



Hands-On Science 3-4 Syllabus

Course Goals

1 Scientific Principles

Students are introduced to three major fields of science: Biology, Chemistry, and Physics.

2 Scientific Method

Students understand, follow, and create various experiments that properly follow the Scientific Method.

3 Formal Presentation

Students learn how scientists present their research and results in the form of a formal poster presentation.

Course Topics

1 Biology

Students observe and test how various living species (plants, bacteria, and humans) react in different conditions.

2 Chemistry

Students understand the properties of various liquid and solid substances and experiment with combining them under different environmental conditions.

3 Physics

Students are introduced to the concepts of structural integrity and aerodynamics and experiment with manipulating them to create efficient prototypes.

4 Laboratory Notebooks

Students learn to maintain adequate records of each experiment that they conduct in the form of a composition notebook, as real-life scientists do.

5 Projects

Students put together a formal poster presentation at the end of the session detailing one experiment that they found the most interesting.

Course Schedule

Day 1

Introduction and Ice-Breaker

Students are introduced to each other and to the instructor.

Introduction of Class Rules

Students learn the rules of Fairfax Collegiate as well as class rules that the instructor sets.

Course Objectives and Activity Overview

Students learn about the objectives and activities of the course.

Composition Notebook Set-Up

Students learn how to maintain a scientific journal of experiments.

Parts of an Experiment

Students understand how to set up and identify the parts of an experiment.

Plant Lab Setup and Initial Recordings

Students set up the plant experiment which will continue throughout the session.

Observation Activity

Students learn about qualitative and quantitative observations.

Day 2

Heart Rate Activity

Students learn how to measure heart rate and the variables that affect heart rate.

Hand Hygiene and Bacteria

Students test which method of hand hygiene is most effective in killing bacteria.

Day 3

Reflexes and Reaction Time

Students understand the importance of reflexes and reaction time through a series of activities.

Sensory Activity

Students experiment with the various senses and understand how eliminating one or more impacts the ability to complete tasks.

Day 4

Introduction to Chemical Reactions

Students learn about the differences between acids and bases and use pH paper to test whether substances are acids or bases

Acid/Base Lab

Students conduct an experiment to observe the result of an acid-base reaction.

Day 5

States of Matter (Part 1)

Students learn about the three different states of matter and possibly determine whether a fourth state exists.

States of Matter (Part 2)

Students make another type of non-Newtonian fluid called Oobleck.

Day 6

Properties of Water

Students learn about the properties of water and test the cohesiveness of water.

Density Tower

Students understand the concept of density and experiment with liquids of various densities.

Day 7

Structural Integrity

Students design an experiment to test the integrity of a structure made of gumdrops and toothpicks.

Day 8

Parachute Activity

Students design a parachute to learn about aerodynamics.

Day 9

Balloon Propulsion Activity

Students learn about thrust and design an experiment to test the propulsion of a balloon.

Poster Presentations

Students learn about data reporting and create a poster based on one activity from the session.

Day 10

Poster Presentations

Students learn about data reporting and create a poster based on one activity from the session.

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