

PHS CC Biology

Extended Standards Power Objective

#1- Analyze and explain how genes are responsible for the inheritance of traits.

Supporting Indicators

Learning Standard	Complexity a	Complexity b	Complexity c
Most Complex ← ————— → Least Complex			
Heredity			
B.H.1 Cellular Genetics	B.H.1a Describe that different genes code for proteins that determine different traits.	B.H.1b Communicate that genes code for specific traits (e.g., eye color, hair color).	B.H.1c Recognize that genes are made up of DNA.
B.H.2 Structure and Function of DNA in Cells	B.H.2a Recognize that changing the segments of DNA molecules can alter genes.	B.H.2b Recognize that genes are made up of DNA, so changing the segments of DNA can alter genes.	B.H.2c When given a representation of individuals from the same parents, identify variations in physical traits.
B.H.3 Genetic Mechanisms and Inheritance	B.H.3a Predict the possible phenotypes of an offspring when given the genotype of the parents (e.g., using a Punnett square).	B.H.3b Recognize that genes combine during sexual reproduction which causes the traits of offspring to not be exact replicas of either parent.	B.H.3c Identify X and Y as female and male chromosomes.
B.H.4 Mutations	B.H.4a Describe how some mutations can be helpful and some can be harmful to organisms.	B.H.4b Recognize that genes can be altered and that those changed genes may then be passed to offspring.	B.H.4c Identify traits that can vary among a population (e.g., eye color, beak shape, etc.).
B.H.5 Modern Genetics	B.H.5a Describe specific ways in which scientists have used DNA to help people or the environment (e.g., sweeter fruit, etc.).	B.H.5b Identify one reason DNA would be purposely altered by humans.	B.H.5c Identify a model of DNA.

Extended Standards Power Objective

#2- Explain the mechanisms responsible for the evolution of life.

Supporting Indicators

Learning Standard	Complexity a	Complexity b	Complexity c
Most Complex ← ————— → Least Complex			
Evolution			
B.E.1 Mechanisms ○ Natural selection ○ Mutation	B.E.1a Describe how the presence or absence of traits may help some	B.E.1b When given a population of animals or plants, identify how	B.E.1c When given a plant or animal, identify traits that help it to

<ul style="list-style-type: none"> ○ Genetic drift ○ Gene flow (immigration, emigration) ○ Sexual selection 	individuals in a plant or animal population survive and reproduce in their environment (e.g., natural selection).	variation in traits impacts their ability to survive and reproduce (e.g., populations of endangered species).	survive in its environment.
B.E.2 Speciation <ul style="list-style-type: none"> ○ Biological classification expanded to molecular evidence ○ Variation of organisms within a species due to population genetics and gene frequency 	B.E.2a Identify evolutionary changes to a given species that have allowed the species to continue to survive and reproduce.	B.E.2b Diagram and describe the evolutionary change in a species.	B.E.2c Given a visual representation, identify a species that has changed over the course of many generations (e.g., cladogram diagram).

Extended Standards Power Objective

#3- Explain how populations of organisms are organized and distributed within an ecosystem.

Supporting Indicators

Learning Standard	Complexity a	Complexity b	Complexity c
Most Complex ← ————— → Least Complex			
Diversity and Interdependence of Life			
B.DI.1 Biodiversity <ul style="list-style-type: none"> ○ Genetic diversity ○ Species diversity 	B.DI.1a Explain how low genetic diversity impacts population size, energy flow or the cycle of matter in a given environment (e.g., Isle Royale Wolf population).	B.DI.1b When given two examples of an animal or plant in a given environment, describe which one would have the higher chance to survive or reproduce based on traits (e.g., fur coat thickness, coloration).	B.DI.1c When given an environment, recognize a plant or an animal that could survive in that environment.
B.DI.2 Ecosystems <ul style="list-style-type: none"> ○ Equilibrium and disequilibrium ○ Carrying capacity 	B.DI.2a Identify how both populations will change in a predator/prey relationship, when given a model of an ecosystem that is not in balance (e.g., carrying capacity).	B.DI.2b Identify how a human or natural change to an ecosystem results in a change to a predator or prey population.	B.DI.2c When given a set of before and after pictures of an ecosystem, (e.g., meadow changed to farm, forest changed to apartment buildings) observe the human caused changes.
B.DI.3 Loss of Diversity <ul style="list-style-type: none"> ○ Climate change ○ Anthropocene effects ○ Extinction ○ Invasive species 	B.DI.3a Describe how drought, flood, volcanic eruption, habitat loss, or introduction of a new species may affect the diversity in an ecosystem.	B.DI.3b Match the cause (e.g., drought, flood, habitat loss, new species) to its effect on organisms in an ecosystem.	B.DI.3c Identify factors that can harm organisms in an environment (e.g., drought, floods, volcanic eruption, habitat loss, new species etc.).

Extended Standards Power Objective

#4- Identify and explain the structure and function of cellular organelles used to carry out cellular activities.

Supporting Indicators

Learning Standard	Complexity a	Complexity b	Complexity c
Most Complex ←————→ Least Complex			
Cells			
B.C.1 Cell Structure <ul style="list-style-type: none"> ○ Structure, function and interrelatedness of cell organelles ○ Eukaryotic cells and prokaryotic cells 	B.C.1a Compare and contrast a prokaryotic cell and a eukaryotic cell.	B.C.1.b Match the organelle with the process it helps to execute (e.g., chloroplast, photosynthesis).	B.C.1.c Identify the function of the cell membrane.
B.C.2 Cellular Processes <ul style="list-style-type: none"> ○ Characteristics of life regulated by cellular processes ○ Photosynthesis, chemosynthesis, cellular respiration, biosynthesis of macromolecules 	B.C.2a Describe how the cell needs specific conditions (e.g., temperature, pH) in order to perform its essential functions (e.g., respiration, photosynthesis).	B.C.2b Complete a diagram that depicts the process of photosynthesis.	B.C.2c Identify photosynthesis and cellular respiration as occurring in a cell.