LAB SAFETY, EQUIPMENT, AND PROCEDURES

PURPOSE: To review lab safety, and introduce laboratory procedures and equipment.

INTRODUCTION: As a new chemistry student, it is imperative to understand safe and proper procedures in the Chemistry laboratory. Safety is a serious issue, and breaches of safety regulations will not be tolerated. As chemists, we will occasionally be working with hazardous materials. It is important that every student understand how to handle and use these materials to prevent serious injury. In addition, you will be presented with information about equipment that you may not have seen before. It is expected that you will know the names and uses of this equipment. There will be a lab practical assessment as part of the midterm grade.

PROCEDURE:
A) Safety Contract: You will review the attached safety contract with the instructor. This contract will also function as you lab safety rules. At the bottom is a portion where you and your parents must sign. Return this signed portion tomorrow for homework. YOU WILL NOT BE PERMITTED IN THE LAB UNTIL THIS HAS BEEN COMPLETED AND RECEIVED!

B) Review of safety equipment: With the instructor, you will review the location and proper use of safety equipment. Please draw a rough sketch of the lab, noting the location of all safety equipment and exits, and submit at the end of today's lab period.

C) Lab Partners: Students will work in groups of two, and only two, for the year. Please carefully choose you lab partner, and report to the instructor. You will be assigned a lab station, which will be your station for the year. The condition of the lab station will be your responsibility. It should be checked every week before lab to check for missing or damaged equipment.

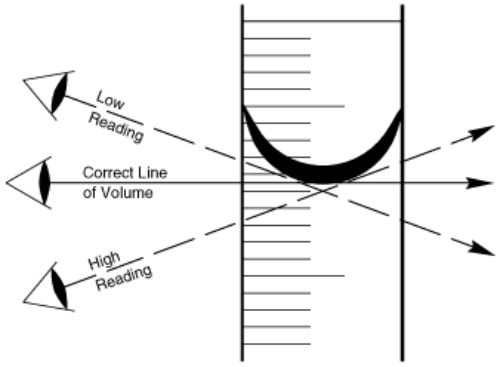
D) Equipment: Attached is a sheet showing the various types of equipment used in a chemistry lab. Some of these pieces are in your lab station, with your instructor, review all pieces of equipment. Know the name and function of each piece for your quiz on Friday!

E) Bunsen Burner: During the year, we will be using both hot plates and Bunsen burners. Many of you have not used Bunsen burners before. It is important to know how to light them correctly. Follow the teacher's instruction, and light the Bunsen burner. Both teammates must show the instructor that they have lit the burner.

F) Handling of solids: With a clean spatula, take about one gram of sodium chloride from the supply bottle on the instructor's table. Place this material on a

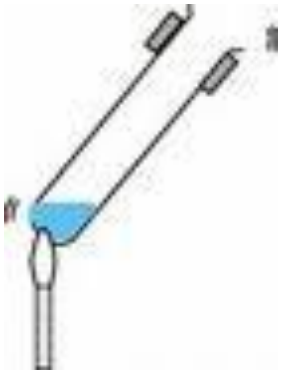
small piece of paper creased down the center. Bring the creased paper to the mouth of a test tube. Pour the material into the tube. Set the tube in a test tube rack, and dispose of the paper in the trash.

G) Handling of liquids: Pour enough water into a graduated cylinder to fill it to the 15 ml mark. Read the volume from the underside of the curved surface, called the *meniscus*. This is the correct way to read volume.



Slowly pour this liquid into the test tube, and return the test tube to the rack.

H) Heating a liquid: **CAUTION! Always point a test tube that is being heated away from yourself and your neighbors.** Use a low flame on your Bunsen burner. Grasp the test tube of salt solution using the test tube holder. Be sure that the test tube is dry on the outside. Move the test tube in and out of the flame for a few seconds, and then lower it into the upper part of the flame. Keep the tube in constant motion while heating (See figure for proper method of holding a test tube in flame). When the salt has dissolved, set the tube in the rack and allow it to cool. Begin clean-up of your lab station and storage of lab equipment. Pour the salt solution down the sink, and rinse out the test tube. Store drying test tubes upside down in the test tube rack. Have the instructor review your lab station before dismissal.



Mr. Shenkler's
Science Classroom Lab Safety Contract

Science is a hands-on laboratory class. Students will be doing many laboratory activities that may require the use of chemicals, laboratory equipment, and other items which, if used incorrectly, can be hazardous. Safety in the science classroom is the number 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. The student and a parent **must sign their copy**. **Please read the entire contract before you sign**. Students will not be allowed in the laboratory until all their contracts are signed and given to the teacher.

GENERAL GUIDELINES

1. Conduct yourself in a responsible manner at all times in the laboratory. Follow all written and verbal instructions carefully. If you do not understand a direction or part of a procedure, ASK YOUR TEACHER BEFORE PROCEEDING WITH THE ACTIVITY.

2. Never work alone in the laboratory. All lab work must be done in teams of two, and only two. No student may work in the science classroom without the presence of the teacher.

3. 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.*

4. Perform only those experiments authorized by your teacher. Carefully follow all instructions, both written and oral. Unauthorized experiments, either in class or at home, are not allowed.

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. Be prepared for your work in the laboratory. Read all procedures thoroughly before entering the laboratory. Never fool around in the laboratory. *Horseplay, practical jokes, and pranks are dangerous and will not be tolerated!*

7. Observe good housekeeping practices. Work *areas should be kept clean and tidy at all times.* Lab tables should be clear of all coats and bags.

8. Be alert and proceed with caution at all times in the laboratory. This means no iPods, disk players, or any other electronic media. Notify the teacher immediately of any unsafe conditions you observe.

9. Dispose of all chemical waste properly. Never mix chemicals in sink drains. Check with your teacher for disposal of chemicals and solutions.

10. Labels and equipment instructions must be read carefully before use. Set up and use the equipment as directed by your teacher.

11. Keep hands away from face, eyes, mouth, and body while using chemicals or lab equipment. Wash your hands with soap and water after performing all experiments.

12. Experiments must be personally monitored at all times. Do not wander around the room, distract other students, startle other students or interfere with the laboratory experiments of others.

13. Know the locations and operating procedures of all safety equipment including: first aid kit(s), and fire extinguisher. Know where the fire alarm and the exits are located.

14. Know what to do if there is a fire drill during a laboratory period; containers must be closed, and any electrical equipment turned off.

CLOTHING

15. Students will wear safety goggles while in the lab area. NO EXCEPTIONS TO THIS RULE!

16. Contact lenses may not be worn in the laboratory.

17. Dress properly during a laboratory activity. Long hair, dangling jewelry, and loose or baggy clothing are a hazard in the laboratory. Long hair must be tied back, and dangling jewelry and baggy clothing must be secured. Shoes must completely cover the foot. *No sandals allowed on lab days.*

18. A lab coat or smock should be worn during laboratory experiments that involve liquids.

ACCIDENTS AND INJURIES

19. Report any accident (spill, breakage, etc.) or injury (cut, burn, etc.) to the teacher immediately, no matter how trivial it seems. Do not panic.

20. If you or your lab partner is hurt, immediately (and loudly) yell out the teacher's name to get the teacher's attention. Do not panic.

21. If a chemical should splash in your eye(s) or on your skin, immediately flush with running water for at least 20 minutes. Immediately (and loudly) yell out the teacher's name to get the teacher's attention.

HANDLING CHEMICALS

22. All chemicals in the laboratory are to be considered dangerous. Avoid handling chemicals with fingers. *Do not taste or smell any chemicals*.

23. Check the label on all chemical bottles twice before removing any of the contents. Take only as much chemical as you need.

24. *Never* return unused chemicals to their original container.

25. *Never* remove chemicals or other materials from the laboratory area.

HANDLING GLASSWARE AND EQUIPMENT

26. Never handle broken glass with your bare hands. Call the teacher for clean-up.

27. Examine glassware before each use. Never use chipped, cracked, or dirty glassware.

28. If you do not understand how to use a piece of equipment, ASK THE TEACHER FOR HELP!

29. Do not immerse hot glassware in cold water. The glassware may shatter.

HEATING SUBSTANCES

30. Do not operate a hot plate or Bunsen burner by yourself. Take care that hair, clothing, and hands are a safe distance from the hot plate at all times. Use of hot plate is only allowed in the presence of the teacher.

31. Heated glassware remains very hot for a long time. They should be set aside in a designated place to cool, and picked up with caution. Use tongs or heat protective gloves if necessary.

32. Never look into a container that is being heated. Never point the open end of a test tube that is being heated at anyone.

33. Do not place hot apparatus directly on the laboratory desk. Always use an insulated pad. Allow plenty of time for hot apparatus to cool before touching it.

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 insure my own safety, and that of my fellow students and teachers. I will cooperate to the fullest extent with my instructor and fellow students to maintain a safe science 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 my being removed from the lab classroom, detention, receiving a failing grade, and/or further disciplinary action.

_____ _____

Student signature Date

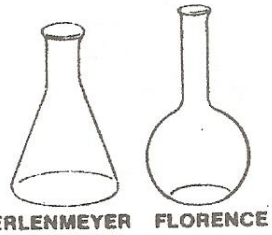
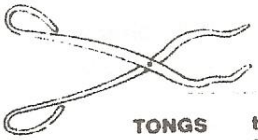
Dear Parent or Guardian:

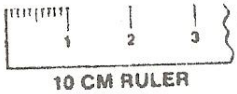
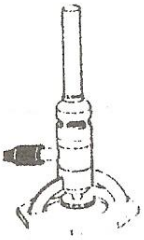
We feel that you should be informed regarding Piscataway High School's effort to create and maintain a safe science classroom/laboratory environment. With the cooperation of the teachers, parents, and students, a safety instruction program can eliminate, prevent, and correct possible hazards. You should be aware of the safety instructions your son or 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 insure the safety of your son or daughter in the science laboratory, and will instruct your son or daughter to uphold his or her agreement to follow these rules and procedures in the laboratory.

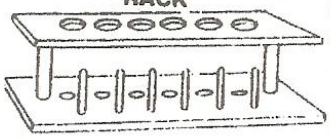
_____ _____

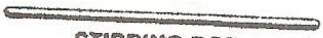
Parent/Guardian signature Date

List Of Apparatus For Student Use

DESCRIPTION	APPARATUS	USE
glass common sizes 100 ml 250 ml 400 ml marked on the beaker	 BEAKER	as a container, like a cup may be heated
glass common sizes 125 ml 250 ml 500 ml marked on the flask	 ERLENMEYER FLASK FLORENCE FLASK	may be heated
glass marked with a milliliter (ml) scale size / divisions 50 ml / 1.0 ml 25 ml / 0.2 or 0.5 ml 10 ml / 0.1 ml	 GRADUATED CYLINDER	to measure volume
glass several sizes	 TEST TUBE	many uses can be heated
metal clamp with a spring handle	 TEST TUBE CLAMP	to hold a test tube
metal	 TONGS	to pick up and hold apparatus

DESCRIPTION	APPARATUS	USE
10 centimeter (cm) ruler, plastic divided into centimeter and millimeter (mm) divisions	 10 CM RULER	to measure length
triangular wire frame with clay material coverings	 PIPESTEM TRIANGLE	to support the crucible
small porcelain dish with cover	 CRUCIBLE AND COVER	to heat small amounts of solid material at high temperature
hardened asbestos	 ASBESTOS SQUARE	to place under hot apparatus
wire screen asbestos center	 WIRE GAUZE	to spread the heat of a flame
metal heating device connected to gas outlet with rubber tubing	 LABORATORY BURNER	to heat chemical in beakers or tes tubes
metal rod upright heavy base	 RING STAND	a support with many uses

DESCRIPTION	APPARATUS	USE
iron ring with screw fastener several sizes	 IRON RING	to fasten to the ring stand as a support for apparatus
metal clamp with 1. screw fastener 2. swivel and lock nut 3. adjusting screw 4. curved clamp	 BURET CLAMP	to hold apparatus may be fastened to the ring stand
heavy porcelain dish with grinder	 MORTAR AND PESTLE	to grind chemicals to a powder
may be of metal or porcelain	 SPATULA	to transfer solid chemicals in weighing
metal file with three cutting edges	 TRIANGULAR FILE	to scratch glass to file
short length of rubber tubing	 RUBBER CONNECTOR	to connect parts of apparatus
metal clamp with finger grips	 PINCH CLAMP	to clamp a rubber connector
rack; may be wood, metal or plastic	TEST TUBE RACK 	to hold test tubes in an upright position

DESCRIPTION	APPARATUS	USE
brush with wire handle	 TEST TUBE BRUSH	to scrub glass apparatus
glass rod	 STIRRING ROD	to stir combinations of materials to use in pouring liquids
porcelain dish	 EVAPORATING DISH	as a container for small amounts of liquid being evaporated
thick glass	 GLASS PLATE	many uses (should not be heated)
curved glass	 WATCH GLASS	may be used as a beaker cover may be used in evaporating very small amounts of liquid
glass or plastic	 FUNNEL	to hold a filter paper may be used in pouring
glass tip with rubber bulb	 MEDICINE DROPPER	to transfer small amounts of liquid
metal	 FORCEPS	to pick up or hold small objects