Grade 8

Big Idea/ Topic (Science)

Mixtures: Homogenous and Heterogenous

Reading/ Writing Skills

Reading Skill: Explain the relationships between ideas
Writing Skill: Writing arguments

Standard Alignment

Science Standard:

S8P1. Obtain, evaluate, and communicate information about the structure and properties of matter.
a. Develop and use a model to compare and contrast pure substances (elements and compounds) and mixtures. (Clarification statement: Include heterogeneous and homogeneous mixtures. Types of bonds and compounds will be addressed in high school physical science.)

ELA Standards:

ELAGSE8RI3: Analyze how a text makes connections among and distinctions between individuals, ideas, or events (e.g., through comparisons, analogies, or categories).

ELAGSE8RI1: Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.

ELAGSE8W1: Write arguments to support claims with clear reasons and relevant evidence.

ELAGSE8W9: Draw evidence from literary or informational texts to support analysis, reflection, and research.

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Pre-Reading: Object Sort

(**Pre-Reading Statement**) Students will be prepared to read when they have sorted the given objects.

Activity 1: Sort the Objects

Before class, prepare 8 containers for each group. Four containers should hold a heterogenous mixture. Four containers should have a homogenous mixture. Label the “ingredients” in each container so that students will see that objects such as steel and air contain multiple ingredients. Some examples of heterogeneous mixtures you could use are trail mix, building blocks, a variety of beads, any mix of objects of different sizes and shapes, and Italian salad dressing. Some examples of homogeneous mixtures to use are; powdered fruit drink mixed with water, tea, steel or copper, and an empty sealed container (air). Put students into groups of four. The students should look at each container and decide on some way to divide the containers into two groups. Students should not be given hints about how to group the objects. They will use the object sort worksheet to record their observations and answer the questions.

Reading: Mixtures

(Introduce the Reading) Tell students that they are going to read an article that may help them sort their containers another way.

Reading Skill: Explain the relationships between ideas

As the students read the article, they will have an accompanying graphic organizer that will be used to jot down characteristics of the new words: mixture, homogenous, and heterogeneous. organizer that will be used to jot down characteristics of the new words mixture, homogenous, and heterogeneous.

Post-Reading: Mixture Sort

Writing Skill: Writing arguments to support claims with clear reasons and relevant evidence.

Activity 1: Mixtures Sort

After reading the article, students will use the mixtures sort worksheet to create a list of at least three characteristics each type of mixture should have. They will look back at how they grouped their objects. This time, they should group them into homogenous and heterogenous mixtures, based on the characteristics they listed on their mixtures sort worksheet.

Activity 2: Classify the object

Students will be given a bottle of lotion or shampoo. They must decide if it is a homogenous or heterogenous mixture. They will use their list from Activity 1 and cite evidence from the article to write a paragraph explaining their opinion.

Help students formulate their arguments by reviewing each part. Remind students that for this argument, they will have one of two claims: The lotion is a heterogenous mixture OR The lotion is a homogenous mixture. For evidence, they will want to make and describe relevant observations of the lotion. Their reasoning will come from their Mixtures Sort lists and the article.

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Print Ready Student Sheets

Making Text Connections:

As you read, use the boxes to write down the characteristics and examples of the types of mixtures.

Mixtures

Definition and Characteristics

Homogenous Mixtures

Definition/Characteristics

Examples

Heterogenous Mixtures

Definition/Characteristics

Examples

Container Sort

Group 1	Group 2

Give each group a name or title.

Group 1: _____

Group 2: _____

How did you decide how to group the containers? What characteristics did you use?

Mixtures Sort

I. List of characteristics

Use the article to create a list of characteristics of each type of mixture**.**

Homogenous Mixtures	Heterogenous Mixtures

II. Object Sort

Look back at the objects from the opening activity and using your checklist, put them in the correct group.

Homogenous Mixtures	Heterogenous Mixtures

III. Classify the object

Take a close look at the bottle of lotion. Would you classify it as a homogenous mixture or a heterogeneous mixture? Use your checklist and the article to answer this question. Make sure you cite your evidence.

Claim: State whether the lotion/shampoo is a homogeneous or heterogeneous mixture.

Evidence: State what characteristics you observe that lead you to make your claim.

Reasoning: Use information from the text and your graphic organizer to explain the difference between homogenous and heterogenous mixtures.

Print Ready Article

Mixtures

Look around your classroom. What are some of the things you see? People, desks, writing utensils? What did you eat and drink for breakfast this morning? Cereal with milk? Orange juice? Pancakes? Without even thinking about it, you are breathing in air right now. If you rode in a car or school bus this morning, it had to have gasoline to make it run properly. What do all of these things have in common? They are all mixtures!

Mixtures

When more than one substance is blended, and no chemical change occurs, you have a mixture. What does this mean? You can put these substances together and they will keep their individual characteristics. For example, when you mix the cereal with the milk, the milk will continue to be milk and the cereal will continue to be cereal. They may begin to look different eventually, but they do not turn into new substances.

One key characteristic of mixtures is that the parts can be separated again. For example, if you have a mixture of blue beads and red beads, you could pick out all of the red beads and all of the blue beads to separate them.

Types of mixtures

There are two main types of mixtures, homogeneous mixtures and heterogeneous mixtures. The type of mixture depends on the composition of the components, how the components blend, and the particle size of the components. Some mixtures can be further broken down into additional types.

Homogenous mixtures

In a homogenous mixture, the composition is the same throughout the mixture which is partly due to the small particle size of the components in the mixture. This means that the components of the mixture have been evenly distributed. The word makes sense because the word part “homo-” means “same.” Homogenous mixtures are mixed or blended so well that you cannot see the individual substances that have been put together. Some examples of homogeneous mixtures are lemonade (without pulp), salt water, and maple syrup. When a homogenous mixture is a liquid, it can also be called a “solution.”

As you see in figure 1 homogenous mixtures can also be gasses and solids. Air is a homogenous mixture that contains a variety oxygen, nitrogen, and other gasses. Homogenous mixtures of metals are called “alloys.” Steel is an alloy of carbon and iron, while brass is an alloy of copper and zinc.

Figure 1

It may seem impossible to separate some of these homogenous mixtures. Take salt water, for example. If you boil salt water, the water will evaporate, and the salt will be left behind as you can see in figure 2. Even steel and brass can be separated, if the metals are heated enough.

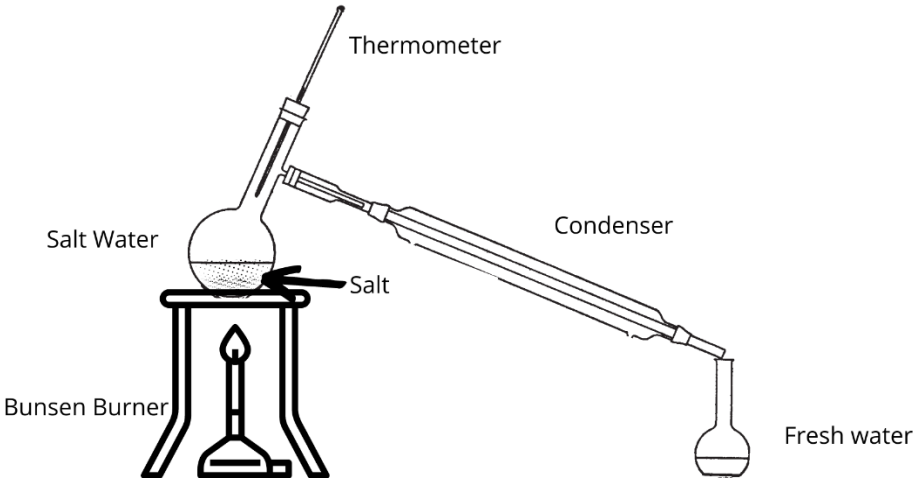

Figure 2

Heterogenous mixtures

Unlike a homogenous mixture, the composition of a heterogeneous mixture is not the same throughout the mixture which is due to the medium and large particle size of the components of the mixture. Again, this word make sense because the word part “hetero-” means “different.” The components of the heterogeneous mixture remain separate, and each component is easily visible.

Some examples of heterogeneous mixtures are pizza, trail mix, gravel, smog, and Italian salad dressing as seen in figure 3.

Figure 3

Heterogenous mixtures can sometimes be separated by picking them apart, as with plastic beads. They also may be separated using a sieve. You may have done this as a child in a sandbox, separating toys or pebbles from the sand by sifting them through a container with small holes, as shown in figure 4.

Figure 4

Mixtures in your classroom

Now look back around your classroom. At first glance, you may not think there are mixtures present. However, the mixture of students in the classroom is a heterogeneous mixture. The air you are breathing is a homogeneous mixture. Take a moment to consider the mixtures all around you.