



The Yellow Belly Ponderosa Project

ACTIVITY 4 MY LIFE AS A WATER MOLECULE

Materials/Teacher Prep:

- At least 7 numbered paper spinners (provided as reproducible) photo copied and cut out
- A paperclip and pencil to use with each numbered paper spinner
- At least one copy of each of the 7 station statement cards to place around the room
- Copies of *My Life As A Water Molecule* record sheet for each student

* Multiple copies of spinners and station statements can be placed in each station area to reduce the risk of over crowding and wait time for students at any particular station throughout the activity.

Additional suggested supplies for pre and post activity discussions:

- Butcher paper and markers
- Venn Diagram or other compare/contrast graphic organizer

Important vocabulary to consider:

Molecule- the smallest unit a substance is made of (**synonym: particle**)

Atmosphere- gasses surrounding the earth or other planets

Transpiration- plant takes in water through roots and releases it through leaves

Evaporation- water molecules heat and rise into the atmosphere

Condensation- process of water changing from vapor to a liquid

Precipitation- water released from clouds as rain, snow, sleet, or hail

Runoff- precipitation that reaches the ground but does not infiltrate the soil

Infiltration- water seeps through the ground

Absorption- water is taken in by something

Aquifer- water stored underground in rock and sediment

Wetlands- water saturated land, marshes, swamps

Canal- artificial waterway

Well- created by drilling into the ground to access water in an aquifer

Treatment plant- uses processes to make water more acceptable for desired uses

Objectives:

- Students will simulate paths that water takes in the water cycle.
- Students will appropriately organize steps within a water path.
- Students will use complete sentences to sequence and summarize personal journey within a water path.
- Students will compare and contrast water paths within the water cycle.

Procedure

A. Probe/Engage: Guide an open discussion with students about what they may already know about the water cycle, the distribution of earth's water, and ways that water is used in everyday life.

Possible discussion questions:

Where can water be found on earth?

Where does rain come from?

Where does water go when it dries up?

Do you think water always takes the same path?

What is a water cycle?

What is (insert any one of the vocabulary words listed on previous page)?

How do you use water everyday?

How do others use water?

Besides people, what other living organisms need to use water?

How do we get drinking water?

Besides living organisms, how or where else is water used?

How does water become polluted?

If water is used for so many different processes why isn't it all used up?

B. Setting up the activity: Provide each student with a copy of *My Life As A Water Molecule* record sheet. Divide the class into 7 groups. Place each group at one the 7 stations.

C. Explain activity instructions:

-Each student will complete the following steps

1) Write down the station title on your *My Life As A Water Molecule* record sheet under *Where I Started*.

2) Use your pencil and a paperclip as a spinner.

3) Once you spin a number, read the statement next to that number on your station card.

4) Write down on your *My Life As A Water Molecule* record sheet under *What Happened* a shortened version of the statement including the important vocabulary in bold type.

5) Write down the station you are going to next under *Where I Went* indicated by the underlined word in the statement.

6) Go to the next station and repeat the process. Continue rotating through stations until all 10 rotations are completed and recorded on the record sheet.

*Draw student's attention to the bold vocabulary words in the station statements and prompt them to include them on their record sheets.

*Make sure that students are going to the next station indicated by the underlined word in the statement they read and record. After the first cycle, accuracy in rotation through the stations should be visible on record sheets by seeing that *Where I Went* and *Where I Started* become the same station location.

*Students will not rotate through stations as a group. Each student's journey as a water molecule may be very different from another.

D. Bringing the rotations to an end:

1) As students complete their journey remind them to organize and summarize the journey on the backside of their record sheet. You may also want to suggest including personal opinions about the journey. Was there anything surprising or eye opening?

- Example of water path organized before summary from *My Life As A Water Molecule* record sheet:
Groundwater ⇒ Spring ⇒ Raven (or animal) ⇒ Cloud ⇒ Mountain ⇒ Groundwater ⇒ Ponderosa Pine (or plant) ⇒ Cloud ⇒ Precipitation ⇒ Ocean

- Example summary: I infiltrated the soil and traveled through the ground to a spring. At the spring thirsty raven drank me. Later, he breathed me out into the atmosphere. Next, I condensed as part of a cloud, then I fell as precipitation in the form of snow on the mountain. Again I infiltrated the ground and ended up being absorbed by a ponderosa pine tree roots! Eventually, Mr. Yellow Belly Pine released me back into the atmosphere through transpiration. I found myself condensing as a cloud once again. Finally, I rested for a while after falling as precipitation into the ocean.

2) Have students rejoin original groups to share summaries and discuss how personal journeys as molecules were the same and different.

*This is a good point to provide students with or have them create Venn Diagrams or other graphic organizers to compare and contrast individual journeys.

E. Coming back together as a class and providing closure

1) Have groups share their findings and discuss as a class journeys throughout the water cycle.

*Possible way to organize and facilitate class discussion after activity:

- On the board, under document camera, or on butcher paper write down the names of each station as headings. Ask students to share all of the different ways they got to each individual station.

Example: fell as precipitation to the mountain

2) Refer back to questions discussed at the beginning of the activity:

Where can water be found on earth?

Where does rain come from?

Where does water go when it dries up?

Do you think water always takes the same path?

What is a water cycle?

What is (insert any one of the vocabulary words listed on previous page)?

How do you use water everyday?

How do others use water?

Besides people, what other living organisms need to use water?

How do we get drinking water?

Besides living organisms, how or where else is water used?

How does water become polluted?

If water is used for so many different processes why isn't it all used up?

3) Additional questions that may help provide closure and links to following lessons and activities:

Although you had different paths as a water molecule, how were journeys the same?

Which station/s seemed to be visited the most?

Can you think of other parts of the water cycle that weren't included in this activity?

Why does the water move through the cycle?

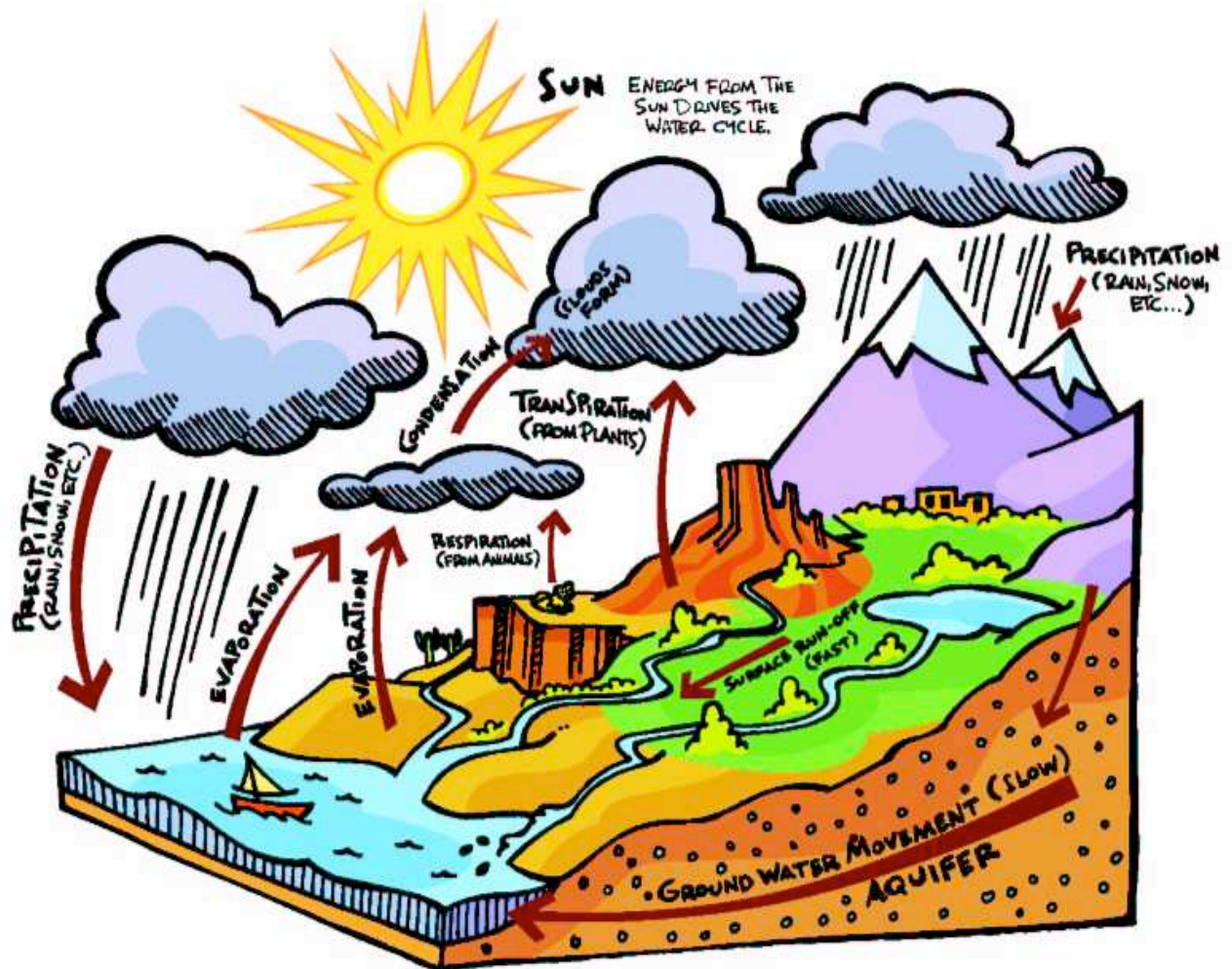
How is the cycle important to animals and plants?

What might happen to or in (insert one part of the cycle) if the water was polluted in (insert another part of the cycle)?

4) Suggestion:

-Visually create a model in drawing form of the water cycle that includes at a minimum the following vocabulary labels: Precipitation, Runoff, Infiltration, Aquifer, Transpiration, Evaporation, and Condensation

- Foster conversations around distribution of water on earth's surface, within the water cycle there is no beginning or ending, and how we treat the water can affect how water moves.



MY LIFE AS A WATER MOLECULE

Student Name _____

| Where I Started (Station Title) | What Happened (Shortened Statement) | Where I Went (Next Station To Go To) |
|---------------------------------------|--|---|
| <i>Example:</i> <i>groundwater</i> | <i>absorbed by Ponderosa Pine</i> | <i>plants</i> |
| <i>plants</i> | <i>transpired through leaves</i> | <i>clouds</i> |
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

- * Summarize your journey on the back.
- * Discuss and list with your group the similarities and differences of your journeys.
- * Share your findings and thoughts with the class.

Station 1: CLOUD

- * Use the spinner and read the statement next to the number you land on.
- * Write down what happens to you at this station, and go to the station that is underlined in the statement you read.

- 1- As you fall as summer rain you **evaporate** into the **atmosphere** and **condense** as part of a cloud (write this down and spin again).
- 2- You fall as snow (**precipitation**) onto the mountain.
- 3- You fall as rain (**precipitation**) into a river.
- 4- You fall as rain (**precipitation**) into the ocean off the coast of California.
- 5- You fall as hail (**precipitation**) onto the forest ground and melt.
- 6- You fall as snow (**precipitation**) onto a parking lot and **runoff** into a stream.

Station 2: MOUNTAIN

- * Use the spinner and read the statement next to the number you land on.
- * Write down what happens to you at this station, and go to the station that is underlined in the statement you read.

- 1- You fall as rain (**precipitation**) onto the mountain, evaporate into the **atmosphere**, and **condense** as part of a cloud.
- 2- You wash down the hillside (**runoff**) into a river.
- 3- You soak into the ground (**infiltration**) and **absorb** into a Ponderosa Pine root system.
- 4- You roll down (**runoff**) the mountainside into a stream.
- 5- You get frozen as ice for the winter. When you melt in the spring a thirsty mountain lion (animal) drinks you.
- 6- You fall as snow, melt in the spring, and **absorb** (**infiltrate**) into the forest ground.

Station 3: OCEAN

- * Use the spinner and read the statement next to the number you land on.
- * Write down what happens to you at this station, and go to the station that is underlined in the statement you read.

- 1- A plant **absorbs** you and releases you through its leaves (**transpiration**) into the air. Then you become part of a cloud (**condensation**).
- 2- You **evaporate** into the air and become part of a cloud (**condensation**).
- 3- You are one of the many drops of water in the ocean, and you stay there (write this down, and spin again).
- 4- A plant **absorbs** you and releases you through its leaves (**transpiration**) into the air. Then you become part of a cloud (**condensation**).
- 5- You are one of the many drops of water in the ocean, and you stay there.
- 6- You **evaporate** into the air and become part of a cloud (**condensation**).

Station 4: STREAM, RIVER, OR SPRING

- * Use the spinner and read the statement next to the number you land on.
- * Write down what happens to you at this station, and go to the station that is underlined in the statement you read.

- 1- You **evaporate** into the air and become part of a cloud (**condensation**).
- 2- A raven (animal) comes to the stream and drinks you up.
- 3- You **evaporate** into the air and become part of a cloud (**condensation**).
- 4- You continue down stream and end up in the ocean.
- 5- You are pumped through a **canal** and **treatment plant** and used as drinking water (animal).
- 6- A plant on the bank of the stream **absorbs** you through its roots.

Station 5: GROUNDWATER/AQUIFER

- * Use the spinner and read the statement next to the number you land on.
 - * Write down what happens to you at this station, and go to the station that is underlined in the statement you read.
- 1- You move underground and flow to the ocean.
 - 2- You move underground slowly through the soil and into a spring.
 - 3- You move underground into wetlands then into a river.
 - 4- Underground a Ponderosa Pine tree (plant) **absorbs** you through its roots.
 - 5- You are pumped out of the **aquifer** by a well and used to water plants on a farm.
 - 6- You are pumped out of the **aquifer** by a well and used by humans (animal) for drinking water.

Station 6: PLANT

- * Use the spinner and read the statement next to the number you land on.
 - * Write down what happens to you at this station, and go to the station that is underlined in the statement you read.
- 1- The plant **transpires** you through its leaves into the **atmosphere** and you condense as a cloud.
 - 2- The plant stores you in its edible leaves until an animal eats you.
 - 3- The plant uses you to grow until you are released through its leaves through **transpiration** and **evaporate** into the **atmosphere** (cloud).
 - 4- You are stored in the edible fruit of a plant until an animal eats you.
 - 5- The plant **transpires** you through its leaves into the **atmosphere** and you condense as a cloud.
 - 6- The plant uses you to grow until you are released through its leaves through **trans** **evaporate** into the **atmosphere** (cloud).

Station 7: ANIMAL

- * Use the spinner and read the statement next to the number you land on.
- * Write down what happens to you at this station, and go to the station that is underlined in the statement you read.

1- After a human or other animal uses you, you are passed as waste onto the ground.

2- You are exhaled from lungs as vapor into the **atmosphere** (cloud).

3- The human or other animal uses you to process food and you are passed from its body as waste on the ground.

4- After a human or other animal uses you, you are urinated onto the ground.

5- A human or other animal drinks you and you are exhaled from their lungs as vapor into the **atmosphere** and **condense** as part of a cloud.

6- You are exhaled from lungs as vapor into the **atmosphere** (cloud).

