

You will learn that safety should be your primary concern whenever you are exploring or investigating in the laboratory. You will also learn about safety rules and procedures to follow when performing an experiment.

GUIDED INSTRUCTION

DIRECTIONS Read the following information and answer the questions.

Conducting laboratory and field investigations is an important part of science. As part of your study of biology, you will be conducting investigations. When you do, you must be aware of certain precautions and know how to conduct certain laboratory procedures in a safe manner. In the laboratory, safety should be your main concern.

No matter what investigation you are doing, always be sure to follow your teacher's instructions. Also read the procedure for each investigation very carefully before you begin. Pay particular attention to any safety warnings that are given. For example, you may be told to heat the contents in a test tube and to be sure that the test tube is facing away from you. This way nothing will accidentally splatter out of the test tube and injure your eyes or face.











Protecting your eyes is extremely important. Be sure to wear safety goggles any time there is a chance that harm could come to your eyes. This is especially true when you are working with chemicals or using a heat source such as a flame. To alert you about the need for eye protection, a safety symbol is included as part of the procedure. In fact, safety symbols will alert you to various safety concerns. The illustration below shows some of these safety symbols. Notice that the safety symbol to alert you to wear safety goggles includes an illustration of a pair of safety goggles. Other safety symbols for eye protection may include an illustration of an eye.

Guided Questions

What is always important to keep in mind when performing an investigation?

How should a test tube be set up when it is being heated?

What is included in a laboratory procedure to alert you to possible dangers?

Eye protection		Electrical safety	
Heating safety		Clothing Protection safety	
Glassware safety		Disposal safety	
Chemical safety		Animal safety	
Sharp instrument safety		Plant safety	

Before putting on safety goggles, remove contact lenses if you are wearing them. Even if you are wearing safety goggles, chemicals can get between your eyes and the contact lenses. Try to wear eyeglasses instead of contact lenses. If that is not possible, check with your teacher for safety goggles that are designed to wear over contact lenses. The goggles look like the ones that swimmers wear. No matter what eye protection you are wearing, if chemicals do get in your eyes, flush your eyes immediately with running water for at least 15 minutes. Be sure to tell your teacher what happened.

No matter what image a safety symbol uses, its purpose is always clear. For example, one of the safety symbols in the table on the previous page shows a hand over wavy lines. This warns about heating safety. The same warning would be given by a safety symbol that shows a flame. Whenever you see this safety symbol, be sure to wear heat-resistant gloves when instructed to do so. In addition, use an electric hot plate as a heat source whenever possible rather than an open flame.

Here are some additional rules to keep in mind when you see the other safety symbols.



- Do not use any glassware that is cracked or chipped.
- Use only heat-resistant glassware when heating materials or storing hot liquids.
- Notify your teacher immediately if a piece of glassware breaks.



- If a chemical spills on your skin, rinse it immediately by using a faucet, shower, or eye-wash station.
- Notify your teacher immediately of any chemical that spills. Do not clean it up unless your teacher instructs you to do so.
- Never touch, smell, taste, or mix chemicals.
- Keep any flammable chemical away from a heat source.
- Work in a well ventilated area when using chemicals that emit vapors.

Guided Questions

What should not be worn with safety goggles?

What important feature should you look for in glassware that you use to heat or store materials?



- Use extreme care when using any sharp or pointed instrument.
- Never cut an object while holding it in your hands.
- Cut an object on a suitable surface always in a direction away from your body.



- Be sure that any electrical device is in the “off” position before plugging it in.
- Place electrical cords so that they do not cause anything to topple over if they are accidentally pulled.
- Turn off all electrical equipment when you are finished.
- Never touch an electrical device that has been used until you are sure that it is no longer hot.



- Wear an apron or lab coat when instructed to do so.
- Do not wear open-toed shoes or sandals.
- Secure loose clothing and tie back long hair to prevent it from coming in contact with laboratory equipment, especially heating devices.
- Wear appropriate protective gloves when handling chemicals, solutions, or live specimens.
- Wear heat-resistant gloves to handle equipment that may be hot.
- For field investigations, wear long pants, long sleeves, socks and closed shoes.



- Do not pour chemicals or solutions down a drain unless your teacher instructs you to do so.

Guided Questions

In what direction should you cut something?

Why should you tie back long hair when doing an investigation?

- Follow your teacher's directions for disposing of all materials when you have completed your investigation.
- Wash all glassware so that it is ready to be used for the next investigation.



- Follow your teacher's instructions about handling any animal.
- Always handle an animal with care.
- Wash your hands after handling an animal.



- Do not eat any part of a plant, including the seeds.
- During field investigations, do not pick any wild plants unless your teacher instructs you to do so.
- Wash your hands after handling any part of a plant.

There are some additional safety rules to follow in any investigation you perform.

- Never act inappropriately.
- Know the locations of safety equipment, such as fire extinguishers and eyewash stations.
- Keep your work area organized and clean.
- Never eat, drink, or apply cosmetics in the laboratory.

All these safety rules and concerns may cause you to think that doing a science investigation is a hassle. This is not the case at all. The rules are simple to follow. Paying attention to safety will mean that your laboratory experiences will be not only educational but also enjoyable.

Guided Questions

How should you dispose of materials after an investigation?



SHORT-ANSWER QUESTIONS

DIRECTIONS Answer the following questions.

1. How do you protect your eyes in the laboratory?

2. What must you never do with chemicals when using them in the laboratory?

3. How should you use a sharp object when cutting something?

4. How do you dispose of any chemicals or solutions at the end of a laboratory exercise?

5. When should you not use a piece of glassware for an experiment?

APPLY THE TEKS

DIRECTIONS Read the paragraph, study the diagram, and answer the questions.

A student unwisely decided to perform an experiment in class before the teacher had a chance to review the safety rules and procedures to follow. The illustration below shows what this student did.



What are five safety rules or procedures that this student did not follow?

 STAAR PRACTICE

DIRECTIONS Read each question and choose the best answer.
Then circle the letter for the correct answer.

- 1 Wearing contact lenses in the laboratory may cause harm. How might this happen?
- A A person's vision may become blurred when putting on safety goggles.
 - B Contact lenses prevent a person from washing their eyes should their face get splashed with a liquid.
 - C The lenses may melt from a heat source.
 - D Chemical fumes may become trapped between the eye and contact lens.
- 2 A student was conducting a field investigation. Which of the following is something this student did that demonstrates a proper technique for the conservation of resources?
- A Wore long pants
 - B Did not take any field specimens
 - C Remained with the class at all times
 - D Recorded her observations in a notebook
- 3 A science laboratory normally has safety equipment. Which of the following is an example of such equipment?
- A Hot plates instead of burners
 - B Clean glassware
 - C Eyewash station
 - D Bottles of chemicals that are properly labeled
- 4 Students were finishing an experiment in their science class. What should they do so that they properly dispose of any chemicals that they did not use?
- A Follow instructions that they are given
 - B Place them in a sealable plastic bag and toss them in the trash
 - C Flush them down a drain
 - D Return them to their original containers
- 5 There are certain steps everyone should take before beginning an experiment in the laboratory. However, which of the following is not necessary to do before you begin?
- A Plug in all electrical equipment to get it ready
 - B Examine all the glassware that you will use
 - C Check that the necessary safety equipment is available
 - D Clean and organize your work space so that it is neat



CUMULATIVE REVIEW

DIRECTIONS Read each question and choose the best answer. Then circle the letter for the correct answer.

- 1 A student did an experiment to see how a colored solution moved up a celery stem that had been cut in half lengthwise. Which part of the celery stem did this student observe?
- A Stamen
 - B Root hairs
 - C Phloem
 - D Xylem
- 2 A student used a sharp knife to cut open plant structures to see what happens during germination. Which plant structures did this student examine?
- A Cones
 - B Seeds
 - C Flowers
 - D Roots
- 3 A student got permission from her science teacher to investigate how ultraviolet light might affect the development of seeds. The student was investigating whether ultraviolet light would cause changes in the plant's DNA. What was this student planning to investigate?
- A Mutations
 - B Recombination
 - C Gene flow
 - D Genetic drift
- 4 A student designed and assembled glassware and other equipment for a science fair project that he was planning to do. He placed various gases inside one of the pieces of glassware. He then exposed these gases to intense heat and electrical discharges. What topic in biology was this student investigating as part of his science fair project?
- A Applications of genetics
 - B Development of species
 - C Origin of life
 - D Storage of energy by cells