

# SCIENCE

Student Book

► **3rd Grade | Unit 5**

.....

# SCIENCE 305

## PROPERTIES OF MATTER

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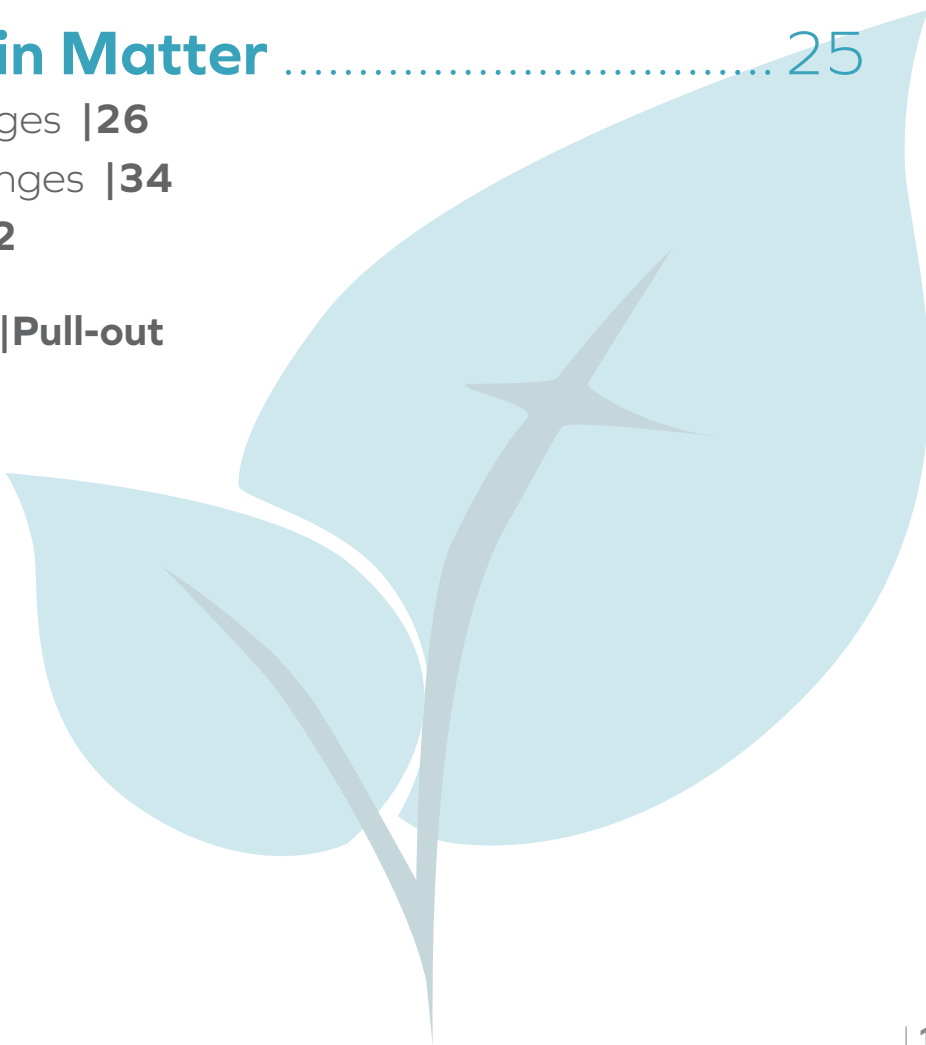
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# PROPERTIES OF MATTER

Did you ever start crying and your mother said, “What’s the matter?” Then you told her what was the matter. In this LIFEPAC®, you will learn about another meaning of matter. You will learn about different properties of matter. When you finish this LIFEPAC, you will know more about the things God made.

## Objectives

**Read these objectives.** The objectives tell you what you will be able to do when you have finished this LIFEPAC.

1. You will be able to tell what matter is.
2. You will be able to name three properties of a piece of matter.
3. You will be able to describe the states of matter.
4. You will be able to tell how matter changes.

# 1. MATTER

Did you know that everything you touch is **matter**? What are you touching now? Are you touching paper or holding a book? Are you sitting in a chair? What is the chair made of?

Everything around you is made of something. The clothes you wear are matter. The food you eat is matter. The air is matter. Even you are matter! You know that the things around you do not look the same. Different kinds of matter look very different. Even if things look different, all things are made of what is called matter.

## Vocabulary

**Study these new words.** Learning the meanings of these words is a good study habit and will improve your understanding of this LIFEPAK.

**chemist** (kēm' ĭst). A person who works in chemistry.

**chemistry** (kēm' ĭ strē). The study of matter.

**chocolate** (chôk' līt). A substance made from cacao beans.

**gravity** (grāv' ə tē). The force that pulls toward the center of the earth.

**mass** (mäs). How much matter is in something.

**matter** (măt' ər). What things are made of.

**plaster** (pläs' tər). White mixture put on walls and ceilings.

**property** (pröp' ər tē). A word used to tell about something.

**volume** (völ' yōōm). The space used.

**Note:** All vocabulary words in this LIFEPAK appear in **boldface** print the first time they are used. If you are unsure of the meaning when you are reading, study the definitions given.

**Pronunciation Key:** hat, **ā**ge, c**ā**re, f**är**; let, **ē**qual, t**ér**m; **it**, **ī**ce; hot, **ō**pen, **ô**der; **oil**; **out**; cup, p**û**t, r**ü**le; **child**; long; **thin**; /TH/ for **th**en; /zh/ for mea**su**re; /u/ or /ə/ represents /a/ in **a**bout, /e/ in taken, /i/ in pencil, /o/ in lemon, and /u/ in circus.

## Special Words

Robert Boyle

Gaelic

Irish

Ask your teacher to say these words with you.



Teacher check:

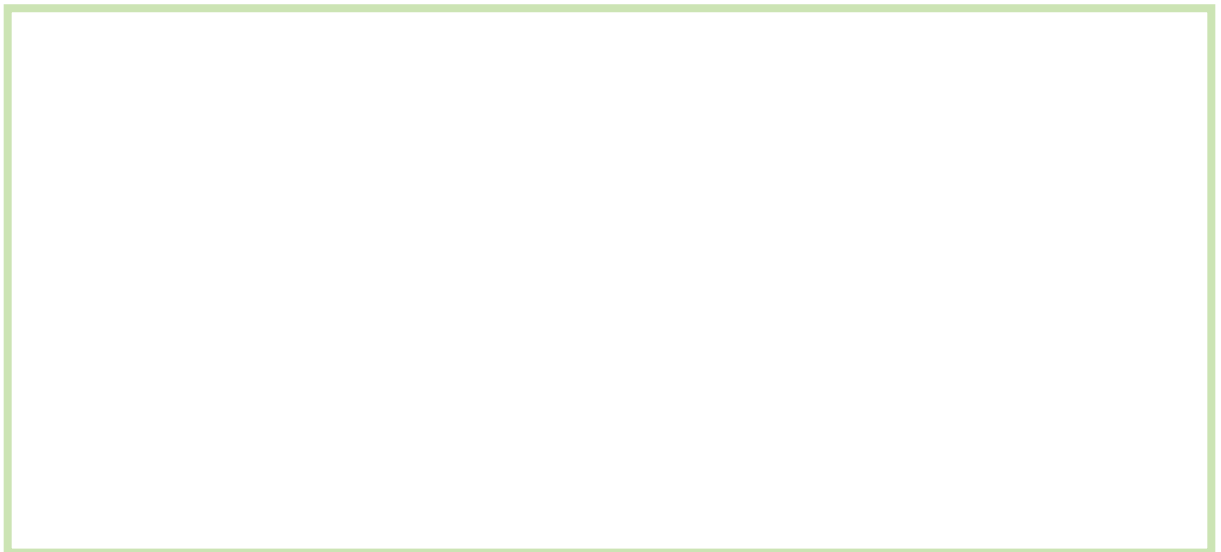
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**Draw a picture.**

**1.1**

Draw and color two things you see that you think are matter.





## Robert Boyle

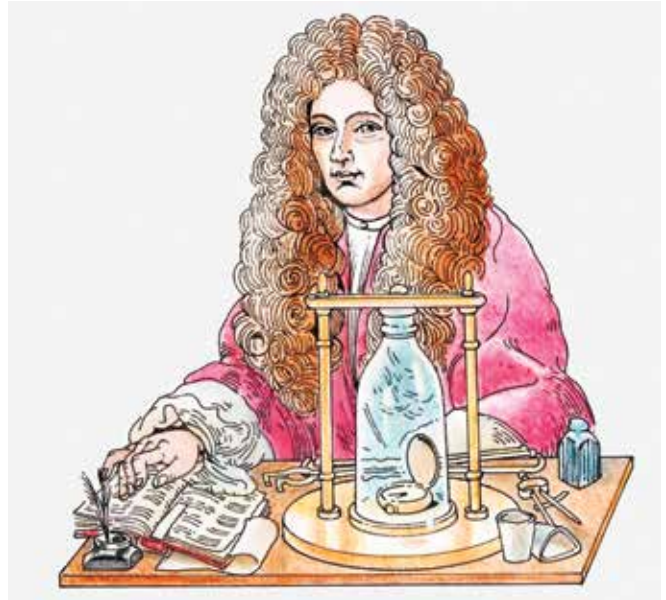
The study of matter is called **chemistry**. Robert Boyle lived about 300 years ago. He is famous for his work in chemistry. He found out a lot about matter.

Robert Boyle was a **chemist**. A chemist is a scientist who tries to find out about matter. A chemist works at finding out what is in each piece of matter.

A chemist also puts different kinds of matter together. When you put **chocolate** in milk to make chocolate milk, you are putting matter together just like a chemist does!

Robert Boyle believed in God. He had the Bible printed in Irish and Gaelic. He paid for the printing. He was also head of a group that told people about Jesus.

You can be thankful for this great man and for his work in chemistry. More important, think how many people were helped by the work he did in getting Bibles printed in Irish and Gaelic. Boyle knew how important the Word was in a person's life.



| Robert Boyle

**Write the answers to the questions.**

- 1.2** What is matter? \_\_\_\_\_
- 1.3** What is the name of the study of matter? \_\_\_\_\_
- 1.4** Who worked out ideas about matter? \_\_\_\_\_
- 1.5** Did this man believe in God? \_\_\_\_\_
- 1.6** What did Robert Boyle do for the people who spoke Irish and Gaelic?  
\_\_\_\_\_  
\_\_\_\_\_
- 1.7** What is the scientist called who tries to find out about matter? \_\_\_\_\_  
\_\_\_\_\_
- 1.8** What two kinds of work does a chemist do?
- a. \_\_\_\_\_  
\_\_\_\_\_
- b. \_\_\_\_\_  
\_\_\_\_\_



# BE A CHEMIST



## You will need these things:

a pan of water  
a cup of sand  
a stick

**Follow these directions.** Check the boxes as you do each step.

- ☐ 1. Pour the sand into the water.
- ☐ 2. Stir the sand.



**Write the answers to the questions on the lines.**

**1.9** What did your water look like before you poured in the sand?

\_\_\_\_\_

**1.10** What did your water look like after you poured in the sand?

\_\_\_\_\_

\_\_\_\_\_

**1.11** Did you put two different kinds of matter together?

\_\_\_\_\_

**1.12** What is the name of a scientist who puts two different kinds of matter together? \_\_\_\_\_

# BE A CHEMIST AGAIN

**You will need these things:**

your sandy water from the last experiment  
a bowl  
a strainer, either metal or cloth

**Follow these directions.** Check the boxes as you do each step.

- ☐ 1. Put the strainer over the clean bowl.
- ☐ 2. Pour the sandy water into the strainer.



**Write the answers to the questions on the lines.**

**1.13** What kind of matter did you pour into the strainer?

\_\_\_\_\_

**1.14** What kind of matter went into the bowl?

\_\_\_\_\_

**1.15** What kind of matter stayed in the strainer?

\_\_\_\_\_

**1.16** Did you find out the different kinds of matter that were in the sandy water? \_\_\_\_\_

**1.17** What kinds of matter were in the sandy water?

\_\_\_\_\_

**1.18** What is the name of the scientist who tries to find out what is in different kinds of matter? \_\_\_\_\_



## Properties

Look at the things in the picture. Try to name as many of the things as you can. You can easily see that all the things are not the same. Some are big and some are little. Some are soft and some are hard. They have different shapes. Some are living. Some are not living. When you tell about something, you tell about its **properties**. You might tell how big something is. You could tell how much something weighs. You could tell about its taste and smell. You might tell about the shape of it, too. Anything you tell about something is a property of it. Different kinds of matter have different properties. You might say that a needle is thin and sharp. You might say that a door is hard and smooth.

Sometimes you can use many words to tell about something. You could use the words light, white, smooth, and round to tell about a ball. Some kinds of matter have many properties.



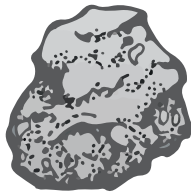
**Think about properties.** Write three words from the list under each picture.

soft  
round  
light

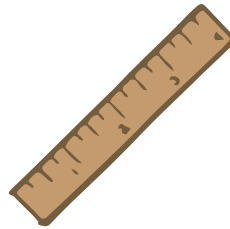
short  
long  
square

smooth  
hard

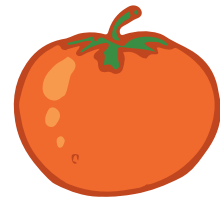
heavy  
rough



Rock



Ruler



Tomato

1.19

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**Write *true* or *false* on the line.**

1.20 \_\_\_\_\_ Things like shape, color, size, and taste are called properties.

1.21 \_\_\_\_\_ Everything you touch is matter.

1.22 \_\_\_\_\_ Robert Boyle was a scientist.

1.23 \_\_\_\_\_ All matter has only one property.



### Complete this activity.

- 1.24** Play the guessing game “Guess the Matter” with two or three other students. Have one person think of a kind of matter. Have others try to guess what it is by asking yes-no questions such as “Does it have shape?” “Can it be seen?” “Can it be cooked?” “Can it burn?” or “Is it hard?” The person to guess the answer is the next one to think of a kind of matter.

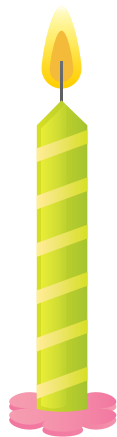


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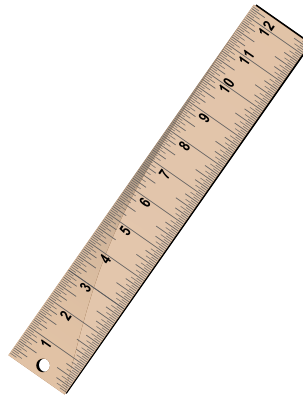
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| football



| candle



| ruler



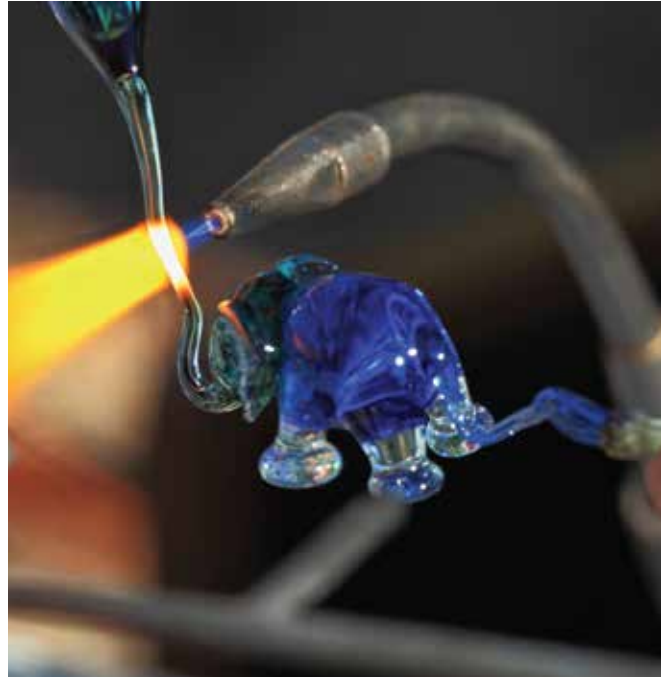
| balloon

Look at the pictures. How would you tell about them? You would say that the ruler is long and straight. You could say the balloon is round and smooth. You would say the candle is hot and round. You might say the football is made of leather and is smooth. These are all matter. You could also use many other properties to tell about them.

Look around your classroom. You will probably see a lot of wood. Wood is used for tables, desks, and many other things. Even your pencil may be made of wood. Wood is matter and has properties.

Look at the walls and ceiling of your room. They might be made of **plaster**. Plaster is matter. The windows in the walls have glass in them. Glass is matter.

As you look around, you see many things. All the things are a kind of matter. They are made from many different things. Even the air in the room is matter!



| Glass is matter.



### **Think about matter.**

**1.25** Put an X on the circles that have words of things that are matter.

desk

water

air

glass

heat

pencil

If you colored every one except heat you did very well. But what about heat? Heat is not matter even though you can feel it. Things like sound and light are not matter.

**Space.** You have learned that almost everything you see around you is matter. You also learned that matter is made from many different things.

All matter takes up space. A ball, window, and desk all take up some space. The house you live in is matter because it takes up space. Nothing else can be in that space until the house is moved from that space. No two pieces of matter can take up the same space at the same time.

Look at the picture. The two basketballs cannot take up the same space at the same time. They cannot go through the hoop together because each one is matter. Only one basketball can go through the hoop at one time.



People are matter, too. Two people cannot go through a narrow doorway at the same time. Sometimes, people push each other to go first. God is not pleased when a person pushes someone. God's Word says: (Ephesians 4:32), "Be ye kind one to another."

When something takes up space, it has volume. All matter has **volume**. Some things take up more space than other things. The bigger things have more volume.



# THINK ABOUT VOLUME



## You will need these things:

three different sizes of books  
three different sizes of bottles filled with water  
three different sizes of rocks  
one card with **small** printed on it  
one card with **middle** printed on it  
one card with **big** printed on it

**Follow these directions.** Check the boxes as you do each step.

- ☐ 1. Put the books on a table.
- ☐ 2. Look at the books. Think about the volume of the books.
- ☐ 3. By each book, put a card which tells about the volume of the book: small, middle, big.
- ☐ 4. Put the bottles of water on the table.
- ☐ 5. Look at the water. Think about the volume of the water.
- ☐ 6. By each bottle of water, put a card which tells about the volume of water: small, middle, big.
- ☐ 7. Put the rocks on the table.
- ☐ 8. Look at the rocks. Think about the volume of the rocks.
- ☐ 9. By each rock, put a card which tells about the volume of the rock: small, middle, big.



**Write the answers to the questions on the lines.**

**1.26** Which things took up the most space? \_\_\_\_\_

\_\_\_\_\_

**1.27** Which things had the most volume? \_\_\_\_\_

\_\_\_\_\_

**1.28** What have you found out about space and volume?

\_\_\_\_\_

\_\_\_\_\_

**Mass.** God planned the world so that everything would go together. He made **gravity** which pulls everything toward the center of the earth. That way, you will not keep going up if you jump to catch a ball.



**Circle the right answer.**

**1.29** When you throw a ball, it \_\_\_\_\_ .

a. keeps on going up                      b. falls to the ground

**1.30** If you throw a ball from a window on the second floor, it

\_\_\_\_\_ .

a. falls down                      b. goes up

**1.31** If you jump over a rope, you \_\_\_\_\_ .

a. jump up and come down

b. jump up and keep going up

Another way to measure the amount of matter you have is by its **mass**. The mass of a wooden block is a measure of how much matter that block contains. The more matter you have, the more mass you have.

The force of gravity pulls on everything. Gravity keeps every kind of matter from going off into the air. The force of gravity pulls harder on some things than on other things. We say these heavy things have more mass. All matter is pulled by gravity. The weight of something tells you how hard the force of gravity is pulling on the matter.

The force of gravity pulls harder on things that have more matter. Gravity pulls harder on things that have more mass. The mass of something is how much matter is in it.

The way to tell if something is matter is to find out if it has mass. Some things are heavy and some are light to carry. All things that have mass are matter. You have probably been sent to the nurse and she weighed you. You might have seen a checkout clerk weigh the fruit at the grocery store. Everything that can be weighed is matter. When you weigh something, you find out its mass. Mass is how much matter you are weighing. Now you have learned another different word. You are starting to use words that scientists use.



# LEARN ABOUT MASS



**You will need these things:**

book  
brick

**Follow these directions.** Check the boxes as you do each step.

- ☐ 1. Hold the brick in one hand.
- ☐ 2. Hold a book about the same size in your other hand.



**Write the answers to the questions on the lines.**

**1.32** Which weighs more, the book or the brick? \_\_\_\_\_

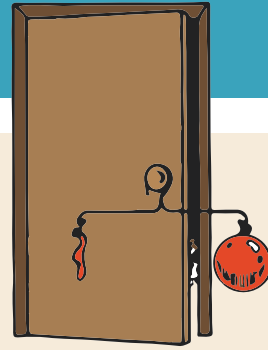
**1.33** Which has more mass, the book or the brick? \_\_\_\_\_

# IS AIR MATTER?



## You will need these things:

two balloons  
wire coat hanger  
door



**Follow these directions.** Check the boxes as you do each step.

- ☐ 1. Have your teacher cut a wire coat hanger at its center.
- ☐ 2. Bend up each end of the hanger.
- ☐ 3. Put the hanger on a doorknob. Try to have it hang straight.
- ☐ 4. Take two empty balloons. Use string to tie one on each side of the hanger.
- ☐ 5. Carefully take one of the balloons off the hanger.
- ☐ 6. Blow up the balloon.
- ☐ 7. Tie the blown-up balloon back on the hanger.



**Teacher check:**

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**Answer the questions about the balloons.** Use complete sentences.

- 1.34** When you filled one balloon with air and tied it on the hanger, did the hanger stay straight? \_\_\_\_\_  
\_\_\_\_\_
- 1.35** Which end of the hanger went lower? \_\_\_\_\_  
\_\_\_\_\_
- 1.36** Why did one end go lower? \_\_\_\_\_  
\_\_\_\_\_
- 1.37** Does air have mass? \_\_\_\_\_
- 1.38** Does air take up space? \_\_\_\_\_
- 1.39** Is air matter? \_\_\_\_\_



**Think about matter.**

- 1.40** Make a list of fifteen different kinds of matter at home today after school. Use other paper for your list. Make sure that everything in your list has mass and takes up space. Bring the list to your teacher tomorrow.



**Teacher check:**

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# IS WATER MATTER?

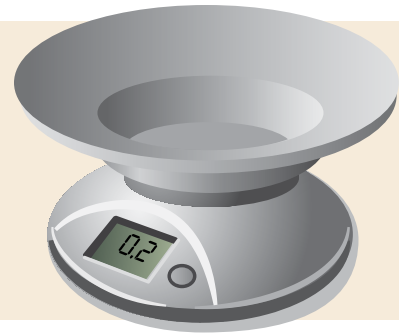


## You will need these things:

small diet or digital kitchen scale that  
reads in grams

cup

water



**Follow these directions.** Check the boxes as you do each step.

- ☐ 1. Fill the cup with water.
- ☐ 2. Weigh the full cup on the scale.
- ☐ 3. Write the mass on the line.  
Mass of cup with water: \_\_\_\_\_ grams
- ☐ 4. Empty the cup.
- ☐ 5. Weigh the empty cup on the scale.
- ☐ 6. Write the mass on the line.  
Mass of empty cup: \_\_\_\_\_ grams
- ☐ 7. Subtract the mass of the empty cup from the full cup.  
The difference is the mass of the water.
- ☐ 8. Write the mass of the  
water on the line.  
Mass of water only:  
\_\_\_\_\_ grams



### Teacher check:

Initials \_\_\_\_\_

Date \_\_\_\_\_





**Think about the cup and water.** Answer the questions on the lines.

**1.41** Is water matter? \_\_\_\_\_

**1.42** Why did you answer the last question the way you did?

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**1.43** Does water take up space? \_\_\_\_\_

**1.44** Does water have mass? \_\_\_\_\_

**1.45** What is mass? \_\_\_\_\_

---



**For this Self Test, study what you have read and done.** The Self Test will check what you remember.

# SELF TEST 1

Each answer = 1 point

**Draw a line from the beginning of the sentence to the end.**

- |             |                                |   |                               |
|-------------|--------------------------------|---|-------------------------------|
| <b>1.01</b> | Properties                     | ● | is a chemist.                 |
| <b>1.02</b> | Robert Boyle                   | ● | pulls to the sky.             |
| <b>1.03</b> | A scientist who studies matter | ● | worked on matter.             |
| <b>1.04</b> | The mass of something          | ● | tell about something.         |
| <b>1.05</b> | The force of gravity           | ● | pulls to center of the earth. |
|             |                                |   | is how much matter is in it.  |

**Write *yes* or *no* in front of each sentence.**

- 1.06** \_\_\_\_\_ Two things can take up the same space.
- 1.07** \_\_\_\_\_ The force of gravity makes apples fall from a tree to the ground.
- 1.08** \_\_\_\_\_ Chemistry is the study of matter.
- 1.09** \_\_\_\_\_ The shape and size of a ball are properties of the ball.
- 1.010** \_\_\_\_\_ If something takes up space, it has volume.

**Answer these questions with *yes* or *no*.**

- 1.011** Is a chair matter? \_\_\_\_\_
- 1.012** Is your pencil matter? \_\_\_\_\_
- 1.013** Does your bike take up space? \_\_\_\_\_
- 1.014** Does a candy bar have mass? \_\_\_\_\_
- 1.015** Could you ever fallen up off a swing? \_\_\_\_\_

**1.016** Will gravity pull more on a crayon than on a bucket full of paint?

\_\_\_\_\_

**1.017** Are the properties of your pen soft and flat? \_\_\_\_\_

**1.018** Was Robert Boyle a good Christian man? \_\_\_\_\_

**1.019** Is heat matter? \_\_\_\_\_

**1.020** Is a paper clip matter? \_\_\_\_\_

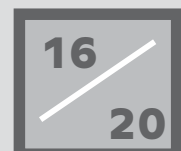


**Teacher check:**

Score \_\_\_\_\_

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