

## ICP Units and Learning Targets

### Unit 1 - Science Skills

Length of Unit: 18 days (August 15th - August 31st)

#### Learning Targets

- 1.1 Describe the difference between a scientific law, a scientific theory, and a hypothesis.
- 1.2 Solve scientific problems using the scientific method: **We will read scientific articles.**
- 1.3 Identify variables within an experiment
- 1.4 Use the correct SI unit and prefix for scientific measurements
- 1.5 Convert between metric prefixes
- 1.6 Convert between scientific notation and standard notation
- 1.7 Perform basic math functions in scientific notation
- 1.8 Describe the difference between accuracy and precision and give an example of each
- 1.9 Make and interpret graphs of scientific data: **We will use Grade 9 CERT test questions (2021-2022).**

### Unit 2 - Properties of Matter

Length of Unit: 14 days (September 1st - September 16th)

#### Learning Targets

- 2.1 Classify matter as a compound, element, homogenous mixture or heterogeneous mixture.
- 2.2 Describe properties and changes of matter as physical or chemical.
- 2.3 Describe evidence that you may observe if a chemical change has taken place.
- 2.4 Determine ways to separate mixtures based on physical properties.
- 2.5 Explain density in terms of particles in an object.
- 2.6 Solve for an unknown using the density equation.

### Unit 3 - States of Matter

Length of Unit: 10 days (September 15th - September 30th)

#### Learning Targets

- 3.1 Describe the difference between solids, liquids, gases, and plasma.
- 3.2 Apply the kinetic theory of matter to phase changes.
- 3.3 Differentiate between thermal energy, temperature, and heat.
- 3.4 Name the phase changes and give examples of each.
- 3.5 Interpret a phase diagram
- 3.6 Explain how fluids exert pressure.
- 3.7 Complete calculations using the pressure equation.
- 3.8 Describe the properties of gases.

3.9 Predict the effect of pressure, temperature, and volume changes on a gas using the gas laws.

#### **Unit 4 - Atomic Structure**

Unit Length: 10 days (October 3rd - October 21st)

##### Learning Targets

- 4.1 Summarize the five essential points of Dalton's Atomic Theory and discuss what was correct and incorrect about his theory.
- 4.2 Summarize the experiments that led to the discovery of the electron
- 4.3 Summarize the experiment that led to the discovery of the nucleus
- 4.4 List the properties of protons, neutrons, and electrons
- 4.5 Explain how atoms of the same element may be different in terms of isotopes and ions.
- 4.6 Determine the number of protons, neutrons, and electrons in an isotope or ion
- 4.7 Convert between moles and grams of an element or compound
- 4.8 Predict the number of valence electrons in an element and the likely charge of ion that will form.

#### **Unit 5 - Periodic Table and Electrons**

Unit Length: 10 days (October 24th - November 4th)

##### Learning Targets

- 5.1 Write the electron configuration and orbital diagram for elements 1-3.
- 5.2 Explain, using electron configuration, why atoms may gain or lose electrons.
- 5.3 Describe why atoms emit light when the electrons get excited.
- 5.4 Describe elements as metals, nonmetals, or metalloids.
- 5.5 Describe the properties of metals, nonmetals, and metalloids.
- 5.6 Name the group in which elements belong. Alkali, alkaline earth, transition, halogens, noble gases.
- 5.7 Describe properties of the above groups of elements.

#### **Unit 6 - Chemical Bonding - Divide test into two parts**

Unit Length: 15 days (November 7th - December 1st)

##### Learning Targets

- 6.1 Draw the electron dot structure for a given element.
- 6.2 Differentiate between ionic and covalent bonding and discuss the properties of each type of bond.
- 6.3 Explain the formation of an ionic bond.
- 6.4 Memorize some common polyatomic ions.

- 6.5 Write chemical formulas and predict the name of chemical formulas for ionic bonds.
- 6.6 Write chemical formulas and predict the name of chemical formulas for covalent bonds.
- 6.7 Write chemical formulas and predict the name of a chemical formula based on the type of bond present.

## **Unit 7 - Chemical Reactions**

Unit Length: 11 days (December 2nd - December 16th)

### Learning Targets

- 7.1 Discuss the parts of a chemical reaction and chemical equation
- 7.2 Explain energy's role in a chemical reaction and decipher energy diagrams.
- 7.3 Balance a chemical equation.
- 7.4 Classify a chemical reaction by type of reaction.
- 7.5 Discuss the factors that affect the rate of a reaction.
- 7.6 Convert between skeleton equations and word equations.

## **Unit 8 - Nuclear Chem**

Unit Length: 10 days (January 2nd - January 13th)

### Learning Targets

- 8.1 Classify the types of nuclear reactions and predict their products
- 8.2 Discuss the differences between chemical and nuclear reactions
- 8.3 Predict how much of an element will remain based on the number of half-lives it has undergone, and vice versa.

## **Unit 9 - Motion**

Unit Length: 15 days ( January 17th - February 6th)

### Learning Targets

- 9.1 Describe motion in terms of displacement, time and, velocity
- 9.2 Construct and interpret displacement and velocity vs time graphs
- 9.3 Apply kinematics equations to solve for various motion quantities
- 9.4 Recognize the independence of horizontal and vertical vectors in projectile motion
- 9.5 Design an experiment to determine velocity or acceleration of an object moving in linear motion.

## **Unit 10 - Forces**

Unit Length: 20 days (February 7th - March 7th)

### Learning Targets

- 10.1 Explain and give examples of newton's laws of motion
- 10.2 Perform mathematical calculations of newton's second law
- 10.3 Interpret and construct free body diagrams.
- 10.4 Explain the difference between mass and weight and perform weight calculations
- 10.5 Analyze velocity-time graphs to determine acceleration & force on an object.
- 10.6 Interpret force graphs to describe the motion of an object.

## **Unit 11 - Energy**

Unit Length: 10 days (March 8th - March 21st)

### Learning Targets

- 11.1 Use the key vocabulary correctly
- 11.2 Identify several types of energy
- 11.3 Explain how mass and speed affect kinetic energy
- 11.4 Explain how mass and height affect potential energy
- 11.5 Describe energy transformations

## **Unit 12 - E&M**

Unit Length: 10 days (March 22nd - April 11th)

### Learning Targets

- 12.1 Use the key vocabulary correctly
- 12.2 Explain the relationship between electricity and magnetism
- 12.3 Determine how a magnetic field is created by an electric current
- 12.4 Give examples of materials that can and cannot conduct electric current
- 12.5 Distinguish between closed, open, series and parallel circuits

## **Unit 13 - Waves**

Unit Length: 20 days (April 12th - May 5th )

### Learning Targets

- 13.1 Use the key vocabulary correctly
- 13.2 Illustrate and compare how different mediums affect wave travel

13.3 Describe the parts of the wave

13.4 Distinguish between the different types of waves and their characteristics

**Writing prompts:**

**Communicate technical information about how some technological devices use the principles of wave behavior and wave interactions with matter to transmit and capture information and energy.**

**Use a real world problem and break it down into smaller, more manageable problems that can be solved by using physics.**

**Communicate scientific and technical information about why the molecular level structure is important in the functioning of designed materials.\***

**Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.**

**Apply scientific principles and evidence to provide an explanation about the effects of changing the temperature or concentration of the reacting particles on the rate at which a reaction occurs.**