Southern Guam, Dr. Shahram Khosrowpanah,
<http://www.hydroguam.net/>

Guam Division of Aquatic and Wildlife Resources (DAWR)
<http://dawr.guam.gov/guams-water-resources/guams-freshwater-resources/>

Guam Water Kids
<http://guamwaterkids.com/teachers.html>

Guampedia
“Fena,” <http://www.guampedia.com/heritage-site-fena/>

National Resources

U.S. Geological Survey Water Science School
<http://water.usgs.gov/edu/>

U.S. Geological Survey / Educational Topics
<http://ga.water.usgs.gov/edu/sitemap.html>

National Oceanic and Atmospheric Administration (NOAA) Educational Resources
<http://www.education.noaa.gov/Freshwater/>

U.S. Environmental Protection Agency
<http://water.epa.gov/learn/kids/drinkingwater/index.cfm>

American Water Works Association
www.awwa.org

National Wild and Scenic Rivers System
www.rivers.gov

Module 3

Graphic Organizer

This section includes “originals” to print or copy including:

- **Worksheets for individual participants**
- **Teachers’ evaluation rubrics**

What is Water? K-W-L

Related Questions:

1. What is surface water?
2. Where do you find surface water?
3. What is groundwater?
4. Where do you find groundwater?
5. What percentage of Earth's water is drinkable?

Student Name: _____

Date: _____ Class: _____ Period: _____

Teacher: _____

Water Cycle K-W-L Chart

K (What I Know)	W (What I Want To Learn)	L (What I Learned)

Guam Water Kids Surface/Ground Water Worksheet

Student Name: _____

Date: _____ **Class:** _____ **Period:** _____

Teacher: _____

Guam Water Kids Surface/Ground Water (Worksheet)

Earth's Water	
Where are most of Guam's rivers located?	
What part of the island is the Northern Guam Lens Aquifer located in?	
Where does most of the water we drink on Guam come from?	
Where does the water that is pumped from the aquifer come from?	
What is a watershed?	
Can you drink salt water? Why?	
Can you drink polluted water? Why?	
Why is it important to take care of Guam's fresh water?	

Surface Water (Worksheet)

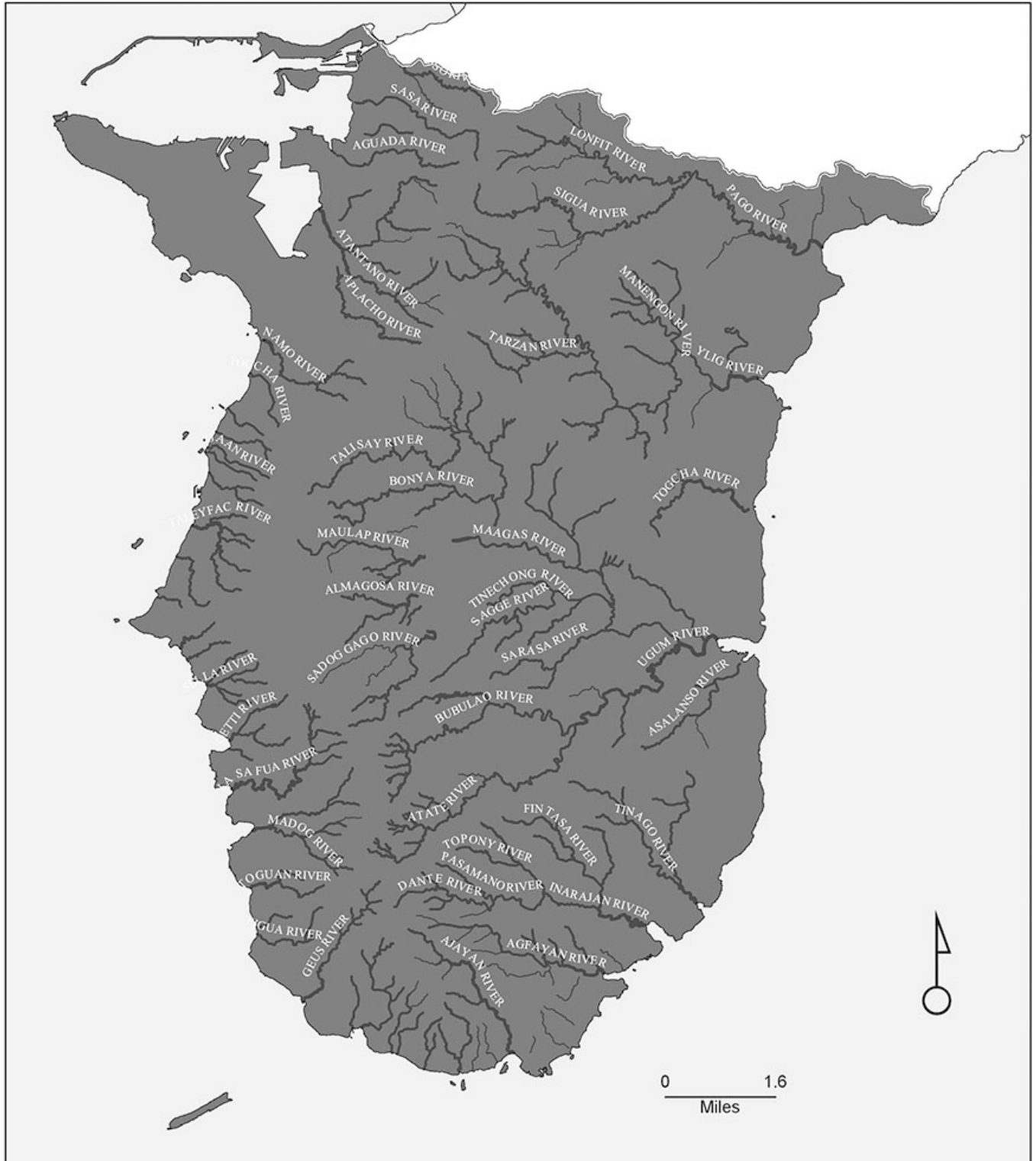
Student Name: _____

Date: _____

Class: _____ **Period:** _____

Teacher: _____

Surface Water Worksheet	Notes
Surface water is ...	
Where can you find surface water on Guam?	
A river is ...	
A river starts out as a ...	
One river on Guam is ...	
A lake is ...	
One lake on Guam is.....	
What is the different between a lake and a pond?	
A wetland is...	
The three types of wetlands are ...	
Why are wetlands important? ...	
Where do you find Guam's wetlands? ...	



To access this map and learn more, go to *Natural Resources Atlas of Southern Guam*:
<http://south.hydroguam.net/map-drainage-names.php>.

Groundwater (Worksheet)

Student Name: _____

Date: _____

Class: _____ Period: _____

Teacher: _____

Where can you find fresh water in Northern Guam?	
What is groundwater?	
Limestone rock is ...	
In Northern Guam, fresh water collects in the ...	
Water going to most homes on Guam come from ...	
What can contaminate the ground water?	

Student Name: _____

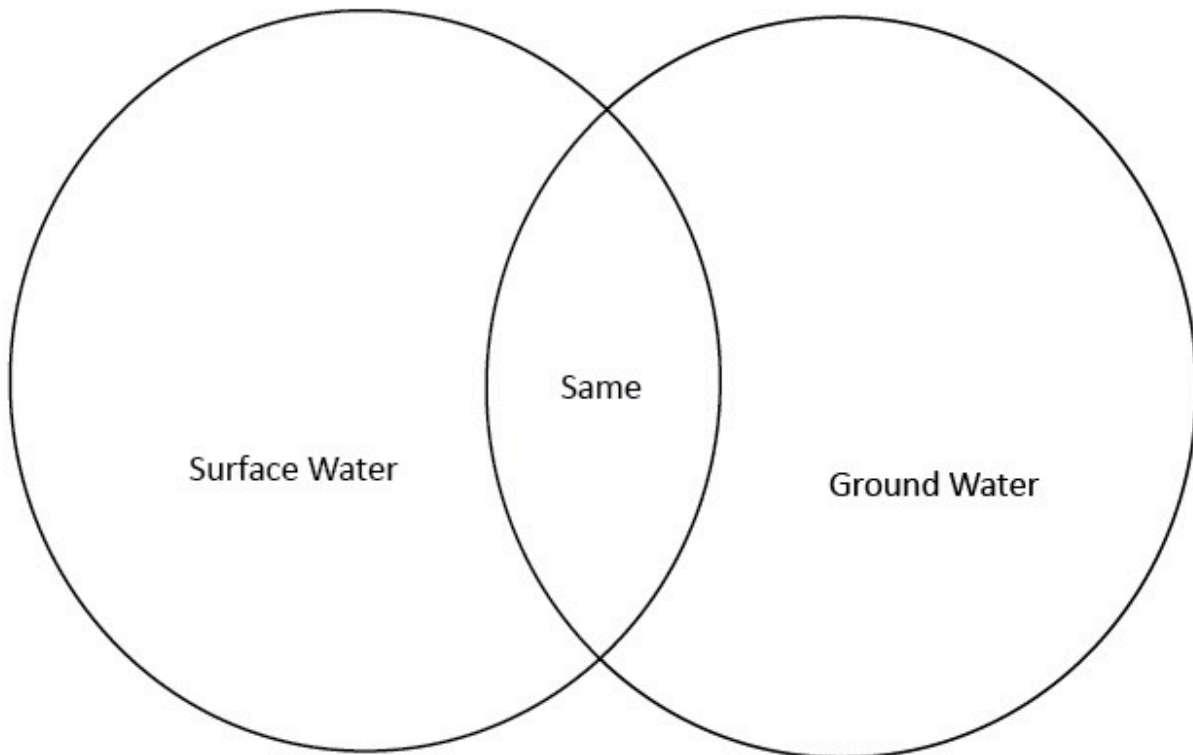
Date: _____

Class: _____ Period: _____

Teacher: _____

Surface and Ground Water Venn Diagram Worksheet

Surface and Ground Water



Fresh Water on Guam Educational Presentation Rubric

Student Name: _____ **Date:** _____

Class: _____ **Period:** _____

Teacher: _____

Fresh Water on Guam Educational Presentation Rubric

My Score	Information (Processes)	Information (Cycle)	Critical Thinking	Quality of Work	Final Result
4	I thoroughly explained surface water and groundwater. I understand each of these so well that I put it into my own words.	I understand surface water and groundwater roles in providing fresh water to Guam. I told a story that “flows” naturally.	I was really stretching my brain on this project! I connected and applied what I learned through research, and I effectively showed my understanding the importance of surface water and groundwater for Guam.	I was creative and presented my project in a unique way that I knew people would enjoy seeing. I did my very best work and it looks polished.	I truly put my heart and my mind into my project. It contains valuable information that would entertain and really helps others understand the importance of surface water and groundwater for Guam, and the need to conserve fresh water.
3	I understand that water travels on Earth. I explained how water travels on the surface and underground but didn’t always go into details.	I showed that I know how water travels on the surface and underground. I presented them one at a time rather than as parts of a whole water cycle.	I put some thought into my project. I remembered the information that we learned and tried to put it into my own words somewhere in my project. I tried to	I was creative but I could have done better work. I know that my project would teach someone the information but I could have spent more time on it.	I am proud of my project. It has all the parts I needed to include and it could effectively teach someone about how water travels on the surface and underground

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			connect my ideas to come up with new ones.		and tell them about ways to conserve water.
2	I know that travels on the surface and underground but am unable to explain it.	I know that water travels on the surface and underground but I didn't demonstrate how these happen in an order that tells a story.	My goal was to finish the project. I made sure to complete all parts of it but didn't try to push my thinking. I included facts but didn't connect them very well with the information I've learned.	There are several mistakes and my work is quite sloppy. These mistakes and the quality of my work could make it hard for others to understand.	I finished the project. I put some important information in it about how water travels on the surface and underground, but I don't know if it will help them to fully understand it or influence them to switch to habits that help to conserve water.
1	I know that water travels on Earth but, I didn't explain how or why.	I don't quite understand how water travels on Earth so, I had a hard time explaining it.	I didn't really understand the project and didn't ask questions so that I could put my best thinking into my work.	My work is messy and there are so many mistakes that others wouldn't be able to read or understand it.	I tried to complete the project. It is unfinished, but isn't work that I am very proud of. It won't help teach others about how water travels on Earth or influence them to switch to habits that help to conserve water.

‘Drip the Raindrop’ Journey on Earth Script Rubric

Student Name: _____ Date: _____

Class: _____ Period: _____

Teacher: _____

Drip the Raindrop Journey on Earth Script Rubric

My Score	Information (Processes)	Information (Cycle)	Critical Thinking	Quality of Work	Final Result
4	Drip the Raindrop thoroughly explained surface water and groundwater. Drip the Raindrop understand each of it so well that he put it into his own words.	Drip the Raindrop understands surface water and groundwater roles in providing fresh water to Guam. He told a story that “flows” naturally .	I was really stretching my brain on this project! I connected and applied what I learned through research, and I effectively showed my understanding the importance of surface water and groundwater for Guam.	I was creative and presented my project in a unique way that I knew people would enjoy seeing. I did my very best work and it looks polished.	I truly put my heart and my mind into my project. It contains valuable information that would entertain and really helps others understand the importance of surface water and groundwater for Guam, and the need to conserve fresh water.
3	Drip the Raindrop understand that water travels on Earth. He explained how water travels on the surface and underground but	Drip the Raindrop showed that he knows how water travels on the surface and underground. He presented them one at a time rather than as parts	I put some thought into my project. I remembered the information that we learned and tried to put it into my own words	I was creative but I could have done better work. I know that my project would teach someone the information but I could have spent more time on	I am proud of my project. It has all the parts I needed to include and it could effectively teach someone about how water travels

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	didn't always go into details.	of a whole water cycle.	somewhere in my project. I tried to connect my ideas to come up with new ones.	it.	on the surface and underground and tell them about ways to conserve water.
2	Drip the Raindrop is unable to explain how water travels on the surface and underground.	Drip the Raindrop didn't demonstrate how water travels on the surface and underground in an order that tells a story.	My goal was to finish the project. I made sure to complete all parts of it but didn't try to push my thinking. I included facts but didn't connect them very well with the information I've learned.	There are several mistakes and my work is quite sloppy. These mistakes and the quality of my work could make it hard for others to understand.	I finished the project. I put some important information in it about how water travels on the surface and underground, but I don't know if it will help them to fully understand it or influence them to switch to habits that help to conserve water.
1	Drip the Raindrop didn't explain how or why water travels on Earth.	Drip the Raindrop had a hard time explaining how water travels on Earth.	I didn't really understand the project and didn't ask questions so that I could put my best thinking into my work.	My work is messy and there are so many mistakes that others wouldn't be able to read or understand it.	I tried to complete the project. It is unfinished, but isn't work that I am very proud of. It won't help teach others about how water travels on Earth or influence them to switch to habits that help conserve water.

Fresh Water Flyer Rubric

Weights	4	3	2	1
Creativity (x1)	The flyer is creative. Its design clearly represents the animal it explains. Color is used meaningfully.	The flyer is somewhat creative. Its design represents the animal it explains. Color is used.	The flyer uses little creativity. Its design somewhat represents the animal it explains. Some color is used.	The flyer is not creative. Its design does not represent the animal it explains. Little if any color is used.
Content Information (x1)	The flyer includes two true facts about the chosen animal. A picture that looks like the animal is included.	The flyer includes one true fact about this animal. A picture that resembles the animal is included.	The flyer includes inaccurate facts about the chosen animal. Picture is not included or does not look like the animal.	The flyer does not include facts about the chosen animal. Picture is not included or does not look like the animal.
Conventions (x1)	All words are spelled correctly in the title, labels and caption.	All familiar words are spelled correctly in the title, labels and caption. One or two scientific words may be misspelled.	Most of the words are spelled correctly in the title, labels, and caption.	Few of the words are spelled correctly in the title, labels, and caption.
Penmanship (x1)	Writing is very neat and easy to read.	Writing is neat.	Writing is somewhat sloppy.	Writing is very sloppy.
Art Connection (x1)	Invitation clearly shows an understanding of the use of symbols in art to communicate meaning	Invitation shows an understanding of the use of symbols in art to communicate meaning.	Invitation somewhat shows an understanding of the use of symbols in art to communicate meaning.	Invitation does not show an understanding of the use of symbols in art to communicate meaning.

Fresh Water Poster Rubric

Weights	4	3	2	1
Labeling (x1)	Every item that needs to be identified has a label. Drawing includes an accurate title.	Most items that need to be identified have labels. Drawing includes an accurate title.	Some items that need to be identified have labels. Includes a title.	Few of the items that need to be identified have labels. Title is missing or not suitable for drawing.
Content and Accuracy (x2)	Poster includes all assigned information including: pictures of the animal as a baby and as an adult, its habitat, and a variety of things it needs to survive. All information is correct.	Poster includes most assigned information including: pictures of the animal as a baby and as an adult, its habitat, and a variety of things it needs to survive. Most information is correct.	Poster includes some assigned information including: pictures of the animal as a baby and as an adult, its habitat, and a variety of things it needs to survive. Some information is correct.	Poster includes little of the assigned information including: pictures of the animal as a baby and as an adult, its habitat, and a variety of things it needs to survive. Information is incorrect.
Conventions (x1)	All words are spelled correctly in the title, labels and caption.	All familiar words are spelled correctly in the title, labels and caption. One or two scientific words may be misspelled.	Most of the words are spelled correctly in the title, labels, and caption.	Few of the words are spelled correctly in the title, labels, and caption.
Penmanship (x1)	Writing is very neat and easy to read.	Writing is neat.	Writing is somewhat sloppy.	Writing is very sloppy.
Science Connection (x1)	Information included on the poster clearly demonstrates an understanding of what animals need to survive.	Information included on the poster mostly demonstrates an understanding of what animals need to survive.	Information included on the poster somewhat demonstrates an understanding of what animals need to survive.	Information included on the poster does not demonstrate an understanding of what animals need to survive.

Fresh Water Poster Caption Rubric

Weights	4	3	2	1
Content and Accuracy (x1)	Caption contains many true facts about the picture.	Caption contains some true facts about the picture.	Caption contains few true facts about the picture.	Caption does not contain true facts about the picture.
Conventions (x1)	Few or no errors in grammar, spelling, capitalization, and punctuation.	All familiar words are spelled correctly, some errors in spelling of content words. Some errors in capitalization, and punctuation, but the errors do not affect understanding.	Has many errors in grammar, spelling, capitalization, and punctuation, and somewhat affects understanding.	Shows little evidence of understanding correct grammar, spelling, capitalization, and punctuation.
Penmanship (x1)	Writing is very neat and easy to read.	Writing is neat.	Writing is somewhat sloppy.	Writing is very sloppy.
Science Connection (x1)	Caption contains information that clearly shows an understanding of the relationship between animals and the things they need in order to survive.	Caption contains information that shows some understanding of the relationship between animals and the things they need in order to survive.	Caption contains information that shows minimal understanding of the relationship between animals and the things they need in order to survive.	Caption does not contain information that shows an understanding of the relationship between animals and the things they need in order to survive.

Guam Water Kids • HIGH SCHOOL SERVICE LEARNING • Module 3

Student Name: _____ Date: _____ Class: _____
Period: _____ Teacher: _____

Student Reflection
(In Class – After Each Module)

My point of confusion was ...	
What I learned was	
I gained a new/greater understanding of _____ by/when	
This learning is important because it connects to my previous learning/experience, myself, and/ or my world (<i>circle one</i>), in the following way...	
What I found meaningful about this module is...	