# HYDROLOGIC SCAVENGER HUNT

UNITE US
INSTRUCTIONS
Grade 7-8

## Overview:

In this lesson, students use multimedia resources on the UNITE US website to learn about the hydrologic (water) cycle.

## Objectives:

The student will:

- describe the components of the hydrologic cycle;
- identify the three phases of water that exist simultaneously on Earth; and
- recognize the amount of energy in water determines its phase.

## Targeted Alaska Grade Level Expectations:

***Science***

[7-8] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating

[7] SD1.2 The student demonstrates an understanding of geochemical cycles by explaining the water cycle's connection to changes in the Earth's surface.

[8] SD1.2 The student demonstrates an understanding of geochemical cycles by applying knowledge of the water cycle to explain changes in the Earth's surface.

[7] SD3.2 The student demonstrates an understanding of cycles influenced by energy from the sun and by Earth's position and motion in our solar system by recognizing the relationship between phase changes (i.e., sublimation, condensation, evaporation) and energy transfer.

## Vocabulary:

**condensation**—the process by which a gas or vapor changes to a liquid by cooling or by increased pressure; this is how clouds are formed

**energy**—the capacity or power to do work; energy can exist in a variety of forms (potential, kinetic, thermal, electrical, mechanical, chemical, nuclear) and can be transformed from one form to another

**evaporation**—the process by which a liquid changes to a gas or vapor at a temperature below the boiling point; most of the water vapor in the atmosphere has evaporated from Earth's surface

**freeze**—to change from a liquid to a solid state by cooling or being cooled to the freezing point

**liquid**—a form of matter with no fixed shape characterized by the ability to flow; the volume and density of a liquid usually remain constant

**melt**—to change from a solid to a liquid state; the temperature at which this happens is called the melting point

**precipitation**—water that falls to Earth's surface in the form of rain, snow, hail or sleet

**solid**—a form of matter characterized by a rigid structure and fixed shape and volume

**sublimation**—the process of changing from a solid to a gas without passing through an intermediate liquid phase (such as ice and snow to water vapor)

**transpiration**—the release of water vapor from plant leaves

**vapor**—the gaseous state of a substance at a temperature where that substance can also be a liquid or solid; for example, water vapor exists as a gas at a temperature below water's boiling point

## Whole Picture:

Water is unique and essential to life on Earth. Just over 2/3 (71%) of Earth's surface is covered with water. The oceans contain about 97% of this water. Most of the remaining three percent is contained as ground water or frozen in glaciers and the polar ice caps. Only about 0.3% of all water on Earth is fresh surface water found in lakes, rivers, and wetlands.

# HYDROLOGIC SCAVENGER HUNT

The hydrologic (water) cycle is the continuous movement of all this water through Earth's ecosystem. The hydrologic cycle is a dynamic system that interacts with other parts of Earth's ecosystem, tying together the land, ocean and atmosphere. Water continually changes form, evaporating, transpiring or sublimating from the surface, traveling through the atmosphere as vapor, condensing as clouds and falling as precipitation. Liquid water travels the surface of Earth as runoff, finding its way into lakes, and streams and eventually traveling to the oceans. Water also infiltrates the ground, percolating through soil and rock to become groundwater. Despite all of this change and transport, the overall amount of water in the system remains fairly constant.

## Materials:

- Computers
- Paper (16 pieces)
- Marker
- Tape
- MULTIMEDIA: "Earth's Water" available on the UNITE US website (uniteusforclimate.org)
- STUDENT WORKSHEET: "Hydrologic Cycle Crossword Puzzle"
- STUDENT WORKSHEET: "Hydrologic Cycle Scavenger Hunt"

## Activity Preparation:

1. Ask a local Native language speaker to provide words for the weather phenomenon listed in chart 1. The local dialect for these words may differ from the examples provided. Write each word on a piece of paper and tape them around the classroom.

## Activity Procedure:

1. Distribute the STUDENT WORKSHEET: "Hydrologic Cycle Scavenger Hunt." Ask students to navigate the MULTIMEDIA: "Earth's Water" on the UNITE US website (uniteusforclimate.org) to research the answers to the first 13 questions.
2. After students have completed questions 1-13, review answers and work together to answer questions14-15
3. Language Links: Alaska Native people have always been careful observers of the weather and their languages are rich in words describing weather. Review the Native language weather words that you have hung around the room. Practice saying them aloud with students to build fluency in local terms related to weather. Include local words in songs, stories and games when possible and use them to describe weather conditions each day.

## Extension Idea:

Add words from the Native Alaskan language chart to the water cycle diagram on STUDENT WORKSHEET: "Hydrologic Cycle Scavenger Hunt."

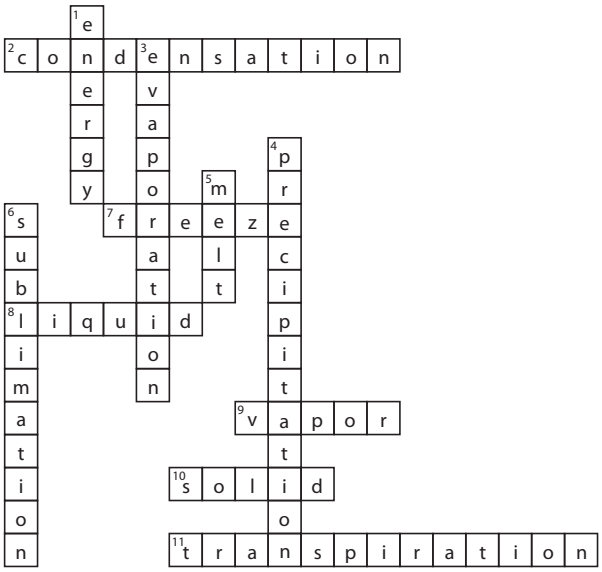
| English | Gwich'in | Kenaakk'e | Lower Tanana | Deg Xinag | Your Language |
|---|---|---|---|---|---|
| Rain / It's raining | Tsin/ahtsin | Kohn / yołee hødelaatlghaanh | Chonh | Chonh | |
| Snow | Zhah | Tseetl | Yeth | Yith | |
| Clouds / It's cloudy | Zhee k'oh / gwit'eh goo'aii | Kk'ul / yokk'uł hoolaanh | K'wth / k'wth xulanh | Q'uth | |
| Water | Chuu | Too | Tu | Te | |
| Steam | Teedhahzhraa | Łets'eeyh | | Tthał | |
| Melt / It's melting | Naaghwan / neeyahkhwaii | Ghaan | Ghan | Ntidlighanh | |

# HYDROLOGIC SCAVENGER HUNT

| | | | | | |
|---|---|---|---|---|---|
| Freeze / It's freezing | Datan | Ggaats | Gats | | |
| Ice | Łuu | Ten | Tenh | Tinh | |
| River | Han | No' | Nik'a | Xin | |
| Stream | K'ahjik or k'ahnjik | Tokkotno' | Nik'a | Srixno | |
| Glacier | Git | Loo | Łu | | |
| Spring | K'ahjik tr'idiinlaii | Too kk' ʉtl | Tok'etth | Xitenighe linghdi | |
| Hot Spring | Nindhaa k'ahjik tr'idiinlaii | | Tu nadhełde | | |
| Lake | Van | Benh | Ben | Vinq'it | |
| Pond | Teełtin | Todaatltonh | Todatltonh | | |
| Ocean | Chuu choo | Daagheyukk kk'e | Tth'itu'bogha | | |

## Answers:

**STUDENT WORKSHEET: "Hydrologic Cycle Crossword Puzzle"**



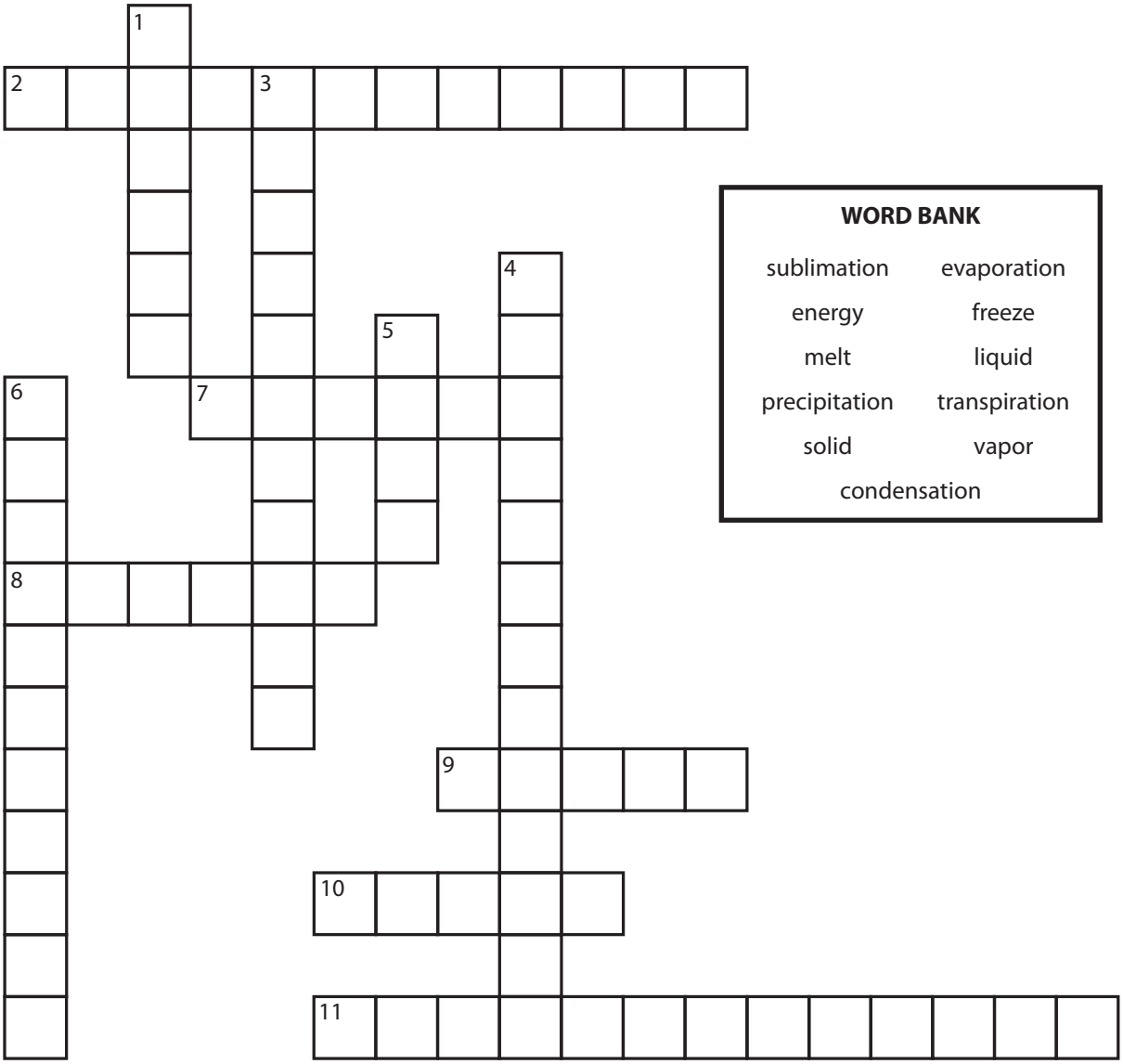

**STUDENT WORKSHEET: "Hydrologic Cycle Scavenger Hunt"**

1. True
2. solid (ice), liquid, vapor
3. energy
4. vapor
5. solid
6. liquid
7. evaporation
8. melting
9. freezing
10. condensation
11. transpiration
12. sublimation
13. precipitation
14. C. meltwater increases, runoff increases, and the size of the glacier decreases
15. Answers will vary. Students may describe: increased temperatures leading to increased evaporation, and water vapor in the air; increased temperatures will cause melting of the glacier, increasing surface runoff and raising ocean levels.
16. A. fall as rain into the ocean

**NAME:** _____

# HYDROLOGIC CYCLE CROSSWORD PUZZLE

**Directions:** Choose the word from the word bank that matches the definition and completes the crossword puzzle.




**WORD BANK**

| | |
|---|---|
| sublimation | evaporation |
| energy | freeze |
| melt | liquid |
| precipitation | transpiration |
| solid | vapor |
| condensation | |

**ACROSS**

2. the process by which a gas or vapor changes to a liquid by cooling or by increased pressure
7. to change from a liquid to a solid state by cooling or being cooled to the freezing point
8. a form of matter with no fixed shape and constant volume and density, characterized by the ability to flow
9. the gaseous state of a substance at a temperature where that substance can also be a liquid or solid
10. a form of matter characterized by a rigid structure and fixed shape and volume
11. the release of water vapor from plant leaves

**DOWN**

1. the capacity or power to do work
3. the process by which a liquid changes to a gas or vapor at a temperature below the boiling point
4. water that falls to Earth's surface in the form of rain, snow, hail or sleet
5. to change from a solid to a liquid state; the temperature at which this happens is called the melting point
6. the process of changing from a solid to a gas without passing through an intermediate liquid phase (such as ice and snow to water vapor)

**NAME:** _____

# HYDROLOGIC CYCLE SCAVENGER HUNT

**Directions:** Find answers to questions 1-13 by navigating the MULTIMEDIA: "Earth's Water" on the UNITE US website (uniteusforclimate.org).

1. True or False: On Earth, water can exist in three phases at once. _____

2. What are the three phases of water?

   _____ _____ _____

3. The amount of _____ in water determines its phase.

4. In what phase do water molecules move fast and sometimes collide? _____

5. In what phase do water molecules move slowly and line up? _____

6. In what phase do water molecules move freely past each other at medium speed?_____

7. What process takes place when the sun warms the surface of a large body of water, causing the water to become vapor? _____

8. What process takes place when ice becomes liquid water? _____

9. What process takes place when liquid water becomes ice? _____

10. What process takes place when water vapor molecules in the atmosphere stick to tiny particles floating in the air, and become a liquid? _____

11. What process takes place when water trapped underground is added to the atmosphere as vapor, released through the leaves of plants? _____

12. What process takes place when solid ice changes directly into water vapor? _____

13. What process takes place when cloud droplets become too large to float in the air, so they fall as rain or snow?

    _____

Use critical thinking skills to respond to questions 14-15.

Multiple Choice: Circle the letter representing the best answer to the question.

14. What **most likely** happens when winter and summer temperatures are above normal and precipitation rates are high?
    A. meltwater decreases, runoff increases, and the size of the glacier decreases
    B. meltwater decreases, runoff decreases, and the size of the glacier increases
    C. meltwater increases, runoff increases, and the size of the glacier decreases
    D. meltwater increases, runoff decreases, and the size of the glacier increases

**NAME: _____**

**HYDROLOGIC CYCLE SCAVENGER HUNT**

15. A glacier in Alaska has been slowly decreasing in size. Use the water cycle to describe what may happen over a period of years. Be sure to **correctly** use at least two terms from the diagram below.

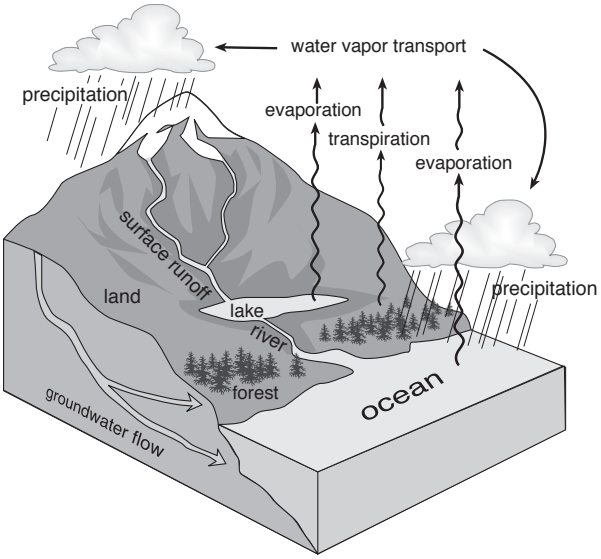
_____

_____

_____

_____

**The Water Cycle**




16. **Global Connections:** The region of Earth around the equator receives the most direct sunlight and therefore experiences more evaporation than other parts of the world. If you look at a map, you will notice that this region is composed of much more ocean than land.

Do you think that precipitation that falls near the equator is ***most likely*** to:

A. fall as rain into the ocean
B. fall as rain onto land
C. fall as snow into the ocean
D. fall as snow onto a glacier