

Steamy Molecules



Suggested Grade Level

3rd grade

Concept:

Steam/Water Molecules

Materials

- Train set
- Worksheet
- White boards and markers
- Cup of ice and water
- Boiling materials
- 2 flashlights (one blue and one red)

MIGS

- **Science**

The student will investigate the properties of force, matter, and motion

- **Integration of the Arts**

Movement

Measurable Objectives

- Students will model the effects of heat energy on the state of water

Anticipatory Set

- Set up train and ask students what they know about trains and if they know what kind of train this is.
- When the train set steams up, ask students what makes the train steam?
- Ask questions like:
 1. Where does steam come from?
 2. Is steam a solid, liquid, or gas?
 3. Where else do we see steam? (iron, cooking...)
 4. Tell the students we are going to model the effects heat has on water.
 5. Heat up the ice and water by boiling it and allowing the students to observe the process.



Instructional Input

Prior Knowledge: Properties of matter

Procedure

1. Explain that water is made up of molecules which are always moving.
2. Each water molecule contains two hydrogen atoms and one oxygen atom.
3. Heat energy contributes to the motion of molecules.
4. When water is cold, like ice, the molecules are moving very slowly and stay close together.
5. Have students stand up and move slowly and close together with peers.
6. When water is warm, like a puddle, the molecules are moving faster and spread further apart.
7. Have students move at a normal pace and spread further apart from each other.
8. When water is hot, like steam from boiling water, the molecules are moving quickly and bounce off of each other.
9. Have students move quickly, bouncing off each other and objects in the room.
10. Tell class they are going to become water molecules again and they will begin as water in its solid form of ice.
11. The red flashlight will represent the addition of heat energy.
12. Shine the light on the students and ask them to act out what the molecules would do.
13. Explain they are now a liquid and add more “heat” by continuing to shine the light on them turning them into gas.
14. Next explain that the blue flashlight represents the subtraction of heat and shine it on the students causing them to move closer to each other.

Modeling

Draw what molecules would look like on the board.

Check for Understanding

Watch how students do as a class in modeling molecules in motion and participation in class discussion.

Guided Practice

Student’s participation of acting out water molecules

Independent Practice

Have student's complete worksheet



Closure

Tell students that the more steam a train has, the faster it makes the train go. Can you show me how the molecules of a steam engine move?

Evaluation

- Observe students while participating. Listen to their interactions with partners and in groups.
- Completion of worksheet
- Students correctly model molecules in motion with the correct form of water

Annotated Bibliography: Steam

Branley, F. (1986). *Down Comes the Rain*. New York: Harper Collins Publishers.

This is a picture book about rain, snow, hail, evaporation, and condensation. It has pictures that illustrate what is going on as well as pictures of examples, such as steam from boiling water. It goes through the entire water cycle.

Activity: Have students act the story out by making their own script.

Kalman, B. (2006). *The Water Cycle*. New York: Crabtree Publishing Company.

This is an informational book about water and the water cycle. The book is separated into different categories and has wonderful pictures along with short text explaining the concept.

Activity: Have students write a story as if they were a drop-let of water and include the water cycle.

Lesson plan compiled by Shayla Bernelis, an Earth Team Volunteer and Early Childhood Education student at Missouri State University, Springfield, MO.

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Write the properties of water next to the pictures.













