NGSS Biology Storylining Working Group Storyline Alignment

IMPORTANT NOTE: The table below provides information regarding which storylines include concepts from the Life Science NGSS Performance Expectations. In some storylines, these are addressed in part to maintain coherence around the selected phenomena. Remember that, regardless as to how these PEs are used, satisfying them all fully within a single course is not recommended. Bundling these PEs around phenomena to allow students to make connections between them is a highly effective and timely way to provide students with a meaningful, rich and rigorous learning experience in your classroom. Also remember that these PEs are suggestions for assessment scaffolds, not a checklist of standards. In some cases, the science practice (beginning of each PE) is changed out for another to reflect what students are actively doing in the storyline. It is also critical that these are revisited throughout the curriculum, not just once in a single storyline. This is why most are revisited in some way to scaffold learning across the storylines, even if not explicitly assessed.

A - Africa H - Homeostasis M - Melanin D - Disease P - Penguin C – Canine		
PE	**Storyline Performance Expectations**	**Units**
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.	M, D
LS1-2	**Develop and use a model** to illustrate the hierarchical organization of **interacting systems** that provide specific functions within multicellular organisms.	A, H
LS1-3	**Plan and conduct an investigation** to **provide evidence that feedback mechanisms maintain homeostasis**.	H, M, D
LS1-4	**Use a model** to illustrate the role of **cellular division (mitosis) and differentiation** in producing and maintaining complex organisms.	D
LS1-5	**Use a model** to illustrate how **photosynthesis transforms light energy into stored chemical energy.**	A, H
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.	A, H
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**.	A, H
LS2-1	**Use mathematical and/or computational representations to support explanations** of factors that affect **carrying capacity of ecosystems** at different scales.	H, M
LS2-2	**Use mathematical representations to support and revise explanations** based on evidence about factors **affecting biodiversity and populations** in ecosystems of different scales.	A, H, M
LS2-3	**Construct and revise an explanation based on evidence** for the cycling of matter and flow of energy **in aerobic and anaerobic conditions.**	A, H
LS2-4	**Use mathematical representations to support claims** for the **cycling of matter and flow of energy** among organisms in an ecosystem.	A, H
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.	A, H
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**.	H
LS2-7	**Design, evaluate, and refine a solution** for **reducing the impacts of human activities** on the environment and biodiversity.	H, P
LS2-8	**Evaluate the evidence** for the **role of group behavior** on individual and species' chances to survive and reproduce.	A
LS3-1	**Ask questions to clarify relationships** about the **role of DNA and chromosomes** in coding the instructions for characteristic traits passed from parents to offspring.	M, D
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.	M, D, C
LS3-3	**Apply concepts of statistics and probability** to **explain the variation and distribution of expressed traits** in a population.	A, M, C
LS4-1	**Communicate scientific information** that **common ancestry and biological evolution** are supported by **multiple lines of empirical evidence.**	P, C
LS4-2	**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.	A, M
LS4-3	**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.	A, H, M
LS4-4	**Construct an explanation based on evidence** for how **natural selection** leads to adaptation of populations.	A, H, M
LS4-5	**Evaluate the evidence** supporting claims that **changes in the environmental conditions may result** in (1) increases in the numbers of individuals in some species, (2) the emergence of new species over time, and (3) the extinction of other species.	H, P
LS4-6	**Create or revise a simulation to test a solution** to mitigate adverse impacts of **human activity on biodiversity**.	H, P