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## ACTIVITY: WATER MOLECULE

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This activity is intended for 2<sup>nd</sup>-3<sup>rd</sup> grade but can be easily adjusted to your children's grade level and abilities. In fact, we encourage it! Have fun!

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### INTRODUCTION:

Comprehension of the critical role played by water in support of all life on Earth is an essential foundational element of the Inland Empire Resource Conservation District's (IERCD's) Water Conservation program. This activity is being provided to increase awareness of water uses and benefits.

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### BACKGROUND:

Water is fundamental to life on Earth. Although, the Earth's surface has more than 70 percent water, only about 3 percent is fresh water and less than 1 percent is available for consumption. Therefore, freshwater is a scarce and valuable resource. Humans use it for almost everything – agriculture, power generation, and personal needs. In the United States, we often take it for granted that we can turn on the faucet and have easy access to safe, clean water. However, many people in the world are not so lucky. Conserving our freshwater resources and monitoring our freshwater distribution are becoming very important issues.

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### SUMMARY:

This activity brings water molecules up to size (human size!) by physically involving family members in simulating molecular movement in each of water's physical states (solid, liquid, gas).

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### MATERIALS:

- Samples of water in each state of matter (Photos of a glass of water, ice, and boiling water or water evaporating on a sunny window ledge) (optional)
- 2 flashlights (one covered with red filter or transparency and one with a blue filter or transparency)

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### DIRECTIONS:

1. Start by telling the family that they are going to become water molecules. They will begin as water in its solid form, ice. As ice, family members stand in place and move very little. (You may want to incorporate hand signals as an additional visual cue for family members during changes in state. Ex: a fist for solid, open hand wave motion for liquid, and wiggling fingers for vapor.)
2. Inform the family that for this activity, a flashlight with a red filter will be used to represent the addition of heat energy. Shinning the light on a family member represents heat energy traveling from an outside source (for instance the sun) to the water molecule (family member), resulting in increased temperature and molecule motion (kinetic energy).

3. Beam the red light on a few family members. They should begin to move slowly in place, gently bumping into each other. Through a chain reaction all family members should begin moving.
4. Tell the entire group that they are now liquid. As liquid molecules, family members should stay close together.
5. Add more heat, the liquid turns into gas. In its gaseous state, water molecules move freely. Family members should step away from each other and roam randomly around the room. (Music may enhance the flow of "molecules" around the room)
6. Then use the flashlight with the blue filter. Shine the blue flashlight on individual family members then to the entire group. Droplets of water will begin to form around the room as molecules lose energy and move together. After all family members become liquid, continue to shine the blue light (representing a complete loss of energy) on students until they become ice.

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### EXTENSION:

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#### Root Beer Float Activity

***Attention: Please consider your child's allergies or medical needs, prior to conducting this activity! Make substitutions if needed!***

**Materials:** Pre frozen individual ice cream scoops, bowl, serving spoon, root beer, and cups.

**Directions:** Write children's answers down during activity.

1. Have children discuss the answer to the question, "What do root beer floats and the 3 states of water have in common?"
2. Place pre frozen ice cream scoops in a bowl and pass them out along with a cup half filled with root beer.
3. Have children answer the following questions: "What is the solid?" and "What is the liquid?" as they add the ice cream to the root beer
4. Notice the gas rise when the ice cream is added to the soda.
5. Discuss the three states of matter and make the connection to the Water Molecule activity and the three states of water.