



LESSON PLAN

Subject: 3rd Grade Science **Lesson:** “Forging Metals and Metallic Properties”

Standard Addressed: Understand the structure and properties of matter before and after they undergo a change. (NC.3.P.2)

Objectives:

- Students will be able to compare solids, liquids, and gases based on their basic properties.
- Students will be able to summarize changes that occur when heat is applied to certain materials.

Materials Needed:

- Device for showing “Forging Metals and Metallic Properties” video
- Butter
- Plastic cups of 2 different sizes (The smaller cups should easily fit inside the larger ones.)
- Butter
- Wooden craft stick
- Hot and ice-cold water
- “Heat and Matter” activity sheet

Outline:

- Prior to the lesson, students should understand that matter commonly exists in three states: solids, liquids, and gases. Students should also understand that different types of matter have different properties.
- Review what students know about matter.
- Show the 5:43 minute video, “Forging Metals and Metallic Properties”, <https://youtu.be/mzGjHNPQGy4>
- Guide students as they complete Activity 1 on the activity sheet.
- Discuss the directions for Activity 2. Students work with a partner or in groups to complete Activity 2.

Take It Further: Investigate *melting point* as a physical property of matter. Place ice in a pot and heat it on a hot plate. Take the temperature when the ice starts to melt. Compare this temperature to the melting point of silver in the video (about 1750° F). Also investigate the melting points of sugar, chocolate and butter.

Cross Curriculum Connection: Have students act out what the particles in a block of ice might look like as the ice heats up and starts to melt. Continue this activity by having the liquid change to a state of gas.





FORGING METALS AND METALLIC PROPERTIES

Grade 3 Science

Name: _____

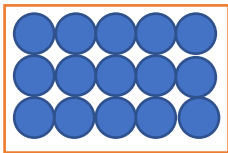
Date: _____

Activity 1: Use the words in the box to fill in the blanks. Some words will be used more than once. One word will not be used at all!

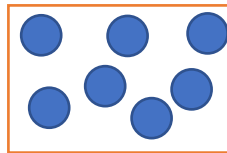
solid	liquid	gas
properties	matter	air

1. Everything in the world is made up of me! I am _____.
2. We are the three common forms of matter on Earth. We are _____, _____, and _____.
3. We are characteristics that help describe matter. We are _____.
4. I flow to take the shape of my container. My molecules wiggle and move around. What state of matter am I? _____
5. I have a definite size and shape. My molecules wiggle just a little and are packed closely together. What state of matter am I? _____
6. I do not have a definite shape or size. My molecules wiggle and move around a lot. They don't like to be close to each other, so they spread out. What state of matter am I?

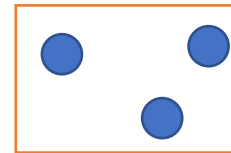
7. These pictures show how our particles are arranged. Can you tell what state of matter we are?



I am a _____



I am a _____



I am a _____



FORGING METALS AND METALLIC PROPERTIES

Name: _____

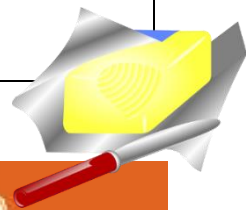
Date: _____

Activity 2: We saw in the video how iron and silver can change from solid to liquid when heat is added, and then turn back to a solid when heat is removed. Now you will investigate how heat changes matter!

Follow these steps as your teacher directs you.

1. Observe the butter in the cup. Is it a solid, liquid, or gas? How do you know? Fill in your answers in the first row of the table below.
2. Place the cup of butter into the larger cup of hot water. Gently stir the butter with the wooden stick for a minute or two. Is the butter now a solid, liquid, or gas? How do you know? Fill in your answers in the second row of the table.
3. Take your cup of butter out of the hot water and put it into the larger cup of ice-cold water. Leave it there for a minute or two. Is the butter now a solid, liquid, or gas? How do you know? Fill in your answers in the last row of the table.

	Solid, Liquid, or Gas?	How do you know?
Butter at Room Temperature		
Butter Placed in Hot Water		
Butter Placed in Ice-cold Water		





FORGING METALS AND METALLIC PROPERTIES

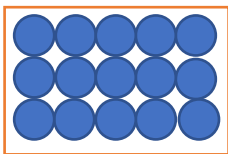
Grade 3 Science

Answer Key

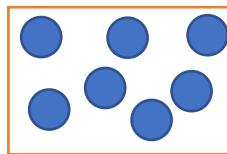
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solid	liquid	gas
properties	matter	air

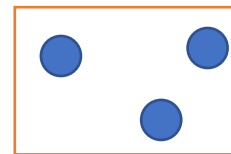
1. Everything in the world is made up of me! I am **matter**.
2. We are the three common forms of matter on Earth. We are **solid**, **liquid**, and **gas**.
3. We are characteristics that help describe matter. We are **properties**.
4. I flow to take the shape of my container. My molecules wiggle and move around. What state of matter am I? **liquid**
5. I have a definite size and shape. My molecules wiggle just a little and are packed closely together. What state of matter am I? **solid**
6. I do not have a definite shape or size. My molecules wiggle and move around a lot. They don't like to be close to each other, so they spread out. What state of matter am I?
gas
7. These pictures show how our particles are arranged. Can you tell what state of matter we are?



I am a **solid**



I am a **liquid**



I am a **gas**



FORGING METALS AND METALLIC PROPERTIES

Answer Key

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3. Take your cup of butter out of the hot water and put it into the larger cup of ice-cold water. Leave it there for a minute or two. Is the butter now a solid, liquid, or gas? How do you know? Fill in your answers in the last row of the table.

	Solid, Liquid, or Gas?	How do you know?
Butter at Room Temperature	Solid	<p>Possible responses:</p> <p>It has a shape. It is firm/hard.</p>
Butter Placed in Hot Water	Liquid	<p>Possible responses:</p> <p>It has melted. It runs/flows/spreads out.</p>
Butter Placed in Ice-cold Water	Solid	<p>Possible responses:</p> <p>It has a shape again. It isn't runny. It is firm/hard again.</p>

