

# New Curriculum

## Introduction

The science unit being altered is water and climate and is being taught to a third grade classroom. The lessons have been edited to include our school's I.B. (International Baccalaureate) program. In addition to the incorporation of I.B. curriculum, the lessons have been adapted to be transdisciplinary with a focus on student engagement.

I.B. Transdisciplinary Theme: Sharing the Planet

Central Idea: Humans influence water and water influences water

Lessons start with teaching of water and water behavior and then move to include climate and weather as the unit progresses. The three lessons shared are the first three lessons of the unit.

## Lesson 1 - Drops of Water

1. Discuss Water
  - a. Tell students that they are going to start an investigation of a very important earth material. Hold up a plastic cup filled with water . Tell students,
    - i. An earth material is any natural material that makes up or comes from Earth. Rocks, sand, air, and water are earth materials. Living organisms and things made by organisms are not earth materials. We are going to investigate this important earth material, water.
    - ii. [Brainstorm with group members: How does water influence humans? How do humans influence water?](#)
2. Focus question: What happens when water falls on different surfaces?
3. Introduce foil and paper surfaces
  - a. Hold up and identify a sheet of waxed paper, aluminum foil, paper towel, and writing paper. Tell them that each different sheet presents a different surface to put water on.
  - b. [Assign students group member roles - class norm.](#)
    - i. [Recorder](#)
    - ii. [Time keeper](#)
    - iii. [Supply Captain](#)
    - iv. [Reporter](#)
4. Introduce the dropper
  - a. Hold up a plastic dropper. Demonstrate how to make drops.
5. Describe the investigation
  - a. Challenge students to place individual drops of water on four different surfaces: writing paper, waxed paper, paper towel, and aluminum foil. Ask students to
    - i. Observe the drops of water carefully from all angles;

- ii. Record observations in their notebooks, using drawings and written descriptions of the shapes the water makes.
        - iii. Consider other materials to test drops on
6. Student Model: Have students draw a model showing what materials absorbed or didn't absorb water. Make sure students label their drawings.
7. Start the investigation
  - a. Organize collaborative groups and assign jobs. Have getters get
    - i. One large sheet of each surface material;
    - ii. One dropper for each student;
    - iii. Two cups of water; and
    - iv. Scissors.
8. Provide additional challenges
  - a. As you visit the groups, introduce these challenges.
    - i. What happens to the circles of water if you add more and more drops to make big drops?
    - ii. How close together can you put two drops of water without having them touch? What happens when they do touch?
    - iii. Can a drop of water bounce off another drop of water?
    - iv. Can you drag a drop of water around with the dropper tip?
    - v. What shape are the drops of water as they fall through air?
9. Clean up
10. Discuss results
  - a. Ask students to talk in their group for 3 minutes about water on different surfaces. Encourage them to
    - i. Share their drawings
    - ii. Identify similarities and differences between the appearance of water on different surfaces;
    - iii. Describe what the water looks like on the different surfaces.
    - iv. Move around room to ensure equitable talk within groups.
  - b. Ask Reports to report what happened to the drops of water on each of the surfaces. Keep track of their observations on the board. When students report that the water soaked into some materials tell them,
    - i. When water soaks into a surface, like the paper towel, we say the towel absorbs the water. When water sits on top of a surface in drops, we call the drops beads and say the water beads up on a waterproof surface.
11. Answer the focus question
  - a. Point to the focus question on the board and ask students to find it in their notebooks. Ask them to review their data in their notebooks and to write an answer to the focus question. After students summarize their observations, ask them to think about what happens to the water on each kind of surface. See if they can come up with a model of mechanism for what happens when water comes in contact with the materials. Ask them to revisit the model they drew on

what materials absorbed or don't absorb water. Revise model and share how the models have changed since the beginning of the lesson.

12. Read "One Well: The story of Water on Earth"

- a. Introduce book and I.B. central idea - Water influences humans and humans influence water.
  - i. As we discussed, water is an earth material. How might water be impacted or influenced by humans? Discuss with group members for 5 minutes. How might water influence humans? Discuss with group members for 5 minutes. Keep these ideas in mind as we read.
  - ii. Read book

13. Discuss book

- a. Remind students of lesson focus question, "What happens when water falls on different surfaces?" Pose students to consider the focus question in contexts of water on environments. When water falls on a community in Alabama, what influence does it have? Does it have the same influence as when water falls on a drought ridden environment or one with poor infrastructure?

14. Conclusion

- a. Have groups select a population/region to investigate:
  - i. Create a poster demonstrating the impact/influence water has on an environment. Select a region or population that is influenced.
  - ii. Write about how the population is influenced by water.
- b. Share with the class.

15. Questions to investigate

- a. Create a list of questions or curiosities students have about the influence of water on an environment.

## Lesson 2 - Water in Nature

1. Introduce the outdoor activity

- a. Tell students,
  - i. We put drops of water on several different materials. Some of the materials soaked up or absorbed water; some materials were waterproof, and water bead up on them.

2. Focus question: What happens outdoors when rain falls on natural materials? Write on board and in science journal.

- a. Drops of water fall on materials outdoors when it rains. I'm wondering, what happens outdoors when rain falls on natural materials?

3. Describe the activity

- a. Tell students that they will use droppers to place simulated rain drops on different surfaces outdoors. They will record their observations in their notebooks.

- i. Work with a partner
    - ii. Use a plastic bag to collect small natural objects for testing
    - iii. Test the objects to see if they are waterproof or absorb water
    - iv. If they absorb water, determine the amount they absorb compared to other materials (more, same, less).
    - v. Record your observations
4. Review the rules for going outdoors
5. Student Model: Have students create a model for the outdoor materials they believe will absorb or repel water. Label model.
6. Go outdoors
7. Collect materials to test
  - a. Confirm that some objects or materials will have to be tested where they are and that small samples of other materials can be collected. Start by giving students 5 minutes to collect samples with a partner.
8. Visit students as they collect samples
  - a. Move among students as they sample. Encourage them to collect small living leaves from a variety of plants as well as dry, dead leaves for comparison.
9. Test the samples
  - a. After 5 minutes, call students back to the sharing circle. Put a small amount of water in a plastic cup for each pair of students and let them start applying drops of water to the sampled objects. Give directions for sample testing.
    - i. Test each sample. Observe it carefully, with and without the hand lens
    - ii. Record whether the sample repels or absorbs the drop.
10. Discuss results
  - a. Call students back to the sharing circle. Ask them to talk in small groups about their discoveries.
    - i. Which natural materials repelled water?
    - ii. Which natural materials absorbed water?
    - iii. What happens to natural materials when it rains?
    - iv. What happens to you when it rains? Are you waterproof or do you absorb water? What about other animals?
11. Return to class
12. Answer the focus question
  - a. What happens outdoors when rain falls on natural materials?
    - i. Ask students to look in their notebooks for the model they described in Part 1 when they observed drops of water on materials in the classroom. Challenge them to incorporate the new observations into their model to refine it. Ask students to work independently to record an answer to the focus question. *Revisit model and revise after investigation. Share what predictions were correct or incorrect.*
13. Discussion - How humans impact water
  - a. Discuss how students explored water being absorbed or repelled by natural materials. What would happen to the materials if the water had been influenced

by humans? How do humans influence water? Give students time to first discuss the questions.

- b. Share ideas and experiences
  - c. Pollution is one way humans influence water. Pollution hurts the environment as water influences the entire environment.
14. Read: "Watch over our Water"
15. Discussion
- a. How does polluted water impact the environment? How can humans influence water in a better way? How do humans influence water now?
16. Creation
- a. With group members create an infomercial about how humans can combat water pollution. How can humans influence water in a positive way?
  - b. OR with group members write a letter to the mayor explaining why humans should protect water and the impact humans have on water.
17. Share
- a. Share infomercial with class

## Lesson 3 - Water on a Slope

1. Introduce water on a slope
  - a. Ask students to think about what happens to a raindrop that falls into a mountain stream. Listen to their ideas. They should know that the drop of water will flow downhill with the stream.
2. Focus question: How does water move on a slope?
3. Describe the activity setup
  - a. Tell students that you have materials to help them observe what happens when water is placed on a slope, or slanted surface. Demonstrate this procedure.
    - i. Create a slope by using a book to prop up one end of the tray. Work with your group to engineer a slope that raises one end of the tray about 5-7 cm above the tabletop.
    - ii. Lay waxed paper on the tray to create a smooth surface. Use a small piece of transparent tape to secure the paper to the tray.
    - iii. Use droppers to drop water on the waxed paper. Observe.
    - iv. Return the water to the plastic cup when it collects at the bottom on the tray, and reuse the water.
4. Start the activity
5. Describe results
  - a. As you visit the groups, encourage students to describe what they did and what they discovered. Make sure that by the end of this investigation students agree that water moves downhill when placed on a slope.

6. Assess progress: performance assessment
  - a. Circulate from group to group. Listen to the group discussions and observe how students work together. Stand back and look at the level of scientific enterprise in the classroom.
7. Set up water-dome races
8. Conduct water-dome races
9. Increase the slope
  - a. What force caused the water domes to move down the slope?
  - b. How could you find out what happens to the speed of the water domes on steeper slopes?
10. Clean Up
11. Discuss water on slopes
  - a. What rule describes the direction that water domes move?
  - b. What is the cause-and-effect relationship between the size of a water dome and speed at which it moves?
12. Slopes in our environment
  - a. Ask students where we find slopes in our environment. Mountains, hills, ramps.
  - b. Water on slopes in the environment will act the same as the created slope in our classroom.
  - c. Ask how might humans affect water's behavior on a slope? Destruction or changes to a natural slope. What happens to the water?
13. Human interactions with slopes
  - a. Watch - National Geographic video
    - i. <https://video.nationalgeographic.com/video/101-videos/0000015d-752d-d1cb-a7fd-f5fd0ae00000>
    - ii. Discuss deforestation and impact on the environment.
  - b. Slopes can be mountains and hills. Humans impact mountains and hills by deforestation and building on them.
14. Create
  - a. Create model on chart paper demonstrating water on a slope with group members.
  - b. OR write a newspaper article about the impact of human interactions and slopes.

## Changes to Curriculum

- Integration of International Baccalaureate Unit of inquiry
  - Transdisciplinary: Curriculum and lessons have been altered to include literacy, math, social studies, and International Baccalaureate units of study. Lessons have had sections added onto them to include other subject areas.
  - Unit of inquiry: Sharing the planet
    - Central Idea: Humans influence water and water influences humans.

- In addition to learning about water and climate students will learn about how water influences the world around them and how we influence water. Thus bringing in subjects of social studies and literacy.
- Student Guided
  - Changes have been made to allow for students to have more choice in additional topics of inquiry. Students can research components of the unit that they find interest in. In addition, students have more opportunities to be creative such as creating their own infomercial and posters.
- Meaningful Instruction - Student Engagement
  - Students are engaged with a variety of activities that range from hands-on experiments to creating an infomercial and poster. Students learn best in a variety of ways so the lessons have been changed to include videos and creative opportunities to show and gain understanding.