

# Activities



**bjupress**  
Greenville, South Carolina

# SCIENTIFIC INVESTIGATION

An investigation is a scientific test to solve a problem.

## Problem

An investigation begins with a problem. The problem comes from an observation that was made. The problem is a question to be answered.

## Hypothesis

A hypothesis is a possible answer to the problem. The investigation tests the hypothesis to find out whether it is correct. The hypothesis is written as a statement.

## Inquiry Skills

Each investigation will emphasize three to five inquiry skills.

## Materials

The materials are the tools and supplies needed to conduct the investigation.

## Procedure

The procedure is the steps of an investigation. The procedure must be followed carefully to have correct results.

## Observations

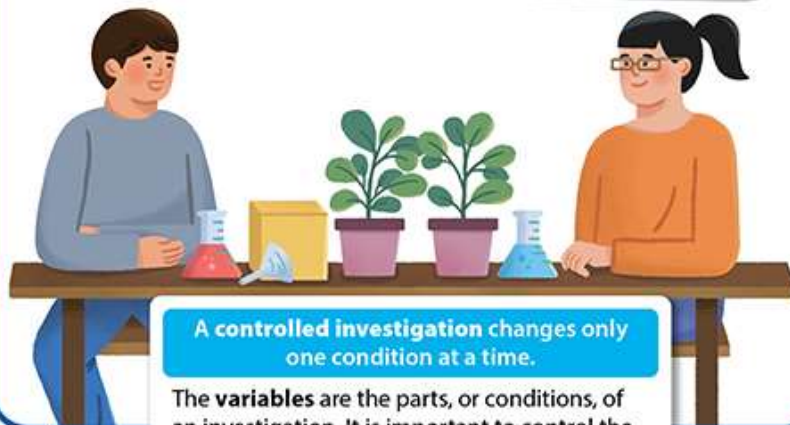
Scientists observe what happens by using the five senses. Scientists record data from their observations in charts, lists, or graphs.

## Conclusions

The conclusions are the answers to the test. They tell what was learned from the investigation and whether the hypothesis was correct.

© 2025 BJU Press. Reproduction prohibited.

# SCIENTIFIC VARIABLES



A **controlled investigation** changes only one condition at a time.

The **variables** are the parts, or conditions, of an investigation. It is important to control the variables so that only one condition is tested at a time. There are three kinds of variables.

## Independent Variable

The **independent variable** is the only part of the investigation that is changed. Only one variable can be changed in a controlled investigation.



## Dependent Variable

The **dependent variable** is the part that is observed and measured in the investigation. The observations and measurements are recorded.



## Controlled Variable

The **controlled variable** is the part of the investigation that does not change. Investigations can have more than one controlled variable.



© 2015 Edmentum - All rights reserved. Reproduction prohibited.

# SCIENCE INQUIRY SKILLS

## Observe

Use your senses to gather information about objects and events.

## Predict

Form an idea about what may happen based on what you know or have experienced.

## Experiment

Set up and follow a procedure to test a hypothesis.

## Measure

Use devices to find the size, mass, volume, or quantity of something.

## Communicate

Share information with others by writing, speaking, or using pictures or graphs.

## Collect, Record, and Interpret Data

Gather and organize information about objects or events.

## Infer

Draw conclusions based on what is already known.

## Hypothesize

Write a hypothesis, or statement, that can be tested by using a controlled investigation.

## Make and Use Models

Create an object to represent or explain something that cannot be easily observed.

## Classify

Group or order objects based on what is similar or what is different.

## Identify and Control Variables

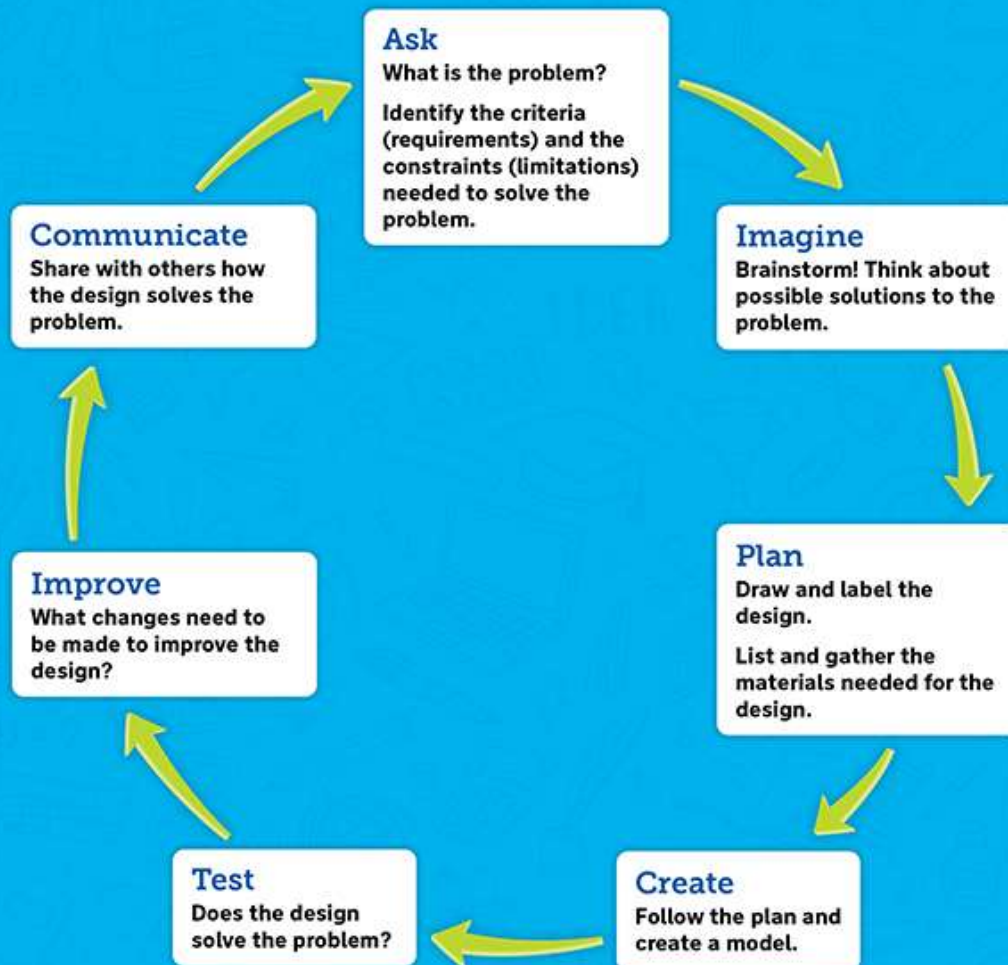
Recognize the changing and unchanging parts of a controlled investigation.

## Define Operationally

Correctly communicate scientific terms, using observations and experience.

© 2025 BJU Press. Reproduction prohibited.

# The Engineering DESIGN PROCESS



© 2025 BJU Press. Reproduction prohibited.

## Seeing the Invisible

Identify what is in each bag as solid, liquid, or gas.

Bag 1 \_\_\_\_\_ Bag 2 \_\_\_\_\_ Bag 3 \_\_\_\_\_

If you look around the room, you will see many things. All these things are made up of matter. You can touch them, measure them, and throw them. You can determine what their colors are.

But scientific study by measurement and observation can answer only certain kinds of questions. One question it cannot answer is where matter came from in the first place. A different source is needed to discover the truth about the beginning of matter.

Read Hebrews 11:1-3. Answer the questions.

1. According to verse 3, where did the world come from?  
\_\_\_\_\_
2. According to verse 1, what is the only way for an individual to relate to something that is invisible (not seen) or still in the future (hoped for)?  
\_\_\_\_\_
3. What is the only way to know where matter came from in the first place?  
\_\_\_\_\_

There are other places in Scripture that also talk about how God created matter.

4. Read John 1:1-5. Who is the "Word" and the "him" who created all things? (Hint: Look at verse 14 if you need help.)  
\_\_\_\_\_  
\_\_\_\_\_
5. Look at John 1:1-2. What verse in the Old Testament is being referred to in these verses? (Hint: Look at the first three words of verse 1.)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Some people are called *materialists*. Materialists have a naturalistic worldview. They reject the Bible. They believe that only matter and energy exist. Materialists do not look at the world through faith in God—through biblical glasses. They look at the world through faith in materialism—through naturalistic glasses.

Christians place their faith in God and what He has revealed in the Bible. Their faith helps them understand the world around them. Materialists place their faith in their own abilities and in science to understand the world. Both worldviews are based on faith. But Christians put their faith in God and not in their own understanding (Proverbs 3:5–6).



6. Respond to this statement: “You should follow the Bible’s teaching about being kind and loving. But you should not believe what it says about science and history.”

---

---

---

---

---



How do you see the world? Are you putting your faith in the God who says He created everything out of nothing? Or are you putting your faith in what scientists say? You must accept by faith that Jesus is the Creator. You must also accept by faith that Jesus took on flesh to save people from their sins. Unless you accept these truths by faith, nothing in science really matters.

© 2025 BJU Press. Reproduction prohibited.

For more information about Answers in Genesis, please go to [www.answersingenesis.org](http://www.answersingenesis.org); [www.creationmuseum.org](http://www.creationmuseum.org); and [www.arkencounter.com](http://www.arkencounter.com).



## STUDY GUIDE

Name \_\_\_\_\_

Match the definition with the term.

- \_\_\_\_\_ 1. anything that has mass and takes up space
- \_\_\_\_\_ 2. the measure of the amount of matter in an object
- \_\_\_\_\_ 3. an event that some scientists believe happened about 14 billion years ago, when all matter in the universe was condensed into one tiny point that rapidly expanded
- \_\_\_\_\_ 4. the amount of space a substance takes up
- \_\_\_\_\_ 5. a method for measuring the volume of a sphere or an unusually shaped object

- A big bang
- B Creation
- C mass
- D matter
- E volume
- F water displacement
- G weight

Write **B** if the statement is true of a biblical worldview.

Write **N** if the statement is true of a naturalistic worldview.

- \_\_\_\_\_ 6. The story of the Bible is true and shapes the way a person thinks, believes, and lives.
- \_\_\_\_\_ 7. Earth and space came into existence by natural processes.
- \_\_\_\_\_ 8. The matter you see is the result of a big bang that happened 14 billion years ago.
- \_\_\_\_\_ 9. The matter that makes up all living and nonliving things was created by God.
- \_\_\_\_\_ 10. No matter would exist without God.
- \_\_\_\_\_ 11. Nature is all there is.

© 2025 BJU Press. Reproduction prohibited.



**Write the letter.**

- \_\_\_\_\_ 12. The volume of cooking oil left in a fryer can be measured with a \_\_\_\_\_.  
A balance      B graduated container      C ruler
- \_\_\_\_\_ 13. The mass of a penny collection can be measured by using a \_\_\_\_\_.  
A balance      B graduated container      C ruler
- \_\_\_\_\_ 14. The volume of a box used for craft supplies can be measured by using a \_\_\_\_\_.  
A balance      B graduated container      C ruler

**Write T if the statement is true. If the statement is false, write the correction for the underlined words.**

- \_\_\_\_\_ 15. Volume and mass are characteristics of matter that can be measured.
- \_\_\_\_\_ 16. The mass of an object in a certain volume, or space, is weight.
- \_\_\_\_\_ 17. The volume of ten marbles can be determined by using water displacement.
- \_\_\_\_\_ 18. Multiplying the *length*  $\times$  *width*  $\times$  *height* of a regularly shaped object, like a shoebox, can be used to determine the mass of the box.

**Write the answers.**

19. How are matter and mass related? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
20. Why is it beneficial to know how matter works? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
21. A king wanted to know the volume of his gold crown. A scientist helped the king find the volume of the crown. How can the volume of an irregularly shaped object, like a king's crown, be measured? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
22. How are density and matter related? \_\_\_\_\_  
\_\_\_\_\_



# STUDY GUIDE

*continued*

Name \_\_\_\_\_



You are home with your mother when your grandparents arrive for a surprise visit. Your mother needs help preparing dinner. She is making a casserole and a salad, and she asks you to help. You offer to make some lemonade. You also offer to bake brownies for dessert. You are very glad you have been learning about matter in science class.



**What is one way you can serve your family by using your understanding of matter?**

---

---

---

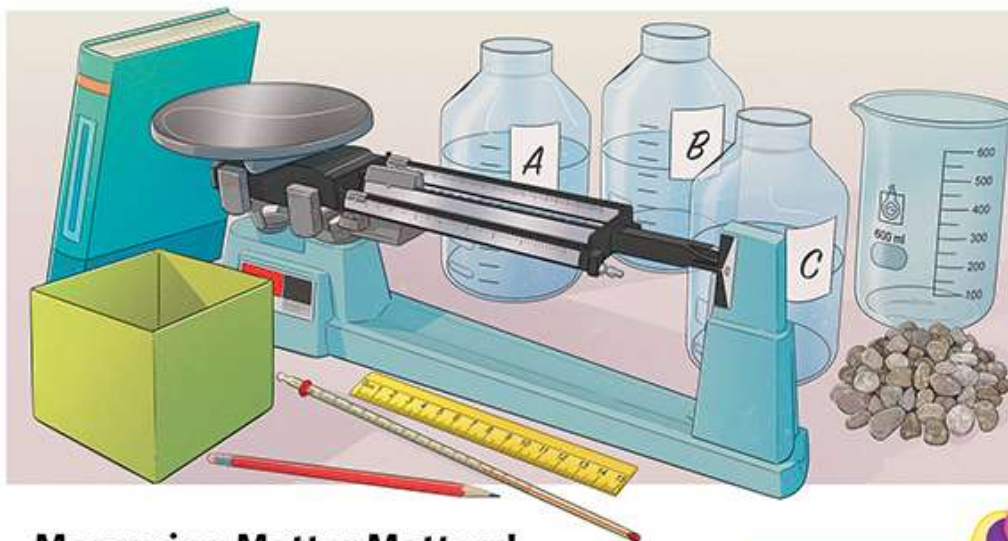
---

---

© 2015 BJU Press. Reproduction prohibited.

# EXPLORATION

Name \_\_\_\_\_



## Measuring Matter Matters!

### Purpose

Practice measuring matter.

### Procedure

#### Measuring Length (cm)

1. Use the centimeter ruler to measure the length of your book. Record the measurement on the Data Chart.
2. Repeat Step 1 to measure the width of your book. Record the measurement on the Data Chart.
3. Repeat Step 1 to measure the height of your book. Record the measurement on the Data Chart.

#### Measuring Mass (g)

4. Use the balance to measure the mass of a handful of pebbles. Record the mass on the Data Chart.
5. Add or remove pebbles until the mass measurement equals 300 g.
6. Remove the pebbles from the balance.
7. Use the balance to measure the mass of the pencil. Record the mass on the Data Chart.

### INQUIRY SKILLS

- Measure
- Collect, record, and interpret data
- Communicate

### MATERIALS

- centimeter ruler
- book
- balance
- pebbles, 400 g (14 oz)
- pencil
- water
- 600 mL beaker
- box
- thermometer
- container of room-temperature water, labeled A
- container of cold water, labeled B
- container of hot water, labeled C

© 2015 BJU Press. Reproduction prohibited.



### Measuring Volume (mL)

8. Pour 400 mL of water into the beaker.
9. Add a handful of pebbles into the beaker. Record the level of water on the Data Chart.
10. Using the Data Chart, subtract 400 mL from the level of water in Step 9 to find the volume of the pebbles. Record the volume of the pebbles on the Data Chart.

### Calculating Volume (cubic centimeters)

11. Use the centimeter ruler to measure the length, width, and height of the box. Calculate the volume of the box. Record the volume on the Data Chart.

$$\frac{\quad}{\text{length}} \text{ cm} \times \frac{\quad}{\text{width}} \text{ cm} \times \frac{\quad}{\text{height}} \text{ cm} = \frac{\quad}{\text{volume}} \text{ cubic centimeters}$$

### Measuring Temperature (°C)

12. Use the thermometer to measure the temperature of the water in container A. Record the temperature on the Data Chart.
13. Repeat Step 12 to measure the temperature of the water in container B. Record the temperature on the Data Chart.
14. Repeat Step 12 to measure the temperature of the water in container C. Record the temperature on the Data Chart.

# EXPLORATION

*continued*

Name \_\_\_\_\_

## Observations

### Data Chart

Object	Measurement
<b>Measuring Length</b>	<b>cm</b>
book (length)	
book (width)	
book (height)	
<b>Measuring Mass</b>	<b>g</b>
pebbles	
pencil	
<b>Measuring Volume</b>	<b>mL</b>
volume of water and pebbles	
volume of water	400
volume of pebbles	
<b>Calculating Volume</b>	<b>cubic centimeters</b>
box	
<b>Measuring Temperature</b>	<b>°C</b>
container A water	
container B water	
container C water	

## Conclusions

1. Why do you think it is important to know how to measure matter accurately?

---

---

2. Share your Data Chart with a partner. Compare measurements and discuss the Conclusions.



## STUDY GUIDE

Name \_\_\_\_\_

### Fill in the blanks.

1. The smallest particle of any substance is an \_\_\_\_\_.
2. Matter that is made up of only one kind of atom is called an \_\_\_\_\_.
3. When two or more atoms join, they form a particle called a \_\_\_\_\_.
4. Matter that is formed by combining atoms of different elements is a \_\_\_\_\_.
5. A characteristic of a substance that can be observed without changing the identity of the substance is a \_\_\_\_\_.
6. A scientist who designs, creates, and tests materials to make new products is a \_\_\_\_\_.

### Match the description with the physical property of matter.

- \_\_\_\_\_ 7. the measure of the amount of matter in an object
- \_\_\_\_\_ 8. what the surface of a pineapple feels like
- \_\_\_\_\_ 9. what burning toast and a frightened skunk create
- \_\_\_\_\_ 10. a way to sort scrap metal or move a paper clip
- \_\_\_\_\_ 11. the bouncing of light off a mirror
- \_\_\_\_\_ 12. the twisting or bending of an athletic shoe or a balloon
- \_\_\_\_\_ 13. the ability of a copper wire to transfer electricity

A color  
B conductivity  
C flexibility  
D magnetic attraction  
E mass  
F odor  
G reflectivity  
H texture

### Match the characteristics with the state of matter.

- \_\_\_\_\_ 14. has a definite shape and a definite volume
- \_\_\_\_\_ 15. has no definite shape but does have a definite volume
- \_\_\_\_\_ 16. does not have a definite shape or a definite volume

A gas  
B liquid  
C solid

**Write the letter.**

- \_\_\_\_\_ 17. Atoms that make up molecules can \_\_\_\_.
- A be only from the same element  
B be only from different elements  
C be from the same element or from different elements
- \_\_\_\_\_ 18. The particles in this state of matter are very active and will spread out until they meet a barrier. The particles can also be compressed easily.
- A gas                      B liquid                      C solid
- \_\_\_\_\_ 19. The particles that make up this state of matter are close together and do not move very much. The particles have a strong attraction to each other.
- A gas                      B liquid                      C solid
- \_\_\_\_\_ 20. The attraction between the particles is strong enough to keep the matter from completely spreading apart.
- A gas                      B liquid                      C solid

**Write T if the statement is true. If the statement is false, write the correction for the underlined words.**

- \_\_\_\_\_ 21. Gold is made up of one kind of atom. It is a compound.
- \_\_\_\_\_ 22. Color is a physical property of matter.
- \_\_\_\_\_ 23. All matter is composed of tiny particles that are never in motion.

**Write the answer.**

24. Why is the work of materials engineers important?

---

---

---

---



# STUDY GUIDE

*continued*

Name \_\_\_\_\_

## THINK ABOUT IT

Jeff's father is an electrician. Jeff wants to work with his father someday. He wants to help solve electrical problems for other people—just as his father does. Jeff has been learning about the physical properties of matter in science class. He was especially interested in the discussion of electrical conductivity.



**Explain why understanding electrical conductivity as a physical property of matter will be helpful to Jeff as an electrician.**

---

---

---

---

---

---

© 2025 BJU Press. Reproduction prohibited.