Biology Prioritized Science Standards

The prioritized standards listed align with the NGSS (Next Generation Science Standards) Performance Expectations. The NGSS also includes a set of Science and Engineering Practices for grades kindergarten through 12. A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world(s) work and which can be empirically tested. Engineering questions clarify problems to determine criteria for successful solutions and identify constraints to solve problems about the designed world. Both scientists and engineers also ask questions to clarify ideas. (see the link at the bottom for detailed descriptions of those condensed practices, grades K-12)

LIFE SCIENCE		
Molecules to Organisms	Structure & Function	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 (HS-LS1-1) Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. (*secondary* HS-LS3-1)
	Growth & Development	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms. (HS-LS1-4)
	Organization for Matter & Energy Flow	Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules. (HS-LS1-6) Use a model to illustrate that 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. (HS-LS1-7)
Ecosystems	Interdependent Relationships	Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. (HS-LS2-1) Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. (HS-LS2-2)
	Cycles of Matter & Energy Transfer	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-LS2-5)
	Dynamics, Functioning, & Resilience	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. (HS-LS2-7)
Heredity	Variation in Traits	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. (HS-LS3-2)
Biological Evolution	Evidence of Common Ancestry & Diversity	Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. (HS-LS4-1)
	Adaptation	Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait. (HS-LS4-3) Construct an explanation based on evidence for how natural selection leads to adaptation of populations. (HS-LS4-4)
	Biodiversity & Humans	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. (HS-LS2-7) Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity. (HS-LS4-6)

EARTH SCIENCE		
Earth's Systems	Earth Materials & Systems	Develop a model to illustrate how Earth's internal and surface processes operate at different spatial and temporal scales to form continental and ocean-floor features. (HS-ESS2-1) Analyze geoscience data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth systems. (HS-ESS2-2)
	Roles of Water	Plan and conduct an investigation of the properties of water and its effects on Earth materials and surface processes. (HS-ESS2-5)
	Weather & Climate	Use a computational representation to illustrate the relationships among Earth systems and how those relationships are being modified due to human activity. (*secondary* HS-ESS3-6)
	Biogeology	Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth. (HS-ESS2-7)
Earth & Human Activity	Human Impacts	Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity. (HS-ESS3-3)
	Global Climate Change	Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. (HS-ESS3-5)
ENGINEERING		
Engineering Design	Defining & Delimiting a Problem	Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants. (HS-ETS1-1) ACT Science: **IOD 701**. Compare or combine data from two or more complex data presentations. **IOD 702**. Analyze presented information when given new, complex information.
	Developing Possible Solutions	Use a computer simulation to model the impact of proposed solutions to a complex real-world problem with numerous criteria and constraints on interactions within and between systems relevant to the problem. (HS-ETS1-4) (secondary to HS-LS4-6) ACT Science: **SIN 701**. Understand precision and accuracy issues. **SIN 702**. Predict the effects of modifying the design or methods of an experiment. **SIN 703**. Determine which additional trial or experiment could be performed to enhance or evaluate experimental results.
	Optimizing the Design Solution	Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering. (HS-ETS1-2) (secondary to HS-PS1-6) (secondary to HS-PS2-3) ACT Science: **EMI 701**. Determine which complex hypothesis, prediction, or conclusion is, or is not, consistent with two or more data presentations, models, and/or pieces of information in text. **EMI 702**. Determine whether presented information, or new information, supports or contradicts a complex hypothesis or conclusion, and why.