



Science

Biology

2nd Nine Weeks



This academic overview can be used to monitor and support your child's at-home learning progress.

Unit 4: The Cell Cycle

Student Learning Targets

- I can describe the stages of the cell cycle.
- I can describe DNA replication.
- I can describe the process of mitosis.
- I can describe the the importance of the cell cycle to the growth of organisms.

Questions to Check for Unit Understanding

- What are the stages of interphase?
- What are the stages of cell division?
- What happens with cells that have errors in the cell cycle?

Key Academic Vocabulary

- Cancer: a disease resulting from the uncontrolled growth and division of the cells of a multicellular organism
- Cell Cycle: the process by which cells grow and divide to produce more cells
- Mitosis: the phase of the eukaryotic cell cycle in which a single cell divides into two cells
- Interphase: the longest phase of the cell cycle, in which the cell will grow larger and replicate its DNA in order to prepare for cell division

Unit 5: The Role of Nucleic Acids and Protein Synthesis

Student Learning Targets

- I can identify the components of DNA.
- I can identify how information for specifying traits of an organism is carried on the DNA.
- I can identify the different types of changes in DNA.
- I can illustrate the different types of changes in DNA.
- I can evaluate the significance of the changes in DNA.

Questions to Check for Unit Understanding

- What are the components of DNA?
- How can an organism have identical DNA in all cells, but the individual cells can have different appearances and functions?
- Why is the genetic code common to all organisms?
- What is the ultimate purpose of DNA?
- How do proteins control DNA?

Key Academic Vocabulary

- Chromosome: a structure made of DNA that contains the genetic information in the form of genes needed to carry out cell functions
- Nucleic Acid: a nucleotide polymer capable of storing and transferring genetic information
- Nucleotide: a molecule made of a sugar, a phosphate, and a nitrogenous base; the monomer of nucleic acid

Unit 6: Genetics and Epigenetics

Student Learning Targets

- I can differentiate between genotypes and phenotypes.
- I can use a pedigree to predict genetic outcomes.
- I can predict genetic outcomes of non-Mendelian inheritance.

Questions to Check for Unit Understanding

- What is the benefit of meiosis on the population?
- How can offspring not share the phenotype of their parents?
- How is the phenotype expressed?
- How would epigenetics benefit an organism?
- How would epigenetics make identifying the genotype of an organism more challenging?
- What is the benefit of genetic counseling?

Key Academic Vocabulary

- Meiosis: cell division that results in the production of haploid gametes: sperm and eggs
- Trait: a distinct characteristic of an organism, which may or may not be inheritable
- Genotype: the genetic makeup of an organism



Science Chemistry 2nd Nine Weeks



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Unit 3: Chemical Bonding & Chemical Formulas

Student Learning Targets

- I can differentiate between ionic and covalent bonds.
- I can write formulas for ionic and covalent compounds.
- I can write formulas for acids and bases.

Questions to Check for Unit Understanding

- Why do bonds form?
- How do bonds form?
- Why do standardized naming and formula-writing conventions exist for chemical compounds?
- How do chemical names and chemical formulas communicate information differently and similarly?

Key Academic Vocabulary

- Chemical Formula: a shorthand notation that uses chemical symbols and numbers as subscripts to represent the type of atoms and number of atoms that are present in the smallest unit of the substance
- Ionic Bond: a form of chemical bond that is characterized by the electrostatic attraction that binds oppositely charged ions together
- Covalent Bond: a form of chemical bond that is characterized by the sharing of pairs of electrons between atoms

Unit 4: Chemical Equations & Reactions

Student Learning Targets

- I can write a chemical equation for a word equation and balance it.
- I can describe the different types of chemical equations expressing different types of reactions.
- I can classify chemical equations.

Questions to Check for Unit Understanding

- How do you balance a chemical equation?
- How does a balanced chemical equation support the Law of Conservation of Matter?
- How do differentiate a single replacement reaction and a double displacement reaction?
- How do distinguish a synthesis reaction from a decomposition reaction?
- Why do we classify chemical reactions?
- Can a chemical reaction be classified as more than one type of reaction?

Key Academic Vocabulary

- Law of Conservation of Mass: a law stating that mass is conserved and is neither created nor destroyed in a chemical reaction; the total mass of the reactants equals the total mass of the products.
- Balanced Chemical Reaction: a chemical equation in which mass is conserved and each side of the equation has the same number of atoms of each element

Unit 5: The Mole and Avogadro's Number

Student Learning Targets

- I can calculate the molar mass of a pure substance.
- I can calculate the number of representative particles in 20.0 moles of pure substance.
- I can identify the components necessary to calculate the percent composition.
- I can recognize the difference between an empirical formula and a molecular formula of a compound.

Questions to Check for Unit Understanding

- How do chemists count atoms, molecules, formula units and ions in a sample of matter if the particles are too small and numerous to see?
- What is the relationship between atomic mass units and grams for a pure substance of matter?

Key Academic Vocabulary

- Avogadro's Number: expressed as 6.02×10^{23} ; the number of representative particles contained in one mole of a substance
- Molar Mass: a general expression used to refer to the mass (in grams) of a mole of any substance, expressed as grams per mole, or g/mol
- Mole: the SI unit used to describe the number of particles (atoms, molecules, ions) of a substance that are present in a sample



Science Physics 2nd Nine Weeks



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Unit 4: Gravity and Circular Motion

Student Learning Targets

- I can create a diagram of circular motion using acceleration and velocity vectors.
- I can calculate the acceleration patterns of an orbiting body using its speed and radius of orbit.

Questions to Check for Unit Understanding

- How is motion in a non-inertial reference frame (like circular motion) similar/different to motion in an inertial reference frame (like one-dimensional and projectile motion)?
- How can objects in circular motion have a constant tangential speed but non-constant tangential velocity?
- How do the mass of objects and the distance separating them affect the gravitational force between them?
- How do the four fundamental forces compare in terms of their relative magnitudes and the ranges over which they act?
- If we encounter a force, how do we know which of the four fundamental forces it is?

Key Academic Vocabulary

- Centripetal Force: the net force acting on an object moving in a curved path that accelerates the object toward the center of the path's curvature
- Projectile: an object moving through space that has gravity as the only force acting upon it
- Gravitational Force: a force of attraction between two masses
- Newton's Law of Universal Gravitation: the law stating that every piece of matter is attracted to every other piece of matter; the force is directly proportional to their masses but inversely proportional to the square of the distance between them.

Unit 5: Impulse and Conservation of Momentum

Student Learning Targets

- I can illustrate the vector forces and accelerations of objects that are bouncing against surfaces or of objects that are colliding with each other.
- I can calculate force, acceleration, and mass of objects with momentum using Newton's Second Law.
- I can calculate the impulse applied to an object.

Questions to Check for Unit Understanding

- In what conditions is momentum conserved/not conserved?
- What characterizes an elastic/inelastic collision and what laws of conservation apply to collisions?
- How is momentum connected to Newton's Second Law?
- What is the relationship between impulse and momentum?

Key Academic Vocabulary

- Law of Conservation of Momentum: a law stating that for collisions in a closed system, the total momentum remains the same

Unit 6: Energy and its Conservation

Student Learning Targets

- I can define and describe the law of conservation of energy.
- I can verbally describe the energy transformations occurring in an energy transformation sequence.
- I can calculate various quantities such as the velocity, height, mass, etc. of an object/system as it undergoes an energy transformation from one form of mechanical energy to another or as work is done on it/by it.

Questions to Check for Unit Understanding

- What does it mean that energy is conserved?
- What are the main forms of humanly useful/non-useful energy?
- How does the flow and storage of energy affect the ability of objects/agents to do work?
- How does the idea of energy efficiency relate to the law of conservation of energy?

Key Academic Vocabulary

- Law of Conservation of Energy: a law stating that energy cannot be created or destroyed—it can only change forms



Science

Environmental Systems

2nd Nine Weeks



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Unit 3: Environmental Resources & Systems

Student Learning Targets

- I can define waste management methods, such as reduction, reuse, recycling, and composting.
- I can evaluate the impact of waste management methods on resource availability.

Questions to Check for Unit Understanding

- What are the methods for land and water management?
- What methods are land use and management?
- What are nonrenewable and renewable resources?
- What are the impacts of waste management on the environment?

Key Academic Vocabulary

- Reduction: the action of utilizing less in amount, degree, or size
- Composting: organic matter that has been decomposed
- Waste: unwanted or unusable materials

Unit 4: Energy Flow & Interactions

Student Learning Targets

- I can define and identify the components of the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere.
- I can define and identify the interactions among the components of the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere.
- I can describe and compare renewable and non-renewable energies.

Questions to Check for Unit Understanding

- What are the components of the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere?
- What are the interactions among the components of the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere?
- What is the difference between nonrenewable and renewable resources?

Key Academic Vocabulary

- Renewable: Materials from Earth that can be replaced by nature within a short amount of time
- Nonrenewable: resources that cannot be replaced by natural processes within a lifetime

Unit 5: Natural Patterns in Environment

Student Learning Targets

- I can define the natural process of succession.
- I can define the natural processes of feedback loops.
- I can examine how succession and feedback loops restore habitats and ecosystems.

Questions to Check for Unit Understanding

- What are the effects on areas impacted by natural events?
- What are regional changes to the environment and what are their global effects?
- What is succession and does it restore the environment?
- What are feedback loops and how do they restore the ecosystem?

Key Academic Vocabulary

- Ecological Succession: the gradual process by which ecosystems change and develop over time
- Feedback Loops: the return of information about a system or process that may affect a change in the system or process