# 430 - Water Cycle Model and Game

## Supports PA STEELS Standards

- 3.3.5.C Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact
- 3.3.6-8.H Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity
- 3.4.6-8.C Develop a model to describe how watersheds and wetlands function as systems, including the roles and functions they serve
- 3.3.9-12.K Plan and conduct an investigation of the properties of water and its effects on Earth's materials and surface processes
- 3.4.9-12.C Analyze and interpret how issues, trends, technologies, and policies impact watersheds and water resources.

## Summary and Timing

Make it rain in your classroom! This kit includes a 3D water cycle demonstration model and a class set of What-a-Cycle (NOAA water cycle activity) game materials. This kit is only available as a loan. Suggested timing - 30-45 minutes.

## Materials *Teacher Provided (view materials)

- What-a-cycle station cards
- What-a-cycle game cards
- What-a-cycle student datasheet (laminated version included in kit or make copies)
- Dice
- Water cycle model with metal arm
- Water cycle model instruction manual
- Lamp
- Hot plate
- Beakers (2 at 400-600mL)
- Blue food coloring
- Masking tape
- Oven mitt
- Ice*

## Safety

- The lamp may get hot, do not touch it.
- The hot plate activity is a teacher demonstration, be sure to wear goggles and keep students at a distance.

# 430 - Water Cycle Model and Game

## Suggested Background Resources

- NOAA JetStream The Hydrologic Cycle
- NASA Climate Kids What is the Water Cycle?

## Local Context

Observe the water cycle in your schoolyard. What happens to rainfall in your schoolyard? Compare and contrast your schoolyard under different conditions (dry, normal, wet).

## Procedure

1. Follow the Water Cycle Demonstration Model instructions to set up the water cycle model. Allow 30-45 minutes to observe the full water cycle, during this time, proceed to step 2.
2. Students play the What-a-Cycle game, periodically checking for changes in the water cycle model.
3. Select journaling/discussion questions relevant to your students and target content. Students can draw models or provide written responses to questions including

- Describe your journey as a drop of water.
- When did phase changes occur and why?
- Does human activity affect the water cycle? Explain.
- Compare the water cycle in different locations (urban vs. rural) or different ecosystems (desert vs. rainforest)?

## Credits and Document Version

Compiled and updated by V. Stone (July 2024)
For the PACE project. The National Oceanic and Atmospheric Administration provides funding through B-WET Grant Number NA22NMF4570323

# 430 - Water Cycle Model and Game

## Water Cycle Demonstration Model

Allow 30-45 minutes to observe the full water cycle. The students can help set up the demo model and then periodically check for changes in the model while working on another task such as the included What-a-Cycle game.

View a demonstration of the model: www.youtube.com/watch?v=eDvzFetg_4A

1. Rinse the inside of the model.
2. Put a small amount of water in the lake.
3. Assemble the model with the cloud end of the lid covering the mountain (Figure 1).
4. Use the metal bracket to prop up the mountain end so the model sits flat (Figure 1).
5. Place a bag of ice inside the cloud indentation. Cover the ice with a lid/bowl.
6. Place white paper under the model's ocean side to reflect the lamp's light.
7. Shine the desk lamp over the ocean end of the model.
8. You should see water droplets start to condense on the bottom of the cloud in the first 10 minutes.
9. Refer to the model instructions included with the lab kit for a full explanation and additional student prompts.
10. Please dry the model before packing up.

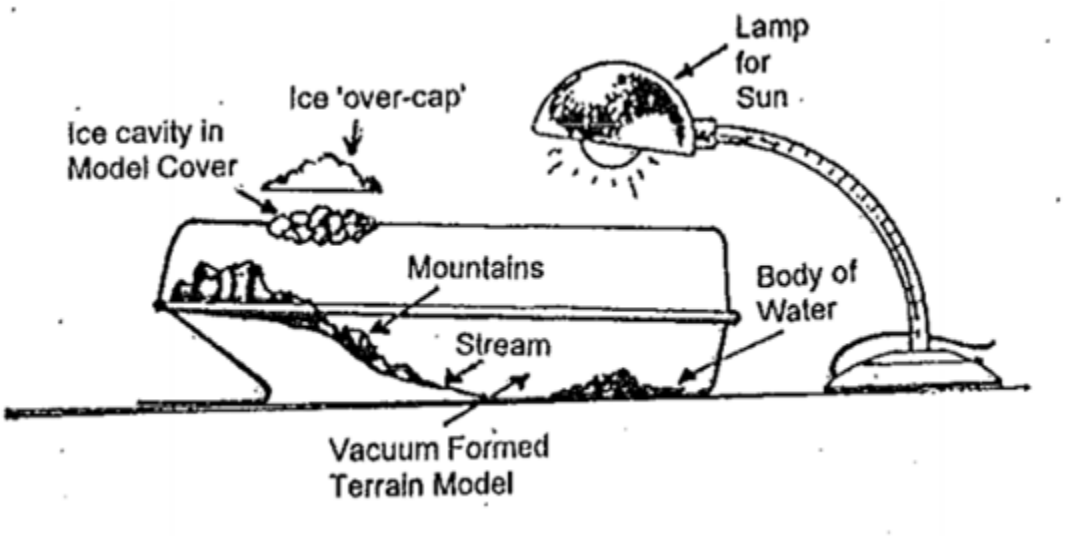


Figure 1. Water cycle model set up.

# 430 - Water Cycle Model and Game

## What-a-Cycle - water cycle dice game

This activity is modified from [NOAA's Learning Lesson What-a-Cycle]

1. Spread the 9 station cards around the room (aquifers, atmosphere, clouds, glaciers, ground, oceans, plants, rivers and lakes, and snow).
2. At each station, place the 6 game cards that match that station. You can either leave several dice at each station or have students carry dice with them.
3. Provide each student (or pairs) with a datasheet.
4. Start half of the students at the "oceans" station, and evenly distribute the remaining students at the other stations.
5. Instruct the students to circle their first station on the datasheet.
6. Students then roll the dice and follow the instructions on the back of the game card. For example, if a student at the "aquifer" station rolls a "1", they remain in the aquifer and roll again (Figure 2).
7. Students should record each move on their datasheet. If they stay in the same spot, they should record tally marks at that location on their datasheet. If they move to another station, they use an arrow to show where they moved. If you want to incorporate phase changes, develop a "phase change key" to use different line colors or styles to indicate if a phase change occurred as students move through the water cycle. Display the phase change key on the board for student reference (Table 1).

**Table 1. Sample phase change key for student datasheets.**

| Phase Change | Line Color or Line Style |
|---|---|
| Evaporation | |
| Condensation | |
| Freezing | |
| Melting | |

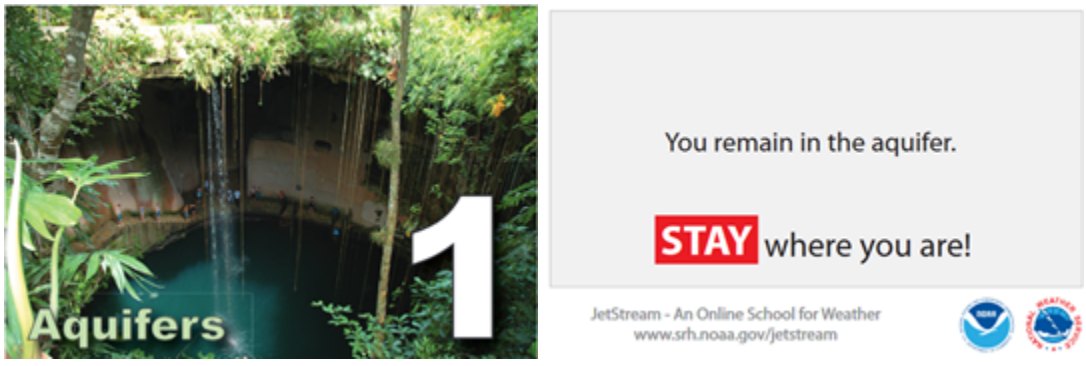


Figure 2. Water cycle game card front and back.

# 430 - Water Cycle Model and Game

What-a-Cycle Student Datasheet