**SNC1D: U2 Date:**

**Chemistry Unit Review**

Matter that has Chemical and Physical Properties

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| **Key Concepts** | **Summary** |
| • Particle theory of matter  • States of matter  • Classifying matter  • Observing physical properties  • Observing chemical properties  • Usefulness and impact of substances’ properties | • All matter is composed of moving particles that attract one another but have spaces between them.  • Matter can be solid, liquid, or gas, or a combination of states and can change from one state to another.  • Elements and compounds are pure substances. Mechanical mixtures, suspensions, and solutions are combinations of pure substances.  • Physical properties are characteristics of a substance that can be observed or measured without changing what the substance is. Physical properties include boiling point, colour, conductivity, viscosity, and adhesion, cohesion, and other special properties of water that are important in living systems.  • Chemical properties describe how substances react with other substances or to light or heat and can be observed when chemical changes occur. |

**Key Terms**

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| • adhesion  • boiling  • boiling point  • chemical change  • chemical property  • chemical reaction  • cohesion | • combustibility  • compound  • condensation  • deposition  • element  • freezing  • freezing point  • inert | • mass  • matter  • mechanical mixture  • melting  • melting point  • particle theory of matter | • physical property  • property  • pure substance  • solution  • sublimation  • suspension  • volume |

The Periodic Table Organizes Elements by Patterns in Properties and Atomic Structure

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| **Key Concepts** | **Summary** |
| • Atomic theory  • Atomic models  • Subatomic particles  • Element names and symbols  • Properties of common elements  • Periodic table  • Properties of chemical groups | • Every element is composed of a distinct type of atom.  • The atomic model continues to be revised based on new experimental evidence. Bohr diagrams are one way to represent atomic structure.  • An atom has a dense nucleus of neutrons and protons, which is surrounded by shells of electrons.  • Each element has a standard name and symbol.  • The periodic table organizes the metals, non-metals, and metalloids based on properties such as number of protons in an atom.  • The alkali metals share similar properties, such as conductivity, which are different from the properties of the halogens and noble gases. |

**Key Terms**

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| • alkali metals  • atom  • atomic mass  • atomic mass units (amu)  • atomic number  • atomic theory | • electrons  • group (chemical family)  • halogens  • ion  • ion charge | • metals  • metalloids  • neutrons  • noble gases  • non-metals  • nucleus (atomic) | • period  • protons  • relative mass  • subatomic particles  • valence electrons  • valence shell |

**Elements Combine to Form Ionic Compounds and Molecular Compounds**

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| **Key Concepts** | **Summary** |
| • Compounds  • Chemical bonds  • Chemical names and formulas  • Using elements and compounds | • Compounds are pure substances composed of atoms of two or more elements that are joined by chemical bonds.  • Ions with opposite charges attract each other in ionic compounds, while atoms in molecules share valence electrons.  • The formulas for many common compounds can be determined from their names, and vice versa.  • How we make use of electrons and compounds affects society, the economy, and the environment. |

**Key Terms**

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| • bond  • chemical formula | • ionic bonds  • ionic compounds | • molecular compound  • molecules | • parts per million (ppm) |

Questions:

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| **1.** What is the main difference between a pure substance and a mixture? Name an example of each.  **2.** What is a chemical change?  **5.** Explain the difference between cohesion and adhesion, using an example.  **6.** Explain why particles of water in the air can form frost on a cold window.  **7.** Name a physical property that is:  (a) shared by gold, copper, and iron  (b) shared by gold and copper but not iron  **12.** Classify and compare the following mixtures.  (a) a drink made by dissolving drink crystals in water  (b) a cup of tea with tea leaves in it  (c) tomato juice  **13.** How can the application of heat result in a chemical change? Explain, using an example. | **15.** If water freezes inside of a building’s water pipes, the pipes may burst. Explain why this happens.  ----------  **1.** What is the smallest amount of an element that can exist?  **2.** Compare and contrast the charge, the location in an atom, and the relative mass of an electron with those of a neutron.  **3.** Beginning with the innermost shell, list the maximum number of electrons that an atom can have in its first three shells.  **8.** (a) If an atom has 43 protons, what element is it?(b) If an atom contains 66 electrons, what element is it?  **10.** Draw a Bohr diagram of a chlorine atom.  11. Draw a Bohr diagram of a chlorine ion. |

More Questions

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| **1.** Define the term “compound.” Give an example.  **2.** (a) H2O2 What elements are present in this substance and in what ratio?  (b) Identify hydrogen peroxide as an ionic compound or a molecular compound. Indicate whether or not each of the following elements can form ions, and if so, give all possible ion symbols.  (a) nitrogen(b) lithium (c) aluminum (d) oxygen (e) chlorine (f) sodium (g) xenon (h) copper  **4.** Write the chemical name for each of the following ionic compounds.  (a) KI (b) CaCl2 (c) AlBr3  **5.** Write the formula for each of the following ionic compounds.  (a) lithium nitride (b) iron(II) chloride (c) sodium hydroxide  **6.** Write the chemical name for each of the following molecular compounds.  (a) PF5 (b) Cl2O3 (c) CF4  **7.** Write the formula for each of the following  molecular compounds.  (a) nitrogen monoxide (b) carbon disulphide  (c) phosphorus tribromide  **11.** (a) What is the main difference between ionic bonds and the bonds in a molecule?  (b) Which generally have higher melting temperatures: ionic compounds or molecular compounds? | **55.** Use the Bohr diagrams below to answer the questions that follow.    (a) Name the elements shown.  (b) Did the ion shown in B form by losing  an electron or gaining an electron?  (c) Would the atom shown in A be likely to  be found in an ionic compound?  Explain.  (d)Would the ion in B be more likely to  bond with Ca2+ or with O2–?  Explain.  **56.** Draw Bohr diagrams to depict atoms of the  following elements.  (a) oxygen (b) sodium (c) hydrogen |

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