

Molecule Movement Activity: Grade 4-6 Science and Art

Overview of Lesson: This activity is designed as an additional exercise to be done after the students have learned about the different characteristics of molecules (solids, liquids, gases). Part 1 of this activity allows the students to explore PHET's States of Matter website. Part 2 allows the students to embody the molecules in a fun, on your feet, interactive exercise.

Big Idea(s): What will the students UNDERSTAND

Science: The effects of temperature on different molecules

Art: Dance, drama, music, and visual arts are unique languages for creating and communicating.

Duration: 1 hour

Learning Objectives/I Can Statements

- I can move like different molecules.
- I can identify the different characteristics of solid, liquid, and gas molecules and the changes that occur when they are heated or cooled.

Curricular Competencies: What will students DO	Content: What will students KNOW
<ul style="list-style-type: none">• Students will observe objects (molecules) in familiar contexts.• Students will transfer and apply learning to new situations.• Students will represent and communicate ideas and findings in various ways, such as movement.	<ul style="list-style-type: none">• Students will know the different phases of matter.• Students will know how molecules are affected by temperature.

Materials and Technology	Pre-Class Preparation
<ul style="list-style-type: none">• Print a copy of the movement table (included below) so you know how the students should be moving.• Laptops	<ul style="list-style-type: none">• Create a space for the students to move in. Consider moving all desks to make a space in the middle of the classroom.

Resources
<i>States of Matter: Basics</i> https://phet.colorado.edu/sims/html/states-of-matter-basics/latest/states-of-matter-basics_en.html

Lesson Plan
Part 1
<ul style="list-style-type: none"> ● Ask the students what the states of matter are and what their characteristics are ● Open the website https://phet.colorado.edu/sims/html/states-of-matter-basics/latest/states-of-matter-basics_en.html. ● Click on the States option. ● Above the thermometer, change the temperature to Celsius instead of Kelvin. ● Under Atoms and Molecules, select water. ● From here, students can toggle between solid, liquid, and gas. They can use the lever below the container to heat or cool the molecules.
Part 2
<ul style="list-style-type: none"> ● Review the table with your students before beginning so they know how to move. ● Identify where the "container" is that they can move in. This could be the entire classroom or just a small square between some desks. This is decided by the teacher. ● Have your students stand up. ● Begin announcing different molecules along with their temperatures and have your students move accordingly.

	Normal	Heated	Cooled
Solid	Students are very close together, they can be touching. They have organized themselves into a square-like formation. All of them are vibrating in place (this might look like them moving their shoulders up and down or side to side)	Students are still close together although they will begin “expanding” (move apart a little bit). All of them are still vibrating but much faster. If you “turn it up” to full heat, they will have to move as fast as they can.	Students are getting even closer together. All of them are vibrating, but much slower.
Liquid	Students are quite close together and are moving throughout the container. Students have no specific direction; instead, they move in random directions. <i>*Movements can just be walking.</i>	Students move faster when heat is added.	Students move slower when they are cooled.
Gas	Students move rapidly in all directions. They might come close to each other when passing one another, but they don’t stay close together.	Students move faster when heat is added.	Students move slower when they are cooled.