*Weather Activity Bag*

# Weather Tanks: Student Activity Guide

Water is constantly moving into and out of the air. We call this the water cycle. Using materials in your activity bag, you will set up and compare several water cycle simulations. Each part of the lesson explores a different aspect of the water cycle and its effect on weather.

These directions will get you started. Your teacher will be in contact to guide you and provide information.

## Materials From The Bag

- 2 Hinged Deli Containers
- 2 Graduated Medicine Cups, 1oz.
- 6 Small Plastic Cups, 1 oz.

## You Will Supply These Materials

- Water
- Pinch of Dirt
- Salt

## Part 1: Open vs Closed Systems

In this part, you will explore what happens to water in a closed system and an open system.

1. Open the two hinged deli containers.
2. Add 15 ml of water to the two graduated 1 oz. cups.
3. Place one of the cups containing 15 ml of water in each deli container.
4. **Seal the lid on one container** and leave the other open.
5. Place the containers near a window or take them outside to receive sunlight. Observe them closely for the first ten minutes, and a couple of times over the course of a day. Record your observations. **Clean and dry materials to re-use in other activities.**

*What's happening...*

In both containers, the water in the cup evaporated. Evaporation is when the liquid water becomes water vapor, an invisible gas. In the closed container, the evaporated water collected on the lid. The closed container is a model of the Earth's atmosphere, where water can continuously move, but not escape. *What do you think would happen to the Earth's water if we didn't have an atmosphere?*

6. Allow the open container with the cup of water to sit for several days. Predict what you think will happen to the water in the cup. Use a marker to mark the current level of the water in the small cup.

## Part 2: Temperature's Effect on The Water Cycle

In this part, you will explore temperature's effect on the water cycle. **You will need to fill four to five small plastic cups with water and freeze them to make ice for this activity.**

1. Open the two hinged deli containers.
2. Add 15 ml of water to the two graduated 1 oz. cups.
3. Place one of the cups containing 15 ml of water in each deli container.
4. Seal the lids on both containers. **Do not open until the activity is over!**

5. Place one cup with ice on the lid of one of the containers.
6. Place the containers near a window or take them outside to receive sunlight. Observe them closely for the first ten minutes, and a couple more times until the ice melts. Record your observations. *Compare the container with the ice cube to the other container. What do you notice?*

*What's happening...*

As you noticed in Part 1, energy from the sun caused the water to evaporate. When water vapor comes in contact with cool air some of the water vapor becomes liquid water. This process is called condensation. There are no large ice cubes in the sky, but there are pockets of very cold air. These cold air pockets cause water vapor to condense into clouds. As this process continues the clouds will produce rain.

7. Based on the information above, predict what you think will happen if you were to use 3-4 cups with ice.
8. Repeat steps 1-4 in **Part 2: Temperature's Effect on The Water Cycle**.
9. Place 3-4 cups with ice on the lid of one of the containers.
10. Place the containers near a window or take them outside to receive sunlight. Observe them closely for the first ten minutes, and a couple more times until the ice melts. Record your observations. *Compare your results to your prediction.*
    **Clean and dry materials to re-use in other activities.**

## Part 3: Effects of Surface Area on The Water Cycle

**You will need to fill up two small plastic cups with water and freeze them to make ice for this activity.**

1. Open the two hinged deli containers.
2. Add 15 ml of water to the two graduated 1 oz. cups.
3. Place one of the cups containing 15 ml of water in one container.
4. **Pour** the 15mL water out into the other deli container. Place cup aside.
5. Close the lids on both containers. **Do not open until the activity is over!**
6. Place a cup with ice on the lids of both containers.
7. Place the containers near a window or take them outside to receive sunlight. Observe them closely for the first ten minutes, and a couple more times until the ice melts. Record your observations. *Compare the containers to each other. What do you notice?*
    **Clean and dry materials to re-use in other activities.**

*What's happening...*

Only water that is in contact with the air can evaporate. In our model, surface area describes the area of water in contact with the air. For example, the surface area of a pool is less than the surface area of a lake. *From this information, explain your results from both containers.*

## Part 4: Dirty Water

In this part, you will explore what happens when there are things in the water. **You will need to fill two small plastic cups with water and freeze them to make ice for this activity.**

1. Open the two hinged deli containers.
2. Add a pinch of dirt to **ONE** of the graduated 1 oz. cups. Add 15 ml of water to the cup and stir.

3. Add 15 ml of water to another graduated 1 oz. cup.
4. Place a cup of water in each deli container. One will have clear water, the other dirty water.
5. Close the lids on both containers. **Do not open until the activity is over!**
6. Place one cup with ice on the lids of both containers.
7. Place the containers near a window or take them outside to receive sunlight. Observe them closely for the first ten minutes, and a couple more times until the ice melts. Record your observations. *Compare the container with clear water to the container with dirty water. What do you notice?*

### What's happening...

In both containers the water on the lid is clear. In the water cycle, only the water evaporates.

8. Based on the above information, predict what you think will happen if the dirty water cup sat out until all of the water evaporated. Use the cup of dirty water that you already made.
9. Allow all of the water to evaporate. *Compare your results to your prediction.*
10. Predict what you think will happen if you add salt to the water cup and allow it to sit out until all of the water is evaporated.
11. Add 15 ml of water to one graduated 1 oz. cups.
12. Add a teaspoon of salt to the graduated 1 oz. cups and stir.
13. Place the cup near a window or take it outside to receive sunlight. Allow all of the water to evaporate. *Compare your results to your prediction. How is this similar to the water evaporating in the ocean?*

### What's happening...

As the sun's energy evaporates water from the ocean the salt does not evaporate causing the ocean to have salty water.

**Clean and dry materials to re-use in other activities.**