



Tree Rings and Climate

Grade 8: (11) Organisms and environments. The student knows that interdependence occurs among living systems and the environment and that human activities can affect these systems. The student is expected to:

- (A) investigate how organisms and populations in an ecosystem depend on and may compete for biotic factors such as food and abiotic factors such as quantity of light, water, range of temperatures, or soil composition;
 - (B) explore how short- and long-term environmental changes affect organisms and traits in subsequent populations; and
 - (C) recognize human dependence on ocean systems and explain how human activities such as runoff, artificial reefs, or use of resources have modified these systems.
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Seed Genetics

Grade 7: (11) Organisms and environments. The student knows that populations and species demonstrate variation and inherit many of their unique traits through gradual processes over many generations. The student is expected to:

- (A) examine organisms or their structures such as insects or leaves and use dichotomous keys for identification;
 - (B) explain variation within a population or species by comparing external features, behaviors, or physiology of organisms that enhance their survival such as migration, hibernation, or storage of food in a bulb; and
 - (C) identify some changes in genetic traits that have occurred over several generations through natural selection and selective breeding such as the Galapagos Medium Ground Finch (*Geospiza fortis*) or domestic animals and hybrid plants.
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Building a Kidney Model

Grade 7: (12) Organisms and environments. The student knows that living systems at all levels of organization demonstrate the complementary nature of structure and function. The student is expected to:

- (A) investigate and explain how internal structures of organisms have adaptations that allow specific functions such as gills in fish, hollow bones in birds, or xylem in plants;
 - (B) identify the main functions of the systems of the human organism, including the circulatory, respiratory, skeletal, muscular, digestive, excretory, reproductive, integumentary, nervous, and endocrine systems;
 - (C) recognize levels of organization in plants and animals, including cells, tissues, organs, organ systems, and organisms;
 - (D) differentiate between structure and function in plant and animal cell organelles, including cell membrane, cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole;
 - (E) compare the functions of cell organelles to the functions of an organ system; and
 - (F) recognize the components of cell theory.
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Cellular Diffusion and Osmosis

Grade 7: (12) Organisms and environments. The student knows that living systems at all levels of organization demonstrate the complementary nature of structure and function. The student is expected to:

- (A) investigate and explain how internal structures of organisms have adaptations that allow specific functions such as gills in fish, hollow bones in birds, or xylem in plants;
 - (B) identify the main functions of the systems of the human organism, including the circulatory, respiratory, skeletal, muscular, digestive, excretory, reproductive, integumentary, nervous, and endocrine systems;
 - (C) recognize levels of organization in plants and animals, including cells, tissues, organs, organ systems, and organisms;
 - (D) differentiate between structure and function in plant and animal cell organelles, including cell membrane, cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole;
 - (E) compare the functions of cell organelles to the functions of an organ system; and
 - (F) recognize the components of cell theory.
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Animal Behavior

Grade 7: (13) Organisms and environments. The student knows that a living organism must be able to maintain balance in stable internal conditions in response to external and internal stimuli. The student is expected to:

- (A) investigate how organisms respond to external stimuli found in the environment such as phototropism and fight or flight; and
 - (B) describe and relate responses in organisms that may result from internal stimuli such as wilting in plants and fever or vomiting in animals that allow them to maintain balance.
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Life Cycles

Grade 7: (14) Organisms and environments. The student knows that reproduction is a characteristic of living organisms and that the instructions for traits are governed in the genetic material. The student is expected to:

- (A) define heredity as the passage of genetic instructions from one generation to the next generation;
 - (B) compare the results of uniform or diverse offspring from asexual or sexual reproduction; and
 - (C) recognize that inherited traits of individuals are governed in the genetic material found in the genes within chromosomes in the nucleus.
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Carbon Dioxide Emissions and Climate Change

Grade 8: (11) Organisms and environments. The student knows that interdependence occurs among living systems and the environment and that human activities can affect these systems. The student is expected to:

- (A) investigate how organisms and populations in an ecosystem depend on and may compete for biotic factors such as food and abiotic factors such as quantity of light, water, range of temperatures, or soil composition;
 - (B) explore how short- and long-term environmental changes affect organisms and traits in subsequent populations; and
 - (C) recognize human dependence on ocean systems and explain how human activities such as runoff, artificial reefs, or use of resources have modified these systems.
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Artificial Selection

Grade 7: (14) Organisms and environments. The student knows that reproduction is a characteristic of living organisms and that the instructions for traits are governed in the genetic material. The student is expected to:

- (A) define heredity as the passage of genetic instructions from one generation to the next generation;
 - (B) compare the results of uniform or diverse offspring from asexual or sexual reproduction; and
 - (C) recognize that inherited traits of individuals are governed in the genetic material found in the genes within chromosomes in the nucleus.
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Ecosystems

Grade 7: (10) Organisms and environments. The student knows that there is a relationship between organisms and the environment. The student is expected to:

- (A) observe and describe how different environments, including microhabitats in schoolyards and biomes, support different varieties of organisms;
 - (B) describe how biodiversity contributes to the sustainability of an ecosystem; and
 - (C) observe, record, and describe the role of ecological succession such as in a microhabitat of a garden with weeds.
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Photosynthesis

Grade 7: (12) Organisms and environments. The student knows that living systems at all levels of organization demonstrate the complementary nature of structure and function. The student is expected to:

- (A) investigate and explain how internal structures of organisms have adaptations that allow specific functions such as gills in fish, hollow bones in birds, or xylem in plants;
 - (B) identify the main functions of the systems of the human organism, including the circulatory, respiratory, skeletal, muscular, digestive, excretory, reproductive, integumentary, nervous, and endocrine systems;
 - (C) recognize levels of organization in plants and animals, including cells, tissues, organs, organ systems, and organisms;
 - (D) differentiate between structure and function in plant and animal cell organelles, including cell membrane, cell wall, nucleus, cytoplasm, mitochondrion, chloroplast, and vacuole;
 - (E) compare the functions of cell organelles to the functions of an organ system; and
 - (F) recognize the components of cell theory.
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