

Chemistry All Around Us - Week 5

Day 2: Exploring Liquids

Teacher/Parent Background:

In science, the "stuff" that everything is made of is called matter. You can use your senses to detect matter. You can feel the shape and roughness of a rock. You can taste the juice of an orange. You can smell popcorn. You can see a crowd at a ball game. The characteristics of matter that we can observe with our senses are called properties. No two substances have exactly the same set of properties. The properties of matter can help us categorize (sort/group) matter.

Overview:

In this activity, young learners will use their senses of touch and sight to explore the various observable properties (characteristics) of different types of matter. They will then use their observations to make decisions about how to define a specific category of matter - liquids.

Related Standards:

- **Analyze and interpret data** to explain that matter of any type can be subdivided into particles too small to see and, in a closed system, if properties change or chemical reactions occur, the amount of matter stays the same.

Key Terms:

- matter - the "stuff" that everything is made of
- properties - characteristics of a substance
- senses - touch, taste, hear, smell, see
- solid - a state of matter in which the substance has a definite shape and a definite volume
- volume - the amount of space that an object or substance takes up
- liquid - a state of matter in which the substance has a definite volume but not a definite shape. It takes the shape of its container.

Materials List:

- A variety of different types of matter from Day 1:
 - Solids - crayons, books, pencils, pebbles, toys, balls, etc.
 - Liquids - water, shampoo, hand soap, milk, etc.

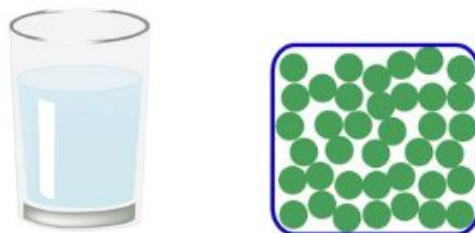
- Gases - filled balloon or sandwich bag, football, basketball, etc.

Activity Description:

1. Revisit the types of matter that the student sorted during Day 1.
 - Yesterday, you sorted these different types of matter into groups or categories. How did you decide which types of matter to group together?
 - We discussed that matter which has a definite shape and volume is called a solid. Which types of matter in your sort are solids?
 - We also discovered that some types of matter are not solid. Which objects are not solid?
2. Remind the student that one of the other categories that scientists use to describe matter is liquids. Prompt the student to begin exploring his/her remaining objects and categories to determine which ones might include liquids.
 - Note: Do not define the term "liquid" at this time. Allow the student to formulate his/her own ideas. Also, the student should not re-sort any items at this time.
3. Once the student has identified which matter he/she thinks are liquids, discuss his/her reasoning:
 - Why do you think these objects are liquids?
 - How are they different from solids?
 - How are they the same as solids?
 - If we drew the tiny particles that make up liquids, what would they look like? Would they be spaced the same way particles in solids are spaced? Why or why not?

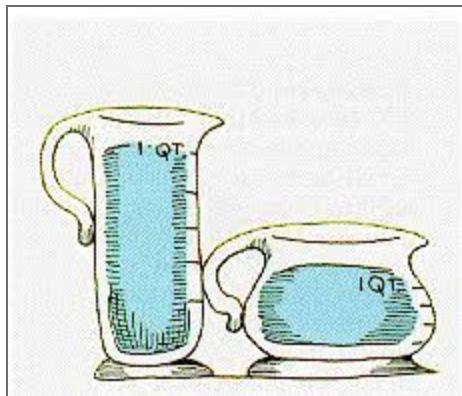
Closure:

Explain that matter that is sorted in the liquid category has a definite volume but takes the shape of its container. The particles in liquids are not as close together as the particles in solids. A liquid's particles move more freely than the particles in a solid. A liquid's particles can flow around one another. The ability to flow is a physical property of all liquids.



LIQUID

Liquids have a definite volume, but they do not have a definite shape. A liquid takes the shape of its container. For example, suppose you pour 1 quart of water into a tall pitcher and 1 quart of water into a short pitcher. Both pitchers contain the same volume of water but the shapes of the spaces filled by the water are different.



Discuss with the student:

- If a liquid does not have a definite shape but takes the shape of the container it is in, which category in your sort contains liquids? Why do you think so?
- Are their types of matter in other categories that might also be liquids? Why or why not?
- Would you like to change how you sorted any objects? Why or why not?
 - Prompt student to make any changes in his/her sort at this time.

Extension:

Provide the student with types of matter that are considered liquids but have different densities such as water, oil, milk, syrup, hand soap and honey. Prompt the student to explore pouring each type of liquid into various containers and observing how, despite the different flow rates, each type of matter eventually takes the shape of the container in which it is poured. This is a good reminder that matter which is in the same category, such as liquid, does not have to have completely identical, observable properties. Liquids can have different densities, colors, etc.

The student can also explore solids which flow or can be poured like liquids (i.e., sand or rice). What properties of these types of matter make them solids and not liquids? How would the student explain to someone else why rice, despite its ability to be poured and appearance of taking the shape of its container, not be considered a liquid?