

# science 10

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## unit 1: chemistry



## book 1: lab safety & equipment

name: Key

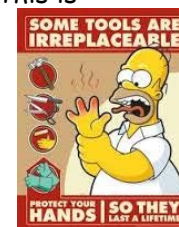
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# Laboratory Safety Rules



1. Students are not to enter the lab (*ie: be at lab benches with lab materials*) unless a teacher is present. Students are NEVER to enter the lab prep room.
2. Never run or 'muck around' in the laboratory. During a lab, you **MUST** remain at your own bench.
3. There is no food or drink permitted in the laboratory. *At desks is OK.*
4. Water bottles & bags/backpacks are to be left at your desk during labs.
5. NEVER taste or smell any substance in the lab, unless instructed to do so safely by your teacher.
6. Always listen carefully and follow instructions specifically. If there is anything you don't understand, ask your teacher. It is very important for your safety that you understand all instructions.
7. Always clean up and return equipment to the correct place when finished an experiment.
8. Keep benches and floor areas tidy. This means all chairs must be pushed in when working at the lab benches, and extra books/equipment is never to be placed on the floor.
9. Breaks and accidents (even minor) must always be reported to your teacher immediately.
10. NEVER attempt to pick up broken glass. Inform your teacher, and keep others clear of the area.
11. Laboratory equipment and chemicals are **ONLY** to be used as directed by your teachers' instructions.
12. Waste products/remains from experiments are to be disposed of as instructed by your teacher. Remember, not everything is safe to rinse down the sink, or throw away in the bin.
13. Be sure any burning material (eg. Match) is put out completely before throwing away.
14. All hot equipment is to be placed to a heatproof mat, **NOT** directly on the benchtop.
15. **ALWAYS** wear safety glasses during experiments with hazardous materials or when heating.
16. Long hair and loose clothing must be tied back during experiments.
17. Long pants & closed toed shoes must be worn during experiments
18. **ALWAYS** wash your hands after any experiments in the laboratory.
19. Use gas taps & water for **EXPERIMENTS** only.
20. Bench tops are to be cleaned and disinfected following **EVERY** practical experiment.
21. When heating or mixing substances, **NEVER** point towards yourself or others.
22. Never mix chemicals or do your own experiments unless you have permission from your teacher. This is wasteful, and could be very dangerous.
23. Always rinse/clean glassware following an experiment.
24. Always use tongs to pick up equipment/objects that have been heated
25. If you need to leave a Bunsen Burner, **ALWAYS** turn it to the visible orange/yellow safety flame



Misbehaviour & breach of safety rules in the laboratory will result in immediate consequences, including a ban from participation in any further practical experiments.



## Prepare For Lab

- ✓ Always use caution in the lab.
- ✓ Handle chemicals carefully.
- ✓ No running in the lab!
- ✓ Read and follow all directions.
- ✓ Learn emergency procedures.
- ✓ Know where emergency equipment is stored.
- ✓ Push lab stools in out of the way—Keep aisles clear!



## In Case of Accident



- ✓ Always notify your teacher immediately!
- ✓ Dispose of broken glass as directed by teacher → do not touch!
- ✓ Clean up any spills immediately!
- ✓ Report any spills, accidents of injury immediately!
- ✓ For a chemical spill on you skin, wash = soap + water; rinse 10-15 mins
- ✓ For a chemical splash in you eyes use eyewash station 15 mins!
- ✓ In case of a large area of spill on your body: safety shower
- ✓ In case of fire: List 4 items that can be used depending on the size of the fire.

fire extinguisher, fire blanket, cover with watch glass, water can, wet paper towel

## Dress For Lab



- ✓ No shorts, skirts, or open-toed shoes
- ✓ Roll up long sleeves
- ✓ Long hair MUST be tied back
- ✓ No hanging jewelry or scarves
- ✓ Wear safety goggles, lab coat, or apron
- ✓ No books, backpacks, or purses in the lab area.

# Lab Safety



## End of Lab

- ✓ Clean and put away all equipment at the end of the lab period.
- ✓ Dispose of waste products according to instruction.
- ✓ Always wash your hands after each lab!

## The Lab Burner

- ✓ Never leave a lit bunsen burner unattended.
- ✓ Use caution when handling heated glassware (use tongs)
- ✓ Do not place hot glassware directly on the lab desk or in cold water (glass will shatter)
- ✓ Never heat a closed container
- ✓ Keep Flammables away from open flames
- ✓ Point the end of a test tube being heated away from yourself and others!

## Handling Chemicals

- ✓ Don't use chemicals that aren't labeled
- ✓ Don't taste anything in the lab unless instructed to
- ✓ Smell by wafting with your hand
- ✓ No unauthorized experiments!
- ✓ Always add acids to water—never add water to acids
- ✓ Never return spilled or unused chemical to the stock bottle! (contamination)
- ✓ Don't touch your face, eyes, or mouth while working in lab
- ✓ No food, drink, gum allowed in the lab.





# Amoeba Sisters | Video Recap

NAME: \_\_\_\_\_

## Amoeba Sisters Video Recap: General Lab Safety

The illustrations below involve one or more general lab safety concepts. For each illustration, write in any applicable lab safety concepts that could relate with that illustration.

1. <sup>Closed toed shoes</sup> <sup>eye protection</sup> <sup>stuffed back</sup> <sup>wear goggles,</sup> <sup>wear hair up,</sup> <sup>gloves for</sup> <sup>chemicals,</sup> <sup>bags should not be</sup> <sup>where people can trip,</sup> <sup>clothing, protection</sup> <sup>you should wear</sup> a safety apron; never drink or eat anything in a lab.

LAB ATTIRE WHEEL OF WISDOM

2. Keep aisles clear

3. Always use a broom and dustpan to pick up broken glass and dispose of appropriately.

4. Do not pour chemicals back into original container.

(THE DRAIN) CAN'T TOUCH THIS

5. Do not put down the drain.

### Heating it Up

In your own words, list safety guidelines that you would follow to be safe when heating this test tube.

6. Point testtubes away from face.







# Amoeba Sisters | Video Recap

NAME: \_\_\_\_\_

## Locate the Safety Equipment in your Lab Room!

For the following items, write where they are found in *your* lab room. Depending on your course and the types of labs that you perform, some may not be applicable. If any are not applicable to your lab room, write N/A under location. If there are other types of lab items or safety equipment that your instructor mentioned, you can add them to the bottom of this chart.

Item/Equipment	What is it for?	Location?
Eyewash	7. To clean chemicals out of eyes.	8. Back left corner.
Safety Shower	9. For <del>the</del> large chemical spills on a person.	10. Back left corner.
Aprons	11. Clothing protection	12. In the locker.
Goggles	13. Eye protection.	14. In the locker.
Fume Hood	15. For venting toxic fumes.	16. Next to the locker.
Fire Extinguisher	17. For fires not on people.	18. By the front door. Back left corner.
Fire Blanket	19. For fires on people.	20. Back left corner.
Fire Exit Route Map	21. For escaping fire.	22. Next to the front door.
Container for Broken Glass	23. For broken glass.	24. Bullet can back left corner.
Biohazard Bag	25. For biohazard	26. Bullet can back left corner.
Chemical Waste Disposal	27. For disposal of chemical waste	28. Front lab table.
Broom and Dustpan	29. Sweeping up glass and solid spills.	30. Inside the side door.
First Aid Kit	31. For first aid help.	32. In the red bag behind the teacher's desk.
MSDS/SDS	33. For looking up chemical safety for chemicals.	34. On the teacher's computer.
Phone	35. For calling for emergencies.	36. Front lab table.



School Name \_\_\_\_\_

Teacher \_\_\_\_\_

## PURPOSE

Science is a hands-on laboratory class. You will be doing many laboratory activities which require the use of hazardous chemicals. Safety in the science classroom is the #1 priority for students, teachers, and parents. To ensure a safe science classroom, a list of rules has been developed and provided to you in this student safety contract. These rules must be followed at all times. Two copies of the contract are provided. One copy must be signed by both you and a parent or guardian before you can participate in the laboratory. The second copy is to be kept in your science notebook as a constant reminder of the safety rules.

## GENERAL RULES

1. Conduct yourself in a responsible manner at all times in the laboratory.
2. Follow all written and verbal instructions carefully. If you do not understand a direction or part of a procedure, ask the instructor before proceeding.
3. Never work alone. No student may work in the laboratory without an instructor present.
4. When first entering a science room, do not touch any equipment, chemicals, or other materials in the laboratory area until you are instructed to do so.
5. Do not eat food, drink beverages, or chew gum in the laboratory. Do not use laboratory glassware as containers for food or beverages.
6. Perform only those experiments authorized by the instructor. Never do anything in the laboratory that is not called for in the laboratory procedures or by your instructor. Carefully follow all instructions, both written and oral. Unauthorized experiments are prohibited.
7. Be prepared for your work in the laboratory. Read all procedures thoroughly before entering the laboratory.
8. Never fool around in the laboratory. Horseplay, practical jokes, and pranks are dangerous and prohibited.
9. Observe good housekeeping practices. Work areas should be kept clean and tidy at all times. Bring only your laboratory instructions, worksheets, and/or reports to the work area. Other materials (books, purses, backpacks, etc.) should be stored in the classroom area.
10. Keep aisles clear. Push your chair under the desk when not in use.
11. Know the locations and operating procedures, where appropriate, for all safety equipment including first aid kit, eye-wash station, safety shower, fire extinguisher, and fire blanket. Know where the fire alarm and exits are located.
12. Always work in a well-ventilated area. Use the fume hood when working with volatile substances or poisonous vapors. Never place your head into the fume hood.
13. Be alert and proceed with caution at all times in the laboratory. Notify the instructor immediately of any unsafe conditions you observe.
14. Dispose of all chemical waste properly. Never mix chemicals in sink drains. Sinks are to be used only for water and those solutions designated by the instructor. Solid chemicals, metals, matches, filter paper, and all other insoluble materials are to be disposed of in the proper waste containers, not in the sink. Check the label of all waste containers twice before adding your chemical waste to the container.
15. Labels and equipment instructions must be read carefully before use. Set up and use the prescribed apparatus as directed in the laboratory instructions or by your instructor.
16. Keep hands away from face, eyes, mouth and body while using chemicals or preserved specimens. Wash your hands with soap and water after performing all experiments. Clean all work surfaces and apparatus at the end of the experiment. Return all equipment clean and in working order to the proper storage area.
17. Experiments must be personally monitored at all times. You will be assigned a laboratory station at which to work. Do not wander around the room, distract other students, or interfere with the laboratory experiments of others.
18. Students are never permitted in the science storage rooms or preparation areas unless given specific permission by their instructor.
19. Know what to do if there is a fire drill during a laboratory period; containers must be closed, gas valves turned off, fume hoods turned off, and any electrical equipment turned off.
20. Handle all living organisms used in a laboratory activity in a humane manner. Preserved biological materials are to be treated with respect and disposed of properly.
21. When using knives and other sharp instruments, always carry with tips and points pointing down and away. Always cut away from your body. Never try to catch falling sharp instruments. Grasp sharp instruments only by the handles.
22. If you have a medical condition (e.g., allergies, pregnancy, etc.), check with your physician prior to working in lab.

## CLOTHING

23. Any time chemicals, heat, or glassware are used, students will wear laboratory goggles. There will be no exceptions to this rule!
24. Contact lenses may be worn provided adequate face and eye protection is provided by specially marked, non-vented safety goggles. The instructor should know which students are wearing contact lenses in the event of eye exposure to hazardous chemicals.
25. Dress properly for lab activities. Long hair, dangling jewelry, and loose or baggy clothing are hazardous. Long hair must be tied back and dangling jewelry and loose or baggy clothing must be secured. Shoes must completely cover the foot. No sandals allowed.
26. Lab aprons have been provided for your use and should be worn during laboratory activities.

## ACCIDENTS AND INJURIES

27. Report any accident (spill, breakage, etc.) or injury (cut, burn, etc.) to the instructor immediately, no matter how trivial it may appear.
28. If you or your lab partner are hurt, immediately yell out "Code one, Code one" to get the instructor's attention.
29. If a chemical splashes in your eye(s) or on your skin, immediately flush with running water from the eyewash station or safety shower for at least 20 minutes. Notify the instructor immediately.
30. When mercury thermometers are broken, mercury must not be touched. Notify the instructor immediately.

## HANDLING CHEMICALS

31. All chemicals in the laboratory are to be considered dangerous. Do not touch, taste, or smell any chemicals unless specifically instructed to do so. The proper technique for wafting chemical vapors will be demonstrated to you.
32. Check the label on chemical bottles twice before removing any of the contents. Take only as much chemical as you need.



33. Never return unused chemicals to their original containers.
34. Never use mouth suction to fill a pipet. Use a rubber bulb or pipet pump.
35. When transferring reagents from one container to another, hold the containers away from your body.
36. Acids must be handled with extreme care. You will be shown the proper method for diluting strong acids. Always add acid to water, swirl or stir the solution and be careful of the heat produced, particularly with sulfuric acid.
37. Handle flammable hazardous liquids over a pan to contain spills. Never dispense flammable liquids anywhere near an open flame or source of heat.
38. Never remove chemicals or other materials from the laboratory area.
39. Take great care when transporting acids and other chemicals from one part of the laboratory to another. Hold them securely and walk carefully.

**HANDLING GLASSWARE AND EQUIPMENT**

40. Carry glass tubing, especially long pieces, in a vertical position to minimize the likelihood of breakage and injury.
41. Never handle broken glass with your bare hands. Use a brush and dustpan to clean up broken glass. Place broken or waste glassware in the designated glass disposal container.
42. Inserting and removing glass tubing from rubber stoppers can be dangerous. Always lubricate glassware (tubing, thistle tubes, thermometers, etc.) before attempting to insert it in a stopper. Always protect your hands with towels or cotton gloves when inserting glass tubing into, or removing it from, a rubber stopper. If a piece of glassware becomes “frozen” in a stopper, take it to your instructor for removal.
43. Fill wash bottles only with distilled water and use only as intended, e.g., rinsing glassware and equipment, or adding water to a container.
44. When removing an electrical plug from its socket, grasp the plug, not the electrical cord. Hands must be completely dry before touching an electrical switch, plug, or outlet.
45. Examine glassware before each use. Never use chipped or cracked glassware. Never use dirty glassware.
46. Report damaged electrical equipment immediately. Look for things such as

frayed cords, exposed wires, and loose connections. Do not use damaged electrical equipment.

47. If you do not understand how to use a piece of equipment, ask the instructor for help.
48. Do not immerse hot glassware in cold water; it may shatter.

**HEATING SUBSTANCES**

49. Exercise extreme caution when using a gas burner. Take care that hair, clothing and hands are a safe distance from the flame at all times. Do not put any substance into the flame unless specifically instructed to do so. Never reach over an exposed flame. Light gas (or alcohol) burners only as instructed by the teacher.
50. Never leave a lit burner unattended. Never leave anything that is being heated or is visibly reacting unattended. Always turn the burner or hot plate off when not in use.
51. You will be instructed in the proper method of heating and boiling liquids in test tubes. Do not point the open end of a test tube being heated at yourself or anyone else.
52. Heated metals and glass remain very hot for a long time. They should be set aside to cool and picked up with caution. Use tongs or heat-protective gloves if necessary.
53. Never look into a container that is being heated.
54. Do not place hot apparatus directly on the laboratory desk. Always use an insulating pad. Allow plenty of time for hot apparatus to cool before touching it.
55. When bending glass, allow time for the glass to cool before further handling. Hot and cold glass have the same visual appearance. Determine if an object is hot by bringing the back of your hand close to it prior to grasping it.

**QUESTIONS**

56. Do you wear contact lenses?  
 YES  NO
57. Are you color blind?  
 YES  NO
58. Do you have allergies?  
 YES  NO  
If so, list specific allergies \_\_\_\_\_

**AGREEMENT**

I, \_\_\_\_\_ (student's name) have read and agree to follow all of the safety rules set forth in this contract. I realize that I must obey these rules to ensure my own safety, and that of my fellow students and instructors. I will cooperate to the fullest extent with my instructor and fellow students to maintain a safe lab environment. I will also closely follow the oral and written instructions provided by the instructor. I am aware that any violation of this safety contract that results in unsafe conduct in the laboratory or misbehavior on my part, may result in being removed from the laboratory, detention, receiving a failing grade, and/or dismissal from the course.

\_\_\_\_\_  
Student Signature

\_\_\_\_\_  
Date

Dear Parent or Guardian:

We feel that you should be informed regarding the school's effort to create and maintain a safe science classroom/ laboratory environment.

With the cooperation of the instructors, parents, and students, a safety instruction program can eliminate, prevent, and correct possible hazards.

You should be aware of the safety instructions your son/daughter will receive before engaging in any laboratory work. Please read the list of safety rules above. No student will be permitted to perform laboratory activities unless this contract is signed by both the student and parent/guardian and is on file with the teacher.

Your signature on this contract indicates that you have read this Student Safety Contract, are aware of the measures taken to ensure the safety of your son/daughter in the science laboratory, and will instruct your son/daughter to uphold his/her agreement to follow these rules and procedures in the laboratory.

\_\_\_\_\_  
Parent/Guardian Signature

\_\_\_\_\_  
Date



# Scavenger Hunt: Safety Contract & Rules



## Answer Sheet : Flinn Safety Contract Scavenger Hunt

Directions: Read the Safety Contract, then use it to fill in the number for the rule described below.  
Get ready to hunt!

Ex.        Rule 1        Act Responsibly in the laboratory.

- \_\_\_\_\_ Shoes must completely cover the foot. 25
- \_\_\_\_\_ Wash your hands with soap and water after performing all experiments. 16
- \_\_\_\_\_ Work areas should be kept clean and tidy at all times. 9
- \_\_\_\_\_ Living organisms should be treated humanely. 20
- \_\_\_\_\_ Never use mouth suction to fill a pipet. 34
- \_\_\_\_\_ Always turn the burner off when not in use. 50
- \_\_\_\_\_ While using chemicals or preserved specimens, keep hands away from your body. 16
- \_\_\_\_\_ Be prepared for your work in the laboratory. Read all procedures thoroughly. 7
- \_\_\_\_\_ If you have a medical condition, check with your physician prior to working in lab. 22
- \_\_\_\_\_ If a chemical splashes in your eye(s) or on your skin, immediately flush with water. 29
- \_\_\_\_\_ Containers must be closed, gas valves, fume hoods, and equipment must be turned off.  
19
- \_\_\_\_\_ They should be set aside to cool and picked up with caution. 52
- \_\_\_\_\_ Always carry with tips and points pointing down and away. 21
- \_\_\_\_\_ Do not touch any equipment, chemicals, or materials until instructed to do so. 4
- \_\_\_\_\_ Take only as much chemical as you need. 32
- \_\_\_\_\_ Keep desk aisles clear. 10
- \_\_\_\_\_ Follow all written and verbal instructions carefully. 2
- \_\_\_\_\_ Do not wander around the room, distract other students, or interfere with others. 17
- \_\_\_\_\_ Lab aprons should be worn during lab activities. 26
- \_\_\_\_\_ Grasp the plug, not the electrical cord when removing an electrical plug from its socket.  
44
- \_\_\_\_\_ Never look into a container that is being heated. 53
- \_\_\_\_\_ Hold them securely and walk carefully. 39
- \_\_\_\_\_ Report any accident immediately. 27



Name: \_\_\_\_\_

Date: \_\_\_\_\_

Class: \_\_\_\_\_

- \_\_\_\_\_ Always work in a well-ventilated area. 12
- \_\_\_\_\_ Be very careful when you insert or remove rubber stoppers from glass tubing. 42
- \_\_\_\_\_ The proper technique for smelling chemical fumes will be demonstrated to you. 31
- \_\_\_\_\_ Do not eat or drink in the lab or use glassware to eat or drink from. 5
- \_\_\_\_\_ Contact lenses should not be worn unless you have permission during lab. 24
- \_\_\_\_\_ Students are not permitted in science storage rooms unless given permission. 18
- \_\_\_\_\_ Perform only authorized experiments. 6
- \_\_\_\_\_ Fill wash bottles only with distilled water to clean glassware. 43
- \_\_\_\_\_ Report damaged electrical equipment immediately. 46
- \_\_\_\_\_ Do not place hot glassware or objects directly on the laboratory desk. 54
- \_\_\_\_\_ Hold containers away from your body when transferring reagents. 35
- \_\_\_\_\_ Never use chipped or cracked glassware. 45
- \_\_\_\_\_ Never leave a lit burner unattended. 50
- \_\_\_\_\_ Handle flammable hazardous liquids over a pan to contain spills. 37
- \_\_\_\_\_ Carry glass tubing in a vertical position. 40
- \_\_\_\_\_ Never work in the lab without the instructor present. 3
- \_\_\_\_\_ Do not immerse hot glassware in cold water. 48
- \_\_\_\_\_ Dispose of all chemical waste properly. 14

According to the Safety Contract:

What are 3 examples of conducting yourself responsibly in the lab? Various answers

- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_

List 3 new words you came across while reading the safety contract, then find their definitions. variable

- 4. \_\_\_\_\_
- 5. \_\_\_\_\_
- 6. \_\_\_\_\_

# Homework

## ASSIGNMENT #2: Complete Activity 1.1, "Quick Check" Q #1-2

This assignment is to be completed in this workbook.

+ Dress the Part p. 11

### Activity 1.1: Safety in the Laboratory

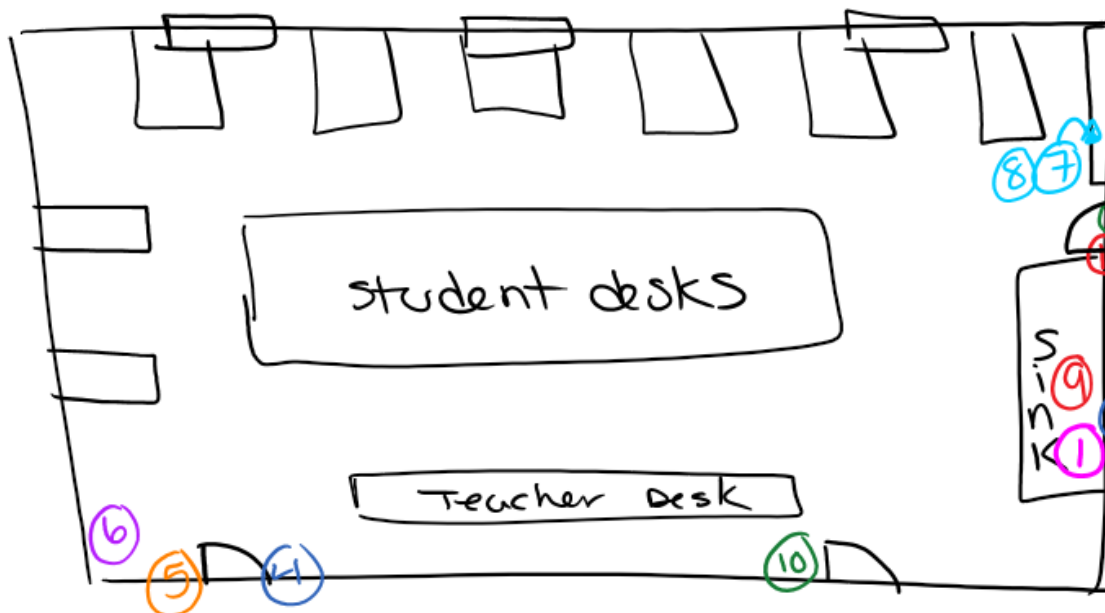
#### Question

Where is the safety equipment located in your chemistry laboratory?

#### Procedure

- In the space below, draw an outline map of your chemistry laboratory, including every item in Table 1.1.3. which appears in the room
- Are there items **missing** that could contribute to safety in your lab? List them below:

10 items



① eye wash station

② Fire Blanket

③ safety Shower

④ Fire Extinguisher

⑤ First Aid Kit

⑥ Fume Hood

⑦ safety Glasses

⑧ Aprons

⑨ Broken Glass

⑩ Phone

## PRACTICE

1. How would you deal with each of the following accidents should it occur during a lab you are performing this year?

(a) While heating a small amount of alcohol in a beaker, it bursts into flame.

**Cover beaker with a watch glass/lid/book to smother the flames**

(b) Your partner hands you a piece of hot glass they've just bent after heating over a Bunsen burner.

**Grab it using tongs, or ask your partner to place it down on a heat proof mat**

(c) A test tube full of concentrated hydrochloric acid is dropped and broken on the floor.

**Notify teacher immediately. Acid will be neutralized with baking soda. Glass will be swept up & disposed of in the broken glass bin (NOT placed in the regular garbage can)**

2. How could you have prevented each accident from happening to begin with?

a) **Heat with a hot plate, NOT a bunsen burner. Then there is no flame.**

b) **No unauthorized experiments. Students should not be bending glass. Do not hand other students hot glassware or equipment**

c) **Always store test tubes in a test tube rack, or carry using tongs.**



# Dress the Part

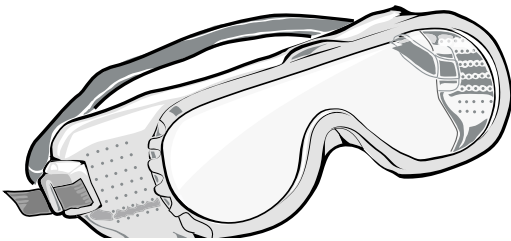
**Background:** There are several pieces of clothing that have been developed specifically for use in the science laboratory. You have probably already used protective goggles, a lab apron, and protective gloves while working in the classroom science lab. In this activity you will identify different pieces of protective equipment, and think of situations in which you should use them.

## PERSONAL PROTECTION PICTOGRAMS



**Directions:** Below are three pictures of protective equipment for the science lab.

- write the name of each item
- write a scenario in which you would need that protection.



Name: \_\_\_\_\_

When to Wear: \_\_\_\_\_

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### SUGGESTED ANSWERS

#### Dress the Part (p. 27)



safety goggles - Wear whenever you use chemicals, heat, or cut things in the science lab.



protective gloves - Wear to protect your hands when working with harmful substances.



lab apron - Wear to protect your clothes from chemicals or stains.

Name: \_\_\_\_\_

When to Wear: \_\_\_\_\_

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Name: \_\_\_\_\_

When to Wear: \_\_\_\_\_

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# SCRAMBLED EYES

## A Lab Safety Demonstration



Did you know that your eyes are very similar in composition to eggs? It's true! Both egg whites and your eyes contain a high amount of proteins and they will both react the same way when exposed to certain chemicals. This activity will demonstrate the importance of observing safety procedures while working in the lab.

Observe the beakers of liquid. One sample is water, and the other sample is a common household chemical that can be dangerous if you aren't careful!

### PREDICTION:

I think that sample A or B is water because what did you think?  
(impossible to tell, both are clear liquids)  
↑ so important to label all chemicals.

Watch your teacher and **record your observations** below.

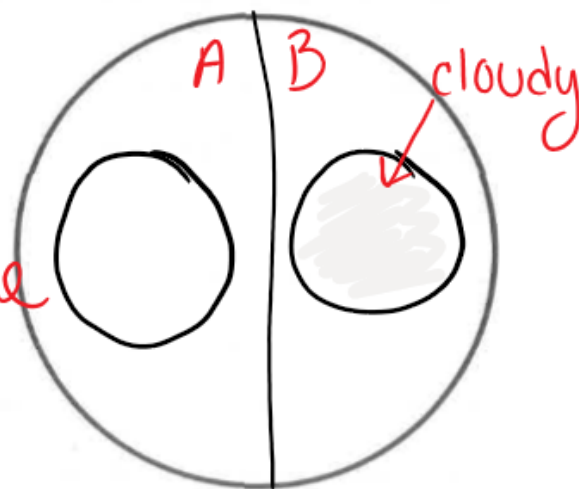
Sample A  
(water)

Sample B  
(1.5M HCl acid)

• no change

• egg white became cloudy

### SKETCH



**What do you think** would happen to your eyes if this chemical was splashed into them during a lab?

similar to the egg, without immediate first aid, permanent damage could be caused. - impaired vision



## Part B: Eye Wash Station Simulation

Watch and record your observations below.

- the egg whites do not "rinse clean"
- egg remains cloudy
- permanent change to the molecular protein structure

Did the eggs come clean using water?

No.

How does this demonstrate the importance of lab safety?

shows the risk to your eyes if protection is not worn.

What are some ways you can prevent accidents and injury during lab activities?

- wear safety glasses
- label chemicals clearly
- follow all teacher instructions.

## Safety Procedures

Any time you know you will be working in the laboratory, it is important to arrive fully prepared to perform all work as safely as possible. We call this *lab preparedness*. The following are some things you should always do before you begin doing a lab.



- Read the entire experiment before class, paying close attention to any safety issues.
- Prepare any Data Tables that may be required. Your teacher will often ask you to prepare a Flow chart before you arrive for lab.
- Clear all binders, backpacks, book bags, coats, etc. away from your Lab bench.
- Always wear eye protection during the laboratory period.
- Wear lab aprons or lab coats if available.
- Tie back long hair to keep it away from flames or chemicals.
- Secure loose sleeves or jewellery to keep them away from flames or chemicals.
- Consider wearing clothing made of natural fibres such as cotton and wool, as those are the most fire resistant fibres.
- Do not wear open-toed shoes or shorts/skirts/etc. during laboratory work.
- Be sure all equipment is in good working order. Do not use broken/chipped glassware or damaged electrical equipment.
- **Never** attempt laboratory procedures without your instructor's permission and direct instruction/supervision.

## Laboratory Technique

There are several things that all good chemists know about using equipment and chemicals in the lab. We refer to these things as *proper laboratory technique*.



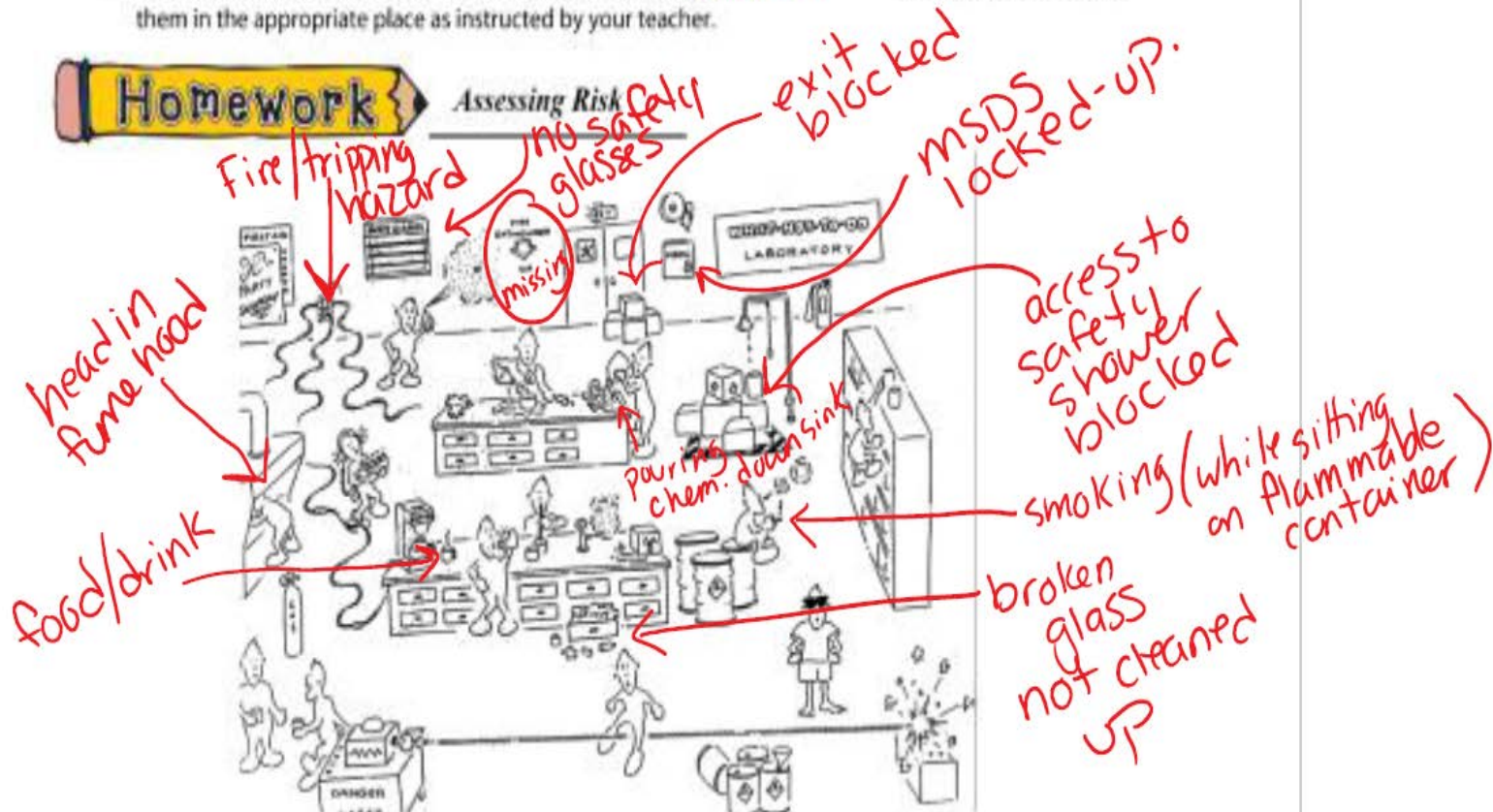
- Always approach lab work with a responsible attitude and keep voices kept to a reasonable volume.
- Do not eat food or drink or chew gum during laboratory period.
- Never touch or taste chemicals.
- Never inhale chemicals directly. Use your hand to waft odours toward you.
- Bring your hand near metal or glass to test for heat. Handle hot equipment with appropriate tongs, test tube holders, or mitts.
- Never use open flames around flammable materials. Use a hot plate or mantle.
- Clamp test tubes near the top and hold at a 45° angle with constant movement and the end pointed away from everyone **during heating**.
- Never leave heat sources unattended. Turn off Bunsen burners and hot plates when not in use.
- When diluting chemicals, **always** start with water. It is particularly important to add acid to water never the other way around.



## Laboratory Clean Up

Last, but not least, there are a number of things that relate to **laboratory clean up**. Some of these things may be related to accidents that occur in the lab. Others simply relate to leaving the lab in as good, or better, condition than you found it.

- Sweep broken glassware into a dustpan and place it in the proper disposal container. **Always** notify teacher & neighbours of any broken glass.
- Clean up spilled chemicals immediately with the spill kit. Be sure to notify neighbours of any chemical spill.
- **Never** return unused chemical to the original stock bottle. Either share it with another student or properly dispose of any excess.
- Always wash glassware well with soap and a brush, then rinse it, and leave it to air dry.
- Wash Rinse your hands well following the use of any chemicals.
- Wipe your lab bench with soap + water when you have completed your lab.
- Clean up should begin with a reasonable amount of time to allow all equipment to be washed well and replaced in the appropriate spot.
- For experiments that run for more than one period, clearly label all materials and leave them in the appropriate place as instructed by your teacher.









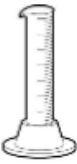



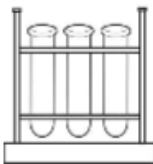



Identify at least 6 things going wrong in the "What-not-to-do-Laboratory"

1. \_\_\_\_\_
  2. \_\_\_\_\_
  3. \_\_\_\_\_
  4. \_\_\_\_\_
  5. \_\_\_\_\_
  6. \_\_\_\_\_
- (various answers)

# **LABORATORY EQUIPMENT SCAVENGER HUNT**

**Instructions:**

For each piece of laboratory equipment shown, find it in the room, or record where it is located (when asked). *Record the NAME & FUNCTION* using the card found on the table.

Picture	Name	Picture	Name
1. 	<b>Name of Equipment:</b> <b>Safety Glasses/Goggles</b>	8. 	<b>Name of Equipment:</b> <b>Test Tube Holder/Tongs</b>
	Where is it located? (Circle one) FRONT <b>BACK</b> LEFT RIGHT		<b>Function:</b> <b>For holding test tubes while Heating over a flame</b>
2. 	<b>Name of Equipment:</b> <b>Beaker</b>	9. 	<b>Name of Equipment:</b> <b>Wash Bottle</b>
	<b>Function:</b> <b>Holding chemicals or observing a reaction</b>		<b>Function:</b> <b>Contains distilled water. Used to rinse samples</b>
3. 	<b>Name of Equipment:</b> <b>Erlenmeyer Flask</b>	10. 	<b>Name of Equipment:</b> <b>Beaker Tongs</b>
	<b>Function:</b> <b>Holding chemicals or observing a reaction</b>		<b>Function:</b> <b>For handling hot beakers</b>
4. 	<b>Name of Equipment:</b> <b>Measuring Cylinder</b>	11. 	<b>Name of Equipment:</b> <b>Fluted Funnel</b>
	<b>Function:</b> <b>For measuring liquids in mL</b>		<b>Function:</b> <b>Used for pouring liquids into small containers or openings</b>
5. 	<b>Name of Equipment:</b> <b>Test Tube</b>	12. 	<b>Name of Equipment:</b> <b>Pipette</b>
	<b>Function:</b> <b>Holding liquids or solids. Can be heated</b>		<b>Function:</b> <b>For measuring small volumes of Liquids</b>
6. 	<b>Name of Equipment:</b> <b>Test Tube Rack</b>	13. 	<b>Name of Equipment:</b> <b>Scoopula</b>
	<b>Function:</b> <b>Used to safely hold test tubes during a lab experiment</b>		<b>Function:</b> <b>Moving samples of solids Sometimes called spatula</b>
7. 	<b>Name of Equipment:</b> <b>Watch Glass</b>	14. 	<b>Name of Equipment:</b> <b>Electronic Balance</b>
	<b>Function:</b> <b>Used for holding a sample for Observation. Can be used to cover a beaker to prevent evaporation, or smother a small fire</b>		<b>Function:</b> <b>Used to measure mass Typically measures in grams (g)</b>

# The Bunsen Burner Mini-Lab

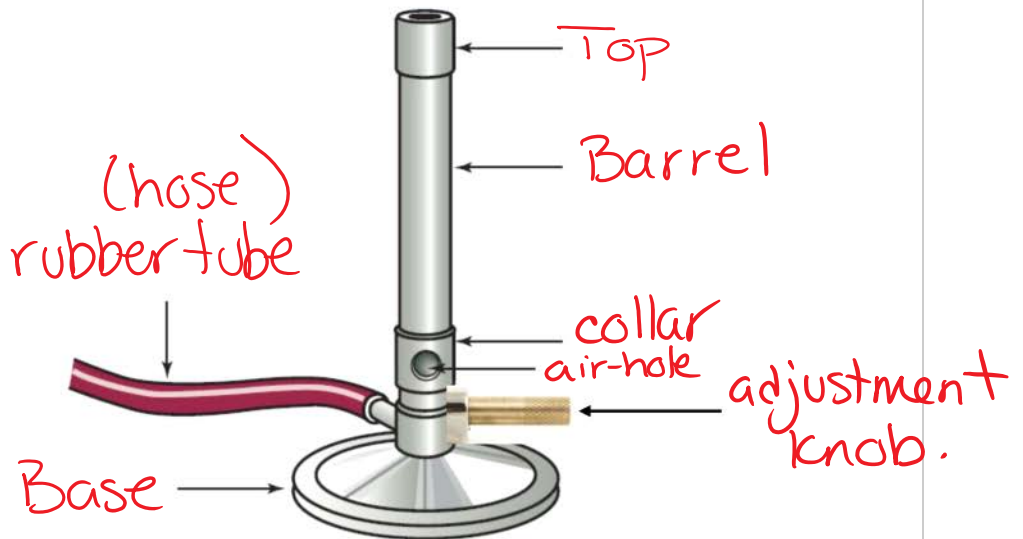
Name: \_\_\_\_\_  
 Group Members: \_\_\_\_\_

Block: \_\_\_\_\_  
 Date: \_\_\_\_ / \_\_\_\_ / \_\_\_\_

**Background:** Often a chemist needs to heat materials. The Bunsen Burner is one of the most efficient ways of doing this. Burners mix gas with air to produce a hot flame. In this lab you will learn how to light and adjust a burner flame and to alternate between the safety flame and the heating flame. (orange/yellow) (blue)

**Parts of the Bunsen Burner:**

Label the parts of the Bunsen burner below.  
 [air hole, barrel, base, collar, gas tube, top]



**Objective:** To investigate... how to safely light and operate a bunsen burner

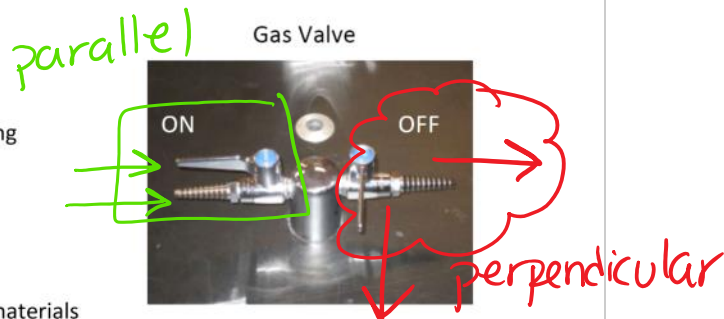


**Materials:**

- |                 |                  |
|-----------------|------------------|
| • bunsen burner | • safety goggles |
| • striker       | • lab aprons     |
| • rubber tubing | • heat-proof mat |

**Safety:**

- 🔥 tie long hair back
- 🔥 Roll up sleeves and remove loose clothing
- 🔥 Put on safety goggles/glasses
- 🔥 Wear a lab apron
- 🔥 Check hose for cracks or damage
- 🔥 Clear the bench of any flammable materials
- 🔥 Check that the gas valve (*handle*) is in the OFF position (perpendicular to the gas tap)
- 🔥 Turn the collar of the Bunsen burner so the air hole is closed.



**Procedure:**

1. Connect hose securely to gas supply tap and Bunsen Burner
2. Make sure the air hole is closed
3. Close the gas flow adjustment valve at the bottom of the burner, and then open it 1 full turn.
4. With the striker in one hand, turn the gas valve-handle **parallel** to the gas tap & hose with your other hand.
5. **IMMEDIATELY** hold the striker over the top of the barrel and light the Bunsen Burner by creating a spark.  
**NOTE: when you first light your Bunsen Burner, it will be on the "safety" or yellow flame.**
6. Place one hand on the base to hold the burner steady, and using your other hand, turn the collar so the air hole is **open**.  
**NOTE: you have now turned the Bunsen Burner to the "heating" or blue flame**
7. Use the adjustment value to change the flame height.
8. When finished, turn the collar so the Bunsen burner is again on the safety flame, and turn the gas valve-handle to the **OFF position** to stop the flow of gas.

**Analysis Questions:**

1. Fill in the following blanks using the word bank below:

WORD BANK			
Rubber	Heat proof surface	Close	Top
Orange	Air-hole	Collar	Blue

NOTE: this question refers to matches, we will always use a striker!

**How to use a Bunsen burner**

1. Connect the Bunsen burner to a gas tap using a piece of rubber tubing.
2. Put the Bunsen burner on a heat proof surface.
3. close the air-hole.
4. Light a match.
5. Put the lighted match over the top and turn on the gas tap. The flame of the Bunsen burner should be orange and irregular in shape.
6. Open the collar slowly. The colour of the flame changes to blue.
7. When not using the Bunsen burner for a while, close air-hole. This will change the blue flame back to a yellow flame. The yellow flame is the safety flame.

**8. Turn off the gas tap after use.**

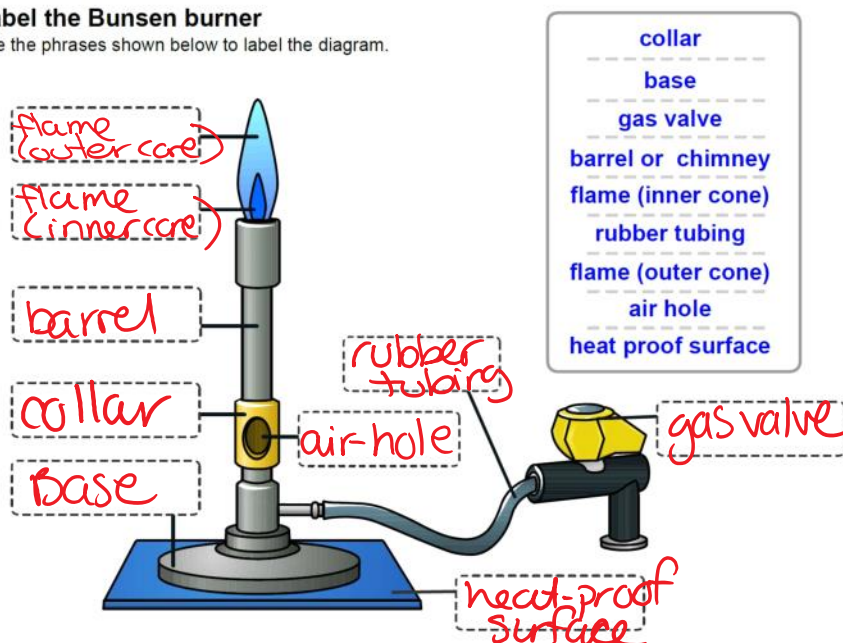
2. What is the colour of the Bunsen flame when the air hole is:

- a. OPEN: blue
- b. CLOSED: yellow / orange

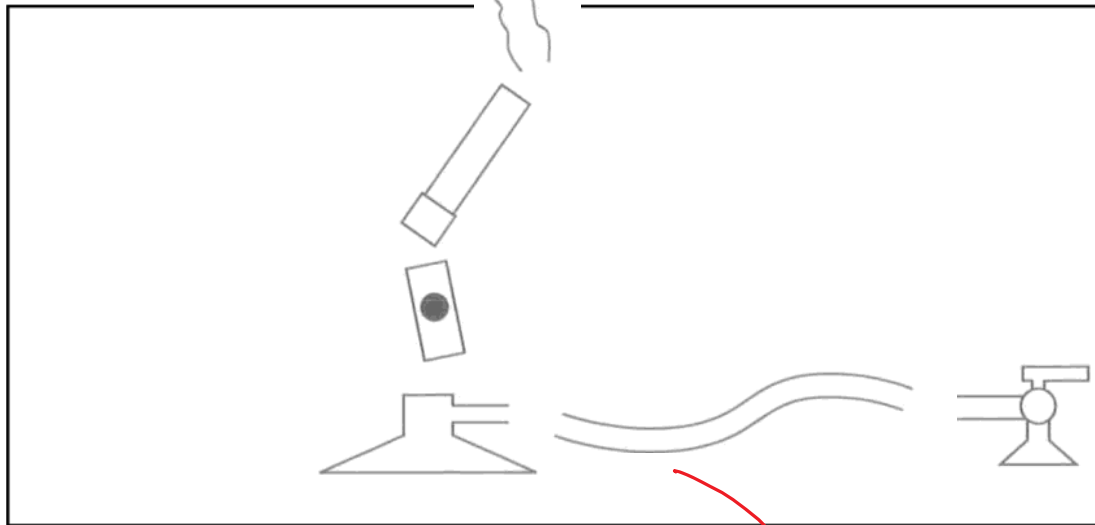
3. Label the Bunsen Burner:

**Label the Bunsen burner**

Use the phrases shown below to label the diagram.



Paste diagram from Questions #4 HERE:



Paste answer to QUESTION #5 HERE:

*see NT*

<p>4</p>	<p>view from above 3 on</p>	<p>7</p>	<p>9</p>	<p>1</p>
<p>5</p>	<p>2</p>	<p>view from above 10 off</p>	<p>6</p>	<p>8</p>
<p>2 Close the air hole.</p>	<p>8 Hold the test tube above the Bunsen burner.</p>	<p>4 Light a match.</p>	<p>10 Turn off the gas tap.</p>	<p>9 Close the air hole again.</p>
<p>7 Open the air hole.</p>	<p>6 Blow out the match.</p>	<p>5 Place flame of match near top of Bunsen burner.</p>	<p>1 Attach the rubber hose of the Bunsen burner to the gas tap.</p>	<p>3 Turn on the gas at the gas tap.</p>