**Unit Pre-1: Safety In The Laboratory Classroom

Content Area: **Science**
Course(s):
Time Period: **September**
Length: **2 Blocks**
Status: **Published**

Pre-Unit 1 Safety In The Lab

Unit Summary

The chemistry classroom often serves as a laboratory. This room is an integral part of the high school chemistry experience. It allows students to explore chemical concepts, view changes in matter, and acquire scientific skills in an atmosphere similar to a professional scientific environment. The laboratory should be arranged so that instruction and lab skills may be practiced safely and effectively. Inorder for students to be safe in the laboratory they need to know what chemicals that are being used and what are the hazards of the chemicals could be.

Enduring Understandings

Chemistry explains and looks at the big picture when it comes to science. However, being safe in the lab while exploring the topics within chemistry is imperative. Students must be able to identify proper safety protocol, know where safety equipment is kept, and what to do in case of an accident.

Essential Questions

Are all laboratory activities approached in the same matter?

Why is Chemistry important?

What are the hazards of a chemical?

What is a safety data sheet?

Student Learning Objectives (PE, SEP, DCI, CCC) & Aligned Standards

Performance Expectations

HS-ETS1-2. Design a solution to a complex real-world problem by breaking it down into smaller, more

manageable problems that can be solved through engineering.

Concepts & Formative Assessment

Appropriately use measurement tools in the laboratory.

Appropriately use chemical in the laboratory.

Resources

ACS American Chemical Society - Guidelines and Recommendations for Teaching of High School Chemistry - Spring 2012

POGIL activities - Safety First

Assessments

Assessments will be aligned to the Performance Expectations and will include a variety of assessment types such as labs, writing prompts, and projects.

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Modifications

Teacher Note: Teachers identify the modifications that they will use in the unit. The unneeded modifications can then be deleted from the list.

Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).

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Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings.

Use project-based science learning to connect science with observable phenomena.

Provide ELL students with multiple literacy strategies.

Prior Learning

By the end of Grade 8, students know that:

Physical science-

Substances are made from different types of atoms, which combine with one another in various ways.

Atoms form molecules that range in size from two atoms to thousands of atoms.

Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it.

Gases and liquids are made of molecules or inert atoms that are moving about relative to each other.

In a liquid, the molecules are constantly in contact with others.

In a gas, they are widely spaced except when they happen to collide.

In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations.

Solids may be formed from molecules or they may be extended structures with repeating subunits (e.g., crystals).

The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter.

Substances react chemically in characteristic ways.

In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants.

The total number of each type of atom is conserved, and thus the mass does not change.

Some chemical reactions release energy, others store energy.

The abundance of liquid water on Earth’s surface and its unique combination of physical and chemical properties are central to the planet’s dynamics.

These physical and chemical properties include water's exceptional capacity to absorb, store, and release large amounts of energy; transmit sunlight; expand upon freezing; dissolve and transport materials; and lower the viscosities and melting point of rocks.

Biology-

The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide plus water into sugars plus released oxygen.

The sugar molecules thus formed contain carbon, hydrogen, and oxygen: Their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled into larger molecules (such as proteins or DNA), used, for example, to form new cells.

As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products.

As a result of these chemical reactions, energy is transferred from one system of interacting molecules to another.

Cellular respiration is a chemical process in which the bonds of food molecules and oxygen molecules are broken and new compounds are formed that can transport energy to muscles.

Cellular respiration also releases the energy needed to maintain body temperature despite ongoing energy transfer to the surrounding environment.

Earth and space sciences-

The abundance of liquid water on Earth's surface and its unique combination of physical and chemical properties are central to the planet's dynamics. These properties include water's exceptional capacity to absorb, store, and release large amounts of energy, transmit sunlight, expand upon freezing, dissolve and transport materials, and lower the viscosities and melting points of rocks.

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