Connecticut Science

Grade 8

Adopted 2010

Heredity and Evolution

2. **Reproduction is a characteristic of living systems and it is essential for the continuation of every species.** 8.2

    1. Relate the continued existence of any species to its successful reproduction and explain in writing the factors that contribute to successful reproduction.
    2. Describe the structure, location and function of chromosomes, genes and DNA and how they relate to each other in the living cell.
    3. Illustrate and chart the purpose, cell type (somatic and germ) and resulting chromosome count during cell division in mitosis and meiosis.
    4. Identify the major structures in human male and female reproductive systems and explain where meiosis and gamete formation take place.
    5. Investigate and report on the role of hormone production as it initiates and regulates the creation of male and female germ cells from birth through adolescence and into adulthood.
    6. Compare and contrast the events and processes that occur when a human egg is fertilized or not fertilized.
    7. Demonstrate the relationship of corresponding genes on pairs of chromosomes to traits inherited by offspring.
    8. Describe in writing the role of the germ cells in the formation of the human zygote and its resulting 23 pairs of chromosomes, the 23rd of which determines gender and the other 22 of which determine the characteristics of that offspring.

Science and Technology in Society

4. **In the design of structures there is a need to consider factors such as function, materials, safety, cost and appearance.
 This content standard is an application of the concepts in content standard 8.1 and should be integrated into the same unit.** 8.4
    1. Identify the forces acting on a truss, beam and suspension bridge, including compression, tension and gravity using models, pictures or diagrams.
    2. Explain in writing the advantages and disadvantages of truss, beam and suspension bridge design and visually identify each bridge.
    3. Conduct an experiment to discover and report on a bridge's ability to support a load based on the interplay of tension and compression forces that result in a net force of zero.
    4. Use technology to simulate how engineers plan, test and revise bridge designs given parameters including cost, time, safety and aesthetics.

Forces and Motion

1. **An object's inertia causes it to continue moving the way it is moving unless it is acted upon by a force to change its motion.** 8.1
    1. Use appropriate tools and techniques to make observations and gather data to determine how forces, including friction, act on an object to change its position over time in relation to a fixed point of reference.
    2. Calculate the average speed of a moving object, and distinguish between instantaneous speed and average speed of an object.
    3. Create and interpret distance-time graphs for objects moving at constant and nonconstant speeds.
    4. Predict the motion of an object given the magnitude and direction of forces acting on it (net force).
    5. Investigate and demonstrate how unbalanced forces cause acceleration (change in speed and/or direction of an object's motion).
    6. Assess in writing the relationship between an object's mass and its inertia when at rest and in motion.
    7. Express mathematically how the mass of an object and the force acting on it affect its acceleration.
    8. Design and conduct an experiment to determine how gravity and friction (air resistance) affect a falling object.
    9. Illustrate how the circular motion of an object is caused by a center-seeking force (centripetal force) resulting in the object's constant acceleration.

Earth in the Solar System

3. **The solar system is composed of planets and other objects that orbit the sun.** 8.3
    1. Relate the strength of gravitational force between two objects to their mass and the distance between the centers of the two objects and provide examples.
    2. Describe in writing how gravitational attraction and the inertia of objects in the solar system keep them on a predictable elliptical pathway.
    3. Distinguish between rotation of Earth on its axis and its elliptical revolution around the sun.
    4. Investigate and report in writing how the Earth's revolution around the sun affects changes in daylight and seasons.
    5. Compare the revolution times of all the planets and relate it to their distance from the sun.
    6. Conduct and report on an investigation that shows how the Earth's tilt on its axis and position around the sun relates to the intensity of light striking the Earth's surface.
    7. Use a model to demonstrate the phases of the moon relative to the position of the sun, Earth and moon.
    8. Develop a model or illustration to show the relative positions of the Earth, sun and moon during a lunar and solar eclipse and explain how those positions influence the view from Earth.