Fairfax Collegiate

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Chem Workshop 5-6 Syllabus

Course Goals

1 The Scientific Method
Students learn about the methods used by scientists to investigate chemistry concepts in the real world, including experimental design, controls and variables, inference and observation, and data recording.

2 Concepts of Chemistry
Students learn about the core concepts of chemical science, such as states of matter and phase changes, heat, energy, acids, bases, atoms, chemical reactions, and energy.

3 Laboratory Science
Students learn the procedures used to conduct laboratory experiments, especially including safety procedures. They also get to design and conduct their own experiments in the lab.

Course Topics

1 Matter
Students learn about matter and the different types of matter that are around us every day.

2 Phase Changes
Students learn about what natural processes allow for matter to change into a different type of matter and how we can synthetically produce different types of matter.

3 Atoms
Students learn about the composition of atoms and how they describe different elements in the periodic table.

4 Energy
Students learn about different types of energy, including potential, kinetic, and thermal energy. Students complete activities and design processes to visualize and understand each type of energy.

5 Chemical Reactions
Students observe and experiment with different chemical reactions. Students practice data recording, making scientific observations, and observe fascinating and unique reactions.

6 Density
Students learn the role of density and complete challenges that help to determine the relative densities of different liquids using the scientific method.

7 Acids and Bases
Students learn about the chemistry behind acids and bases and how they impact our environment, such as the impact of acid rain on ecosystems.

Course Schedule

Day 1

Introduction and Icebreaker
Students get a chance to learn each other's names and introduce themselves.

States of Matter Sorting
Students arrange a given set of cards into categories to identify liquids, solids, and gases as the three categories of matter.

Lesson on Matter
Students try to come up with their own definition of matter and learn relevant vocabulary.

States of Matter
Students observe objects in each state of matter.

Speed of Water
Students explore the speed of water molecules in hot vs. cold water.

Matter Bingo
Students test their knowledge on the terms and concepts relating to matter with a competitive game of bingo.

Day 2

Phase Changes
Students learn about the different ways that matter can change phases.

Phase Change Activity
Students demonstrate their knowledge of phase changes with a brief activity.

Oobleck
Students learn about non-Newtonian fluids, and how they cross into different phases.

Venn Diagram
Students recollect all the information they've learned about matter and different phases by illustrating the differences and similarities through a Venn Diagram.

Snow Globe
Students observe the changes in matter that occur when liquid glycerin alters the consistency of water.

Day 3

Parts of an Atom
Students use a model kit to learn and understand the different parts of an atom.

Atomic Structure Timeline
Students learn about the history of atoms and the different models proposed by different scientists.

Chemdoku
Students play a game of Sudoku with chemistry rules.

Periodic Play
Students demonstrate their knowledge of atoms and the periodic table by creating a play performance for their classmates.

Day 4

Element Word Find

Students familiarize themselves with the different elements of the periodic table by playing a popular game.

Labeling the Periodic Table
Students learn about the different groups on the periodic table.

Periodic Table Battleship
Students practice using the information from the periodic table by playing a popular game.

Atomic Musical Chairs
Students visualize the role of electrons and orbitals in an atom through playing musical chairs.

Build the Periodic Table
Students explore an element of their choice by researching and building a model of the element.

Day 5

Spool Racer
Students learn about the concept of potential vs. kinetic energy through this activity.

Marble Roller Coasters
Students use their knowledge of energy to create a roller coaster for a marble.

Potential Kinetic Track
Students visualize the effects of potential and kinetic energy through this demonstration.

Homemade Thermometer
Students observe thermal energy by creating their own thermometers.

Rube Goldberg
Students practice using different types of energy to generate a circuit of simple machines that accomplish a certain task.

Day 6

Types of Reactions
Students learn the various types of chemical reactions that can occur.

Chemical Reactions Activity
Students demonstrate their knowledge of chemical reactions through an activity.

Baking Soda and Vinegar
Students observe a fundamental chemical reaction between baking soda and vinegar.

Pop Rockets
Students use chemical reactions to launch their own rockets.

Coke and Mentos
Students practice using the scientific method to observe the effects of different variables on this chemical reaction.

Day 7

Equilibrium
Students learn about the equilibrium of chemical equations.

Equilibrium with Paper Balls

Students use a demonstration to observe the concept behind chemical equilibrium.

How many Waldo's?
Students play a game of Where's Waldo to demonstrate the conservation of elements throughout a reaction.

Elephant Toothpaste
Students observe a fun chemical reaction that uses many different chemicals.

Identify the Chemical Reactions
Students play with different chemical reactions to identify the four main types of observable reactions.

Day 8

Density
Students learn the key concepts behind density.

Art using Density
Students use the relative densities of different liquids to create their own art.

Layering Liquids
Students engage in a competition to determine the relative densities of several household liquids.

Build a Boat
Students attempt to construct a boat that can float on water and hold as many marbles as possible without sinking.

SCUBA Diver
Students use materials to make a neutrally buoyant SCUBA diver figure.

Day 9

Acids and Bases
Students observe the differences between acids and bases by observing the different colors produced by each.

Testing pH
Students practice determining the pH of different household items.

Math of Acids and Bases
Students learn the math behind determining the pH and the pOH of different solutions.

Acid Rain
Students learn the implications of acid rain in the environment.

Day 10

Red Cabbage Test
Students determine the acidity/basicity of a common food.

The Scientific Method
Students use the scientific method to come up with their own research question.

Final Review
Students demonstrate the knowledge they learned in the course with a final review game.

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