

Water Cycle Model: Making Salt Water Fresh

Objective:

Identify changes in states of water and heat transfers that enable water to go through the water cycle. (This activity requires an incandescent lightbulb of 75 watts.)

Demonstrates:

- Evaporation
- Condensation
- Precipitation
- Run off
- Heat transfer
 - Radiation
 - Convection
 - Conduction

Materials:

- Desk lamp with a bendable neck
- Salt packet / stir stick
- Water (100 ml)
- Ziploc bag of ice
- Tooth picks – enough for students
- Large rectangular black plastic food container with clear lid (an ideal container can be found in grocery deli cases containing assorted prepared foods)
- Something to elevate one side of the container (book)

Activity:

1. Place 100 ml of water in a black plastic container with a clear cover.
2. Elevate the container so the water will be on the lowest side, to represent the ocean.
3. Pour one salt packet in the water and stir. Then place the lid on the container.
4. Turn on the lamp and direct the light towards the water. On the high side, away from the water, place the ice bag on top of the clear lid. This represents the cool air in the atmosphere. NOTE: LED bulbs will not get hot enough. Use a heat lamp or incandescent bulb.
5. The light represents solar **radiant** energy; the heating of the plastic and air inside the container and water represents **conduction** (molecules are bumping each other to transfer heat). The rising and cooling of the evaporated water vapor represents **convection** in the water cycle.
6. After the water has completed the cycle (water evaporated and condensed on inside lid under the external ice bag). Tap on the lid near the ice bag to demonstrate precipitation! Make sure students do not think the droplets inside the container are from melted ice (but are from condensation). The model demonstrates evaporation, condensation, precipitation and run off (infiltration is not possible with plastic container unless soil is added at the top of the model under ice). Be sure students understand the ice represents cooler temperatures at higher altitudes.

7. The basin water will be salty and the water condensed on the surface of the lid will taste fresh if the model was constructed properly. Make sure the students understand that the dissolved salt is left behind during evaporation.
8. Take off the lid. Have students dip one end of their toothpick into the saltwater and taste it. Then, take the other end of the toothpick and have students dip it into the condensation drops inside the top cover to taste fresh water.

