

Integrated Science 7: Course Description

This course is designed to provide investigative experiences and inquiry activities in the physical, biological, and earth sciences as well as in the application of knowledge of these sciences to environmental issues.

The goal of this course is to develop scientifically literate students who have both the background necessary for understanding environmental concerns in our technological society and the foundational tools for further study in science.

Course Curriculum and Objectives

EALR - Science 1.1

Understand how properties are used to identify, describe and categorize substances, materials, and objects and how characteristics are used to categorize living things.

=====

GLE - Science 1.1.2 Motion of Objects

- **Understand the position, relative speeds, and changes in speed of objects.**

Objective/Skill Being Taught:

- Describe and measure the relative position or change in position of one or two objects.
- Describe an object's motion as speeding up, slowing down, or moving with constant speed using models, numbers, words, diagrams, and graphs.
- Measure and describe the speed of an object relative to the speed of another object.

GLE - Science 1.1.5 Nature and Properties of Earth Materials

- **Understand and how to classify rocks, soils, air, and water into groups based on their chemical and physical properties.**

Objective/Skill Being Taught:

- Describe properties of minerals and rocks that give evidence of how they were formed (e.g. crystal size and arrangement, texture, luster, cleavage, hardness, layering, reaction to acid)
- Describe properties of soils that give evidence of how the soils were formed (e.g. chemical composition such as acidic, types of particles, particle size, organic materials, layering)
- Describe how Earth's water (i.e. oceans, fresh waters, glaciers, ground water) can have different properties (e.g. salinity, density)
- Describe how the atmosphere has different properties at different elevations

EALR - Science 1.2

Understand how components, structures, organizations, and interconnections describe systems

=====

GLE - Science 1.2.1 Structure of Physical Earth/Space and Living Systems

- **Analyze how the parts of a system interconnect and influence each other.**

Objective/Skill Being Taught:

- Describe the interactions and influences between two or more simple systems.

GLE - Science 1.2.4 Components and Patterns of Earth Systems

- **Understand the components and interconnections of Earth's Systems**

Objective/Skill Being Taught:

- Describe the components of the Earth's systems (i.e. the core, the mantle, oceanic and crustal plates, landforms, the hydrosphere and atmosphere)
- Describe the interactions among the components of Earth's systems (i.e. the core, the mantle, oceanic and crustal plates, landforms, the hydrosphere and atmosphere)
- Describe magma (i.e. magma comes from Earth's mantle and cools to form rocks)

EALR - Science 1.3

Understand how interactions within and among systems cause changes in matter and energy.

=====

GLE - Science 1.3.1 Nature of Force

- **Understand factors that affect the strength and direction of forces**

Objective/Skill Being Taught:

- Observe and describe factors that affect the strength of forces (e.g. an object with a greater mass has a greater gravitational force (weight); certain types of magnets have greater magnetic forces; a larger muscle can pull with greater force)
- Describe how forces acting on an object may balance each other (e.g. the downward force of gravity on an object sitting on a table is balanced by an upward force from the table)
- Measure and describe how a simple machine can change the strength and/or direction of a force (i.e. levers and pulleys)
- Describe pressure as a force (e.g. pressure increases results in greater forces acting on objects going deeper in a body of water)

GLE - Science 1.3.2 Forces to Explain Motion

- **Understand how balanced and unbalanced forces can change the motion of objects**

Objective/Skill Being Taught:

- Describe how an unbalanced force changes the speed and/or direction of motion of different objects moving along a straight line, 2nd Law of Motion (e.g. a larger unbalanced force is needed to equally change the motion of more massive objects)
- Describe how frictional forces act to stop the motion of objects
- Investigate and describe the balanced and unbalanced forces acting on an object (e.g. a model car speeding up on a table has both an unbalanced force pulling it forward and a gravitational force pulling it down balanced by a table pushing upward)
- Investigate and describe pressure differences that result in unbalanced forces moving objects (e.g. pressure differences cause forces that move air masses, move blood through the heart, cause volcanic eruptions)

GLE - Science 1.3.3 Conservation of Matter and Energy

- **Understand that matter is conserved during physical and chemical changes.**

Objective/Skill Being Taught:

- Observe and describe evidence of physical and chemical changes of matter (e.g. change of state, size, shape, temperature, color, gas production, solid formation, light)
- Observe and describe that substances undergoing physical changes produce matter with the same chemical properties as the original substance and the same total mass (e.g. tearing paper, freezing water, breaking wood, sugar dissolving in water)
- Observe and describe that substances may react chemically to form new substances with different chemical properties and the same total mass (e.g. baking soda and vinegar, light stick mass before, during and after reaction)

GLE - Science 1.3.4 Processes and Interactions in the Earth System

- **Understand the processes that continually change the surface of the Earth**

Objective/Skill Being Taught:

- Describe the processes by which soils are formed (e.g. erosion and deposition in river systems)
- Describe how heat (thermal) energy flow and movement (convection currents) beneath Earth's crust cause earthquakes and volcanoes
- Describe how constructive processes change landforms (e.g. crustal deformation, volcanic eruption, deposition of sediment)
- Describe how destructive processes change landforms (e.g. rivers erode landforms)
- Describe the processes involved in the rock cycle (e.g. magma cools into igneous rocks; rocks are eroded and deposited as sediments; sediments solidify into sedimentary rocks; rocks can be changed by heat and pressure to form metamorphic rocks)

GLE - Science 1.3.5 History and Evolution of the Earth

- **Understand how fossils and other evidence are used to document life and environmental changes over time.**

Objective/Skill Being Taught:

- Describe how fossils are formed
- Describe different kinds of evidence that are used to document past conditions on Earth (e.g. glacial markings, ash layers, tree rings, rock layers)
- Describe how fossils and other artifacts provide evidence of how life has changed over time (e.g. extinction of species)

GLE - Science 1.3.6 Hydrosphere and Atmosphere

- **Analyze the relationship between weather and climate and how ocean currents and global atmospheric circulation affect weather and climate.**

Objective/Skill Being Taught:

- Compare weather and climate
- Explain the effect of the water cycle on weather (e.g. cloud formation, storms)
- Explain how ocean currents influence the atmosphere in terms of weather and climate
- Explain the causes of atmospheric circulation and oceanic currents (e.g. prevailing winds are the result of hot tropical regions, cold polar regions, and Earth's spin)

GLE - Science 1.3.8 Life Processes and the Flow of Matter and Energy

- **Understand how individual organisms, including cells, obtain matter and energy for life processes**

Objective/Skill Being Taught:

- Describe the different sources of matter and energy required for life processes in plants and animals (e.g. seeds have energy for germination, green plants need light for energy)
- Describe how organisms acquire materials needed for life processes
- Describe how systems interact to distribute materials and eliminate wastes produced by life processes
- Describe that both plants and animals extract energy from food, but plants produce their own food from light, air, water, and mineral nutrients, while animals consume energy-rich foods

GLE - Science 1.3.9 Biological Evolution

- **Understand how the theory of biological evolution accounts for species diversity, adaptation, natural selection, extinction, and change in species over time**

Objective/Skill Being Taught:

- Describe how fossils show that extinction is common and that most organisms that lived long ago have become extinct
- Describe how individual organisms with certain traits are more likely than others to survive and have offspring (i.e. natural selection, adaptation)
- Describe how biological evolution accounts for the diversity of species developed through gradual processes over many generations

GLE - Science 1.3.10 Interdependence of Life

- **Understand how organisms in ecosystems interact with and respond to their environment and other organisms**

Objective/Skill Being Taught:

- Describe how energy flows through a food chain or web
- Describe how substances such as air, water, and mineral nutrients are continually cycled in ecosystems
- Explain the role of an organism in an ecosystem (e.g. predator, prey, consumer, producer, decomposer, scavenger, carnivore, herbivore, omnivore)
- Describe how a population of an organism responds to a change in its environment

TEXT:

Prentice Hall Science, c. 1997 Prentice Hall, Inc., publishers.