HSPI Activity Title from HS Biology	NGSS: Science and Engineering Practices
Safety First	- Developing and using models - Constructing explanations (for science) and designing solutions (for engineering)
Scientific Inquiry	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Experimental Variables	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Planning and carrying out investigations - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Analyzing and Interpreting Scientific Data	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Properties of Water	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information

Biological Molecules	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Prokaryotic and Eukarytoic Cells	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Organelles in Eukaryotic Cells	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Cell Size	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Membrane Structure and Function	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information

Transport in Cells	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Photosynthesis: What's in a Leaf	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Cellular Respiration	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Photosynthesis and Respiration	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information

The Cell Cycle	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Mitosis	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Meiosis	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
DNA Structure and Replication	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information

Evidence for Evolution	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Biological Classification	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information

Evolution and Selection	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Nutrient Cycles	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information

Ecological Relationships	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Biomes	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Energy Transfer in Living Organisms	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information

Ecological Pyramids	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Succession	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Population Distribution	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information

Population Growth	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Using mathematics and computational thinking - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
The Spread of Pathogens	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
Human Blood Cell Typing	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information
The Circulatory System	- Asking questions (for science) and defining problems (for engineering) - Developing and using models - Analyzing and interpreting data - Constructing explanations (for science) and designing solutions (for engineering) - Engaging in argument from evidence - Obtaining, evaluating, and communicating information

NGSS Performance Expectations

HS-LS1-6	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-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
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HS-LS1-5	Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.
HS-LS1-7	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-LS1-5 HS-LS1-7	.Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy. .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-LS1-4	Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.
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HS-LS3-1 HS-LS3-2	.Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. .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-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.

HS-LS3-1 LS4-1	HS-.Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring. .Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.
HS-LS2-7	Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.

HS-LS4-1 HS-LS4-2 HS-LS4-3 HS-LS4-4 HS-LS4-5	.Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. .Construct an explanation based on evidence that the process of evolution primarily results from four factors: (1) the potential for a 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. . 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. .Construct an explanation based on evidence for how natural selection leads to adaptation of populations. .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.
HS-LS2-3 HS-LS2-5 HS-ESS2-6	.Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions. .Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere. .Develop a quantative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere and biosphere.

HS-LS2-2 HS-LS2-6	.Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversityand populations in ecosystems of different scales. .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.
HS-ESS2-7	Construct and argument based on evidence about the simultaneous coevolution of the Earth's systems and life on Earth.
HS-LS2-4	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.

HS-LS2-4	Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.
HS-LS2-2 HS-LS2-6 HS-LS2-7	.Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales. .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. .Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity.
HS-LS2-2	Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.

HS-LS2-1 HS-LS2-6	.Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales. .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.
HS-LS1-2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.
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NGSS: Disciplinary Core Idea
ESS 2.c. The roles of water in Earth's surface processes. PS 1.a. Structure and Properties of Matter. PS 2.b. Types of Interactions.

LS1.c Organization of Matter and Energy Flow in Organisms. PS1.b. Chemical Reactions.
LS1.a. Structure and Function.
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LS1.a. Structure and Function. LS1.c. Organization of Matter and Energy Flow in Organisms.
LS1.a. Structure and Function. LS1.c. Organization of Matter and Energy Flow in Organisms. LS2.b. Cycles of Matter and Energy Transfer in Ecosystems.
LS1.a. Structure and Function. LS1.c. Organization of Matter and Energy Flow in Organisms. LS2.b. Cycles of Matter and Energy Transfer in Ecosystems. PS1.b. Chemical Reactions.
LS1.c. Organization of Matter and Energy Flow in Organisms. LS2.b. Cycles of Matter and Energy Transfer in Ecosystems. PS1.a. Structure of Matter. PS1.b. Chemical Reactions.

LS1.b. Growth and Development of Organisms. LS3.a. Inheritance of Traits. LS3.b. Variation of Traits.
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LS1.c. Organization of Matter and Energy Flow in Organisms. LS3.a. Inheritance of Traits. LS3.b. Variation of Traits.

LS3.a.Inheritence of Traits. LS3.b.Variation of Traits. LS4.a.Evidence of Common Ancestry and Diversity. LS4.c. Adaptations.
LS4.d. Biodiversity and Humans.

LS4.a. Evidence of Common Ancestry and Diversity. LS4.b. Natural Selection. LS4.c. Adaptation.
LS2.b. Cycles of Matter and Energy. PS3.d. Energy and Chemical Processes. ESS2.d. Weather and Climate.

LS2.a. Interdependent Relationships in Ecosystems. LS2.c. Ecosystem Dynamics, Functioning and Resilience.
ESS2.d. Weather and Climate. ESS2.e. Biogeology.
LS1.c Organization for Matter and Energy Flow in Organisms. LS2.b. Cycles of Matter and Energy Transfer in Ecosystems.

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LS2.a. Interdependent Relationships in Ecosystems. LS2.c. Ecosystem Dynamics, Functioning and Resilience. LS4.d. Biodiversity and Humans. ESS3.c. Human Impacts of Earth Systems
LS2.a. Interdependent Relationships in Ecosystems. LS2.c. Ecosystem Dynamics, Functioning and Resilience.

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LS1.a. Structure and Function.
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Common Core: ELA-Science and Technical Subjects
RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words. (HS-PS1-1) WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. (HS-PS1-2),(HS-PS1-5) WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research. (HS-PS1-3)
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RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. WHST.9-12.5 Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience. WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research.
SL.11-12.5 Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.
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RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. RST.11-12.9 Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible. WHST.9-12.1 Write arguments focused on discipline-specific content. MP.2 Reason abstractly and quantitatively.
RST.11-12.1 Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account. WHST.9-12.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. WHST.9-12.9 Draw evidence from informational texts to support analysis, reflection, and research.

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RST.9-10.8 Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem. RST.11-12.7 Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem. RST.11-12.8 Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information. WHST.9-12.7 Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

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Common Core Math
MP.2 Reason abstractly and quantitatively.
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