

Charyl Stockwell Academy

Explorer Benchmarks and Grade Level Content Expectations

(Benchmarks are in standard print, GLCEs are in italics)

Science

(revised April, 2007)

Science Processes:

- ***Inquiry Process: Inquiry involves generating questions, conducting investigations, and developing solutions to problems through reasoning and observation. Generate scientific questions based on observations, investigations, and research.***
 - *Design and conduct scientific investigations.*
 - *Use tools and equipment (spring scales, stop watches, meter sticks and tapes, models, hand lens) appropriate to scientific investigations.*
 - *Use metric measurement devices in an investigation.*
 - *Construct charts and graphs from data and observations.*
 - *Identify patterns in data.*
- ***Inquiry Analysis and Communication: Inquiry includes an analysis and presentation of findings that lead to future questions, research, and investigations.***
 - *Analyze information from data tables and graphs to answer scientific questions.*
 - *Evaluate data, claims, and personal knowledge through collaborative science discourse.*
 - *Communicate and defend findings of observations and investigations using evidence.*
 - *Draw conclusions from sets of data from multiple trails of a scientific investigation.*
 - *Use multiple sources of information to evaluate strengths and weaknesses of claims, arguments, or data.*
- ***Reflection and Social Implications: Reflecting knowledge is the application of scientific knowledge to new and different situations. Reflecting knowledge requires careful analysis of evidence that guides decision-making and the application of science throughout history and within society.***
 - *Evaluate the strengths and weaknesses of claims, arguments, and data.*
 - *Describe limitations in personal and scientific knowledge.*

- *Identify the need for evidence in making scientific decisions.*
- *Demonstrate scientific concepts through various illustrations, performances, models, exhibits, and activities.*
- *Design solutions to problems using technology.*
- *Describe the effect humans and other organisms have on the balance in the natural world.*
- *Describe how science and technology have advanced because of the contributions of many people throughout history and across cultures.*
- Interpret science concepts using forms of writing

Physical Science: Forces and Motion:

- ***Force Interactions: Some forces between objects act when the objects are in direct contact (touching), such as friction and air resistance, or when they are not in direct contact (not touching), such as magnetic force, electrical force and gravitational force.***
 - *Distinguish between contact forces and non-contact forces.*
 - *Demonstrate contact and non-contact forces to change the motion of an object.*
 - *Describe the non-contact forces exerted by magnets, electrically charged objects, and gravity*
- ***Force: Forces have a magnitude and direction. Forces can be added. The net force on an object is the sum of all of the forces acting on the object. An object's speed and/or direction of motion changes when a non-zero net force is applied to it. A balance force on an object does not change the objects motion (the object either remains at rest or continues to move at a constant speed in a straight line).***
 - *Describe what happens when two forces act on an object in the same or opposing directions.*
 - *Describe how constant motion is the result of balanced (net zero) forces.*
 - *Describe how changes in the motion of objects are caused by a non-zero net (unbalanced) force.*
 - *Relate the size of change in motion to the strength of unbalanced forces and the mass of the object.*
- ***Speed: Motion can be described by a change in position relative to a point of reference. An object's motion can be described by its speed and the direction it is moving. An object's position and speed can be measured and graphed as a function of time.***
 - *Explain the motion of an object relative to its point of reference.*
 - *Describe the motion of an object in terms of distance, time, and direction, as the object moves, in relationship to other objects.*

- *Illustrate how motion can be measured and represented on a graph.*
- Describe or compare motions of common objects in terms of speed and direction.
- Use simple measurement devices to determine the force, speed, and/or change in speed of objects.
- Explain how objects move, how objects change speed, and how objects change direction through language arts or creative expression.
- Relate motion of objects to unbalanced forces in two dimensions

Life Science: Organization of Living Things:

- ***Species Adaptation and Survival: Species with certain traits are more likely than others to survive and have offspring in particular environments. When an environment changes, the advantage or disadvantage of the species' characteristics can change. Extinction of a species occurs when the environment changes and the characteristics of a species are insufficient to allow survival.***
 - *Explain how behavioral characteristics (adaptation, instinct, learning, habit) of animals help them to survive in their environment.*
 - *Describe the physical characteristics (traits) of organisms that help them survive in their environment.*
 - *Describe how fossils provide evidence about how living things and environmental conditions have changed.*
 - *Analyze the relationship of environmental change and catastrophic events (for example: volcanic eruption, floods, asteroid impacts, tsunamis) to species extinction.*
- ***Relationships Among Organisms: Similarities among organisms are found in anatomical features, which can be used to infer the degree of relatedness among organisms. In classifying organisms, biologists consider details of internal and external structures to be more important than behavior or general appearance.***
 - *Relate degree of similarity in anatomical features to the classification of contemporary organisms.*
 - *Explain characteristics and functions of observable body parts in a variety of animals.*

Earth Science: Earth Systems:

- ***Seasons: Seasons result from annual variations in the intensity of sunlight and length of day due to the tilt of the axis of the Earth relative to the plane of its yearly orbit around the sun.***
 - *Demonstrate using a model, seasons as the result of variations in the intensity of sunlight caused by the tilt of the earth on its axis, and revolution around the sun.*
 - *Explain how the revolution of the Earth around the sun defines a year.*

Earth Science: Earth in Space and Time:

- ***Solar System: the sun is the central and largest body in our solar system. Earth is the third planet from the sun in a system that includes other planets and their moons, as well as smaller objects, such as asteroids and comets.***
 - *Design a model that describes the position and relationship of the planets and other objects (comets and asteroids) to the sun.*
- ***Solar System Motion: gravity is the force that keeps most objects in the solar system in regular and predictable motion.***
 - *Describe the motion of planets and moons in terms of rotation on axis and orbits due to gravity.*
 - *Explain moon phases as they relate to the position of the moon in its orbit around the Earth, resulting in the amount of observable reflected light.*
 - *Recognize that nighttime objects (stars and constellations) and the sun appear to move because the Earth rotates on its axis and orbits the sun.*
 - *Explain lunar and solar eclipses based on the relative positions of the Earth, moon, and sun, and the orbit of the moon.*
 - *Explain the tides of the oceans as they relate to the gravitational pull and orbit of the moon.*

Applied Health Concepts:

- Describe the basic structure and functions of the human body systems
- Recognize that personal behaviors influence an individual's well being
- Identify the most common health problems of children (as well as dangerous communicable diseases such as HIV/AIDS)
- Identify health problems that should be detected and treated early (such as HIV/AIDS)
- Identify responsible health behaviors
- Compare behaviors that are safe to those that are risky or harmful