Course Syllabus
Science, Science-Grade 7

Morgan County Curriculum 4.1 Middle Sch., Final
Morgan County School District

Physical Science (25%)

- The learner will be able to classify substances according to their chemical/reactive properties; and infer real life applications for substances based on chemical/reactive properties.
  *In chemical reactions, the total mass is conserved.
  Substances are often classified into groups if they react in similar ways. The patterns which allow classification can be used to infer or understand real life applications for those substances.
- The learner will be able to * Classify Elements ad compounds according to their properties; and
  * Compare properties of different combinations of elements.
  Observations of simple experiments illustrate that chemical elements do not break down during normal laboratory reactions such as heating, exposure to electric currents, or reaction with acids. Elements combine in many ways to produce compounds
  Common patterns emerge when comparing and contrasting the properties of compounds to the elements from which they are made. Understanding of these patterns allows for evidence-based predictions of new or different combinations of elements/compounds.
- The learner will be able to explain the cause and effect relationship between simple observable motion and unbalanced forces.
  An object remains at rest or maintains a constant speed and direction of motion unless an unbalanced force acts on it (e.g., gravity). When an unbalanced force acts on an object, the change in speed or direction depends on the size and direction of the force.

Earth/Space Science (25%)

- The learner will be able to make inferences and predictions related to changes in the Earth's surface or atmosphere based on data/evidence.
  The Earth's processes we see today, including erosion, movement of lithospheric plates, and changes in atmospheric composition, are predictable and similar to those that occurred in the past. Analysis of evidence from Earth's history substantiates the conclusion that the planet has also been influenced by occasional catastrophes such as the impact of an asteroid or comet.
- The learner will be able to explain the layers of the Earth and their interactions.
  The use of models/diagrams/graphs helps illustrate that the Earth is layered. The lithosphere is the thin crust and the upper part of the mantle. Lithospheric plates move slowly in response to movements in the mantle. There is a dense core at the center of the Earth.
- The learner will be able to describe the concept of gravity and the effect of gravitational force between the sun, the moon, and the Earth.
  The gravitational pull of the Sun and moon on Earth's oceans as the major cause of tides can be understood from generalizations based on evidence.

Biological Science (20%)

- The learner will be able to * Describe the role of genes/chromosomes in the passing of information from one generation to another (heredity);
  * Compare inherited and learned traits.
  Every organism requires a set of instructions for specifying its traits. This information is contained in genes located in the chromosomes of each cell that can be illustrated through the use of models. Heredity is the passage of these instructions from one generation to another and should be distinguished from learned traits.
- The learner will be able to describe and compare sexual and asexual reproduction.
  Reproduction is a characteristic of all living systems and is essential to the continuation of every species as evidenced through observable patters. A distinction should be made between organisms that reproduce asexually, and those that reproduce sexually, including humans and plants, male and female sex cells carrying genetic information unite to begin the development of a new individual.
- The learner will be able to * Describe the usefulness of fossil information to make conclusions about past life forms and environmental conditions;
  *Explain the cause and effect relationship of the extinction of a species and environmental changes.

Extinction of species is common and occurs when the adaptive characteristics of a species are insufficient to allow its survival. Most of the species that have lived on Earth no longer exist. Fossils provide evidence of how environmental conditions and life have changed.

Unifying Ideas (30%)

- The learner will be able to understand that Earth systems have sources of energy that are internal and external to the Earth. The Sun is the major external source of energy.
- The learner will be able to * Describe the transfer and/or transformations of energy, which occur in examples that involve several different forms of energy (e.g., heat, electrical, light, motion of objects and chemical).
  *Explain, qualitatively or quantitatively, that heat lost by hot object equals the heat gained by cold object.
  The transfer and transformation of energy can be examined in a variety of real life examples. Models are an energy way to convey the abstract/invisible transfer of energy in a system. Heat energy is the disorderly motion of molecules. Heat can be transferred through materials by the collisions of atoms or across space by radiation. If the material is fluid, currents will be set up in it that aid the transfer of heat. To change something's speed, to bend or stretch things, to heat or cool them, to push things together to expand or contract them, or tear them apart all require transfers (and some transformations) of energy. Heat lost by hot object equals the heat gained by cold object. This is an energy conversion statement. Whenever hot and cold objects are put in contact, heat energy always transfers from the hot object to the cold object and this continues until all the mass is at the same temperature. Students should understand that heat produced by burning comes from the release of chemical energy of the substance.
- The learner will be able to understand that waves are one way that energy is transferred. Types of waves include sound, light, earthquake, ocean, and electromagnetic.
- The learner will be able to describe or represent the flow of energy in ecosystems, using data to draw conclusions about the role of organisms in a ecosystem. For most ecosystems, the major source of energy is sunlight. Energy entering ecosystems as sunlight is transferred by producers into chemical energy through photosynthesis. That energy then passes from organism in food webs.
- The learner will be able to compare abiotic and biotic factors in an ecosystem in order to explain consequences of change in one or more factors.
  The number of organisms an ecosystem can support depends on the resources available and abiotic factors (e.g., quantity of light and water, range of temperatures, soil composition). Given adequate biotic and abiotic resources and no diseases or predators, populations (including humans) increase at rapid rates. Lack of resources and other factors, such as predation and climate, limit the growth of populations in specific niches in the ecosystem.

Consumerism [20%]

- The learner will be able to describe consumer actions (reuse, reduce, recycle) and explain how these actions impact the environment (e.g., conserving resources, reducing pollution, reducing solid waste, conserving energy).