**Podcast 1.1 Falcon High School Lab Safety**

* Know the rules
* Follow the rules
* Enforce the rules
* Safety First

**Dress Code**

1. Wear splash-proof \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ long hair.
3. Do not wear clothing which is loose enough to knock over containers on the work bench or drag or dip into flames or chemicals.
4. Wear clothing which \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ your chest, belly, sides, back, shoulders and upper arms. No cutouts or cutoffs, tank tops, tube tops, muscle shirts, etc.
5. Wear clothing which covers and protects your body from the waist all the way down to and including your **ankles**. NO \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. Wear \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which cover and protect your feet completely. No sandals, flip-flops, open-toed shoes, or shoes with open sides or heels, no slippers - the top of your foot must be covered!

**Behavior**

1. \_\_\_\_\_\_\_\_\_\_\_\_\_ work in the lab unsupervised.
2. Stay focused & \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to all written and verbal instructions. Ask questions before proceeding if you are unsure.
3. Misbehavior CANNOT and WILL NOT be tolerated! NO HORSEPLAY!
4. Immediately \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ your teacher of any unsafe conditions you observe.
5. Report all accidents \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, no matter how small: this includes broken glass, cuts and scrapes, chemical spills and fire
6. NEVER eat or drink in the lab (not even water)
7. Keep \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ away from eyes, mouth and body while using chemicals.
8. Wash your hands with soap and water after performing lab activities. When you are in the lab, if you notice that you have a mysterious itch on your arm which just won't go away, assume that it is a chemical on your skin and wash with plenty of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
9. NEVER touch, taste or smell any chemicals unless specified to do so

**ALWAYS WEAR SPLASH-PROOF GOGGLES,NOT SAFETY GLASSES, WHEN WORKING WITH CHEMICALS, FLAME, OR GLASSWARE**

1. Never rinse anything down the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ without the permission of your teacher
2. In fairness to others, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ all glassware and equipment at the end of the lab.
3. Return all equipment and supplies to the proper storage area
4. You and your parents must agree to and sign the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in order to participate in lab activities
5. Failure to comply with safety guidelines may result in your removal from the class and loss of credit for the work that is done in your absence

**What to Do in Case of an Accident**

Always tell your instructor about all accidents immediately!!!

**1. Broken glass.** Do not pick up broken glass with \_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_! Get a broom and dust pan. Ask your teacher for help.

**2. Small chemical spill.** If you know it’s safe, wipe up liquid spills with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and dispose of them as your instructor suggests. For solids sweep them up with a broom and a dust pan and dispose of them as your instructor suggests.

**3. Large chemical spill.** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the area of the spill. Warn the people around you LOUDLY. Call your instructor! Let the expert handle the clean-up!

**4. Chemical splash in your face, goggles on.** If the goggles have protected your eyes, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_! Yell for help. Go to the \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ and rinse your face quickly with the goggles still on. Then remove the goggles and rinse your face again.

**5. Chemical splash or broken glass in your face, goggles off.**

If this sort of accident happens, you may not be able to see well enough to go to the eye wash station on your own. YELL LOUDLY FOR HELP and cooperate with anyone who comes to your aid.

**6. Large splash of dangerous chemical on your clothing and/or body.** Quickly follow this procedure while continuously YELLING FOR HELP:

A. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the area where the spill occurred (you don't want to get more chemical on you).

 B. CALL \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ FOR HELP and to warn others to stay away from the spill!

 C. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ any contaminated clothing.

D. Use the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. (The treatment for chemical exposure is 15 minutes under cold running water, or as long as you can stand it.)

**7. Small, confined fire.** For a small fire in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, find something you can use as a lid for the container. When the container is covered, the fire will quickly burn itself out. Call the instructor for help.

**8. Small, open fire.** If you have a small fire which is not in a container, move away from the fire and SHOUT FOR HELP!

**9. Large fire.** SHOUT FOR HELP and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the area immediately! The fire alarm will probably sound. When it does, evacuate the building and TELL EVERYONE YOU CAN, where the fire is.

**10. Your clothing on fire** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_! It will only fan the flames and make the fire worse! Instead, you should **STOP** moving, **DROP** to the ground (lie down!), and **ROLL** on the ground to squash out the flames! **YELL** continuously**!**

**11. Fire Alarm**. **If a fire alarm sounds you must evacuate the building immediately!** To evacuate properly, you should quickly and calmly do the following:

 A. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **all flames and unplug any hot plates or other electric equipment you are using.**

 B. **Leave your**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **.**

 C. **Walk calmly out of our classroom to the exit by the stairs, and away from the building to the sidewalk in front of the tennis courts.** We will stay together as a class and line up for attendance.

<http://www.youtube.com/watch?v=PSdY4gEfCHY>

Or

<http://www.nclark.net/Lab_Safety.wmv>

**Podcast 1.2 Scientific Method**

**Setting Up Your Notebook :** 2 or 3 inch Three-ring Binder used only for Chemistry

* Divide it by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ so you can study more effectively
* You need one pack of 5-tab dividers per \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for general chemistry, 8-tab for honors chemistry
* Label tabs with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from your syllabus.
* Stock binder with extra lined paper and graph paper.

**Lab Notebook: \_\_\_\_\_\_\_\_\_\_\_\_\_ Notebook or Carbonless Copy Student Lab Notebook**

* Cover (outside): Your Name, Class Name, Teacher’s Name
* First Inside Page is Your Title Page (middle, centered): Name, Class Name, Teacher’s Name, Falcon High School
* Table of Contents:

**Lab Report Format – The PRE-LAB**

**Purpose**: Brief \_\_\_\_\_\_\_\_\_\_\_\_ of Learning Goals

**Variables**: Identify important factors that influence the outcome of the experiment

-- Independent Variable – Dependent Variable

-- Control – Constants

**Question**: Derived from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_;

 “How does IV affect DV?”

**Hypothesis**: Answer/Prediction to question based on \_\_\_\_\_\_\_\_\_\_;

 “If IV then DV because Theory”

**Materials**: describe quality and quantity (not “acid”, but 100 mL of 6M hydrochloric acid)

**Procedure**: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (do NOT recopy) in one or two paragraphs. Assume reader is knowledgeable.

**Lab Report Format – During/After Lab**

**Data**: Tables organize numerical data, observations are thorough and descriptive

**Analysis**: This will include chemical equations, questions, and \_\_\_\_\_\_\_\_\_\_\_ described in lab handout

**Conclusion**: minimum \_\_\_\_\_\_\_\_\_ paragraphs, be sure to include average AND percent error for your DV

**Discussion**: Connect to \_\_\_\_\_\_\_\_\_\_\_ and to real world applications (not applications in class or science lab).

More than just following a given format… It’s a written record of your work, your insights, and your thoughts

**Writing an Effective Conclusion**

**Paragraph #1**

In one sentence, \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_. Was the hypothesis supported? Explain why you think it turned out that way. Is the experimental value different from the theoretical value? Do the results make sense given what you already know? How might the methods you used bias your results?

**Paragraph #2 --** Error Analysis: Discuss how the \_\_\_\_\_\_\_\_ types of errors may have influenced the outcome of your experiment

* Random •Environmental
* Instrumental •Personal

**Paragraph #3**

What would you change or do differently? What else could you try? What else do you want to know or wonder about?

**Scientific Method**

1. **Observations**
	1. Identifies a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. Leads to a Question
2. **Hypothesis**
	1. If… Then.. Because
	2. Must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!
3. **Experiment**
	1. Designed to test the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	2. Conduct the experiment
	3. Draw Conclusions
	4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Hypothesis
4. **Theory** – attempt to explain observed phenomena and may be modified with new information

**Scientific Theory or Scientific Law?**

* **Scientific Theory** – a thoroughly \_\_\_\_\_\_\_\_\_\_\_\_\_ model that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_ experiments give certain results. A theory can NEVER be proven true because it is always possible that a new experiment will disprove it.
* **Scientific Law** – a concise statement that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the results of many observations and experiments. It describes a natural phenomenon without attempting to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ it.

**Podcast 1.3: Properties of Matter**

* Anything that has mass and takes up space is considered to be \_\_\_\_\_\_\_\_\_\_\_\_\_
* Quantitative Properties of Matter
	+ **Mass**: the amount of matter an object contains is measured on a balance in units of grams (g)
	+ **Volume**: the amount of space that an object occupies, measured in unit of cubic centimeters (cm3) or milliliters (mL)

**Volume**

 Three Methods to find Volume

 1. Mathematically V = l x w x h

 2. Water Displacement

 3. Graduated Cylinder

**Properties of Matter**

* Qualitative Properties
	+ Uses \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to describe properties of matter
* Quantitative Properties
	+ Uses \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and measurement to describe properties of matter

**Physical properties**

* Quality or condition of a substance that can be observed or measured without changing the composition of the substance (it’s identity remains the same)
* All forms of a substance have identical properties, sometimes called characteristic properties

Examples of Physical Properties

* Intrinsic Properties: stay the same no matter how much of the substance is present
	+ Color - Odor - Solubility - State of Matter
	+ Hardness - Density - Melting Point -Boiling Point
* Extrinsic (Non-Characteristic) Properties
	+ Mass -Volume
	+ Appearance -Shape

**States of Matter**

* Most classes only deal with the three states of matter most commonly found on Earth
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_: the gaseous state of a substance that is generally a liquid or solid at room temperature (Example: Water Vapor)
* A vapor is always considered a gas, however a gas is not always considered a vapor

**Chemical Properties**

* Describe how a substance interacts with other substances
* Examples:
	+ Corrosive
	+ Inert
	+ Flammable
	+ Combustible
	+ Caustic
	+ Mutagen, Carcinogen, Teratogen

**Podcast 1.4: Changes in Matter**

**Changes in Matter**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: an alteration of a substance that DOES NOT change its chemical composition
	+ phase changes
	+ Changing shape or form
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: an alteration of a substance that DOES change its chemical composition
	+ Ability to react or break down

**Classification of Matter**

* Pure Substance: a sample of matter having a \_\_\_\_\_\_\_\_\_\_ and definite composition. It is ususally an element or a compound. Ex: Water (H2O) , Magnesium (Mg)
* Mixture: a physical blend of two or more substances that are not \_\_\_\_\_\_\_\_\_\_\_ combined
	+ Heterogeneous
	+ Homogeneous
	+ Solutions
	+ Alloys

**Pure Substances**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: a substance that cannot be separated into simpler substances by chemical means – contains all the same type of atoms
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_: a substance that CAN be separated into simpler substances (elements or other compounds) by chemical reactions but NOT by physical means – contain a definite proportion of more than one type of atom
* Classification of matter
* Separating Substances
* Mixtures are separated \_\_\_\_\_\_\_\_\_\_\_\_\_
* Compounds are separated \_\_\_\_\_\_\_\_\_\_\_

**Separating a Mixture**

* Distillation: Separation of liquids base on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Floatation: Separation of insoluble solids based on \_\_\_\_\_\_\_\_\_\_\_\_\_
* Filtration: Separation of soluble and \_\_\_\_\_\_\_\_\_\_\_\_ solids based on solubility
* Fractional Crystallization: Separation of two soluble solids based on Solubility and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Chromatography: Separation of two \_\_\_\_\_\_\_\_\_\_\_ based on adhesion to thin film
* Chemical changes of Matter

**Evidence of a Chemical Change:**

1. Color Change
2. Evolution of a \_\_\_\_\_\_\_\_\_\_\_\_
3. Formation of a Precipitate
4. Change in \_\_\_\_\_\_\_\_\_ (heat or light)
5. \_\_\_\_\_\_\_\_\_\_ Change

**Chemical Reaction**

Aluminum + Iron (III) Oxide ∆→ Aluminum Oxide + Iron

Law of Conservation of Mass: Matter cannot be created or destroyed.

The amount of mass in a \_\_\_\_\_\_\_\_\_\_\_ chemical system before a change equals the same amount of mass in the system after a physical change or chemical reaction has occurred.