

Water Cycle Game: Teacher Guide

Level: Intermediate

Subject: Geography

Duration: 30 minutes

Type: Small group activity

Learning Goals:

- Define each component of the water cycle
- Investigate the movement of water through the different stages of the water cycle
- Be able to explain the driving forces of the water cycle

Materials:

- Dice (printed template provided)
- 6 Printed activity sheets provided below

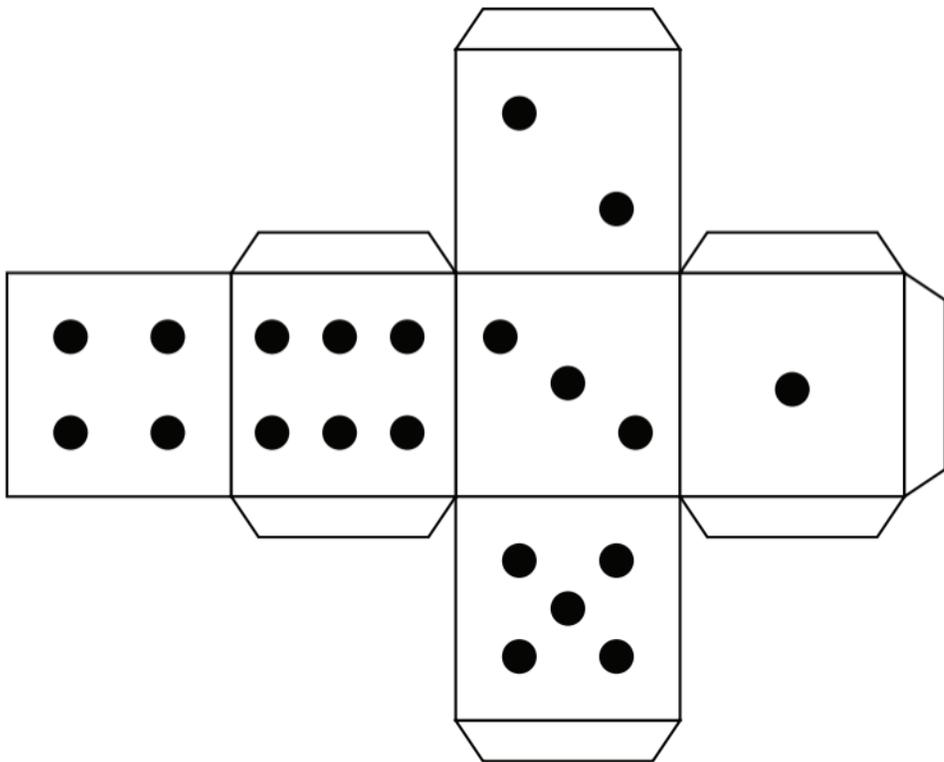
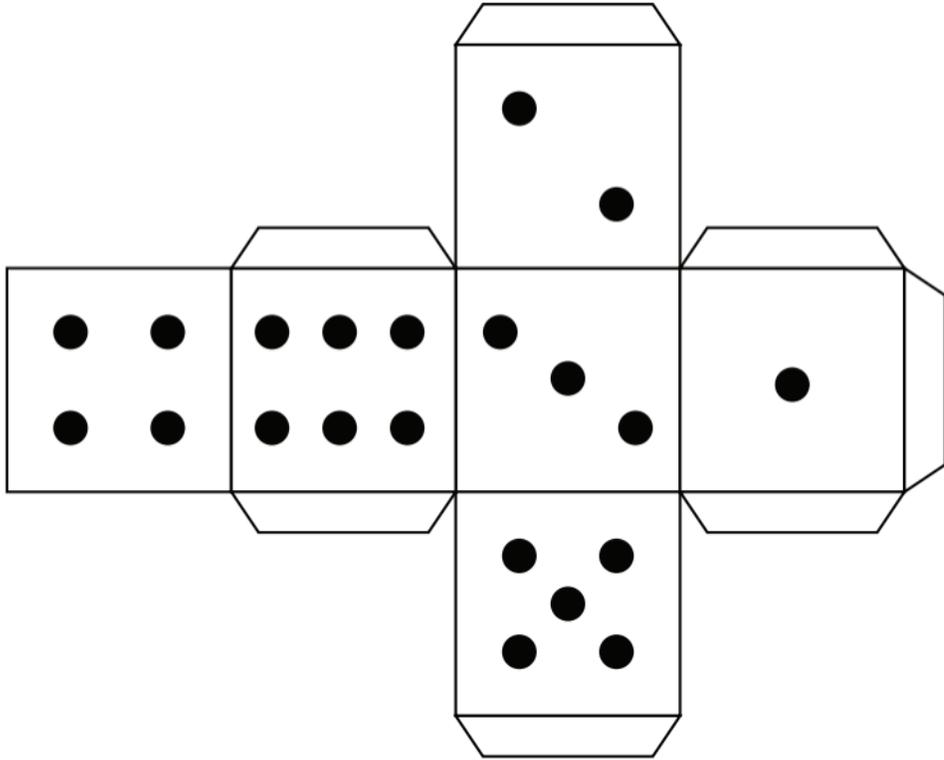
Background:

This lesson plan is intended for classes that want to continue to explore the complexities of the water cycle. To successfully complete this activity, students should already have a basic understanding of the water cycle including the ability to define the components of the water cycle and explain the driving forces between each stage. Background information for the water cycle is available on the School-2-School website under the Teaching Materials Tab with the “Water Cycle” lesson plan. Allow 30 minutes for this activity: 5 minutes to introduce the activity, 15 minutes to play the game (10 rounds of 1 minute each), and 5 minutes for class discussion.

Explain that students will play a game; they will role-play water as it moves throughout Earth. Start the conversation about the hydrologic cycle by asking students where water exists on Earth and how it gets there. By the end of the activity, the students would understand the processes by which water moves from one location to another including the multiple paths that water can take. This activity is modified from the UAF Geophysical Institute.

If needed, reintroduce the term “water cycle.” Explain that a cycle is something that repeats over and over. For example, the year is a cycle. The twelve months of the year repeat over and over every year. Water moves on Earth in a cycle as well. Even though water moves in a variety of ways, it always returns to its original position.

The materials required for this activity are the printed 6 pages of student information sheets and 6 six-sided dice. If you do not have a six-sided dice, you can print out a dice template and glue together the cube. A template is provided below for 2 dice: print, cut out, and glue tabs to assemble.



Before the activity the teacher should arrange the classroom into 6 stations. Student should work in small groups, there should be one dice per group. Have one group start at each station. Each station represents the different places that water exists: oceans, rivers & lakes, groundwater, ice & glaciers, clouds, and plants. Each station will have a dice and an information sheet. The dice will move around with the group but the station information sheet will remain at the station for the duration of the activity.

Explain that when the signal is given, each group will roll the die. Students should read the number on the die and match it to the chart on the sheet on the table. The chart will indicate where to go next. For example, if a student rolls a 3 at the Soil Surface Station, he or she will move to the Ground Water station next. If confusion in the activity directions exists, it may be helpful to play a mock round to make sure students understand the rules.

At the next station, the student should roll the die and move according to the chart at the new station. Each station will have a different chart. As students move from station to station, they should chart their paths on their advanced topics student worksheets. For round 1, student should mark a #1 on the correct place on the water cycle map. For the following rounds, students should show their path using an arrow and placing the round number. At the end of the game, students will share paths with each other.

Discussion:

After the first round, have the students stop at their current station. Now is a good time to check in to check their understanding. Ask one student from each station to describe which station they started at, what number on the dice they rolled and the corresponding process of movement, concluding with their next station. Use this as an opportunity to help any groups that still have questions or are confused. Once each group has had the opportunity to share and all questions have been answered, you can instruct the class to continue with the remaining 9 rounds.

After the 10 rounds have been completed, instruct the students to find a seat and complete their student handout. Ask students to share the path that their water droplet took. Was this path more complicated than the students expected? How often did the group stay at the same station for more than one round?

Ask students to answer the following questions based on the paths that were taken during the water cycle game. List student ideas on the board and discuss as a class. Where can water from a plant go? How does water get to a river? Where can water go from a glacier? How does water get to a cloud?

Below is a summary of the 6 student information cards for the teacher's use, following by the 6 station information cards for student use during the activity.

Starting Station	Dice Roll	Process of Movement	Moves To
Ocean	1,2	With heating from the sun you change from a liquid to a gas by the process of evaporation	Clouds
	3,4,5,6	You float in the ocean	Ocean
Rivers & Lakes	1,2	You percolate into the groundwater	Groundwater
	3	You flow into the ocean	Ocean
	4	A dry air mass combined with heating from the sun causes evaporation	Clouds
	5,6	You continue to flow from lakes to rivers	Rivers & Lakes
Groundwater	1,2	You pop up as an underground spring and supply water to a river or a lake	Rivers & Lakes
	3	After a long time you seep into the ocean	Ocean
	4	A root absorbs you up to be used by a plant	Plants
	5,6	You remain in the aquifer	Groundwater
Snow & Glaciers	1	You change from a solid to a gas through the process of sublimation	Clouds
	2	You break off (calve) from the glacier and become an iceberg in the ocean. You melt.	Ocean
	3	You melt and become runoff, entering a river or lake	Rivers & Lakes
	4,5	You melt and percolate into the underground water	Groundwater
	6	You remain a solid and stay where you are.	Snow & Glaciers
Plants	1,2,3,4	You move to the leaves of the plant and evaporate into the clouds in the process of transpiration	Clouds
	5,6	You are used by the plant to move necessary minerals to the parts of the plants that require them for photosynthesis. You remain in the plant	Plants
Clouds	1	You freeze into an ice crystal and combine with other ice crystals to form a snow flake. As the snow flake grows it becomes too heavy to be supported by the rising air and you fall to the earth.	Snow & Glaciers
	2	You combine with other droplets and grow larger and larger. You reach a size that cannot be supported by rising air and therefore fall as rain over a river or lake or enter a river or lake by runoff	Rivers & Lakes
	3	You combine with other droplets and grow larger. You reach a size that cannot be supported by rising air and therefore fall as rain over the ocean	Ocean
	4,5,6	You float in the atmosphere and remain as a cloud	Clouds



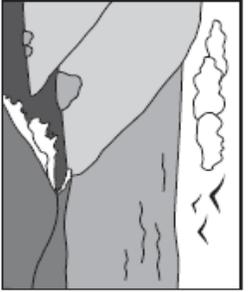
PLANT

1		Clouds	
2		Clouds	
3		Clouds	
4		Clouds	
5		Plant	
6		Plant	



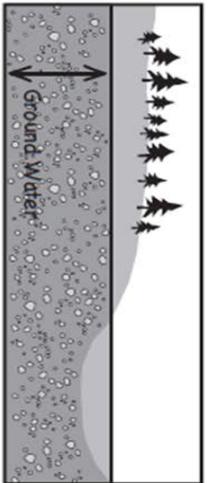
CLOUDS

1		Ocean	
2		Ocean	
3		Ocean	
4		Clouds	
5		Clouds	
6		Clouds	



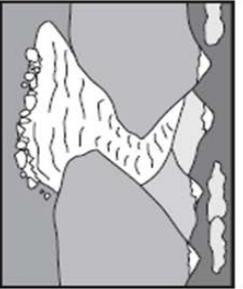
OCEAN

1		Clouds	
2		Clouds	
3		Ocean	
4		Ocean	
5		Ocean	
6		Ocean	



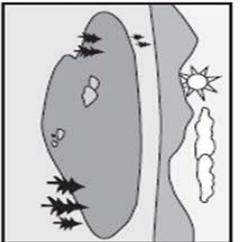
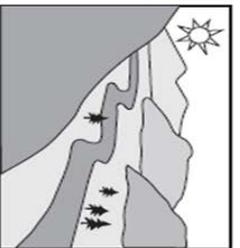
GROUND WATER

1		Rivers & Lakes	
2		Rivers & Lakes	
3		Ocean	
4		Plant	
5		Ground Water	
6		Ground Water	



Snow & Glaciers

1		Clouds	
2		Ocean	
3		Rivers & Lakes	
4		Ground Water	
5		Ground Water	
6		Snow & Glaciers	



RIVERS & LAKES

1		Ground Water	
2		Ground Water	
3		Ocean	
4		Clouds	
5		Rivers & Lakes	
6		Rivers & Lakes	

Water Cycle Game: Student Worksheet

Fill out the following table documenting the movement of your water droplet. For each round describe the process that moved your water droplet from one location to another (example: precipitation, runoff, infiltration, evaporation, root absorption, transpiration, or stays in place).

Round	Starting Location	Process Description	Ending Location
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

On the Figure below, place the round number in the corresponding box. Draw arrows between the boxes to show the movement of the water droplet over the 10 rounds.

