UNIT A

Investigating Properties of Matter

What does a rusty car have in common with fireworks? Believe it or not, they both involve a chemical reaction with oxygen.

In China, fireworks have lit up the sky since the fifth century. To make fireworks, the Chinese mixed charcoal, saltpetre, and sulfur to produce gunpowder. When oxygen reacts with a mixture of these substances and metallic additives, it produces the colours you see when fireworks explode.

Surprisingly, rusting is a similar reaction. But the result is not nearly as spectacular!

There are thousands of chemicals and countless possible reactions. How can scientists know about them all?

In this unit, you will study the properties of chemicals and learn how classification can help you understand the chemicals and reactions around you. As you work, you will think about the role chemicals play in our lives. You will also learn how to handle chemicals safely in investigations, at work, and at home.

Unit Contents

CHAPTER 1

Understanding

Getting Ready...

- Why do so many products have warning labels?
- How can you use chemicals safely?
- Why are ice, steam, and liquid water all considered water?
- Why is antifreeze used in a car?

People use chemicals to kill weeds on their lawns, on golf courses, and on farm fields. People wear protective equipment because the active ingredients can damage skin and lungs.

Science Log

Brainstorm all of the ways you can describe a substance. Write the list of ideas in your Science Log, and then try to answer the questions above.

Chemicals are all around us — in our bodies, in the food we eat, and even in the ink in this book. Chemicals are useful, but some can be dangerous.

It is important to know the characteristics of all the chemicals we use.

- Does the substance have special handling or storage requirements?
- How will it react with other substances?
- How should you dispose of it?

The answers to these questions allow you to use chemicals safely.

Chemical packages include easy-to-understand hazard symbols. Look at the symbol on the bottle of correction fluid above. What does it tell you about the contents?

In this chapter you will learn why chemicals can be useful and how to use them safely. You will learn about two information systems that help you use chemicals safely at work and at home. Then you will learn more about the substances around you and discover ways of understanding the chemicals you use every day.

Matter

What You Will Learn

In this chapter you will learn:

- how to interpret safety information at work and at home
- why it is dangerous to mix common household substances
- what all matter has in common
- how to identify the three states of matter
- what the differences are between a chemical and a physical property
- how to tell the difference between a pure substance and a mixture

Why It Is Important

- Chemicals have useful and harmful properties. By learning more about these properties, we can use chemicals effectively and safely. After all, chemicals are everywhere.

Skills You Will Use

In this chapter you will:

- interpret WHMIS and HHPS safety information
- describe matter using the particle theory of matter
- investigate chemical and physical properties
- determine the properties of pure substances and mixtures

Starting Point ACTIVITY

When Substances React

Why might mixing some substances be dangerous?

Safety Precautions

What You Need

film canister
scale
scoopula
graduated cylinder
calcium chloride
phenol red indicator
resealable plastic bag (sandwich size)
sodium bicarbonate
water

What to Do

1. Place 5 g of calcium chloride and 2 g of sodium bicarbonate into the plastic bag.
2. Pour 5 mL of phenol red indicator into the film canister. Add 5 mL of water and seal the canister.
3. Place the film canister in the bag. Remove as much air as possible from the bag, and then seal the bag.
4. Working from the outside of the bag, carefully remove the top from the film canister and mix the liquid and powder.

What Did You Discover?

1. What did each substance look like at the beginning of the activity?
2. **(a)** Describe what happened to the materials during the activity.
   (b) Describe the contents of the bag after Step 4.

1.1 Chemicals All Around Us

From the time you get up in the morning to the time you go back to bed, you use a lot of chemicals.

DidYouKnow?

Dynamite was invented by Alfred Nobel, a Swedish scientist. Dynamite is stable because the nitroglycerin in it is mixed with clay and other materials. However, before Nobel got the mix right, there were so many accidents that he was considered a public enemy.

The toothpaste you use to brush your teeth and the clothes you wear contain chemicals. So do the substances that make up your body. Some chemicals used around the house can be dangerous.

Chlorine is useful *because* it is poisonous. We use small amounts to kill bacteria in our drinking water and swimming pools, and to get rid of mildew. But exposure to large amounts causes respiratory failure and can kill a person.

Other common household materials have similar dangers. Ammonia is in many household cleaners. Lye is used in soaps and oven cleaners. Methane is a common fuel. If not handled properly, each of these chemicals can cause death.

Chemicals can also pose hazards when they are mixed. The chemical reactions that occur can form even more dangerous chemicals. Such reactions can produce poisonous gases, corrosive liquids, or explosions.

Other chemicals are harmful to the environment.

The following table outlines the uses and dangers of six chemicals you probably have around your home.

Table 1.1 Uses and Dangers of Common Chemicals

Chemical	Common Uses	Dangers
ammonia	ingredient in many household cleaners	• can burn skin and other body tissues • releases toxic gas when mixed with chlorine • toxic, an irritant when inhaled
benzene	present in gasoline, synthetic rubber, inks, and paints	• can cause cancer
chlorine	sold as ingredient in many household cleaners and as household bleach	• burns skin and other body tissues • releases toxic chlorine gas when mixed with acids (for example, vinegar) • forms deadly gas when mixed with bases (for example, ammonia) • toxic, an irritant when inhaled
lye	ingredient in drain and oven cleaners	• burns body tissues on contact • can irritate lung tissue • inhibits reflexes
methane (natural gas)	fuel used for heating, cooking, and transportation	• explosive • fumes can cause suffocation
toluene	common ingredient in nail polish and some glues	• breathing fumes can cause light-headedness and confusion • can cause permanent brain damage • toxic • flammable

READING Check

Why should ammonia and chlorine *not* be mixed?

Chemical Storage and Disposal

Some chemicals are not just dangerous when you are using them. They can also be dangerous if they are not properly stored or disposed of.

Household products that contain toxic chemicals should be stored out of reach of children. Bleach and ammonia can react strongly to one another, so they should be stored separately from each other. Containers of oven cleaner may explode if heated or crushed, so they should be stored away from heat.

Gasoline, camping fuel (for example, propane), and paint thinner (for example, Varsol™) catch fire so easily that they should be stored outside your living area. Do you have any of these chemicals inside your living area?

Special care is also needed when disposing of chemical substances. Simply dumping them down the drain or in a landfill can cause environmental damage.

Many products have disposal instructions on the label. Household hazardous products can be taken to a special municipal collection site. Such sites may be located at the local fire station or in a special area of a landfill site. Products such as motor oil and car batteries can be taken to service stations for recycling.

READING Check

Where can you find disposal information for household products?

Figure 1.1 Someone has painted fish near this storm drain. What point is the fish symbol trying to make?

Figure 1.2 How should the warnings on these labels affect your use, storage, and disposal of these products?

Disc CONNECT

To learn more about WHMIS, load the student CD-ROM onto your computer. Launch the **WHMIS** applet and follow the instructions.

Chemicals at Work and School

You do not have to memorize how to use and dispose of chemicals safely. You just have to remember to read the labels.

The **W**orkplace **H**azardous **M**aterials **I**nformation **S**ystem (**WHMIS**) provides detailed information on how to store, handle, and dispose of any chemical found in the workplace — including schools. It also provides first aid information.

Information is provided in three ways:

- labels — All hazardous materials have a WHMIS label, which summarizes safe handling procedures.
- **MSDS** — **M**aterial **S**afety **D**ata **S**heets provide detailed information about each chemical. The information includes physical and chemical properties, safe handling, first aid, and disposal procedures.
- worker education — As part of their job, workers who use dangerous substances must take WHMIS training. Employers are required to provide the training.

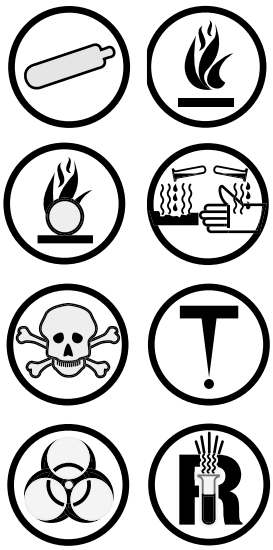


Figure 1.3 Look for these WHMIS symbols on any product you use.

Figure 1.4 WHMIS labels provide important information on the safe handling and disposal of products. The MSDS provides additional information.

Find Out ACTIVITY

A Closer Look at WHMIS

SKILL CHECK
- Initiating and Planning
- Performing and Recording
- Analyzing and Interpreting
- Communication and Teamwork

What You Need

WHMIS label

related MSDS

What to Do

Read the information provided on both the label and the MSDS.

What Did You Find Out?

1. If you had to use this product, what safety precautions should you take?
2. Which provides more information: the label or the MSDS?
3. Why isn't all the safety information provided on the product label?
4. When might you need more information about a chemical you are using?

Chemicals at Home

The symbols on the products you use at home are called **H**azardous **H**ousehold **P**roduct **S**ymbols (**HHPS**). These symbols are found on household products that are reactive or dangerous. Like WHMIS symbols, they alert you to potential hazards. Read the label carefully to determine exactly what the hazard is.

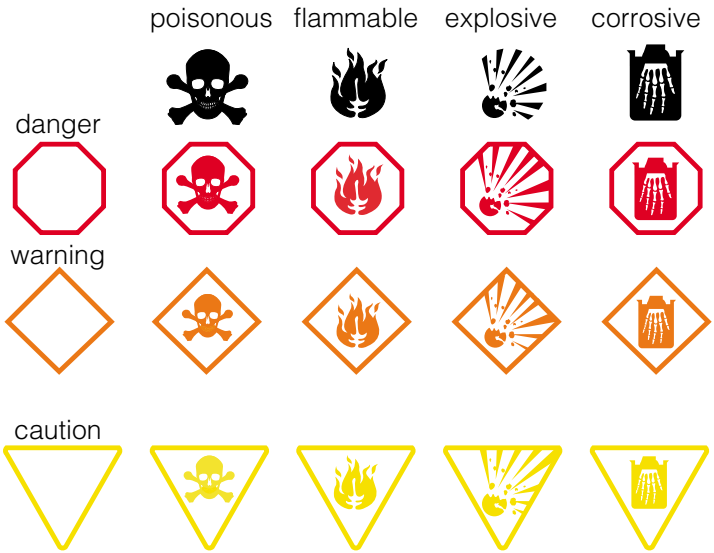


Figure 1.5 These symbols are designed to look like traffic signs. The symbols, colours, and shapes make them easy to understand.

READING Check

WHMIS and HHPS labels are used on different products. What is the difference?

Check Your Understanding

Key Terms

WHMIS
MSDS
HHPS

1. Why might a useful chemical also be dangerous?
2. Use a chart similar to the one shown here to compare WHMIS and HHPS.

	WHMIS	HHPS
Similarities		
Differences		

3. Give three examples of hazardous chemicals often found in the home.
4. **(a)** If a product is labelled as flammable, how should it be stored?
   (b) Where can you find more information about the safe handling and storage of a substance?

1.2 Describing Matter

Matter is anything that has mass and takes up space. You are surrounded by it. You are also made up of it. All chemical substances are considered to be matter.

An ancient Greek philosopher named Democritus thought all matter was made up of tiny bits too small to be seen. He called these tiny bits atoms. The word comes from the Greek word for uncuttable.

Scientists have spent hundreds of years investigating matter. They developed a theory to help them explain its characteristics. A **theory** is an explanation of something that has been supported by repeated experimental results.

The **particle theory of matter** helps explain what scientists learned about the nature of matter by thinking of atoms as tiny particles and describing their nature and their behaviour in different substances.

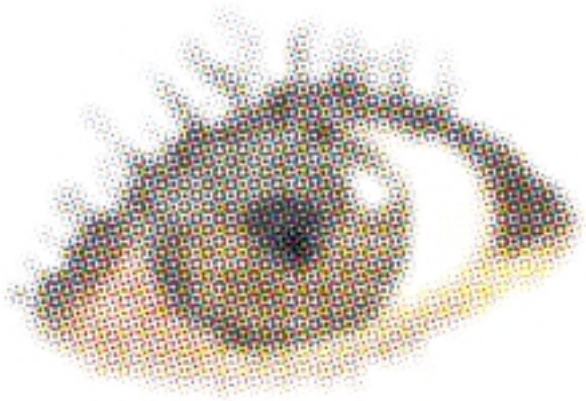


Figure 1.6 Look at any picture in this book through a magnifying glass and you will see a bunch of closely packed dots of colour. The dots that make up this picture are like the particles that make up matter.

The Particle Theory of Matter

- All matter is made up of very small particles. This is similar to the way photographs are made up of very small dots. See Figure 1.6.
- All particles in a pure substance are the same. For example, distilled water is only one colour because all of the particles that make it up look exactly the same.
- There are spaces between particles. Figure 1.7 on the next page shows that the distance between particles is different for solids, liquids, and gases.
- Particles are always moving. As particles gain energy, they move faster.
- The particles in a substance are attracted to each other.

READING Check

Define "matter."

States of Matter

Matter exists in three basic states: solid, liquid, and gas. The particle theory can be used to explain these three **states of matter**. See Table 1.2.

In **solids**, particles are packed tightly together and cannot move very much. This means that a solid will keep its shape and not flow.

In **liquids**, particles are touching, but can move past each other. This explains why liquids can take the shape of their container and flow easily.

Particles in a **gas** are far apart and moving quickly. Particles in a gas will keep moving away from each other until stopped by the walls of a container.

READING Check

Compare the spaces between the particles in a solid and a gas.

Table 1.2 States of Matter

Solid	Liquid	Gas
• particles are closely packed • particles move very little	• particles are farther apart than in a solid • particles move around	• particles are loosely packed • particles move freely
		

Off the Wall

There is a fourth state of matter that exists only at extremely high temperatures. This is the plasma state. The surface of the Sun is so hot (about 6000°C) that most of the substances there exist as plasma.

Try This!

In a large disposable cup, mix 200 mL of water and 300 to 350 mL of cornstarch. Use your hands to work out all the lumps. What happens if you rest your finger on the surface of the mixture? What happens if you poke the mixture? Is this mixture a solid or a liquid?

Properties of Matter

Scientists use a variety of physical and chemical properties to identify and classify matter.

DidYouKnow?

Materials such as paper and many textiles catch fire easily. This chemical property can make such materials a fire hazard. Applying a chemical flame retardant to the materials can make them less flammable.

When you think of a **physical property**, consider how you would describe a friend. You might refer to the person's weight, height, and hair or eye colour.

If you were to describe your friend's character, or the way your friend reacts with other people, you would be talking about qualities that are similar to chemical properties.

A **chemical property** tells how a substance will react with other substances. For example, one chemical property is how easily a substance catches fire. Knowing this information allows us to use a substance safely and effectively. The details of a substance's physical and chemical properties are usually included on the MSDS.

Some physical and chemical properties are listed in Table 1.3. You will look at chemical properties again in Chapter 2.

READING Check

What is the difference between a physical and a chemical property?

Table 1.3 Some Physical and Chemical Properties

Physical Property	Chemical Property
• shape • colour • what state it is in at room temperature • freezing temperature • boiling point • how it feels (its texture) • how hard it is • how it smells • if it is magnetic • how well it conducts electricity • how flexible it is • how dense it is	• if there is a change in smell, colour, temperature • how easily it catches fire and burns • how it reacts with other substances • whether it appears that new substances have been produced

Internet CONNECT

www.mcgrawhill.ca/links/science.connect1

Everything is made of matter. Each substance has unique properties. To learn more about the properties of some modern materials, go to the above web site. Go to Internet Connects, Unit A, Chapter 1, and then to Materials and Uses. Use the information you find to identify the properties of some modern materials.

DESIGN & DO

INVESTIGATION 1–A

SKILL CHECK

- Initiating and Planning
- Performing and Recording
- Analyzing and Interpreting
- Communication and Teamwork

The Egg Drop

We can use our knowledge of the properties of matter to help choose materials that are useful for particular purposes.

Transportation of fragile materials requires special packaging that will protect the contents. Packaging materials need to be:

- *resilient* or able to resist a change of shape, and
- *elastic* or have an ability to return to their original form.

Challenge

Pack an egg in a coffee can using materials with properties that will protect the egg against breakage when dropped from a height of 4 m.

Safety Precautions

Apparatus

scissors

Materials

1 empty coffee can (454 g)
variety of packing materials
tape
egg

Design Criteria

A. Design a package that fits inside the coffee can. Your team may do anything you wish to the inside of the coffee can.

B. At least two different kinds of packaging materials must be used. You may use more than two kinds of materials if you wish.

C. Identify the physical properties of the packing materials you plan to use. Explain how these will help to protect the egg.

Plan and Construct

1. In your group, construct a package for your egg. Draw a colourful, detailed, and labelled cross section of your design.
2. Test your design by dropping the protected egg from a height of 4 m.
3. For an extra challenge, either try to package two eggs in one coffee can or drop the can from a greater height.

Wash your hands thoroughly at the end of this investigation.

Evaluate

1. Record the physical properties of the egg. Highlight or underline the properties that must be considered when packaging an egg.
2. List five properties for each packaging material chosen in your design. Indicate which of the properties might be useful in preventing the egg from breaking.
3. What properties do the packaging materials you used have in common? How do they differ?
4. Did the egg break? Are there any signs of cracking or leaking?
5. Based on your results, how would you improve your design?

DESIGN & DO

INVESTIGATION 1–B

SKILL CHECK

- Initiating and Planning
- Performing and Recording
- Analyzing and Interpreting
- Communication and Teamwork

Classifying Matter

Challenge

Design and construct an investigation that will help you group a number of substances according to their properties.

Safety Precautions

- Handle hot objects with care.

Apparatus

conductivity tester
graduated cylinder
hot plate
magnet
magnifying glass
ruler
scale
thermometer
tongs or oven mitts

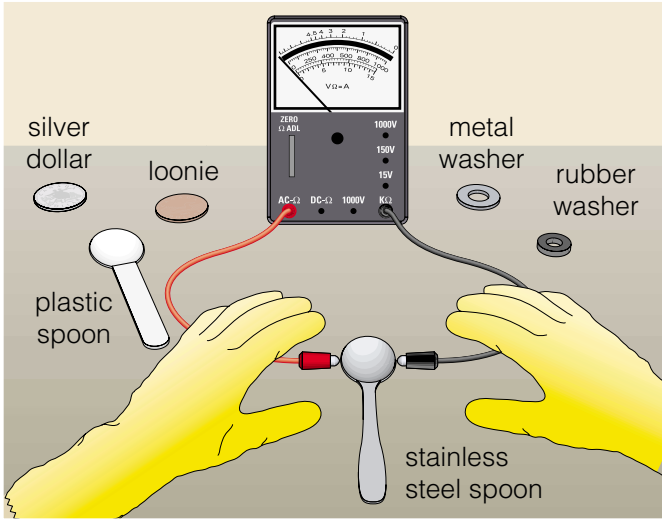
Materials

steel wool
variety of substances to be classified

Design Criteria

A. Choose 10 substances that you would like to classify. These might be supplied by your teacher, or you might like to include your own items after getting your teacher's approval.

B. Your classification system should allow you to classify additional substances.



Will electricity run through this substance? Touch both wires to the sample. The needle on this conductivity tester will move to the right if the sample conducts electricity.

Plan and Construct

1. In your group, brainstorm the physical and chemical properties you might use to classify substances.
2. List what properties you can identify using the materials and apparatus on hand.
3. Develop a series of tests that will confirm several properties of each substance provided. For example, can you pick up an item with the magnet? What is its colour, texture, and state?
4. Plan a procedure for each test, and show it to your teacher for approval.
5. Carry out your tests and record your observations. Wash your hands.
6. Using your observations, classify the samples into groups based on their properties.

Evaluate

1. Were you able to classify each of the substances?
2. Did you gather enough information to distinguish each substance from the others?
3. What do the substances have in common? How do they differ?
4. Suggest ways to improve your classification system.

Check Your Understanding

1. Use the particle theory of matter to explain why liquids and gases take the shape of their containers, and why solids do not.
2. What do the particles in ice and boiling water have in common? How are they different?
3. Identify the state of matter of each of the following substances.
   - **(a)** air
   - **(b)** distilled water at 110°C
   - **(c)** distilled water at 10°C
   - **(d)** distilled water at -10°C
4. Two substances are described below. Use a table to classify each property as either physical or chemical.
   - drain cleaner — thick fluid, dissolves fats, corrosive to skin, blue in colour
   - hydrogen gas — lighter than air, odourless, colourless, explodes when spark is present

Key Terms

matter
theory
particle theory of matter
states of matter
solid
liquid
gas
physical property
chemical property

1.3 Classifying Matter

You have learned about the particle nature of matter and the properties of matter. You have also used this knowledge to group and make predictions about different substances. Using the particle theory, we can organize substances into two basic categories based on how many types of particles they contain.

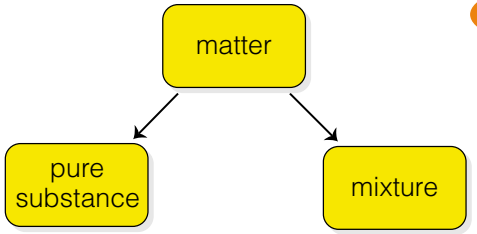


Figure 1.7 Substances can be classified based on how many types of particles they contain.

READING Check

List two classifications of matter.

Pure Substances and Mixtures

Have you ever read the label on a package of your morning breakfast drink? Many labels claim that the package contains "pure" juice. Then, when you read the ingredients, you notice that the package contains water and a list of other ingredients. It is not "pure" at all — it is a mixture.

READING Check

Explain the difference between a pure substance and a mixture.

Scientifically speaking, a **pure substance** is made of only one type of particle. All parts of a pure substance are identical. Examples include distilled water, baking soda, and sugar.

But many items that are advertised as "pure" are actually mixtures. For example, gold is so soft that it has to be mixed with other metals to maintain its shape. Gold jewellery is usually a mixture. So is juice.

A **mixture** contains more than one type of particle. In some mixtures, you can see the different types of substances because similar particles stay clumped together. For example, you can see the different substances that make up salsa and concrete. But you would need a microscope to see the different substances that make up milk, toothpaste, maple syrup, and perfume.

Try This!

Observe products that are labelled "pure." Read the list of ingredients on each label. Which ones match the scientific definition of pure?

Figure 1.8 Just by looking at these products, can you tell which substance is pure?

Differences Between Mixtures and Pure Substances

If you were handed two clear, colourless liquids, and told that one was a mixture and the other was a pure substance, could you tell which was which just by looking at them? Not likely.

In order to tell the substances apart, you would have to examine more of their properties. You might be able to tell them apart by smell, texture, or density. You might need to examine their chemical properties. Or you might have to investigate their boiling and freezing points.

Mixtures boil and freeze at different temperatures than the pure substances that make them up. Road crews use this property of mixtures to keep roads clear of ice. By adding salt to the snow and ice on the roads, they create a salt-water mixture that cannot stay frozen at typical winter temperatures.

READING Check

List methods you would use to tell a pure substance from a mixture.

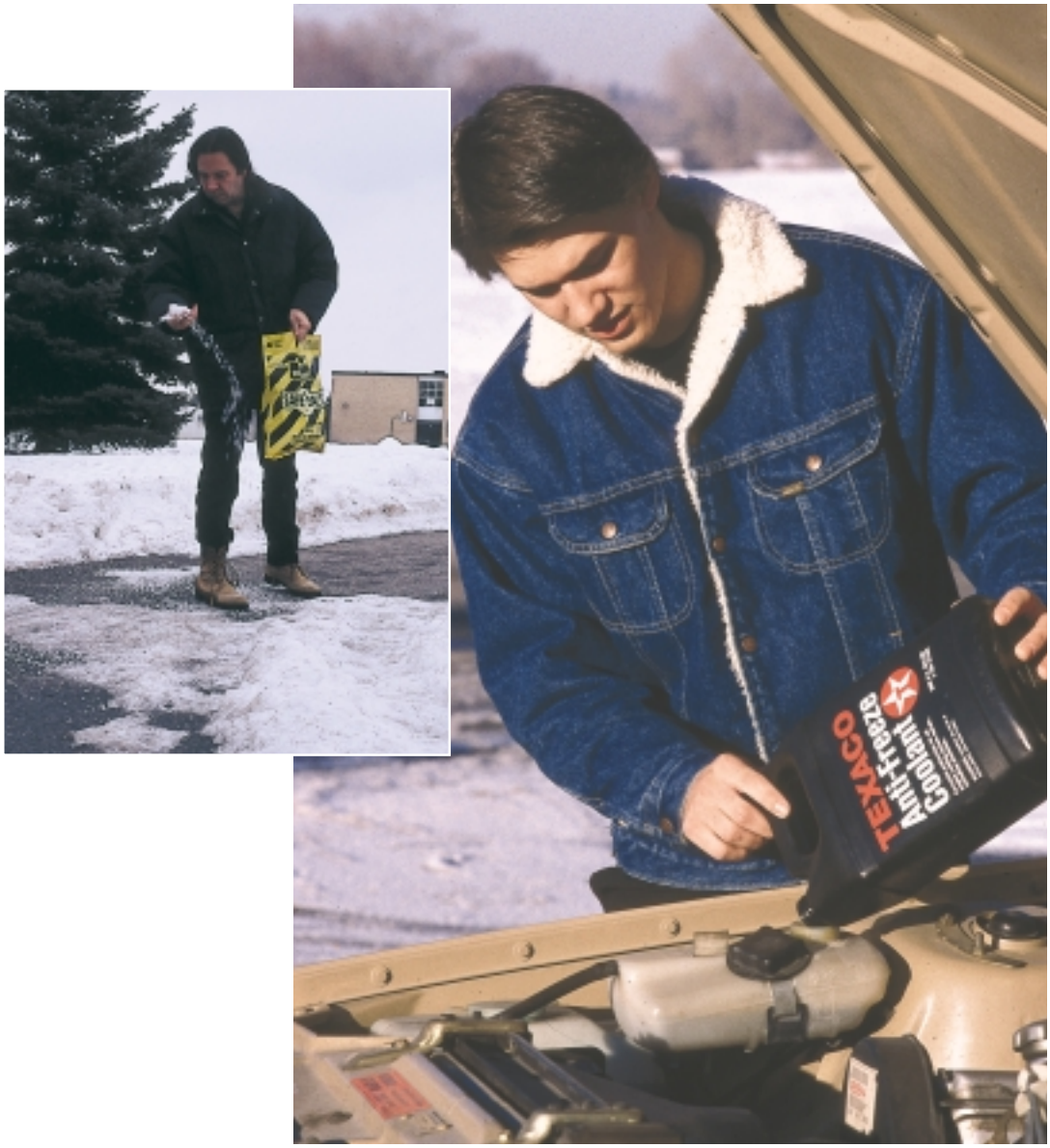


Figure 1.9 Why is salt put on the roads in winter? Why do we use antifreeze in a car's cooling system? The answer has to do with the difference between pure substances and mixtures.

SCIENCE Myths

We add salt to cooking water to raise the boiling temperature and thus cook food faster. But did you know that by the time you added enough salt to affect the cooking time, the food would be too salty to eat?

CONDUCT AN

INVESTIGATION 1-C

SKILL CHECK

- Initiating and Planning
- Performing and Recording
- Analyzing and Interpreting
- Communication and Teamwork

Melting and Boiling Points

Problem

How does salt affect the freezing point and boiling points of water?

Prediction

1. Which of the samples do you think will have the lowest melting point?
2. Which will have the highest boiling point?

Safety Precautions

- Do not stir the mixture with the thermometer.
- Wash your hands and wipe up any spills at the end of the investigation.

Apparatus

4 large beakers (400 mL)
hot plate or Bunsen burner
thermometer
stirring rod
measuring scoop
support stand
thermometer clamp
scale

Materials

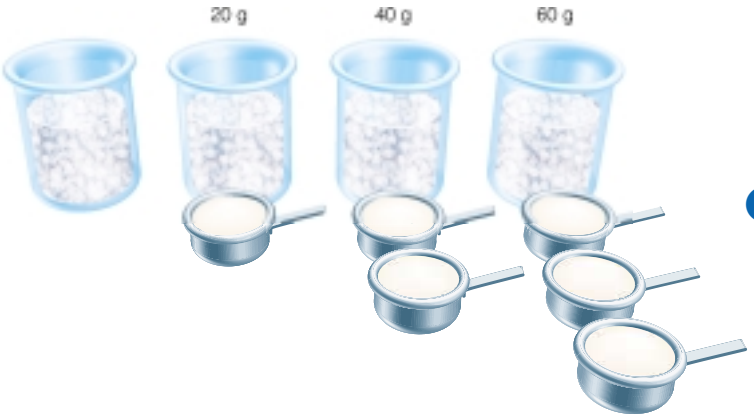
800 mL crushed ice
120 g rock salt (sodium chloride)

Procedure

Your teacher will assign one mixture of salt and ice to your group. Your group will share its data with the class, and you will use the class data to answer the Analyze and Conclude and Apply questions.

Part 1: Melting Point

1. Place 200 mL of crushed ice into each beaker. Record the temperature of the ice when the thermometer stops dropping.
2. Label the beakers A, B, C, and D. Add the following:
   - Beaker A = Add nothing.
   - Beaker B = Add 20 g of salt.
   - Beaker C = Add 40 g of salt.
   - Beaker D = Add 60 g of salt.
3. Use a stirring rod to mix the contents of each beaker thoroughly. Record the temperature of the contents.



Part 2: Boiling Point

1. Use the support stand and thermometer clamp to suspend the thermometer in Beaker A. Make sure that the tip of the thermometer does not touch the bottom of the beaker.
2. Heat the mixture on the hot plate until its contents reach the boiling point.

3. Record the temperature when the thermometer stops rising.

4. Repeat Steps 1–3 with Beakers B, C, and D.

Computer CONNECT

Record your results in a spreadsheet, and then use the graph option to create a graph of your results.

Analyze

1. **(a)** Which beaker reached the lowest temperature?

   (b) Was there any liquid in that beaker?

2. At what temperature did each mixture boil?

3. Graph your results. Make two graphs:
   - In one, place the boiling temperature on the *y*-axis and the amount of salt added on the *x*-axis.
   - In the other, compare the temperature of the ice mixture to the amount of salt added.

4. What pattern do you see in the graphs?

Conclude and Apply

5. Is the melting point of the salt water mixture lower or higher than that of pure water?

Check Your Understanding

Key Terms

pure substance

mixture

1. Use a table to classify each of the following substances as a pure substance or a mixture: baking soda, peanut butter, bleach, distilled water, motor oil, sugar. Explain your classification.

Substance	Pure Substance	Mixture	Explanation
air		X	More than one kind of gas is present.

2. Use your knowledge of the properties of mixtures to explain why antifreeze is placed in car radiators.

3. Explain how you could use your knowledge of mixtures to tell the difference between a container of distilled water and a container of salt water.

4. Explain the difference between the particles of a pure substance and those of a mixture.

CHAPTER

1 Review

Key Terms

WHMIS
MSDS
HHPS
matter
theory
particle theory of matter
states of matter
solid
liquid
gas
physical property
chemical property
pure substance
mixture

Reviewing Key Terms

If you need to review, the section numbers show you where these terms were introduced.

1. Describe a difference between each of the following terms:
(a) physical property and chemical property (1.2)
(b) matter and particle (1.2)
(c) mixture and pure substance (1.3)

2. In your notebook, match each warning in column A with the correct label in column B. (1.1)

A	B
(a) toxic effects	i. 
(b) biohazard	ii. 
(c) corrosive	iii.
(d) flammable	iv. 
(e) dangerously reactive	v. 
(f) poisonous and infectious	vi. 
(g) explosion hazard	vii. 
	viii. 
	ix. 

Understanding Key Ideas

Section numbers are provided if you need to review.

3. Briefly outline what to consider when storing chemicals. (1.1)

4. List three physical properties that make a golf ball different from a table tennis ball. (1.2)

5. Classify each of the following as a physical or chemical property. (1.2)
(a) An iron nail rusts.
(b) Krypton gas "floats" above air.
(c) Sodium reacts violently with water.

6. Name two physical properties sugar and salt have in common. (1.2)

7. Compare the particles in a glass of water with those in an ice cube. (1.2)

8. For each of the following, indicate whether a physical or chemical change has occurred. (1.2)
(a) Paper is cut.
(b) Paper is burned.
(c) A rubber band is stretched.
(d) A cake is baked.
(e) Sugar is dissolved in water.
(f) A match is lit.

9. List three pure substances and three mixtures. Explain the reason for each classification. (1.3)

10. Compare mixtures and pure substances in general terms. (1.3)

Developing Skills

11. List the key points of the particle theory of matter. (1.2)

12. Use marbles to create a model representing the particles in a solid, a liquid, and a gas. (1.2)

13. The following data are provided for two liquids. How can you identify which one is a pure substance and which is a mixture made from the pure substance? (1.3)

	Freezing Temp. (°C)	Boiling Temp. (°C)
Liquid 1	-17	123
Liquid 2	-13	113

Problem Solving/Applying

14. Some materials in your home are hazardous. Prepare a short chart to help your family members remember what each HHPS symbol stands for. (1.1)

15. To make the world easier to understand, we classify things such as music, food, vehicles, and animals. Give an example of a classification system you have encountered and explain why it is useful. (1.2)

16. Explain the effect salt has on icy roads in winter. (1.3)

Critical Thinking

17. What happens to the particles in a liquid as the temperature drops? (1.2)

18. Is it easier to freeze orange juice or distilled water? Explain. (1.3)

Pause & Reflect

1. How hard is it to use chemicals safely? What resources or tools can you use to ensure your safety at work and at home?
2. Go back to the beginning of this chapter on page 4 and review the Getting Ready questions. Now that you have completed this chapter, could you explain the answers to a co-worker or friend? Try it.