

Explore—Doing Science

What piece of safety equipment does this icon represent?



The Activities and Investigations in your textbook will help you explore and investigate questions about your world using the skills of scientific inquiry. Which is the missing skill in the Skill Check below?

Skill Check

- ✓ Performing and Recording
- ✓ Analyzing and Interpreting
- ✓ Communicating



Where would you look in this textbook to find out how to make a scientific drawing?



Explain—Understanding Science

National Geographic features help you understand science through images. What is the title of the National Geographic feature in Unit 4?



Learning how to understand and use science vocabulary is an important communication skill. What colour is used to highlight key terms and their definitions in the margin?



Suppose you are reviewing terms and definitions to study for a test. What part of this textbook can help you?



Extend—Applying Science

Every chapter has a feature that explores a specific real-world scientific topic or issue that relates to that chapter. Questions at the end of the feature challenge you to find out more about the topic. The feature runs along the bottom of two pages.

What is the feature called?



In each chapter you will have the opportunity to read about young Canadians, most of them high school students, who have used the tools of scientific inquiry to positively influence their community, the environment, or some other facet of their lives.

What is the name of this feature?



What feature focusses on careers in science?



Evaluate—Studying Science

What feature, at the beginning of each chapter, provides three strategies to help you learn the material in your science textbook?



Section Review questions, Chapter Review questions, and Unit Review questions all help you check your understanding. What question category helps you test your understanding as you read through a section?



Answers to some of the review questions are included in this textbook. Where are they?



Safety in your Science Classroom

Become familiar with the following safety rules and procedures. It is up to you to use them and your teacher's instructions to make your activities and investigations in *ON Science 9* safe and enjoyable. Your teacher will give you specific information about any other special safety rules that need to be used in your school.

1. Working with your teacher ...

- Listen carefully to any instructions your teacher gives you.
- Inform your teacher if you have any allergies, medical conditions, or other physical problems that could affect your work in the science classroom. Tell your teacher if you wear contact lenses or a hearing aid.
- Obtain your teacher's approval before beginning any activity you have designed for yourself.
- Know the location and proper use of the nearest fire extinguisher, fire blanket, first-aid kit, and fire alarm.

2. Starting an activity or investigation ...

- Before starting an activity or investigation, read all of it. If you do not understand how to do a step, ask your teacher for help.
- Be sure you have checked the safety icons and have read and understood the safety precautions.
- Begin an activity or investigation only after your teacher tells you to start.

3. Wearing protective clothing ...

- When you are directed to do so, wear protective clothing, such as a lab apron and safety goggles. Always wear protective clothing when you are using materials that could pose a safety problem, such as unidentified substances, or when you are heating anything.
- Tie back long hair, and avoid wearing scarves, ties, or long necklaces.

4. Acting responsibly ...

- Work carefully with a partner and make sure your work area is clear.
- Handle equipment and materials carefully.
- Make sure stools and chairs are resting securely on the floor.
- If other students are doing something that you consider dangerous, report it to your teacher.

5. Handling edible substances ...

- Do not chew gum, eat, or drink in your science classroom.
- Do not taste any substances or draw any material into a tube with your mouth.



6. Working in a science classroom ...

- Make sure you understand all safety labels on school materials or those you bring from home. Familiarize yourself, as well, with the WHMIS symbols and the special safety symbols used in this book, found on page xvii.
- When carrying equipment for an activity or investigation, hold it carefully. Carry only one object or container at a time.
- Be aware of others during activities and investigations. Make room for students who may be carrying equipment to their work stations.

7. Working with sharp objects ...

- Always cut away from yourself and others when using a knife or razor blade.
- Always keep the pointed end of scissors or any pointed object facing away from yourself and others if you have to walk with such objects.
- If you notice sharp or jagged edges on any equipment, take special care with it and report it to your teacher.
- Dispose of broken glass as your teacher directs.

8. Working with electrical equipment ...

- Make sure your hands are dry when touching electrical cords, plugs, or sockets.
- Pull the plug, not the cord, when unplugging electrical equipment.
- Report damaged equipment or frayed cords to your teacher.
- Place electrical cords where people will not trip over them.



9. Working with heat ...

- When heating an item, wear safety goggles and any other safety equipment that the text or your teacher advises.
- Always use heatproof containers.
- Point the open end of a container that is being heated away from yourself and others.
- Do not allow a container to boil dry.
- Handle hot objects carefully. Be especially careful with a hot plate that looks as though it has cooled down.
- If you use a Bunsen burner, make sure you understand fully how to light and use it safely.
- If you do receive a burn, inform your teacher, and apply cold water to the burned area immediately.



10. Working with various chemicals ...

- If any part of your body comes in contact with a substance, wash the area immediately and thoroughly with water. If you get anything in your eyes, do not touch them. Wash them immediately and continuously for 15 min, and inform your teacher.
- Always handle substances carefully. If you are asked to smell a substance, never smell it directly. Hold the container slightly in front of and beneath your nose, and waft the fumes toward your nostrils.
- Hold containers away from your face when pouring liquids.

11. Working with living things ...

On a field trip:

- Try not to disturb the area any more than is absolutely necessary.
- If you move something, do it carefully, and always replace it carefully.
- If you are asked to remove plant material, remove it gently, and take as little as possible.

In the classroom:

- Make sure that living creatures receive humane treatment while they are in your care.
- If possible, return living creatures to their natural environment when your work is complete.

12. Cleaning up in the science classroom ...

- Clean up any spills, according to your teacher's instructions.
- Clean equipment before you put it away.
- Wash your hands thoroughly after doing an activity or an investigation.
- Dispose of materials as directed by your teacher. Never discard materials in the sink unless your teacher requests it.

13. Designing and building ...

- Use tools safely to cut, join, and shape objects.
- Handle modelling clay correctly. Wash your hands after using modelling clay.
- Follow proper procedures when using mechanical systems and studying their operations.
- Use special care when observing and working with objects in motion.
- Do not use power equipment such as drills, sanders, saws, and lathes unless you have specialized training in handling such tools.



Safety Symbols

ON Science 9 Safety Symbols

The following safety symbols are used in *ON Science 9* to alert you to possible dangers. Be sure you understand each symbol used in an activity or investigation before you begin.



Disposal Alert

This symbol appears when care must be taken to dispose of materials properly.



Thermal Safety

This symbol appears as a reminder to use caution when handling hot objects.



Sharp Object Safety

This symbol appears when a danger of cuts or punctures caused by the use of sharp objects exists.



Electrical Safety

This symbol appears when care should be taken when using electrical equipment.



Skin Protection Safety

This symbol appears when use of caustic chemicals might irritate the skin or when contact with micro-organisms might transmit infection.



Clothing Protection Safety

A lab apron should be worn when this symbol appears.



Fire Safety

This symbol appears when care should be taken around open flames.



Eye Safety

This symbol appears when a danger to the eyes exists. Safety goggles should be worn when this symbol appears.

Instant Practice—Safety Symbols

Find four of the *ON Science 9* safety symbols in activities or investigations in this textbook. For each symbol, identify the possible dangers in the activity or investigation that the symbol refers to.

WHMIS Symbols

Look carefully at the WHMIS (Workplace Hazardous Materials Information System) safety symbols shown here. The WHMIS symbols are used throughout Canada to identify dangerous materials. Make certain you understand what these symbols mean. When you see these symbols on containers, use safety precautions.



Compressed Gas



Flammable and Combustible Material



Oxidizing Material



Corrosive Material



Poisonous and Infectious Material Causing Immediate and Serious Toxic Effects



Poisonous and Infectious Material Causing Other Toxic Effects



Biohazardous Infectious Material



Dangerously Reactive Material

Instant Practice—Safety Symbols

Hydrogen gas is stored in containers under pressure. This gas is highly flammable.

1. What two symbols would you expect to see on a label for hydrogen gas?
2. Describe the following.
 - a. the risks illustrated by the two symbols
 - b. precautions someone would need to take when working with the gas
 - c. where it could be safely stored
 - d. first aid or emergency treatment
3. If you did not know the answer to part d., where would you find this information?