

Properties of Matter

SC.5.P.8.1 - Compare/contrast physical properties of solids, liquids, and gases

- SC.4.P.8.1 - Measure/compare objects/materials based on physical properties
- SC.3.P.8.1 - Measure/compare temperatures of solids and liquids
- SC.3.P.8.2 - Measure/compare mass/volume of solids and liquids
- SC.3.P.8.3 - Compare objects/materials based on physical properties

SC.5.P.8.2 - Dissolving (common materials, factors that speed up and slow down)

SC.5.P.8.3 - Separating mixtures (size, shape, color, magnetism, dissolving)

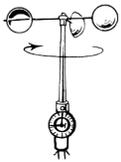
- SC.5.P.8.2 - Dissolving (common materials, factors that speed up and slow down)
- SC.4.P.8.4 - Magnetism

SC.5.P.9.1 - Physical and chemical changes are affected by temperature

- SC.3.P.9.1 - Physical changes of water through heating and cooling
- SC.4.P.9.1 - Identify familiar chemical changes

Day 1

Weather Instruments

Instrument	name	function
		
		
		
		
		
		
		

Today's Focus:

- I will be able to explain that matter is anything that has mass and takes up space.
- I will be able to compare and contrast the physical properties of solids, liquids, and gas.

Words to Know:

Word	Definition	Picture or image
matter		
mass		
volume		
solid		
liquid		
gas		

Is It Matter?

Listed below is a list of things that are considered matter and things that are not considered matter. Put an X next to each of the things that you consider to be matter.

- | | | | |
|--------------------------------------|--|---|--|
| <input type="checkbox"/> rocks | <input type="checkbox"/> salt | | |
| <input type="checkbox"/> baby powder | <input type="checkbox"/> planets | | |
| <input type="checkbox"/> milk | <input type="checkbox"/> leaf | | |
| <input type="checkbox"/> air | <input type="checkbox"/> steam | | |
| <input type="checkbox"/> light | <input type="checkbox"/> rotten apples | | |
| <input type="checkbox"/> dust | <input type="checkbox"/> heat | | |
| <input type="checkbox"/> love | <input type="checkbox"/> sound waves | | |
| <input type="checkbox"/> cells | <input type="checkbox"/> water | | |
| <input type="checkbox"/> atoms | <input type="checkbox"/> bacon | | |
| <input type="checkbox"/> blood | <input type="checkbox"/> oxygen | <input type="checkbox"/> gravity | <input type="checkbox"/> dissolved sugar |
| <input type="checkbox"/> smoke | <input type="checkbox"/> stars | <input type="checkbox"/> magnetic force | <input type="checkbox"/> cloud |



Explain your thinking. Describe the “rule” or reason you used to decide whether something is or is not matter.

For each of the items in the table, make observations for each item and then answer the two questions. Use those answers to decide if the substance is matter or is not matter.

Items	Observations	Does it take up space?	Does it have mass?	Conclusion based on evidence.
Water		Yes or No	Yes or No	Water is / is not matter.
Rock		Yes or No	Yes or No	A rock is / is not matter.
Air		Yes or No	Yes or No	Air is / is not matter.

Light		Yes or No	Yes or No	Light is / is not matter.
Frozen Water Bottle		Yes or No	Yes or No	Frozen Water is / is not matter.
Music		Yes or No	Yes or No	Music is / is not matter.

What is Matter?

Anything that has mass and takes up space is **matter**. All physical objects are made of matter. Mass is the amount of matter in something. **Volume** is the amount of space something takes up. If you could view an object through the most powerful microscope, you would see that matter is made of tiny particles called atoms. Each of these particles has mass even though they are so small you cannot see them. Different types of matter are made of different arrangements of atoms. Each type of matter has physical properties that you can see, smell, touch, taste, measure, and study.

State of Matter: Solid

Solids keep their _____ and _____.
Solids have a _____ mass and a _____ volume.

Examples of solids:

1. _____
2. _____
3. _____

State of Matter: Liquid

Liquids have a _____ volume, but will take the shape of their _____.

Liquids have the ability to _____.

Examples of liquids:

1. _____
2. _____
3. _____

State of Matter: Gas

Gases have no _____ volume and no _____ shape.

Gases will expand to fill their _____.

Examples of gases:

- 1. _____
- 2. _____
- 3. _____

Bottle Demonstration

- 1. Why did the bottle crush with no lid? _____

- 2. Why did the bottle with the lid support you? _____

- 3. How does this support the concept that air is matter? _____

What happens if we poke a hole in a filled balloon?

Check What You Know: Is sand a solid or a liquid?

Video: What's Matter?

How do we know air, or any gas, really, is there if we can't see it? _____

Has Your Thinking Changed?

Go back and revisit "Is It Matter?" on page 4.

States of Matter: Review and Create

Solid description	Solid picture	Solid examples

Liquid description	Liquid picture	Liquid examples

Gas description	Gas picture	Gas examples

Check What You Know: Concept Circles:

Match the four terms or phrases into a complete circle that describe solids, liquids and gases. Write 2-3 sentences using the terms or phrases to summarize what you know.

Solids: _____

Liquids: _____

Gases: _____

Check What You Know:

Solids, liquid, and gases are the common forms, or states, that matter can take. Each state has specific characteristics. Which of the following best describes a liquid?

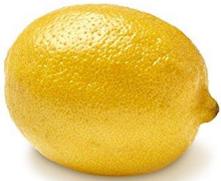
- A. It has soft atoms
- B. It has its own shape
- C. It takes the shape of its container
- D. It takes the volume of its container

Day 2:

Today's Focus:

I will be able to identify, compare, and contrast the basic measurable physical properties of matter such as mass, volume, and temperature.

Think About This!! (Turn and Talk)



Do you think a lemon is a solid, liquid, or gas? _____

What are some measurable physical properties of a lemon? _____

How do you measure its physical properties? _____

Video - Materials and Their Properties (Turn and Talk)

1. Why is wood a good material for furniture but not for windows? _____

2. What materials are good to use to make clothing? Explain why.

3. What types of materials are best to use to build a house? _____

Reading: Physical Properties

A **physical property** is a characteristic of matter that you can observe or measure directly. You can describe matter by listing the physical properties you observe. For example, you can describe an apple as *red*, *crunchy*, *sweet*, and *smooth* using properties you observe with your senses.

Reading: Using your senses

Shape, color, hardness, texture, odor, and taste are some of the physical properties you can observe using your senses. An object's color, taste, and odor can be observed using senses of sight, taste, and smell. Hardness is how easily an object's shape can be changed. Size is how big something is. Shape is the form an object has. Texture is the way the surface of an object feels to the touch.

How would you describe the following items? List the physical properties of each item in the following table.

Object	Physical Properties
	
	
	

Some physical properties can be _____.

Physical Property	How is it measured?
Mass	
Volume of liquids	

Volume of rectangular prism	
Volume of irregularly shaped object	
Temperature	

How is mass different from volume? _____

Reading: How to Find the Mass of Objects

To find the mass of an object, you will use a balance.

- A balance compares the mass of two objects.
- There is a little arrow between the two pans. If the arrow points to the middle line, the masses are equal.

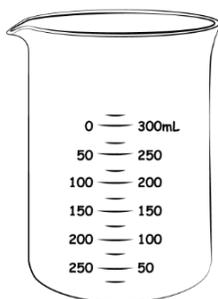
What do we use to find the mass of an object? _____

What does it mean when the pans of the balance are level? _____

What does it mean when the pans of the balance are not level? _____

Check What You Know: Measuring Volume

Penelope purchased an orange juice at lunch. On the container it states there is 250 mL of juice. In science class, she takes out her juice and wants to see if the juice will have the same volume if poured into a beaker. Penelope pours the juice from the container into a beaker. Will the orange juice have the same volume in the beaker?



Color in a volume equal to 250 mL.

Reading: How to Find the Volume of Objects

Rectangular prisms

To find the volume of a rectangular prism, you will need to measure the length, width and height of the object using a metric ruler. Once you have those measurements, you will multiply them to find the volume. Don't forget to include your units!!

$$\text{Volume} = \text{length} \times \text{width} \times \text{height}$$

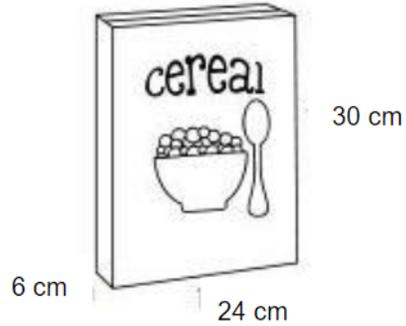
Example:

$$\text{Volume} = \text{length} \times \text{width} \times \text{height}$$

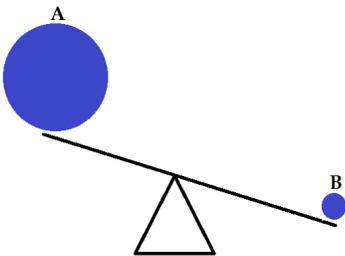
$$\text{Volume} = 24 \text{ cm} \times 6 \text{ cm} \times 30 \text{ cm}$$

$$\text{Volume} = 4,320 \text{ cm}^3$$

What is the volume of the cereal box?

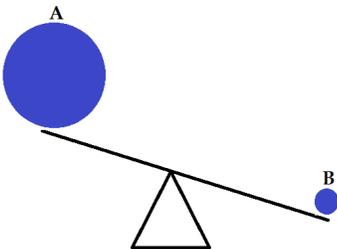


Check What You Know



1. Look at the picture above. What can you determine about the picture?

- A. A has more mass than object B.
- B. Object B has more mass than object A.
- C. Object A has the same volume as object B.
- D. Object B has a greater volume than object A.

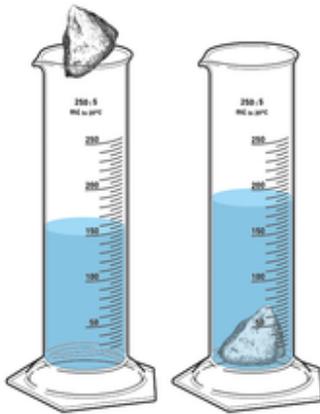


2. Look at the picture above. What can you determine about the picture?

- A. Object A has a greater volume than object B.
- B. Object B has a greater volume than object A.
- C. Object A has the same volume as object B.
- D. Object A has more mass a than object B.

3. Bob and Mary had four different objects that were the same size. They wanted to find out if they all had the same mass. Which tool would they use?

- A. Graduated cylinder
- B. Meter Stick
- C. Balance Scale
- D. Spring Scale



4. Look at the picture above. If the beginning volume in the graduated cylinder is 100 mL and the ending volume in the graduated cylinder is 160 mL, what is the volume of the rock? Explain your answer.
