Animation Activity: Classifying Matter

FOR THE TEACHER

Summary
In this animation, students will become familiar with definitions and examples of several broad classifications of matter, including pure substances (elements and compounds) and mixtures (homogeneous and heterogeneous). Students will be given real-life examples as well as particle diagrams.

Grade Level
High and Middle School

NGSS Alignment
This activity will help prepare your students to meet the performance expectations in the following standards:

- **MS-PS1-1**: Develop models to describe atomic composition of simple molecules and extended structures.
- **Scientific and Engineering Practices**: Developing and Using Models

Objectives
By the end of this lesson, students should be able to

- Define the following terms: matter, pure substance, element, compound, mixture, homogeneous mixture, heterogeneous mixture
- Differentiate between particle diagrams of elements, compounds, homogeneous mixtures, and heterogeneous mixtures

Chemistry Topics
This lesson supports students’ understanding of

- Matter
- Elements and compounds
- Mixtures

Time
**Teacher Preparation**: minimal
**Lesson**: 10-30 minutes

Materials
- Computer and projector with internet access
- [https://teachchemistry.org/classroom-resources/classifying-matter-animation](https://teachchemistry.org/classroom-resources/classifying-matter-animation)

Safety
- No specific safety precautions need to be observed for this activity.

Teacher Notes
- This animation can be used to introduce some of the different ways matter can be categorized.
- All of the animations that make-up the [AACT Animation collection](https://teachchemistry.org/classroom-resources/classifying-matter-animation) are designed for teachers to incorporate into their classroom lessons. Intentionally, these animations do not have any sound, so that a teacher can speak while the animation is playing, and stop the animation as needed to instruct.
We suggest that a teacher pause this animation at several points, including the “Challenge Your Knowledge” questions to give students the opportunity to make notes, ask questions, and test their understanding of the concepts presented. It might be helpful to provide students with the blank concept map student document (or encourage them to make their own) and have them fill out the map as the animation progresses. You could add some of the information to the blank concept map before handing it to students as a way to scaffold the information.

The sugar molecules in the sugar water example are simplified to make the particle diagram less cluttered, with the full molecule shown off to the side to remind students of the actual structure.

Oil is represented in this animation as oleic acid molecules, as it is the most abundant fatty acid in several common oils. Most common oils are in fact mixtures of different kinds of fatty acids and other molecules, and they are actually present in the form of a triglyceride (three acid molecules attached to a glycerol unit) rather than single acid molecules. Like the sugar water example, we have chosen to simplify it and show just single oleic acid molecules to avoid over complicating the concept of mixtures we are presenting in this animation.

The proportions for the particle diagrams of the mixtures (particularly air and steel) are an approximation and are not perfect representations of the compositions of those mixtures. You could use this as a discussion point with your students.

You could expand on this lesson with a more in-depth discussion of further classifications of matter, particularly subcategories of mixtures including solutions (and solutes/solvents), alloys, suspensions, colloids, and emulsions. Another way to build on this topic is to examine various ways of separating mixtures.

Here are several of the classroom resources from the AACT Library that may be used to further teach this and related topic(s):
  - Elements, Compounds, & Mixtures – Oh My!
  - Analyzing Mixtures
  - Separation of a Mixture
  - What Does Ironman Eat for Breakfast?
  - What Type of Mixture is Paint?
  - Making Sense of Milk