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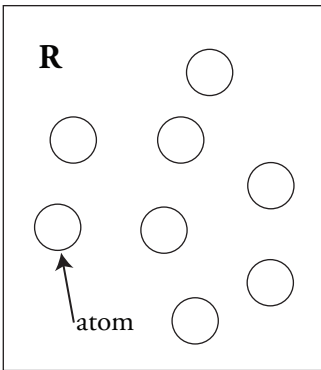
Classification of Matter

How do atoms combine to make different types of matter?

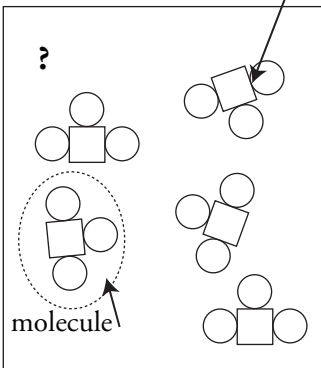
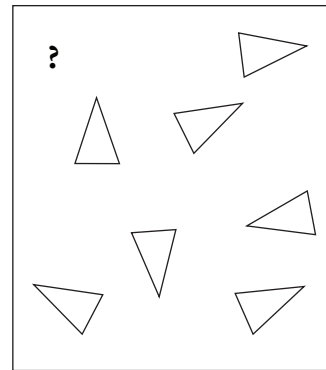
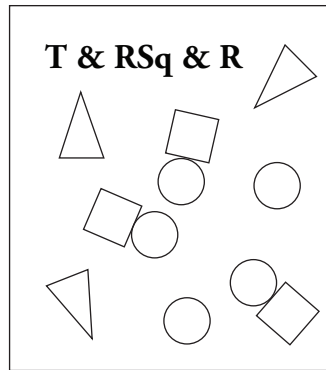
Why?

Look at the things in this room. They are all matter. That matter may be pure or it may be a mixture. Can you tell by looking at it? What if you looked at it under a microscope? Then could you tell? Something that looks pure may not really be pure. It depends on what type of particles an object or substance is made of. In this activity we will explore how the smallest chemical units of matter determine whether something is classified as an element, a compound, or a mixture.

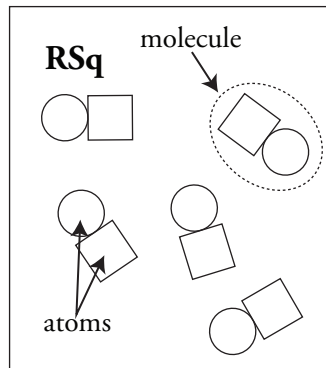
Model 1 — Atoms, Particles, and Molecules



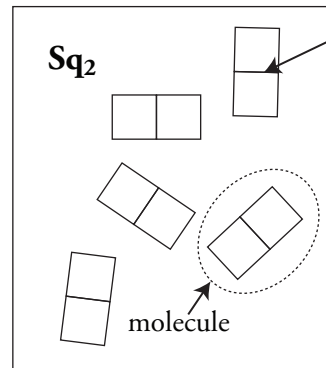
8 particles



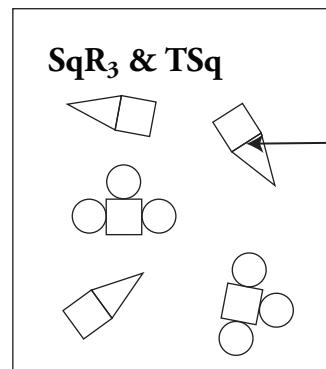
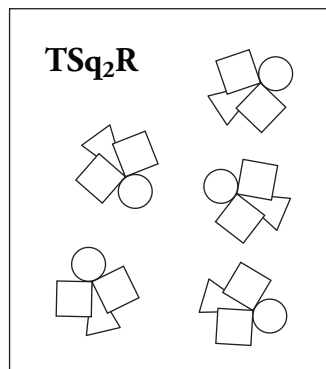
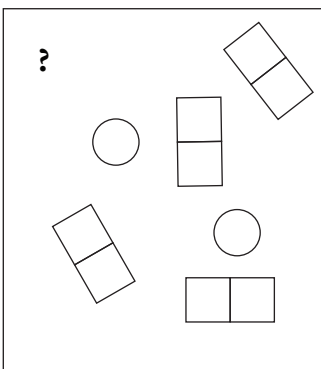
chemical bond



5 particles




chemical bond



chemical bond

5 particles

1. Locate the circled molecule of **RSq** in Model 1.
 - a. Find a second **RSq** molecule and circle it.
 - b. How many atoms are in a molecule of **RSq**?
2. Find and circle a molecule of **TSq₂R** in Model 1.
 - a. How many different types of atoms are found in a molecule of **TSq₂R**?
 - b. How many Sq atoms are in a molecule of **TSq₂R**?
3. Locate the drawing labeled **SqR₃ & TSq** in Model 1.
 - a. How many different types of atoms are found in the sample of **SqR₃ & TSq**?
 - b. How many different types of molecules are found in the sample of **SqR₃ & TSq**?
4. When two atoms are touching in the drawings of Model 1, what is holding the atoms together?
5. As a group, discuss the following questions and record your answers:
 - a. Can a *particle* be a single atom?
 - b. Can a *particle* be a molecule?
 - c. How many particles are in the drawing representing **T & RSq & R** in Model 1?
 - d. What is your group's definition of the word "particle" as it is used in chemistry?
-  6. Compare the codes listed at the top of each drawing in Model 1 with the shapes in that box.
 - a. What do the letters **R**, **Sq**, and **T** in the codes represent?
 - b. What do the small numbers (subscripts) in the codes represent?
 - c. When atoms are touching, how is that communicated in the code?
 - d. What is the common characteristic of the samples in which an ampersand (&) is used?
 - e. In Model 1 there are three drawings that are labeled with a question mark. Write codes to properly label these drawings.

Read This!

Matter is classified as a **pure substance** when all of the particles are identical. Matter is classified as a **mixture** if there are different types of particles present.



8. Identify which drawings from model 1 are pure substances and which are mixtures. List the codes for the drawings in the appropriate places below.

Pure Substances

_____	_____
_____	_____
_____	_____

Mixtures

9. How are the codes (chemical formulas) for pure substances different from those for mixtures?

Read This!

Elements are defined as pure substances made from only one type of atom. **Compounds** are defined as pure substances made from two or more types of atoms.



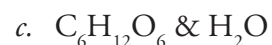
11. Identify which pure substances from question 8 are elements and which are compounds. List the codes for the drawings in the appropriate places below.

Elements

Compounds

How are the codes (chemical formulas) for elements different from those for compounds?

12. Use what you have just learned about chemical formulas to identify each of the following as an element, a compound or a mixture. *Hint: Elements start with uppercase letters which can be followed by a single lowercase letter.*



14. Explain the difference between:

a. An atom and an element.

b. A molecule and a compound.

