IB Chemistry Summer Packet

All students taking IB Chemistry course are required to complete a review packet prior to the start of the course. The packet is designed to help the student review material that was learned in prerequisite science classes. The material is necessary for the student to successfully be in IB Chemistry. A pretest will be administered the second week of classes to assess the students' knowledge of the science concepts covered in the packet.

The teacher will personally consult with the parent/student to discuss their future in the class if:

1. The student does not show adequate knowledge of the subject material covered on the pretest.

2. The student does not complete the summer work packet by the first day of class.

3. The student does not hand in the summer work packet on the first day of class.

I have read and understand the information written above.
Student signature: _____ Date _____
Parent/guardian signature: _____ Date _____

I attest that all of the work contained in this packet is my own. *This does not mean that you can't work together on this, I HIGHLY SUGGEST IT, however this means that you did not just copy someone's work.*

Student signature: _____ Date _____

PARENTS: Please take some time and look through this packet as well. Pay particular attention to the "Show your work"

Student Name: _____

Please also review the lab safety contract, sign it, and turn it in the first day of school. (found at the end of the packet)

If you have questions, please contact me at victoriagriffin@u-46.org. I will check my email weekly over the summer break and will be happy to assist you.

With this packet, try your best! We WILL be covering these topics over the first week of school. A test over the summer content will be given the second week.

See you this fall!

1A												3A	4A	5A	6A	7A	8A
1 **H** Hydrogen 1.0079	2A																2 **He** Helium 4.0026
3 **Li** Lithium 6.941	4 **Be** Beryllium 9.0122											5 **B** Boron 10.81	6 **C** Carbon 12.011	7 **N** Nitrogen 14.007	8 **O** Oxygen 15.999	9 **F** Fluorine 18.998	10 **Ne** Neon 20.179
11 **Na** Sodium 22.990	12 **Mg** Magnesium 24.305	1B	2B	3B	4B	5B	6B	7B	8B	9B	10B	13 **Al** Aluminum 26.982	14 **Si** Silicon 28.086	15 **P** Phosphorus 30.974	16 **S** Sulfur 32.06	17 **Cl** Chlorine 35.453	18 **Ar** Argon 39.948
19 **K** Potassium 39.098	20 **Ca** Calcium 40.08	21 **Sc** Scandium 44.956	22 **Ti** Titanium 47.90	23 **V** Vanadium 50.941	24 **Cr** Chromium 51.996	25 **Mn** Manganese 54.938	26 **Fe** Iron 55.847	27 **Co** Cobalt 58.933	28 **Ni** Nickel 58.71	29 **Cu** Copper 63.546	30 **Zn** Zinc 65.38	31 **Ga** Gallium 69.72	32 **Ge** Germanium 72.59	33 **As** Arsenic 74.922	34 **Se** Selenium 78.96	35 **Br** Bromine 79.904	36 **Kr** Krypton 83.80
37 **Rb** Rubidium 85.468	38 **Sr** Strontium 87.62	39 **Y** Yttrium 88.906	40 **Zr** Zirconium 91.22	41 **Nb** Niobium 92.906	42 **Mo** Molybdenum 95.94	43 Tc Technetium (97)	44 **Ru** Ruthenium 101.07	45 **Rh** Rhodium 102.91	46 **Pd** Palladium 106.4	47 **Ag** Silver 107.87	48 **Cd** Cadmium 112.41	49 **In** Indium 114.82	50 **Sn** Tin 118.69	51 **Sb** Antimony 121.75	52 **Te** Tellurium 127.60	53 **I** Iodine 126.90	54 **Xe** Xenon 131.30
55 **Cs** Cesium 132.91	56 **Ba** Barium 137.33	71 **Lu** Lutetium 174.97	72 **Hf** Hafnium 178.49	73 **Ta** Tantalum 180.95	74 **W** Tungsten 183.85	75 **Re** Rhenium 186.21	76 **Os** Osmium 190.2	77 **Ir** Iridium 192.22	78 **Pt** Platinum 195.09	79 **Au** Gold 196.97	80 **Hg** Mercury 200.59	81 **Tl** Thallium 204.37	82 **Pb** Lead 207.2	83 **Bi** Bismuth 208.98	84 **Po** Polonium (209)	85 **At** Astatine (210)	86 **Rn** Radon (222)
87 **Fr** Francium (223)	88 **Ra** Radium (226)	103 Lr Lawrencium (260)	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (263)	107 Bh Bohrium (262)	108 Hs Hassium (265)	109 Mt Meitnerium (266)	110 (269)	111 (272)	112 (277)						

57 **La** Lanthanum 138.91	58 **Ce** Cerium 140.12	59 **Pr** Praseodymium 140.91	60 **Nd** Neodymium 144.24	61 **Pm** Promethium (145)	62 **Sm** Samarium 150.4	63 **Eu** Europium 151.96	64 **Gd** Gadolinium 157.25	65 **Tb** Terbium 158.93	66 **Dy** Dysprosium 162.50	67 **Ho** Holmium 164.93	68 **Er** Erbium 167.26	69 **Tm** Thulium 168.93	70 **Yb** Ytterbium 173.04
89 **Ac** Actinium (227)	90 **Th** Thorium 232.04	91 **Pa** Protactinium 231.04	92 **U** Uranium 238.03	93 Np Neptunium 237.05	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (254)	100 Fm Fermium (257)	101 Md Mendeleviu m (258)	102 No Nobelium (259)

IB Chemistry is an in-depth and rigorous (but hopefully enjoyable) course. This course will not only challenge you to advance your chemistry knowledge but also to develop your critical thinking, problem solving, and inquiry skills. The activities selected for summer work should help you review essential chemistry concepts, lay the foundation for the Internal Assessment component of this course, and allow us to hit the ground running in the fall. Completion of the following activities is required and will be due the ***first day*** of class.

Section 1: Things to Know

There is no "work" to be completed for this section. Instead, please find a list of commonly used items that you should review prior to the beginning of school.

1. **Element Names and Symbols**
2. **Common Polyatomic Ions, Polyatomic Elements, and Metal Ions**

You need to know the names and formulas (including charge) of the following polyatomic ions.

Polyatomic Ions to Memorize

Negative Charge	Ion Name and Formula	
1-	hydroxide, OH^- acetate, $C_2H_3O_2^-$ cyanide, CN^- hydrogen carbonate, HCO_3^- (bicarbonate)	hypochlorite, ClO^- chlorite, ClO_2^- chlorate, ClO_3^- perchlorate, ClO_4^- hydrogen sulfate, HSO_4^- (bisulfate) nitrate, NO_3^- nitrite, NO_2^-
2-	chromate, CrO_4^{2-} dichromate, $Cr_2O_7^{2-}$	carbonate, CO_3^{2-} sulfite, SO_3^{2-} sulfate, SO_4^{2-}
3-	phosphate ion, PO_4^{3-}	

Positive Charge	Ion Name and Formula
1+	ammonium ion, NH_4^{1+}

Polyatomic Elements to Memorize:

H_2, N_2, O_2, F_2, Cl_2, Br_2, I_2 P_4 S_8

Metal Ions to Memorize:

Ag^{+1} Zn^{2+} Cd^{2+} Al^{3+} Ga^{3+} Mercury (I) Hg_2^{+2} Mercury (II) Hg^{+2}

3. **Strong Acids and Bases**

You need to know the names and formulas of the following strong acids and strong bases.

Strong Acids:		Strong Bases:	
Hydrochloric Acid - HCl	Chloric Acid $HClO_3$	Lithium Hydroxide LiOH	Rubidium Hydroxide RbOH
Hydrobromic Acid - HBr	Nitric Acid HNO_3	Sodium Hydroxide NaOH	Cesium Hydroxide CsOH
Hydroiodic Acid - HI	Sulfuric Acid H_2SO_4	Potassium Hydroxide KOH	Calcium Hydroxide $Ca(OH)_2$
		Strontium Hydroxide $Sr(OH)_2$	Barium Hydroxide $Ba(OH)_2$

4. **SI Units and Conversions**

You need to know all the SI units below and how to convert between magnitudes.

Property	Unit	Symbol
Mass	**gram**	**g**
Time	**second**	**s**
Temperature	**Kelvin**	**K**
Volume	**cubic meter**	**m^3**
Pressure	**Pascal**	**Pa**
Energy	**Joule**	**J**

TABLE 1.3 Selected Prefixes used in the Metric System

Prefix	Abbreviation	Meaning	Example
Giga	G	10^9	1 gigametre (Gm) = 1×10^9 m
Mega	M	10^6	1 megametre (Mm) = 1×10^6 m
Kilo	k	10^3	1 kilometre (km) = 1×10^3 m
Deci	d	10^{-1}	1 decimetre (dm) = 0.1 m
Centi	c	10^{-2}	1 centimetre (cm) = 0.01 m
Milli	m	10^{-3}	1 millimetre (mm) = 0.001 m
Micro	μ[a]	10^{-6}	1 micrometre (μm) = 1×10^{-6} m
Nano	n	10^{-9}	1 nanometre (nm) = 1×10^{-9} m
Pico	p	10^{-12}	1 picometre (pm) = 1×10^{-12} m
Femto	f	10^{-15}	1 femtometre (fm) = 1×10^{-15} m

[a]This is the Greek letter mu (pronounced 'mew').

5. **Common Lab Equipment**

Match the names to the pictures of the most common chemistry lab equipment. You can find this at the end of the packet.

Section 2: Chemistry Concept Review

Each of the following skills/concepts are essential to the IB HL Chemistry Course. Please take time to review and practice these concepts and skills. You may complete your work on this document (print or digitally) or show your work on a separate sheet of paper. You will submit these review problems on the ***first day*** of class. Video links are embedded if you need additional review/support.

1. Put the following into scientific notation and round the following quantities to the specified number of significant figures:

_____ **a.** 5,487,129 m to three significant figures

_____ **b.** 0.013479265 mL to six significant figures

_____ **c.** 31,947.972 cm^2 to four significant figures

_____ **d.** 192.6739 m^2 to five significant figures

_____ **e.** 786.9164 cm to two significant figures

_____ **f.** 389,277,600 J to six significant figures

_____ **g.** 225,834.762 cm^3 to seven significant figures

NOTE: SHOW YOUR WORK

What does SHOW YOUR WORK even mean? In Chemistry, SHOW YOUR WORK means something very specific. When showing work, you're describing a narrative, giving a step by step recipe for solving a problem. Even if you know how to solve the problem in your head, SHOW YOUR WORK means that you need to know how to express that onto paper. It's a way of explaining your thought processes- even the ones you don't realize that you have. It is a systematic way of describing your work. SHOWING YOUR WORK is required for all IB Chemistry problems

2. Make the following conversions. Put answer in correct number of sig. figs.

8.32 µm = _____ dm

2.194 cL = _____ mL

0.007 Mg = _____ kg

25 L = _____ mL

1500 ps = _____ ns

0.00944 dm = _____ km

50.0 m/s = _____ miles/hour

3. Make the following conversions below.
   a. 32.0 g CH_4 to moles (2.00 moles)

   b. 8.76 g of NaOH to moles (0.219 moles)

   c. 27.00 moles H_2O to grams (486.5 g)

   d. 4.3 moles Ne to grams (87 g)

e. 0.78 moles Mg_2O_3 to formula units (4.70×10^{23})

f. 155 g NH_4OH to formula units (2.66×10^{24})

g. 4.78×10^{23} atoms Ag to moles (0.797 moles)

h. Determine the mass of one molecule of H_2O (3.0×10^{-23} g)

4. Calculate the average atomic mass for silicon if 92.21% of its atoms have a mass of 27.98 amu, 4.70% have a mass of 28.98 amu, and 3.09% have a mass of 29.97 amu. (28.09 amu)

5. Oxygen has three naturally occurring isotopes: O-16 with a mass of 15.99 amu; O-17 with a mass of 17.00 amu; and O-18. The relative abundances are 99.76%, 0.038%, and 0.20% respectively. What is the mass of O-18? (20.96 amu)

6. Complete the tables below.

	Symbol	Protons	Neutrons	Electrons
(a)	$^{134}Cs^{+}$			
(b)	$^{131}I^{-}$			
(c)		55	82	54
(d)		94	145	90

Element Name	**Symbol**	**Atomic number**	**Number Protons**	**Number Neutrons**	**Number Electrons**	**Mass Number**
Nitrogen						14
Sodium						24
	Br					80
		15				30
			27			60
	Ca					40
Argon						39
					56	138

7. A hydrogen filled balloon was ignited and 1.50 g of hydrogen reacted with 12.0 g of oxygen. How many grams of water vapor formed? (Show the balanced chemical equation).

8. Without doing any calculations, determine which of the sample contains the greatest number of the element in moles. Which contains the greatest mass of the element?
   a. 55.0 g Cr b. 45.0 g Ti c. 60.0 g Zn

9. What is the molar mass of methane (CH_4)?

10. How many hydrogen atoms are in 3.0 moles of ethanol, C_2H_5OH?

11. A compound with an empirical formula of CH_2 has a molecular mass of 42.09. What is its molecular formula?

12. A compound of nickel has a mass composition of 37.9% nickel, 20.7% sulfur, and 41.4% oxygen. What is its empirical formula?

13. Aluminum and iron(III) oxide react to form iron and aluminum oxide. What mass of iron is produced from the reaction of 21.4g of aluminum and 91.3g of iron(III) oxide? What is the limiting reactant? What is the excess reactant? (Show the balanced chemical equation).

14. What volume of nitrogen forms when 100. g of ammonia, NH_3, decomposes completely into its elements at STP? (Show the balanced chemical equation).

15. Calculate the volume in mL of 2.00 M HNO_3 solution required to react with 216 grams of Ag according to the equation.

$$3\ Ag(s) + 4\ HNO_3(aq) \rightarrow 3\ AgNO_3(aq) + NO(g) + 2\ H_2O(l)$$

16. Draw the Lewis structures for NH_3 and CO_2.

17. Name or write the chemical formula for the following:
    a. Sodium carbonate
    b. Sulfurous Acid
    c. Dinitrogen Trioxide
    d. Iron(III) oxide
    e. NH_4Cl
    f. $HClO_2$ (aq)
    g. SF_6
    h. $CuCl_2$

Helpful Videos

Scientific Notation: https://tinyurl.com/4cyzsrmt

Significant Figures: https://tinyurl.com/4yrys9bz

Conversions Video: https://tinyurl.com/4yrys9bz

Molar Conversions: https://tinyurl.com/4zknzbwk More Molar Conversion: https://tinyurl.com/yc3vy7ec

Average Atomic Mass: https://tinyurl.com/ytux9bd3 More Average Atomic Mass: https://tinyurl.com/ye288dnp

Empirical and Molecular Formula: https://tinyurl.com/46fmn9pr Emp. And Molecular Formula: https://tinyurl.com/jfue6bsr

Writing Balanced Chemical Equations: https://tinyurl.com/mpuc64wj

Stoichiometry: https://tinyurl.com/ywssry9h

Limiting vs. Excess Reactant: https://tinyurl.com/yc4wx37m

Lewis Structures: https://tinyurl.com/2p8pfk3u VSPER Theory: https://tinyurl.com/bdft3er3

Nomenclature: https://tinyurl.com/2p8says4

Section 3: Internal Assessment Preparation/Lab Preparation

In preparation for your Internal Assessment for Chemistry, you will complete a review of basic vocabulary and concepts that you need to be familiar with in order to make your IA a success. The following activity should be completed in a digital format (PowerPoint, Google Slides, Word Doc, etc). Include section designations by including the Part number and Part Title that are **BOLD** and **UNDERLINED** below. You will submit this along with Section 2 of the summer work to **Canvas** on the ***first day*** of school.

Part 1: General Vocabulary

Instructions: Define/describe the following terms. Include the terms.

1. Independent Variable
2. Increments
3. Dependent Variable
4. Control Variable
5. Uncertainty of Measurement with Example
6. Random Error
7. Systematic Error
8. Accuracy
9. Precision

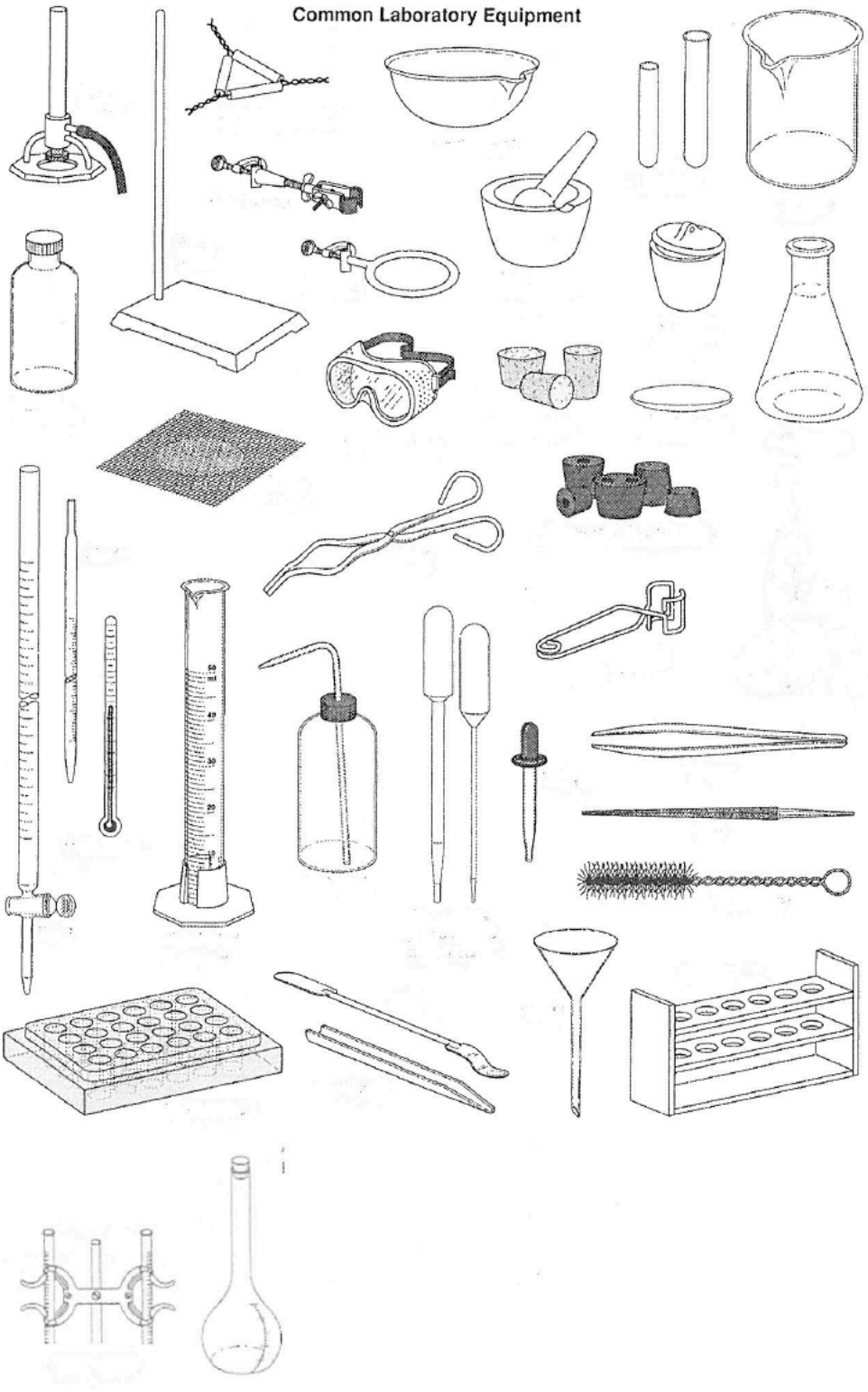
Part 2: Graphing Basics

Instructions: Answer the following questions in complete sentences. Include the prompt or graph type.

1. When graphing data, explain what variable you should place on the x-axis and on the y-axis.
2. Explain what is meant by "properly labeling the axes" of a graph.
3. Explain how error bars are used and what they mean in terms of data shown.
4. Show an example (picture) and state what type of data is appropriately shown by the following graph types:

A. Line graph
B. Scatterplot with trendlines
C. Circle (Pie) graph
D. Bar graph
E. Double bar graph
F. Histogram
G. Box and Whiskers plot

Notes and Scratch Paper


Common Laboratory Equipment

Lab Equipment:

1. Erlenmeyer Flask
2. Watch Glass
3. Volumetric Flask
4. Micropipet
5. Graduated Cylinder
6. Bunsen Burner
7. Glass Bottle
8. Beaker
9. Wire Gauze
10. Iron Ring
11. Forceps
12. Wash Bottle
13. Test tubes
14. Buret
15. Safety Goggles
16. Corks
17. Dropper
18. Scooper
19. Test tube holder
20. Tongs
21. Funnel
22. Wire Brush
23. Glass Pipet
24. Crucible and Cover
25. Evaporating Dish
26. Mortar and Pestle
27. Ring Stand
28. Utility Clamp
29. Wire Triangle
30. Thermometer
31. Rubber Stoppers
32. Test Tube Rack
33. Spatula
34. 24 Well Plate
35. Buret Clamp
36. File

You will be spending a lot of time this year in the lab. Make sure you know the names of all the lab equipment. Match the pictures with the names.

Student Safety Contract

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, eyewash 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.

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Student Safety Contract
Continued

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

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