

SCIENCE

NORTH CAROLINA ESSENTIAL STANDARDS

FORCES AND MOTION

7.P.1 Understand motion, the effects of forces on motion and the graphical representations of motion.

- 7.P.1.1 Explain how the motion of an object can be described by its position, direction of motion, and speed with respect to some other object.
- 7.P.1.2 Explain the effects of balanced and unbalanced forces acting on an object (including friction, gravity and magnets).
- 7.P.1.3 Illustrate the motion of an object using a graph to show a change in position over a period of time.
- 7.P.1.4 Interpret distance versus time graphs for constant speed and variable motion.

ENERGY: CONSERVATION AND TRANSFER

7.P.2 Understand forms of energy, energy transfer and transformation and conservation in mechanical systems.

- 7.P.2.1 Explain how kinetic and potential energy contribute to the mechanical energy of an object.
- 7.P.2.2 Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).
- 7.P.2.3 Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.
- 7.P.2.4 Explain how simple machines such as inclined planes, pulleys, levers and wheel and axles are used to create mechanical advantage and increase efficiency.

EARTH SYSTEMS, STRUCTURES AND PROCESSES

7.E.1 Understand how the cycling of matter (water and gases) in and out of the atmosphere relates to Earth's atmosphere, weather and climate and the effects of the atmosphere on humans.

- 7.E.1.1 Compare the composition, properties and structure of Earth's atmosphere to include: mixtures of gases and differences in temperature and pressure within layers.
- 7.E.1.2 Explain how the cycling of water in and out of the atmosphere and atmospheric conditions relate to the weather patterns on Earth.
- 7.E.1.3 Explain the relationship between the movement of air masses, high and low pressure systems, and frontal boundaries to storms (including thunderstorms, hurricanes, and tornadoes) and other weather conditions that may result.
- 7.E.1.4 Predict weather conditions and patterns based on information obtained from:
 - Weather data collected from direct observations and measurement (wind speed and direction, air temperature, humidity and air pressure)
 - Weather maps, satellites and radar
 - Cloud shapes and types and associated elevation
- 7.E.1.5 Explain the influence of convection, global winds and the jet stream on weather and climatic conditions.
- 7.E.1.6 Conclude that the good health of humans requires: monitoring the atmosphere, maintaining air quality and stewardship.

STRUCTURES AND FUNCTIONS OF LIVING ORGANISMS

7.L.1 Understand the processes, structures and functions of living organisms that enable them to survive, reproduce and carry out the basic functions of life.

- 7.L.1.1 Compare the structures and life functions of single-celled organisms that carry out all of the basic functions of life including:
- Euglena
 - Amoeba
 - Paramecium
 - Volvox
- 7.L.1.2 Compare the structures and functions of plant and animal cells, including major organelles (cell membrane, cell wall, nucleus, chloroplasts, mitochondria, and vacuoles).
- 7.L.1.3 Summarize the hierarchical organization of multi-cellular organisms from cells to tissues to organs to systems to organisms.
- 7.L.1.4 Summarize the general functions of the major systems of the human body (digestion, respiration, reproduction, circulation, and excretion) and ways that these systems interact with each other to sustain life.

EVOLUTION AND GENETICS

7.L.2 Understand the relationship of the mechanisms of cellular reproduction, patterns of inheritance and external factors to potential variation among offspring.

- 7.L.2.1 Explain why offspring that result from sexual reproduction (fertilization and meiosis) have greater variation than offspring that result from asexual reproduction (budding and mitosis).
- 7.L.2.2 Infer patterns of heredity using information from Punnett squares and pedigree analysis.
- 7.L.2.3 Explain the impact of the environment and lifestyle choices on biological inheritance (to include common genetic diseases) and survival.