

SCIENCE Grade 10: HS BIOLOGY	YEAR AT A GLANCE Student Learning Outcomes by Marking Period 2016-2017
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FIRST TERM	Overarching/general themes: 5 E model of learning; science practices; characteristics of living things; characteristics that define humans; unity; diversity; genetic variation; and evolution.	
Dates	Textual References BSCS Bio: AHA, 2nd/3rd eds*	To Demonstrate Proficiency by the End of the Quarter Students Will:
Marking Period Starts: Sept. 8, 2015 Suggested Completion Date: Sept. 18, 2015 for Engage Nov. 13, 2015 for Unit 1 1 st Predictive Assessment: TBD Close Reading: <i>Found in South Africa: Key Link in Human Evolution?</i> CWA: What Does it Mean to Be Human? Unit Project: Critter Project First Marking Period Ends: Nov. 6, 2015 *BSCS Biology: A Human Approach text, 2 nd /3 rd eds.	Introduction: Engage Being a Scientist Unit 1: Evolution: Patterns and Products of Change in Living Systems Ch 1: The Human Animal Ch 2: Evolution; Change Across Time Ch 3: Products of Evolution: Unity and Diversity	<ul style="list-style-type: none"> • Record observations by drawing observed objects (NGSS). • Report results of the termite activity in table and graphs to communicate findings (NGSS). • Use evidence from the termite investigation to write an explanation for the behaviors/phenomena observed (NGSS). • Discuss the nature of science using examples from cooperative activities and discussion (NGSS). • Explain how biology may be relevant to their lives after reflecting on the role that biology plays in their lives (NGSS). • Engage in scientific practices including asking questions; planning and carrying out an investigation; analyzing and interpreting data; constructing explanations; and obtaining, evaluating, and communicating information (NGSS). <ul style="list-style-type: none"> • Compare and contrast human characteristics with other living organisms, finding commonalities across life characteristics (4.4, 4.7, 5.1). • Develop testable questions to investigate characteristics (opposable thumbs/brain structure) that illustrate the idea that humans possess a combination of characteristics that distinguish them from other animals. (5.2, 5.3, NGSS). • Create a model showing a geological timeline (both biological and geological) of earth’s history to appreciate the vastness of geological time and the idea that humans have only recently emerged (NGSS). • Infer that populations of organisms change over time from exploring the historical perspective of various scientists (5.1). • Write a newspaper article highlighting Darwin and the theory of evolution summarizing the main ideas and evidence that support them (5.1, 5.2, 5.3). • Simulate predator/prey relationships in different environments to illustrate the principle of natural selection and use the information gathered to explain natural selection (5.1). • Examine the Iceman to clarify the role of evidence in making inferences and the process of cultural evolution (5.1). • Complete a case study involving bacterial infections highlighting selective pressure, variation, and reproductive success in and use the information to develop an explanation of evolution in action (5.1, 5.2, 5.3). • Write a statement about adaptations in marine organisms and/or plants, discussing how adaptations are inherited, examples of how they enhance survival and why their usefulness depends on the organism’s environment (5.1, 5.2, 5.3). • Classify objects/organisms and explain the system to show that biological classification is hierarchical and that it reflects evolutionary relationships (5.2). • Investigate patterns of behavioral, physical, and in the range of zebras and relate them to diversity, variation, and the adaptive significance of zebra stripes (5.1, 5.2, 5.3). • Create a fictional creature (Critter Project) to illustrate unity/diversity, the relationship among its evolutionary history, adaptations, and environment (5.1, 5.2, 5.3, NGSS). • Demonstrate how evolution explains the unity and the diversity of living systems by examining diversity across time and the classification of living organisms. Use this evidence to develop an explanation (2.2, 2.3, 5.1, 5.2, 5.3).

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SECOND TERM	Overarching/general themes: Homeostasis; response, regulation, and feedback; internal and external conditions and regulation; health and disease; what it means to be fit; structure and function; energy and matter; metabolic processes (photosynthesis & cellular respiration); community; role of producers, consumers, and decomposers in the flow of energy and the cycling of matter in a community.	
Dates	Textual References BSCS Bio: AHA, 2 nd /3 rd eds.	To Demonstrate Proficiency by the End of the Quarter Students Will:
<p>Marking Period Starts: Nov. 9, 2015</p> <p>Suggested Completion Date: Jan. 20, 2016 for Unit 2 Feb. 8, 2016 for Unit 3: Ch 7</p> <p>2nd Predictive Assessment: TBD</p> <p>Close Reading: -- <i>Molecular Movement</i>, 2nd ed. -- <i>What Happens to the Food You Eat</i>, 2nd ed.</p> <p>Unit Project: Critter Project</p> <p>Second Marking Period Ends: Jan. 29, 2016</p>	<p>Unit 2: Homeostasis: Maintaining Dynamic Equilibrium in Living Systems Ch 4: The Internal Environment of Organisms Ch 5: Maintaining Balance in Organisms Ch 6: Human Homeostasis: Health and Disease</p> <p>Unit 3: Energy, Matter, and Organization: Relationships in Living Systems Ch 7: Performance and Fitness</p>	<ul style="list-style-type: none"> • Examine a case study of dehydration to illustrate that conditions in the body can change in response to external conditions, which may result in changes in behavior as well (4.8). • Use de-shelled eggs to explain interactions between a cell's internal and external environment (4.8). • Construct a model of a cell membrane (using dialysis tubing) to illustrate molecular movement, selective permeability, and compartments and boundaries (2.1, 4.8). • Write a narrative about the journey of blood through the human body and its connection to other systems (4.2, 4.8). • Define interactions of systems that adjust the internal environment resulting in a dynamic balance as homeostasis by applying knowledge to systems (circulatory, urinary, respiratory, nervous and endocrine systems) (4.2, 4.3, 4.7, 4.8). • Explain the body's response to cold to highlight regulation in the human body (4.8). • Use data from investigations of pulse and breathing rates, as well as pH and buffers to illustrate the interaction of systems and buffers in maintaining homeostasis (4.2, 4.3, 4.8). • Revisit Critter Project (fictional creature created in Unit 1) to highlight how critter maintains homeostasis (4.2, 4.3, 4.8). • Analyze information in a case study and simulations about stressors that may overwhelm the ability of organisms to maintain their internal environment and make decisions using information and evidence (2.8, 4.8). • Examine a case study and create a healthcare proposal to demonstrate knowledge of risk assessment and ethical issues in healthcare. • Provide examples that show how individual and collective behavior may influence an individual's ability to maintain homeostasis (4.8). • Construct an explanation that makes the connection between an individual's performance and diet and exercise by assessing their own fitness and investigating food we eat and the digestive system (1.1, 1.2, 4.1, 4.2, 4.3). • Provide evidence that matter and energy are involved in maintaining fitness by testing food to determine bio-molecules present and relate it to diet. Research the digestive system and the role of enzymes in the human body. Use findings to develop an explanation about food intake, energy demands and healthy fitness patterns (1.1, 1.2, 1.3, 4.1, 4.2). • Describe how living organisms use matter and energy to build and maintain structures using information learned by investigating muscles and the skeletal system (2.5, 4.5). • Engage in a case study of marathon runners to examine the relationships among training, diet, and physical performance.

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THIRD TERM	Overarching/general themes What it means to be fit; structure and function; energy and matter; metabolic processes (photosynthesis & cellular respiration); community; role of producers, consumers, and decomposers in the flow of energy and the cycling of matter in a community; ecology; carbon cycle; food webs; matter and energy; ecosystems and ecological interdependence; population growth and factors that affect it; carrying capacity; reproduction and inheritance; asexual and sexual reproduction; human reproduction; genetics; genetic variation, inheritance patterns, and the role of genetics in evolution and behavior.	
Dates	Textual References BSCS Bio: AHA, 2 nd /3 rd eds.	To Demonstrate Proficiency by the End of the Quarter Students Will:
Marking Period Starts: Feb. 1, 2016 Suggested Completion Date: March 31, 2016 for Unit 3 (cont'd) and Unit 6: Ch. 15 May 2, 2016 for Unit 4: Ch. 10 Unit Project: Critter Project Third Marking Period Ends: April 15, 2016	Unit 3: continued Energy, Matter, and Organization: Relationships in Living Systems Ch 8: The Cellular Basis of Activity Ch 9: The Cycling of Matter and the Flow of Energy	<ul style="list-style-type: none"> • Conduct a calorimetry experiment to measure the amount of energy stored in food. Use data to support your findings. • Design and conduct an experiment examining factors affecting the rate of photosynthesis (2.4). • Explain how energy is stored in the organization of matter and how living organisms obtain and process matter and energy. Use observations/data from investigations involving photosynthesis and cellular respiration to support your thinking (2.4, 6.4). • Describe how communities of organisms depend on the cycling of matter in and the flow of energy through an ecosystem. Examine food webs and cycles including carbon, nitrogen, and water cycles and use data/observations to develop an explanation about the cycling of matter and the flow of energy through the ecosystem (6.3, 6.4). • Read and revisit the Critter Project to explore metabolism (2.5).
	Unit 6: Ecology: Interaction and Interdependence in Living Systems Ch 15: Interdependence among Organisms in the Biosphere	<ul style="list-style-type: none"> • Use observations, videos and case studies to develop explanations about the interactions between a community or organisms and the abiotic environment, illustrating the complex nature of ecosystems (6.3). • Describe the relationship between population size and the carrying capacity of the habitat for a given species with information gained by reading about interactions and interdependence in living systems (6.2). • Revisit Critter Project to identify the interactions of the critter with other organisms in the environment. Note: Ch 15 concepts (dynamics of population growth, factors affecting population growth, and carrying capacity) appear here due to connections found in Unit 3 (carbon cycle, food webs, and matter and energy) and the timing of MCAS.
	Unit 4: Continuity: Reproduction and Inheritance in Living Systems Ch 10: Reproduction in Humans and Other Organisms	<ul style="list-style-type: none"> • Examine the reproductive strategies of organisms to explain why the continuity of species depends on the transfer of genetic information (2.7, 4.6). • Describe inheritance patterns and models of inheritance and relate them to the transfer and preservation of information through the reproduction and behavior of genetic material (3.1, 3.2, 3.4, 3.5, 3.6). • Examine the reproductive strategies of organisms recognize the diversity of reproductive strategies and explain that the continuity of species depends on the transfer of genetic information (2.7, 4.6). • View the Miracle of Life video to view conception and development (4.6). • Design a brochure highlighting reproductive behavior and its regulation (4.6). • Revisit Critter Project highlighting reproductive strategies and continuity (4.6).

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FOURTH TERM	Overarching/General themes Reproduction and inheritance; asexual and sexual reproduction; human reproduction; genetics; genetic variation, inheritance patterns, and the role of genetics in evolution and behavior; growth and differentiation; tissue and organ formation; development and evolution; life stages and social expression across cultures; interaction and interdependence; human influence on the biosphere.	
Dates	Textual References BSCS Bio: AHA, 2 nd /3 rd eds.	To Demonstrate Proficiency by the End of the Quarter Students Will:
Marking Period Starts: April 25, 2016 Suggested Completion Date: May 27, 2016 for Unit 4 and 5 June 22, 2016 for Unit 6: Ch. 15 and Ch. 16 Close Reading: <i>Why Cheaper Genetic Testing Could Cost Us a Fortune (Time)</i>	Unit 4: Continuity: Reproduction and Inheritance in Living Systems Ch 11: Continuity of Information through Inheritance Ch 12: Gene Action	<ul style="list-style-type: none"> • Create a model that illustrates the process by which genetic information is expressed (3.1, 3.2, 3.3, 3.4, 3.5, 3.6). • Trace the transfer of a specific trait through generations (3.4). • Illustrate mitosis and meiosis and relate their importance in reproduction and survival (2.7). • Explain how sexual reproduction and mutation increase genetic variation and why this is important for the evolution of the species (3.3, 5.3). • Appreciate that human reproduction takes place within a cultural setting and involves ethical issues by relating the concept of mating behaviors to certain rites, rituals, and practices in human culture. • Create models that illustrate the processes by which genetic information replicated, transcribed and translated and expressed. Write an account of the processes using illustrations to clarify details as needed (3.1, 3.2, 3.3 3.4, 3.5, 3.6). • Write an argument about some aspect of the impact/implications of genetic engineering technology on ethical, social, and public policy questions. Research essays to explain the molecular basis for this technology, gather evidence to support your claim, and to develop (3.1, 3.2, 3.3). • Use models, mathematics and computational thinking to examine and explain continuity (NGSS).
Unit Project: Critter Project MCAS Testing: June 1-2, 2016 Fourth Marking Period Ends: June 22, 2016	Unit 5: Development: Growth and Differentiation in Living Systems Ch 13: Processes and Patterns of Development Ch 14: The Human Life Span (if time permits)	<ul style="list-style-type: none"> • Describe the importance of development in living systems and explain physical development and the processes of growth and differentiation. • Model the process of mitosis and relate it to growth of new cells (2.6, NGSS). • Infer the role of development in evolution as it relates to growth and development of cells. • Explain that humans pass through a series of life stages, providing examples of how they grow and develop in various ways (physical, cognitive, emotional, and social) by exploring and distinguishing among the life stages of humans. • Interview/observe people in other life stages and cultures to make inferences about how culture influences life stages. <p>Note: Ch 13 need to be addressed here given timing of MCAS. If time permits, Ch 14 may be done now or after MCAS.</p>
End of Course Assessment: June 1-20, 2016	Unit 6: Ecology: Interaction & Interdependence in Living Systems Ch 15: Decisions in a Complex World Ch 16: Interdependence in the biosphere	<ul style="list-style-type: none"> • Use examples (texts/observations) that support and explain how ecosystems can be modified by human actions (6.2). • Explore the idea that human actions follow from decisions, made within a cultural context by analyzing case studies, building arguments and engaging in debate.