



<b>Description</b> This activity is meant to extend your students' knowledge of the topics covered in the Make it Matter lab at The Tech. Through this activity, your students will use their own bodies to experience and demonstrate how molecules are arranged and move within the three states of matter: solid, liquid and gas.		
<b>Grade Level</b> 2	<b>Student Outcomes</b> Students will: <ul style="list-style-type: none"> <li>Demonstrate the molecular patterns of arrangement and movement for the three states of matter: solid, liquid, and gas.</li> </ul>	<b>NGSS connections</b> <ul style="list-style-type: none"> <li>Disciplinary Core Idea PS1.A</li> </ul>
<b>Duration</b> 20-30 minutes		

<b>Materials</b> <ul style="list-style-type: none"> <li>Large outdoor space like a basketball court</li> </ul>
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<b>Vocabulary</b> <i>Familiarity with these terms and concepts will enhance students' experience in the activity.</i> <ul style="list-style-type: none"> <li><b>Solid:</b> A state of matter that has its own defined shape, weight and volume. Examples: wood, metal, and plastic.</li> <li><b>Liquid:</b> A state of matter that does not have its own shape but takes the shape of the container it is in. It has its own defined weight and volume. Examples: water, milk, and juice.</li> <li><b>Gas:</b> A state of matter that does not have its own defined shape, mass, or volume. Examples: air, helium, and oxygen.</li> <li><b>Molecule:</b> Small particles that make up matter.</li> </ul>
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## Introduction

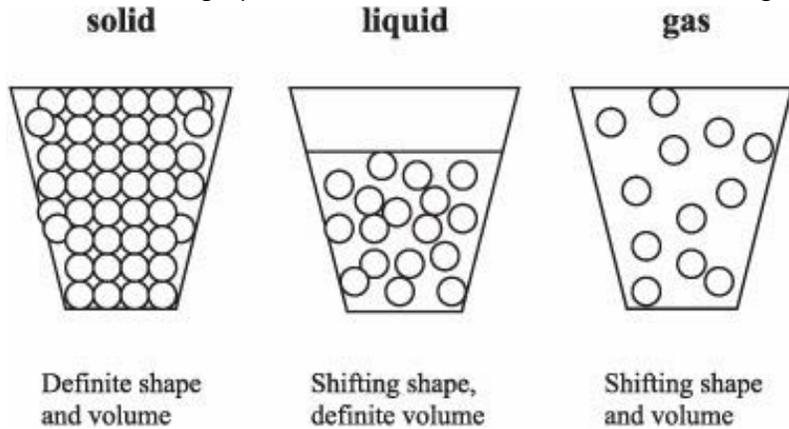
By now, your students are familiar with three phases of matter: solids, liquids, and gases. But what gives matter these properties? Matter is classified as a solid, liquid or gas based on its molecular structure or the way the molecules are arranged and move. Students will demonstrate how the molecules move in these three phases by playing the role of the molecules!

## Teaching Points

- Review the phases of matter with students and have them provide examples of each. Students should be able to describe some basic properties of each phase:
  - Solid: Something hard, doesn't change shape on its own.
  - Liquid: Something that flows and takes the shape of the container it is in.
  - Gas: Something that we might not be able to see and does not take the shape of the container that it is in.
- Molecules, or the tiny particles that make up matter, are arranged and move in certain ways. It is the arrangement and movement of molecules that determine an object's phase of matter.



- a. In solids, the molecules are neatly and tightly arranged so that they can't move easily.
  - b. In liquids, the molecules are more loosely arranged and can flow and move past each other.
  - c. In gases, the molecules are very loose and move very fast past each other.
3. You can use this graphic to show how the molecules are arranged in each phase



\*image from <http://kidsscience.blogspot.com/2013/12/as-matter-of-fact.html>

## Procedure

1. Gather your students outside on a large flat surface like the basketball court.
2. All students from this point forward are going to be the "molecules." To demonstrate each phase, arrange the students in the following configurations:
3. Solid: If you have a four square court, this would be a perfect space to have kids arrange. Arrange students in straight rows and columns to form a solid square or fill the court square. Students should be very close together and not be able to move around easily!
4. Liquid: Group students into groups of three or four and have them link arms. Now have them move around the four square court or basketball court, flowing past each other! Molecule teams should not leave the designated court space — liquids don't move out of their container on their own!
5. Gas: Move to the basketball court for more space. Each student is their own gas molecule now, free to move about however they decide! They can even escape the court since gas molecules move about so freely.
6. To add an extra game element to this exercise, you can call out different phases or different objects and have them act out the particular phase of matter of the object!