

### **Key Concepts – Grade 8 Assessment**

Use this as a study guide as you prepare for your science exams. The highlighted items are the ones discussed in Earth science class for 8<sup>th</sup> grade. The ones not highlighted were covered in 6<sup>th</sup> grade physical science and 7<sup>th</sup> grade life science. Use old textbooks or materials in this website to help you review anything you may have forgotten.

**Read this study guide with a pencil in you hand;**

- 1. circle the verbs in each sentence**
- 2. and underline the object(s) in each sentence .**

### **Science as Inquiry (16%)**

- Identify questions that guide/design scientific investigations and can be answered by a scientific investigation.
- Determine correct evidence to support a hypothesis.
- Identify flaws in an investigation.
- Identify parts of experimental design, types of variables, and controls; sequence steps in a scientific investigation; analyze data; and justify a logical conclusion.
- Use graphs, charts, tables, models, weather maps, and topographic maps to interpret, make predictions, and solve problems.
- Identify first steps scientists take when preparing to work on an investigation.
- Identify the best way to present results of an investigation (students and scientists).
- Use mathematics to connect a data set with a model, graph, symbols, inferences, or a valid conclusion.
- Describe how technology has helped scientists collect more accurate data or affected society.
- Explain why scientists question other scientists' work.
- Identify appropriate safety procedures and tools.
- Recognize the value of communication, multiple trials, and empirical evidence in the development of conclusions and scientific theories.
- Determine the mean, median, and mode for a data set.

### **Physical Science (21%)**

- Compare physical properties of materials (density, freezing or boiling point, solubility, malleability, conductivity, magnetism).
- Identify elements in common objects (clothing, food, tools, rocks, soil, water).
- Use the periodic table to classify or identify properties of individual or groups of elements.
- Draw a distance-time line graph indicating motions such as constant speed, acceleration, deceleration (negative acceleration).

- Recognize or describe that all matter is made up of constantly moving particles and that the state of matter depends on the energy and motion of the particles.
- Differentiate among protons, electrons, neutrons, ions, and molecules.
- Compare and contrast forces and explain the causes and effects of gravity.
- Determine or illustrate with arrows the motion of an object subjected to balanced or unbalanced forces; indicate direction and magnitude or distance.
- Describe the relationship among force, mass, and acceleration.
- Identify reactants, products, and indications (energy changes, formation of new substances) of chemical reactions and that the mass of products is the same as mass of the reactants.
- Identify how temperature, agitation, and particle size affect the rate of chemical reactions.
- Relate valence electrons to bonding and types of chemical bonds. Identify accurate bond illustrations.
- Describe how heat travels (heat transfer) in and around objects (conduction, convection, and radiation) and how it affects objects.
- Differentiate among forms and types of energy: kinetic, potential, mechanical, chemical, thermal, radiant, electrical, and magnetic.
- Analyze the motion of electricity (negative charges) in circuits and how it is transformed from and into other forms of energy.
- Describe the colors in the visible light spectrum; the effects of light traveling through a prism; refraction, absorption, transmission of light; and relate wavelengths to colors.
- Identify and compare the components of the electromagnetic spectrum; relate wavelength to sequence and energy of components

### **Life Science (21%)**

- Identify and compare different types of cells, their components, and the functions of each cell type and its basic organelles (plant cell, animal cell, red blood cell, white blood cell, muscle cell, skin cell).
- Describe basic needs and processes of common living cells or life (energy, transport mechanisms, elements/nutrients, reproduction).
- Recognize and describe basic plant tissues and the structures and functions of each.
- Recognize major functions, organs, and interactions of body systems (circulatory, respiratory, nervous, skeletal, muscular, digestive, urinary).
- Use structures and features of organisms for simple classification and to determine adaptations to specific habitats.
- Provide or select examples of changes over time that have allowed various species to survive or that illustrate similarities in structures of animals. Fossil evidence may be used.
- Contrast meiosis and mitosis; recognize the function of each type of cell division.
- Analyze, compare, and sequence the life cycles of a variety of organisms, including humans.
- Describe and contrast the processes (input, output, functions) of photosynthesis and aerobic respiration; determine the relationship between these two processes; write the chemical equation for each process.
- Differentiate among the structure and roles of DNA, genes, and chromosomes.
- Differentiate between genotype and phenotype and be able to predict either for simple monohybrid crosses using a Punnett square.
- Compare sexual and asexual reproduction.

- Identify conditions and habits that lead to optimal health and a prolonged life (balanced diet, exercise, immunization, etc.).
- Recognize major communicable, noncommunicable, and genetic diseases or disorders and identify causes, preventative measures, symptoms, and treatments.

### **Earth and Space Science (21%)**

- Describe the structure of the four density layers of Earth (crust, mantle, outer core, inner core).
- Identify and compare the layers of Earth's atmosphere (based on density, pressure, temperature of each layer plus special characteristics)
- Describe the components of the water cycle and recognize that it is powered by the Sun and affects weather patterns.
- Explain how unequal heating of air close to Earth's surface causes weather patterns ( be able to read weather maps and symbols)
- Describe natural disasters, predict their effects, and classify them as constructive or destructive forces (earthquakes, hurricanes, volcanic eruptions, tsunamis, etc.).
- Identify major characteristics of stars, the Moon, meteors, planets, and the solar system.
- Compare and classify the planets of our solar system (appearance, size, type, composition, orbits, and distance from our Sun).
- Identify effects of convection currents on tectonic plates of Earth's crust and upper mantle (volcanoes, earthquakes, ocean floor spreading, mountain building, faulting, and folding).
- Identify characteristics of and classify major rocks and minerals.
- Identify characteristics of major landforms and determine the effects of constructive or destructive forces on them (mountains, valleys, river systems, plateaus, and plains).
- Use Hertzsprung-Russell diagram to determine brightness and temperature of stars, including our Sun.
- Identify the relative positions of the Earth, Sun, and Moon during a solar eclipse and a lunar eclipse.
- Identify and sequence the phases of the Moon ( remember the Oreo cookie activity?)
- Model or describe the tilt, revolution, and rotation of the Earth and recognize the positions of the Earth and Sun during each of Earth's four seasons.
- Describe the components of soil and explain the significance of the presence of organic materials and soil layers.
- Identify roles, types, and agents of weathering and erosion, including coastal erosion.
- Explain the significance of fossils and why similar fossils are found on two or more separate continents.
- Identify the motivation for and value of space exploration.
- Identify processes and data used to estimate the age of Earth ( rock layers, radioactive decay).
- Describe or illustrate the rock cycle and differentiate among igneous, metamorphic, and sedimentary rock.

### **Science and the Environment (21%)**

- Analyze and identify the impact of human activities and technology on populations, habitats, and Earth systems.

- Identify and compare the major biomes found on Earth.
- Identify the Sun as the ultimate source of energy to power ecosystems and trace the energy flow in ecosystems using food webs, chains, or pyramids.
- Differentiate among and sequence levels of organization in the biosphere from specific to general (atoms, molecules, organelles, cells, tissues, organs, systems, organisms, populations, communities, ecosystems, biomes, and biosphere).
- Compare and differentiate between niche and habitat.
- Predict the effects that habitat destruction, the introduction of a nonnative species, or the loss of an organism have on an ecosystem or other species.
- Identify relationships and interactions among producers, consumers, decomposers, scavengers, herbivores, and carnivores and identify forms of symbiosis: mutualism, parasitism, and commensalism.
- Identify effective measures for the prevention of soil and coastal erosion.
- Describe carrying capacity, limiting factors, and sustainability, and their relationships to changes in habitat and populations.
- Differentiate between renewable and nonrenewable natural resources.
- Identify major sources of pollution, describe their likely effects, and classify them as point or nonpoint sources.
- Interpret, illustrate, or describe natural cycles, such as the carbon and nitrogen cycles