

Science Learning Activity

“Water’s Ways”

Purpose

The purpose of this activity is to discover how water works in different ways. Students will determine how water moves from higher to lower places. This lesson will address the misconception of water sources and how water moves from different levels (i.e. high to low).

Lesson Goal or Objectives

By the end of this lesson, students will understand how water moves in different ways. Students will be able to classify at least two different ways in which water moves and explain how this works.

Lesson Inquiry Question

How can we identify fresh water sources and where they come from? (How does water or rain collect onto the surface of the earth and flow into different sources?)

Target Group

This activity is appropriate for students in second grade. To use with older students, the procedure should be modified, along with the key concepts and vocabulary to fit what the student’s pre-knowledge about water.

Approximate Time

Teacher prep: Half hour to gather materials and create charts/graphs and cards

Student: One class period (30-45 minutes for actual experimentation)

Background Science Information

Fresh water can be found in rivers, lakes, streams, ponds, and in groundwater. Although there is much more salt water on the Earth than fresh water, it can still be located within these areas. Fresh water is an essential aspect for human survival. The Great Lakes are the largest surface freshwater system on the Earth. Fresh water plays a key role in collection of water and providing drinking water to most of the United States.

Oakland Schools (29 June 2009). Water’s ways. *The Oakland Schools Curriculum*. Retrieved 30

January 2013 from <http://scope.oakland.k12.mi.us/lesson.aspx?lesson=1405>

Discipline-based Content Expectations

Inquiry Process:

S.IP.02.13 Plan and conduct simple investigations.

Inquiry Analysis and Communication:

S.IA.02.13 Communicate and present findings of observations.

Reflection and Social Implications:

S.RS.02.11 Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.

Content Expectation:

E.FE.E.1 Identify water sources (wells, springs, lakes, rivers, oceans).

Materials Needed

- Blue food coloring (any color is usable)
- Camera (disposable or classroom digital camera)
- Group of index cards (one water vocabulary word written on each)

- Different plastic containers for water to flow through (cups, funnels, cup with holes cut in the bottom, tubes, straws, etc.)
- Plastic cups (1 per group)
- Cake pans (1 per group)
- Emptied 2-liter bottle (capped)
- Pitchers to hold colored water
- Cup of sand (1 cup)
- Paper towels

Safety Considerations

The water being used for the experiment has been mixed with food dye. Students should be aware that no liquids should be used for drinking.

References

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PROCEDURE

Pre-Assessment (and Engage)

Hold up a 2-liter bottle of water (colored so that it’s more visible to students). Turn bottle upside down. Ask the students where the water moves within the bottle. Why does the water move there? Turn the bottle on different angles. Ask the students why the water always moves to the lowest point of the bottle. Before answers are discussed, have students write down their predictions or thoughts in their science journals. As students finish up, break them into smaller groups to discuss what they have written down. Once students have been given time to discuss, generate a chart of facts or reasons that they “think they know” about why water always moves to the lowest point of a container. Have one student from each group present the best idea that they had come up with. Based on the students’ responses/ideas, the teacher may need to adjust the lesson if students seem unsure or are off track from what the teacher expected. If students have a strong understanding or ideas as to why water may always move to the lowest point of a container, the teacher may decide to spend less time on the lesson or elaborate it to a higher level of thinking for students.

What do we THINK we know about water movement?	HOW will we find out?	What do we CONCLUDE ?

Description of Student Learning Activities

1. **Explore:**
2. Ask the question, “What types of water cover the Earth? Where does it come from?”

Once concluded that both fresh and salt-water cover the Earth, provide photos (for the entire class to see) of where these types of water are most often seen. Provide pictures of the water sources that have been previously written on the notecards (i.e. lake, stream, river, ocean, etc.). Break students into small groups around the classroom. Have students try to match the water source with the pictures.

3. **Explain:**

4. Write out the definitions of the water sources on the board. Have students copy these definitions into their notebook to help them later (real-world connections). Explain how each of these water sources is necessary to give pure and clean drinking water to homes all around the United States.
5. Have students make a Venn diagram in their science journals comparing fresh water to salt water. Discuss with students the similarities and differences that are found within each of these types of water. Explain that there is a much heftier amount of salt water on the Earth than there is fresh water, but fresh water is the type that is used for drinking and within their homes.
6. Once students have included a few details in each section of the Venn diagram, call on students to share their best ideas with the rest of the class.
7. Encourage students to explain where they think that fresh water comes from (i.e. what sources) and where salt water comes from.
8. Discuss: What are the differences between fresh and salt water? How do you think that you could tell the difference between the two besides tasting them? Can salt water be made into fresh water? Record any other questions that students may come up with during this time. Choose one question to investigate as a class (How can we identify fresh water sources and where do they come from?).

1. **Expand or Elaborate:**

- Together, develop a simple investigation and system to find out how fresh water moves within different sources and containers. Write the question on the board: "How does fresh water move?"
2. Create a list of materials for each group, i.e. different containers/sizes (cups, sand, dishpans, etc.).
3. Create a procedure. (within the small groups, as each one will be slightly different.) After students design their water systems, have them draw/write out their predictions about what will happen when water is added to their containers.
4. Using a cup of colored water (in order for students to be able to see it), have them test out their systems. Observe how and where the water moves. Record their observations in their science journal either through pictures or words.
5. After students have completed testing their systems, discuss their results. While everyone's system was different, did the water all still move to the same part? What surprised you? What can you say about water movement? What is our conclusion? (Second grade students may not completely be able to understand why water moves in the way that it does. As long as they are on the right track towards comprehension, the lesson will be doable). Discuss how students have been working like scientists and that it is very important to investigate our questions! As a class complete the chart:

Question:	Claim:	Evidence:	How have our ideas changed?

6. Students can draw pictures to illustrate their conclusions.

Real-World Connections

Break students into smaller groups (pre-determined in classroom) and send them outside. Provide each group with one index card that has one type of water source listed on it. Explain to students that they will be searching for a place in the schoolyard that will allow them to create a source similar to the one that they have on their card. Once each group has located a spot (under the supervision of other parents or helpers in the class), provide a small cup of water to each group. Allow students to investigate how well their system worked in the schoolyard. Once all of the groups are finished, gather all the students together again and have a short discussion to find out how well each system worked. How was your system similar to a real freshwater system? How is it different? Why did your group choose the spot that you did?

Post-Assessment (Evaluate)

- Allow students time to review and reflect on their "pre-assessment" pictures and ideas recorded in their journals (about water movement).
- Students should have the opportunity to respond to or modify (not erase and change) their original ideas.
- The class may also reflect on the ideas listed on the "pre-assessment" chart that the groups had come up with. Discuss each item in terms of its validity. Allow students to add new or better ideas to the list. Why did the ideas change?
- Continue to fill in the classroom chart entitled "What We Know About Water."

What do we THINK we know about WATER?	HOW will we find out?	What do we CONCLUDE?

- Both the pre-assessment and post-assessment charts can be used throughout the remainder of the unit.
- The teacher should also assess whether students still have misconceptions about fresh water movement by reading their science journals and listening to discussions. If some students are still having difficulty with the concept, additional activities may be introduced at this point in the unit before moving on to the next concept.

Create a classroom book about fresh water systems. Assign the same groups that were used outside to the same fresh water system (depending on size of class and how many water systems were used) and have each individual student:

- Describe the water system (what is it and how does it work?). (4 points)
- Describe the system they had created outside. (3 points)
 - Explain similarities. (1 point)
 - Explain differences. (1 point)
- Explain how this fresh water system is useful in providing the world with water. (1 point)

	Great job! (10 points)	Good effort! (6-9 points)	Nice try! (0-5 points)
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Describes the assigned water system	Accurately describes water system with detail as to how it works and what it actually is.	Vague description of water system. Describes how it works or what it actually is.	Did not accurately describe assigned water system. No type of description is evident.
Describe the system created in class/outside (similarities/differences)	Accurately describes in detail the water system that was created outside along with the similarities and differences between them.	Vague description of created water system. Not all of the steps were included in the process, or some parts were incorrect. Few similarities/differences are mentioned.	Did not accurately describe water system or at all. Few steps were provided and no similarities or differences were made.
Explains uses of fresh water system	Provides multiple uses of fresh water system. Evident that ideas and facts were present.	Explains few uses of assigned fresh water system. Few facts are provided.	No usages were explained. No evidence of ideas or facts are presented.

Water's Ways



What do we THINK we know about water systems?	HOW will we find out?	What do we CONCLUDE?

Fresh Water vs. Salt Water

Fresh Water

Salt Water

