



### **Mitosis**

(5) Science concepts. The student knows how an organism grows and the importance of cell differentiation. The student is expected to:

- (A) describe the stages of the cell cycle, including deoxyribonucleic acid (DNA) replication and mitosis, and the importance of the cell cycle to the growth of organisms;
  - (B) describe the roles of DNA, ribonucleic acid (RNA), and environmental factors in cell differentiation; and
  - (C) recognize that disruptions of the cell cycle lead to diseases such as cancer.
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### **Ecosystems**

(12) Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to:

- (A) interpret relationships, including predation, parasitism, commensalism, mutualism, and competition, among organisms;
  - (B) compare variations and adaptations of organisms in different ecosystems;
  - (C) analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids;
  - (D) describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles; and
  - (E) describe how environmental change can impact ecosystem stability.
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### **Diffusion and Osmosis**

(10) Science concepts. The student knows that biological systems are composed of multiple levels. The student is expected to:

- (A) describe the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals;
  - (B) describe the interactions that occur among systems that perform the functions of transport, reproduction, and response in plants; and
  - (C) analyze the levels of organization in biological systems and relate the levels to each other and to the whole system.
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### **Photosynthesis**

(9) Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. The student is expected to:

- (A) compare the functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids;
  - (B) compare the reactants and products of photosynthesis and cellular respiration in terms of energy, energy conversions, and matter; and
  - (C) identify and investigate the role of enzymes.
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### **Cellular Respiration**

(9) Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. The student is expected to:

- (A) compare the functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids;
  - (B) compare the reactants and products of photosynthesis and cellular respiration in terms of energy, energy conversions, and matter; and
  - (C) identify and investigate the role of enzymes.
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### **Rate of Transpiration**

(4) Science concepts. The student knows that cells are the basic structures of all living things with specialized parts that perform specific functions and that viruses are different from cells. The student is expected to:

- (A) compare and contrast prokaryotic and eukaryotic cells, including their complexity, and compare and contrast scientific explanations for cellular complexity;
  - (B) investigate and explain cellular processes, including homeostasis and transport of molecules; and
  - (C) compare the structures of viruses to cells, describe viral reproduction, and describe the role of viruses in causing diseases such as human immunodeficiency virus (HIV) and influenza.
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### **Fruit Fly Behavior**

(12) Science concepts. The student knows that interdependence and interactions occur within an environmental system. The student is expected to:

- (A) interpret relationships, including predation, parasitism, commensalism, mutualism, and competition, among organisms;
  - (B) compare variations and adaptations of organisms in different ecosystems;
  - (C) analyze the flow of matter and energy through trophic levels using various models, including food chains, food webs, and ecological pyramids;
  - (D) describe the flow of matter through the carbon and nitrogen cycles and explain the consequences of disrupting these cycles; and
  - (E) describe how environmental change can impact ecosystem stability.
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### **Sordaria Genetics**

(7) Science concepts. The student knows evolutionary theory is a scientific explanation for the unity and diversity of life. The student is expected to:

- (A) analyze and evaluate how evidence of common ancestry among groups is provided by the fossil record, biogeography, and homologies, including anatomical, molecular, and developmental;
  - (B) examine scientific explanations of abrupt appearance and stasis in the fossil record;
  - (C) analyze and evaluate how natural selection produces change in populations, not individuals;
  - (D) analyze and evaluate how the elements of natural selection, including inherited variation, the potential of a population to produce more offspring than can survive, and a finite supply of environmental resources, result in differential reproductive success;
  - (E) analyze and evaluate the relationship of natural selection to adaptation and to the development of diversity in and among species; and
  - (F) analyze other evolutionary mechanisms, including genetic drift, gene flow, mutation, and recombination.
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### **Artificial Selection**

(6) Science concepts. The student knows the mechanisms of genetics such as the role of nucleic acids and the principles of Mendelian and non-Mendelian genetics. The student is expected to:

- (A) identify components of DNA, identify how information for specifying the traits of an organism is carried in the DNA, and examine scientific explanations for the origin of DNA;
  - (B) recognize that components that make up the genetic code are common to all organisms;
  - (C) explain the purpose and process of transcription and translation using models of DNA and RNA;
  - (D) recognize that gene expression is a regulated process;
  - (E) identify and illustrate changes in DNA and evaluate the significance of these changes;
  - (F) predict possible outcomes of various genetic combinations such as monohybrid crosses, dihybrid crosses, and non-Mendelian inheritance; and
  - (G) recognize the significance of meiosis to sexual reproduction.
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### **Peroxidase Enzyme**

(9) Science concepts. The student knows the significance of various molecules involved in metabolic processes and energy conversions that occur in living organisms. The student is expected to:

- (A) compare the functions of different types of biomolecules, including carbohydrates, lipids, proteins, and nucleic acids;
  - (B) compare the reactants and products of photosynthesis and cellular respiration in terms of energy, energy conversions, and matter; and
  - (C) identify and investigate the role of enzymes.
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