Cassandra Williams- Lesson Plan

**Grade Level:** 6th Grade Science
Lesson will take place during January-Feb after Ecology Unit and at the beginning of Weather and Climate Unit

**Topic:** Water Cycle and the Ocean- what does the water cycle have to do with the weather/atmosphere?
How does the ocean determine atmospheric conditions?
*Overarching Understandings:* Ocean Literacy, Earth is a system of interrelated spheres

**Standards:** CO Department of Education
3. Earth and Space Science.4. Energy flows and matter cycles within and among Earth's systems, including the sun and Earth's interior as primary energy sources. Plate tectonics is one result of these processes.
3. Earth and Space Science.6. Water cycles among land, ocean, and atmosphere, and is propelled by sunlight and gravity. Density variations of sea water drive interconnected ocean currents.
3. Earth and Space Science.7. Complex interactions determine local weather patterns and influence climate, including the role of the ocean.

**Time Needed**:
Day 1- Engage
Day 2- Explore- preferable a block day (my school has block on wed/thurs)
Day 3- Explain
Day 4-5 Elaborate
Day 6- Evaluate

**Measurable objectives:**
Learning Targets for the lesson (this is the format of what my school likes us to have present throughout the lesson and reviewed at the end of the lesson:)

- *We will analyze how water and land heat and cool so we can understand how water influences our atmospheric conditions (weather.)*
- *We will analyze our knowledge of the water cycle in the ocean so we can evaluate how the ocean determines the conditions of the atmosphere (weather.)*

**Procedures/Methods:**
ENGAGE- Day 1

Students often come to middle school with some prior knowledge of the water cycle, including the basic terms such as precipitation, evaporation. They are familiar with other terms such as condensation, runoff, groundwater, etc., but often cannot fully explain or define them. In sixth grade, the goal is to deepen and extend their knowledge and incorporate all the terms starting with calling it the Hydrologic cycle. For this Engage Activity, the teacher provides students with a Hydrologic cycle diagram and cut-outs of the words that explain the process.

The students then move the cut-outs of the words around on the diagram to see if they can place them correctly. The goal is for students to practice with/manipulate the words and to reflect on what they know as well as for the teacher to be able to assess prior knowledge of all the students' differing levels of knowledge. The teacher also uses this activity to introduce the term Hydrologic cycle (instead of water cycle.) Students answer questions on the student handout/doc (below) to reflect on the terms they know and don't know. Then they pair with a partner or group to discuss and reflect. Finally, (number 4 on doc) is for the students to complete the class vocabulary activity which we call Vocab Squares (Vocab strategy we use is based on the Frayer Model) of four terms of the hydrologic cycle that they did not know. (This is differentiated as students self assess which four terms to choose. Teacher must approve students' chosen terms.)

*Materials:*

Hydrologic Cycle Diagrams laminated if possible or copied so each student has one.
Hydrologic cycle terms cut out (laminated if possible for reuse) for students to place on the diagram to practice labeling.
Doc/worksheet for lesson (below)

*Procedure:* To begin this part of the lesson, the teacher gives students a laminated hydrologic cycle diagram with each term cut out and laminated as well. Students first independently place the terms in the correct boxes of the cycle diagram. After they have time to try on their own and record their answers to questions 1 and 2 on the doc/worksheet for this lesson, they can then work with their groups to review and discuss and make changes. Students answer question 3 on the doc below. Teacher concludes with class discussion by having students share answers to identify most commonly mentioned terms (answers to question 3.) Teacher can make a list on the board or digitally so students can see it for the duration of the lesson. This discussion and explicit labeling of words to learn allows the teacher to assess prior knowledge.

EXPLORE- Day 2

*Beginning of class warm-up or bell ringer:*

Teacher shows full diagram of Hydrologic Cycle with terms (Evaporation, Condensation, Precipitation, Run off, Snowmelt, Sun and water vapor, Deposition, Transpiration, Sublimation, Surface flow, Plant uptake, Groundwater flow, percolation, Watershed) in correct places to review and pronounce all terms with students.

*Coastal vs Inland Temperatures Mini-Lab* from this class but modified to reflect changes learned in discussions and to meet needs of this lesson. Rewritten here:

*Purpose:* Students see that water has a higher heat capacity than land (soil and rock) so the ocean takes longer to heat and cool than the land. Add air as a third container.

*Materials:*

3 containers- large (like the bottom two-thirds of a gallon milk jug or three very large beakers)
3 thermometers and clips (or 6 if want to do surface temperature in each container)
Water, sand

*Preparation:* Teacher fills one container with water and one with local soil (dirt, rock, etc.) The third container remains "empty" and will represent air. A thermometer is placed in each of the three containers and clipped to the side so it remains still. (If there are six thermometers, 2 for each container, one can be inserted into each substance and one thermometer clipped to the surface of the substance in the container, if desired.)
The teacher can set these up in one location in the shade the day before the activity so the temperatures have time to stabilize.
*Procedure:*

1. Students measure the starting temperatures of each substance (surface and inserted, if chosen) and record it on their doc/worksheet number 6 for this lesson (below)
2. Move containers into direct sunlight (will use the windowsills in my classroom) and let them sit until near the end of class in which temperatures will be measured again. While waiting, complete number 7 on your doc. (It asks the students to read the headings Water, Land and Air (from ch. 2 Ocean and Water Cycling pages 32-34
3. At the end of class, students measure and record the temperatures in the containers on question 8.

EXPLAIN- Day 3

Read together Ch. 2 pages 28-32. Students use Cornell Note format throughout the year in core classes and are familiar with the set up. Teacher option for students to complete these notes on paper or virtually. Teacher can differentiate this by including headings and sentence starters for students with accommodations. Attached is a Word doc copy of our template.

ELABORATE- Day 4-5, depending on if students present them or just turn them in.
**RAFT** Writing assignment/cartoon: The Water Cycle. This can be completed virtually or printed on paper

**R**= Role: Imagine you are a single water droplet

**A**= Audience: You are writing to tell a story to other water droplets.

**F**= Format: You are going to create a cartoon strip or a travel journal to tell the story of your journey.

**T**= Topic: You are going to explain the processes you experienced as you moved through the water cycle.

You are a single water droplet who has just arrived back in the ocean after making your way through the water cycle. The other water droplets in the ocean want to know all about your experience. Create a cartoon strip or a travel journal that explains everything you have experienced through the cycle. You must **include the following terms *with an explanation*** of each one in your cartoon: **Evaporation, Condensation, Precipitation, Run off, Snowmelt, Sun and water vapor, Deposition, Transpiration, Sublimation, Surface flow, Plant uptake, Groundwater flow, percolation, Watershed**

EVALUATE-/Assessment- Day 6

1- Using the same Hydrologic cycle diagram and terms used throughout the lesson, students now each get their own copy and a word list to label for a grade.

2- Extension if time or for differentiation: Students read Ch. 2 pages 38-39, the heading The Other End of the Cycle:Where Freshwater Meets the Sea. Student assignment: create a Google quiz with five questions about this information. Exit ticket is a 3-5 sentence summary statement about what they learned from these two pages of text.

***Student doc:***

*Hydrologic Cycle- what does water have to do with the conditions of our atmosphere? What role does the ocean play?*

Name: _____

**Part A: Label the water cycle.**

1. What terms did you have the easiest time placing in the diagram?
2. What terms did you have the most difficult time placing in the diagram?
3. What did you change or discuss in your group that helped you locate the correct placement of the terms?
4. Complete Vocab Squares for four of the terms you identified in number 2. Your teacher must approve the four terms before you complete the Vocab Squares for them.

a.

| WORD and DEFINITION | PICTURE/IMAGE |
|---|---|
| EXAMPLE OR FACT | SOURCES OF INFO |

b.

| WORD and DEFINITION | PICTURE/IMAGE |
|---|---|
| EXAMPLE OR FACT | SOURCES OF INFO |

c.

| WORD and DEFINITION | PICTURE/IMAGE |
|---|---|
| EXAMPLE OR FACT | SOURCES OF INFO |

d.

| | |
|---|---|
| WORD and DEFINITION | PICTURE/IMAGE |
| EXAMPLE OR FACT | SOURCES OF INFO |

**Part B: Land vs AIr vs Water Temperatures**

6. Record the beginning temperatures of each of the three containers. We will do this at the beginning of class.

e. Land _____ b. Air _____ c. Water _____

7. Draw something you learned (like notes you would take to remember something important, from the text reading yesterday. You must draw something from each heading Water, Air and Land.

8. Place the containers in the window/sunlight and measure the temperatures at the end of class.

f. Land _____ b. Air _____ c. Water _____