

---

---

# Lesson Plan

## Mission 1: Wayward Water!

### Lesson 2 – A Mystery to Pond-tificate!

#### Grade Level: 5



## DURATION & AGENDA

1- 45 minute Class Period (w/ Optional 2<sup>nd</sup> Day for In-Class Experiments)

- *3 Minutes of Warm-Up Discussion , Prior Knowledge Assessments*
- *3 Minutes for Lesson (“1A”) Video - Investigation Setup*
- *5 Minutes of Class Discussion on Observations; Reinforce the Question*
- *20 Minutes to complete the Interactive Video Investigation as a Class (Lesson “2B”)*
- *20 Minutes to complete the Interactive Video Investigation as a Class, Small Groups or Individually - (Lesson “1B”)*
- *10 Minutes to Conduct an In-House Experiment or watch re-creation*
- *5 Minutes to Watch Final Conclusion Video; Recap*

*Optional 2<sup>nd</sup> Day–In-House Experiment*

*5 Minutes to Watch Final Conclusion Video and*

*Recap*

## SUMMARY OF LEARNING GOALS

This lesson explores evapotranspiration (processes of the Hydrologic Cycle) within the Hydrosphere unit (Mission 1). Mission 1 Lesson 2 investigates specific processes of evaporation and transpiration using an interactive scene based on a half-filled Oklahoma pond. Initial observations such as noting water levels vs dock height, etc., lead students to formulation of a primary question, “Why is the pond only half-full?”

Through interactive selections, users can watch and collect data on observable phenomena- nearby plants, the soil beneath the pond, houses and structures near the pond, air over the pond and the pond water itself. Data is presented which describes the relative inflow and outflow of water to the pond, including brief introduction of the concept of water tables and zones of saturation; wells and human water use; transpiration of water vapor through plants; infiltration and the effects of the sun and wind in converting liquid water to evaporation, and rate of conversion.

Students must watch the videos and discuss clues, noting them as they go, for use to present the most applicable, reasoned claim as to why the pond is not full.

---

The video introduces the concept and provides other examples and experiments which expand on the topic of evaporation and transpiration. Mission1 Lesson 3 continues the hydrologic cycle by exploring condensation and precipitation, and the concept of water vapor.

## Alignment to Standards

### Oklahoma Academic Standards for Science (5)

- ***5-ESS2-1 Develop a model to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.***
- ***5-ESS2-2 Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.***

### ***Also Applicable: MS***

**MS-ESS2-4 Earth's Systems – Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.**

#### **Science and Engineering Practices: Develop and Use Models**

- Students collect data and build model of how water could be removed from a pond by various means, and use the data to reason the best claim/hypothesis leading to discussion on the process of evaporation (and transpiration).
- Includes a simple model of unobservable behavior in discussion about how water is gained or lost in the pond from underground saturated rocks and soil (water table, groundwater).

## CARRYING OUT THE LESSON

In this lesson, instructors should engage in prior knowledge discussion which explores when students have ever witnessed water “disappear”. Stories such as, do they have a pond or pool which loses water over time, may be good way to initiate the lesson.

The instructor will show the initial video “2A” to the class. A brief Q&A discussion will follow to establish the key features of the scene and key observations that lead the class to understand the question that will be investigated in Lesson 2B. This is “*Why is the pond half-full, and where did the water go?*”

The narrative of the water nanodroplet is intended to be useful in helping focus the students on tracking a single drop of water as it moves through the earth system, the Hydrosphere. Teachers can adopt the water nanodroplet in their discussions. This is based on real technology, but includes stretch concepts so a discussion early in the Mission may need to

---

occur (what does nano- mean? Etc.).

Once the question is established, the instructor plays “Lesson 2b”, and selects a student to help choose what data to collect first. Students may take note or make sketches (optionally, in the downloadable “Mission Notes” form) or on a sheet of paper, individually. The instructor will guide the class through all available selections, careful to watch all possible selections for clues and teaching points.

At the end of the data gathering section, the class will choose the most reasoned claim for that set of observations. The instructor will discuss the data and how we arrived at that claim/ hypothesis. The instructor may then introduce the main concept or process, evaporation. The students may watch the final segment of the video introducing the concepts and expansions.

(Depending on the instructor’s time available, an optional 2<sup>nd</sup> day can have the class perform the in-video experiments in class. In absence of Day 2, we recommend watching the short experiment video in the lesson and discussing it.)

The instructor will conclude the lesson with a wrap-up of what the class did – observe, question, gather data, and use the data to choose the most reasonable claim. Then compare that with established process definitions, experiments and expansion material.

The instructor can add their own material to any part of this lesson plan to further customize the discussion. Experiment guides are available in the resource tab on each Lesson for download and printing, with materials lists and directions to conduct experiments in the classroom.

## SUGGESTED ASSESSMENTS

Each lesson includes, on the “C” level tab, a short quiz called a “Knowledge Scanner”. This quiz can be printed and conducted individually or as a group.

Additionally, an example CER Rubric is provided in case the instructor wants to request a written summary of the investigation and learnings. The rubric is located in the Mission Resource Tab.

An End of Mission exam is available at the end of Mission 1, and can be edited as needed by the instructor. This exam covers all material shown in Mission 1, Lessons 1-8.

Sketches, diagrams, and models of various processes and systems can also be requested and evaluated as a general assessment of comprehension of lesson material.