FOLSOM CORDOVA UNIFIED SCHOOL DISTRICT

Biology: The Living Earth

Board Approval Date: February 18, 2021	**Course Length: 2 Semesters**
Grading: A-F	**Credits: 5 Credits per Semester**
Proposed Grade Level(s): 9	**Subject Area: Life Science** **Elective Area (if applicable):**
Prerequisite(s): **N/A**	**Corequisite(s):** **N/A**
CTE Sector/Pathway:	
Intent to Pursue 'A-G' College Prep Status: Yes	
A-G Course Identifier: (d) Laboratory Science	
Graduation Requirement: Yes	
Course Intent: District Course **Program (if applicable):**	
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COURSE DESCRIPTION:

Biology is the first course in the California Next Generation Science Standards (CA NGSS) Three Course Model, and includes the Disciplinary Core Ideas related to Life Science and integrates a selection of the Earth and Space Science concepts. This course also incorporates the eight Science and Engineering Practices and seven Crosscutting Concepts related to the NGSS. In this course, students will explore concepts related to the structure and function of living organisms, heredity, genetic variation, natural selection, evolution, the biosphere, types of ecosystems and biomes, the ecology of populations and

communities, the effects of change on the biosphere and its parts, the relationship of humans with the environment, and explorations of challenges humans face and sustainable solutions for the future health of Earth and its inhabitants.

DETAILED UNITS OF INSTRUCTION:

Unit Number/Title	Unit Essential Questions	Examples of Formative Assessments	Examples of Summative Assessment
1. Introduction to the Living Earth	How do living things acquire energy and matter for life? How do organisms store energy? How are photosynthesis and cellular respiration connected?	*Practice: Core Ideas of Life Science *Project: Evidence of a Feedback Mechanism in Homeostasis	*Virtual Lab: Thermoregulation in Desert Animals *Lab: Scientific Method *Lab: Investigate Living Things *Unit Test
2. DNA and Heredity	How are characteristics of one generation passed to the next? What allows traits to be transmitted from parents to offspring?	*Journal: Your Traits Reflect on the uniqueness of human traits. *Practice: DNA and Cell Reproduction *Practice: Mendelian Genetics	*Lab: Cell Division *Unit Test
3. DNA to Proteins	How are proteins made from genetic material? What types of errors can occur during replication?	*Practice: From Nucleic Acids to Proteins *Practice: Biotechnology	*Lab: Modeling DNA Replication *Lab: Mutations *Unit Test
4. Evolution	What evidence shows that different species are related? How does variation affect a population under selective pressures? What affects changes in ecosystems that ultimately affect populations?	*Practice: Adaptation and Natural Selection *Journal: Theories and Laws *Practice: Diversity of Life	*Lab: Natural Selection *Unit Test
5. Earth's Structure And Evolution	How do layers of rock form and how do they contain fossils?	*Practice: The Changing Biosphere	*Lab: Investigate Weathering and Erosion *Unit Test

	What properties of water affect Earth's surface?		
6. The Biosphere	How do carbon and oxygen cycle through the environment? How has the cycling of energy and matter changed over Earth's history?	*Practice: Nature of the Biosphere *Project: Explore Your Local Ecosystem *Practice: Matter and Energy in the Biosphere	*Lab: Investigate Cycling of O_2 and CO_2 *Unit Test
7. Ecology	What factors affect the size of populations within an ecosystem? What are common threats to remaining natural ecosystems and biodiversity?	*Lab: Limiting Factors and Carrying Capacity *Practice: Communities *Explore: Biodiversity Hotspots	*Lab: Limiting Factors and Carrying Capacity *Lab: Investigate Cycling of Matter and Energy *Unit Test
8. Humans And The Environment	What are the changes that are happening in the climate and what effects are those having on life? How are human activities impacting Earth's systems and how does that affect life on Earth?	*Practice: Natural Resources and Land Use *Explore: Effects of Climate Change	*Lab: Investigate Resource Consumption *Unit Test
9. Sustainability For The Future	What can humans do to mitigate their negative impact on the environment?	*Practice: Global Challenges	*Lab: Investigate Your Ecological Footprint *Project: Explore Sustainability for Your Local Environment *Lab: Investigate Food Security *Unit Test

ESSENTIAL STANDARDS:

HS-LS1-1: Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins which carry out the essential functions of life through systems of specialized cells. (ELA/Literacy CCSS: RST.11-12.1, WHST.9-12.2, WHST.9-12.9)

HS-LS1-5:Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy (ELA/Literacy CCSS: SL.11-12.5)

HS-LS1-7: Use a model to illustrate the cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed resulting in a net

transfer of energy. (ELA/Literacy CCSS: SL.11-12.5)
HS-LS2-5: Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere and geosphere.
HS-LS2-6: Evaluate the claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem. (ELA/Literacy CCSS: RST.9-10.8, RST.11-12.1, RST.11-12.7, RST.11-12.8 and Math CCSS: HSS-IC.B.6, MP 2, HSS-ID.A.1, HSS-IC.A1)
HS-LS3-2: Make and defend a claim based on evidence that inheritable genetic variations may result from: (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors. (ELA/Literacy CCSS: RST.11-12.1, WHST.9-12.1 and Math CCSS: MP.2)
HS-LS4-1: Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. (ELA/Literacy CCSS: RST.11-12.1, WHST.9-12.2, WHST.9-12.9, SL.11-12.4 and Math CCSS: MP.2)
HS-LS4-2: Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment. (ELA/Literacy CCSS: RST.11-12.1, WHST.9-12.2, WHST.9-12.9, SL.11-12.4 and Math CCSS: MP.2, MP.4)
HS-LS4-4: Construct an explanation based on evidence for how natural selection leads to adaptation of populations. (ELA/Literacy CCSS: RST.11-12.1, WHST.9-12.2, WHST.9-12.9 and Math CCSS: MP.2)
HS-LS4-5: Evaluate the evidence supporting claims that changes in environmental conditions may result in: (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species. (ELA/Literacy CCSS: RST.11-12.8, WHST.9-12.9 and Math CCSS: MP.2)
HS-ESS2-6: Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. (Math CCSS: MP.2, MP.4, HSN-Q.A.1, HSN-Q.A.2, HSN-Q.A.3)
HS-ESS2-7: Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth. (ELA/Literacy CCSS: WHST.9.12.1)
HS-ESS3-1: Construct an explanation based on evidence for how the availability of natural resources, occurrence of natural hazards, and changes in climate have influenced human activity. (ELA/Literacy CCSS: RST.11-12.1, WHST.9-12.2 and Math CCSS: MP.2, HSN-Q.A.1, HSN-Q.A.2, HSN-Q.A.3)

RELEVANT STANDARDS AND FRAMEWORKS, CONTENT/PROGRAM SPECIFIC STANDARDS:

Link to Common Core Standards (if applicable):
Educational standards describe what students should know and be able to do in each subject in each grade. In California, the State Board of Education decides on the standards for all students, from kindergarten through high school.
9th-10th http://www.corestandards.org/ELA-Literacy/RST/9-10/
11th-12th http://www.corestandards.org/ELA-Literacy/RST/11-12/

Link to Framework (if applicable):
Curriculum frameworks provide guidance for implementing the content standards adopted by the State Board of Education (SBE). Frameworks are developed by the Instructional Quality Commission, formerly known as the Curriculum Development and Supplemental Materials Commission, which also reviews and recommends textbooks and other instructional materials to be adopted by the SBE.
https://www.cde.ca.gov/ci/sc/cf/documents/scifwchapter7.pdf

Link to Subject Area Content Standards (if applicable):
Content standards were designed to encourage the highest achievement of every student, by defining the knowledge, concepts, and skills that students should acquire at each grade level.
https://www.nextgenscience.org/

Link to Program Content Area Standards (if applicable):
Program Content Area Standards applies to programs such as International Baccalaureate, Advanced Placement, Career and Technical Education, etc.
N/A

TEXTBOOKS AND RESOURCE MATERIALS:

Textbooks

Board Approved	Pilot Completion Date (If applicable)	Textbook Title	Author(s)	Publisher	Edition	Date
Yes		*Apex:Biology*		Apex Online Courses	2019	

Other Resource Materials

Supplemental Materials
Board approved supplemental materials (Including but not limited to: Film Clips, Digital Resources, Supplemental texts, DVDs, Programs (Pebble Creek, DBQ, etc.):