

LESSON PLAN

Subject: 8th Grade Science

Lesson: The Life Cycle of Clay

Standards Addressed: Understand the properties of matter and the changes that occur when matter interacts. Classify matter as elements, compounds, or mixtures based on how the atoms are packed together in arrangements. (8.P.1.1)

Objectives:

- Understand that mixtures are physical combinations of two or more different substances that retain their own individual properties and are combined physically.
- Show that mixtures can be separated by physical means (filtration, sifting, or evaporation).
- Identify mixtures as heterogeneous or homogeneous
- Review how transfer of heat affects the movement of atoms and produces change in states of matter.

Materials Needed:

- Device for showing video
- “The Life Cycle of Clay” Activity sheet

Outline:

- Prior to the lesson, students should understand:
 - The difference between an element, a compound, and a mixture
 - The definitions of homogeneous and heterogeneous
 - How heat affects the movement of atoms and produces change in states of matter
- Before the video, have students look over page 1 of the activity and review some of what you have learned about mixtures.
- Watch the video with students. Students may fill out page 1 of the activity while watching the video.
- After the video, students may complete the activity sheets individually or in a group.

Take It Further: One of the most common minerals in different types of clay is called kaolinite. It is a type of clay that is often used in medications for upset stomach, sometimes in powder makeup, or even to thicken milkshakes! Students will research the structure of kaolinite to find out what elements are combined to create the mineral. Then they must determine if kaolinite is an element, a compound, or a mixture.

Cross Curriculum Connection: In a pottery kiln, the silica in a porcelain clay reaches its melting point at around 2284°F. This is what fuses the various particles of the clay mixture together and allows it to harden into one solid piece of pottery. Have students act out the movement of silica molecules at room temperature when the silica is a solid, and at melting point when the silica becomes liquid.





The Life Cycle of Clay

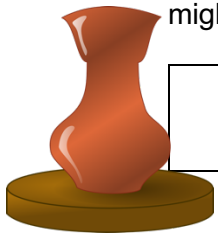
Grade 8 Science

Student Name: _____

Date: _____

What is Clay?

In the video, we saw how the potter begins the clay-making process with a mixture called "slop". Based on the sediments mentioned in the video, what are three substances that might be in a slop mixture?



--	--	--

Which of these substances need to be partially removed from the mixture to get the right consistency of clay for pottery?

--	--



Mixtures can be separated by filtration, sifting, or evaporation. Potters sometimes use all three of these methods to work with their clay. But which of these methods was shown in the video?



Using your knowledge about how molecules move in the different states of matter, why would a slop mixture with too much water have trouble holding a shape outside a container?

The Life Cycle of Clay

Types of Clay

In reality, pottery clay is actually a *mixture* made up of *other* mixtures. All types of pottery clays are made of millions of microscopic particles of different **silicate rocks** and minerals like Mica, Granite, Feldspar, and Kaolinite.



What in the world is a silicate rock?

Write your own definition for a silicate rock:

The most important thing about all of those types of rocks is that they contain the mineral **silica**. Silica is the purest type of glass that the earth can make. That is what melts in the high temperatures of a pottery kiln and allows pottery to harden into one solid piece. The more silica that a clay mixture contains, the harder the pottery will be.

The purest clays with the highest amount of silica are called "**porcelain**."

In this stone-ware clay pot, you can see specks of Granite and Mica.

Would this clay mixture be considered homogeneous or heterogeneous?



David Drake, South Carolina, 1858

In this porcelain bowl, the clay is so pure, and the particles are so fine, you can't find any individual particles.

Would this clay mixture be considered homogeneous or heterogeneous?



Jingdezhen, China, 1785



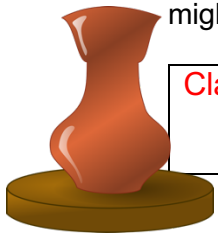
The Life Cycle of Clay

Grade 8 Science

ANSWER KEY

What is Clay?

In the video, we saw how the potter begins the clay-making process with a mixture called “slop”. Based on the sediments mentioned in the video, what are three substances that might be in a slop mixture?



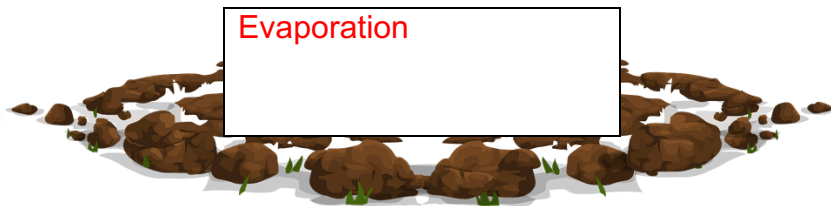
Clay	Sand	Water
------	------	-------

Which of these substances need to be partially removed from the mixture to get the right consistency of clay for pottery?

Sand	Water
------	-------



Mixtures can be separated by filtration, sifting, or evaporation. Potters sometimes use all three of these methods to work with their clay. But which of these methods was shown in the video?



Using your knowledge about how molecules move in the different states of matter, why would a slop mixture with too much water have trouble holding a shape outside a container?

The water is a liquid and in liquids molecules move around with more frequency. The liquid state wants to take the shape of its container, therefore too much water allows for too much movement of molecules and makes the mixture weak.

The Life Cycle of Clay

ANSWER KEY

Types of Clay

In reality, pottery clay is actually a **mixture** made up of other mixtures. All types of pottery clays are made of millions of microscopic particles of different **silicate** rocks and minerals like Mica, Granite, Feldspar, and Kaolinite.



What in the world is a silicate rock?

Write your own definition for a silicate rock:

A silicate rock is a rock with a high silica content.

The most important thing about all of those types of rocks is that they contain the mineral **silica**. Silica is the purest type of glass that the earth can make. That is what melts in the high temperatures of a pottery kiln and allows pottery to harden into one solid piece. The more silica that a clay mixture contains, the harder the pottery will be.

The purest clays with the highest amount of silica are called **“porcelain.”**

In this stone-ware clay pot, you can see specks of Granite and Mica.

Would this clay mixture be considered homogeneous or heterogeneous?

Heterogeneous



David Drake, South Carolina, 1858

In this porcelain bowl, the clay is so pure, and the particles are so fine, you can't find any individual particles.

Would this clay mixture be considered homogeneous or heterogeneous?

Homogeneous



Jingdezhen, China, 1785