

Arizona Project WET 5E Lesson Two

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Date: August 2026

LESSON TWO: WATER IN EARTH'S SYSTEMS	
PROJECT WET WATER LITERACY PRINCIPLES:	
Water Connects All Earth Systems a. Water is found in the atmosphere, on the surface, and underground. b. The water cycle connects Earth systems, purifying and renewing water on Earth. c. The Sun drives the water cycle through state changes and energy transfer. d. Climate and water are inseparable—changes in water impact climate, and climate change impacts water resources.	
LESSON SUMMARY	The water cycle connects Earth systems, and this lesson explores those relationships. Students compare the movement of water through diverse substrates. Students conduct an experiment to see how water moves through plants in the process of transpiration.
MATERIALS	• Clear plastic ziplock bag for each student. • Thirsty Plants Data worksheet (below) • Transpiration Diagram (found power point slides provided below) • Clear plastic cup for each student (could be something out of recycle bin) • Thirsty Plants Data Sheet • Water Cycle Cause and Effect Biomes • Guided notes and quiz if you choose to use them.
TIME	1-3 Hours
OBJECTIVES	Students will be able to develop and use a model to identify the places where water connects Earth systems and describe the cause and effect relationships between water, sunlight, life, and gravity that lead to water always moving and changing form. Students will be able to plan an investigation to explore and explain the interactions between two of Earth's systems (the biosphere - plants) and the atmosphere (captured in a bag) and explain the cause and effect relationship underlying transpiration.

GUIDING QUESTIONS	What are the relationships between plants and the water cycle? • What are the relationships between earth materials and the water cycle?
ARIZONA STATE STANDARDS ADDRESSED IN LESSON	
SCIENCE	ARIZONA SCIENCE STANDARD: 4.E1U1.6/7 Plan and carry out an investigation to explore and explain the interactions between Earth's major systems and the impact on Earth's surface materials and processes. Conduct the Thirsty Plant experiment and consider the movement of water through Earth's systems, the biosphere (plants) the atmosphere (precipitation, transpiration, humidity), and the geosphere (soil) as they are linked by the movement of water (hydrosphere). n
MATH (Elaborate)	4.MD.B Represent and interpret data. Measure the water collected in the Thirsty Plants experiment and estimate the number of leaves on a tree/bush to find an approximate volume of water contained in all of the leaves of plant/bush. Compare rainfall and transpiration inches on the graph on slide 10 and configure two totals as a percentage of total atmospheric water in one or more cities.
ELA (Elaborate)	4.RI.7: Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on web pages) and explain how the information contributes to an understanding of the text in which it appears. Read about Evaporation, Transpiration, and Evapotranspiration and respond to the writing prompt.
Social Studies (Elaborate)	Geography 4.G3.1 Explain how the location and use of resources affects human settlement and movement. Ask students to think, discuss, and write about what people need to survive and what they would need to do if the water resources were scarce.
CTE (Elaborate)	5.6 Explore jobs, occupations and careers to understand the value of all careers to society. How do we get data about precipitation? What kind of jobs help us to know things about the weather and climate?
ENGAGE	
Ask the questions in the slides and give students a chance to think, pair, share about what they see in the graphs in the slides.	
EXPLAIN	

Use slides to explain transpiration and review the Water Cycle Diagram. Students add new parts and processes to their water cycle diagram.

VOCABULARY

Evapotranspiration

EXPLORE

1. Students investigate transpiration by using a plastic bag to physically capture the water that leaves a plant and explore where that water comes from.
2. Students do a whole-body simulation to model the movement of liquid water through different earth materials.
3. Optional: Students experiment with different earth materials and how water moves through each.
4. Optional: Students use an online simulation to visualize how water moves through different materials.

ELABORATE

Optional extension activities for Math, ELA, CTE, and Social Studies

EVALUATE

[Notes and Quiz](#)

REFLECT

What went well? What resources could be improved, added, or removed to increase the usability or effectiveness of this lesson? [General Feedback Google Form](#)

CONTENT KNOWLEDGE AND SUGGESTED READING FOR TEACHERS

- Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.