

Phoenixville Area School District Understanding by Design (UbD) Science Template

Grade Level 3

Unit Name: Structure of Life

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Stage 1 Desired Results

Transfer

Students will be able to independently use their learning to...

1. Ask questions and/or define problems
2. Develop and/or use models
3. Plan and/or carry out investigations
4. Analyze and interpret data using computational thinking
5. Obtain, evaluate, and communicate information (supported by evidence)
6. Construct explanations and design solutions

Meaning-Making

Students will understand that...

- Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.
- Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size.
- Many characteristics of organisms are inherited from their parents.
- Different organisms vary in how they look and function because they have different inherited information.
- Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment.
- The environment also affects the traits that an organism develops.
- Some kinds of plants and animals that once lived on Earth are no longer found anywhere.
- Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments.
- Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.
- For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.
- When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.

ESSENTIAL QUESTIONS

Students will keep considering...

- What are seeds and what happens to them?
- How do plants grow and survive?
- What are characteristics that allow populations of animals to survive and reproduce in an environment?
- How are characteristics similar to and different from parents to offspring?
- What can we learn about animals that lived in the past by looking at their skeletons?

Overarching NGSS & PA Standards:

3.1.3.A.
Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

3.1.3.B
Construct an argument that some animals form groups that help members survive.

3.1.3.C
Analyze and interpret data to provide evidence that plants and animals have

<p>traits inherited from parents and that variation of these traits exists in a group of similar organisms.</p> <p>3.1.3.D Use evidence to support the explanation that traits can be influenced by the environment.</p> <p>3.1.3.E Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.</p> <p>3.1.3.F Use evidence to construct an explanation for how the variations in characteristics</p>	<ul style="list-style-type: none"> Populations live in a variety of habitats and change in those habitats affects the organisms living there. 	<p>(What thought-provoking questions will foster inquiry, meaning making, and transfer?) (These may come from NGSS)</p>
<i>Knowledge and Skills Acquisition</i>		
	<p style="text-align: center;">UNDERSTANDINGS</p> <p><i>Students will know...</i></p> <ul style="list-style-type: none"> Seeds develop in the plant part called a fruit. Different kinds of fruits have different kinds and numbers of seeds; seeds have a variety of characteristics. A seed is an organism, a living thing Seeds undergo changes in the presence of water. A seed contains the embryo plant and stores food. A seed grows into a new plant (reproduction). Seed-dispersal mechanisms (wind, water, and animals) move seeds away from parent plants. Germination is the onset of a seed's development/ Plants need water, light, space, and nutrients to grow. The lifecycle is the sequence of stages during which a seed grows into an adult (mature) plant and produces seeds, which in turn produce new plants of the same kind. The fruit of the plant develops from the flower. Roots function to take up water and nutrients so they can be transported to other parts of the plant. Different kinds of plants have different root systems. Crayfish have observable structures and behaviors that serve various functions in growth, survival, and reproduction. Different organisms can live in different environments; organisms have adaptations (characteristics that are structures or behaviors) that allow them to survive and reproduce in those environments. Each kind of organism has characteristics inherited from its parents; other characteristics are the result of the environment. Differences in characteristics (variations of traits) between individuals of the same species may provide an advantage in surviving. Organisms are related in feeding relationships called food chains. Some animals claim and territory that they defend against others of their kind. Some organisms live in social groups that may help the individuals in the group survive (to obtain food or defend themselves). 	<p><i>Students will be skilled at...</i></p> <p>Develop models to describe phenomena. Construct an argument with evidence, data, and/or a model. Analyze and interpret data to make sense of phenomena using logical reasoning. Use evidence (e.g., observations, patterns) to support an explanation. Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.</p>

among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.

3.1.3.G

Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.

3.1.3.H

Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.*

- A skeleton is a system of interacting bones. Humans have about 206 bones. Bones have several functions: support, protection, and movement.
- The number and kinds of bones in an organism are characteristics inherited from the parents of the organism. The offspring may exhibit variations.
- Muscles attach across joints to move bones.
- Fossils are important evidence about extinct organisms and past environments.
- Fingerprints can be sorted into three groups based on basic pattern: whorl, arch, and loop.

KEY VOCABULARY

<p>adaption advantage biome camouflage carnivore characteristics climate community diverse ecosystem environment herbivore hibernation inherit</p>	<p>interact life cycle mimicry omnivore organism population predator prey producer reproduce survive trait unique variation</p>
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<p>Which branch(es) of science apply:</p> <p>LS</p>		
<p>Stage 2 – Evidence</p>		
<p>Evaluative Criteria</p>	<p><i>Assessment Evidence</i></p>	
<p>What criteria will be used in each assessment to evaluate attainment of the desired results?</p> <p>Rubrics related to each will be developed.</p>	<p style="text-align: center;">PERFORMANCE TASK(S):</p> <p>Investigations:</p> <p>I. Task(s): Students conduct a seed hunt by opening fresh fruit and locating the seeds. They describe and compare seed properties. Students examine and sort a selection of seeds—bean, pea, sunflower, and corn. They investigate the effect water has on seeds by setting up seed sprouters and observing and recording changes over a week. Students systematically find out how much water lima beans soak up in a day. Students investigate seed dispersal mechanisms of plants. Assessment: Investigation 1 I-Check</p> <p>II. Task(s): Students examine germinated seeds to determine similarities and differences in the way the organisms grow. They set up a hydroponic garden to observe the life cycle of a bean plant. Students go outdoors to investigate the roots and shoots of various plants. They use tools to dig up plants and compare the structures above ground to those below ground. Through direct experience and readings, students learn about plant structures and functions. Assessment: Investigation 2 I-Check</p> <p>III. Task(s): Students observe and record some of the structures of a crustacean, the crayfish, and compare it to other organisms. They establish a feeding and maintenance schedule for the organisms. Students investigate crayfish behavior and map where the crayfish spend time within their habitat. Through readings, organism cards, and a video, students learn about adaptations of organisms in different environments, including different kinds of group and social behaviors. Students use a computer simulation to study variation of traits in species and explore how variation might affect survival of individuals. Students engage in an outdoor simulation activity to explore food chains.</p>	<p>Differentiation Considerations:</p> <p>For labs, some students may wish to:</p> <ul style="list-style-type: none"> • Explain verbally instead of in a written format • Draw their responses • Write in their first language <p>If challenges arise with the complexity of the task(s), some students may need:</p> <ul style="list-style-type: none"> • Additional incremental steps • An alternative activity <p>Other considerations:</p> <ul style="list-style-type: none"> • When grouping students various skills sets and strengths will be considered • When asking students to describe a model, opportunities to draw or write it, as well. • Teacher can scribe written responses for students

	<p>Assessment: Investigation 3 I-Check</p> <p>IV. Task(s): Students observe the articulated human skeletal system in action, use posters and a sense of touch to estimate and refine a count of the 206 human bones, and build skeleton puzzles from memory. Students dissect rodent bones from owl pellets and compare them to human bones. They explore joints and their role in movement focusing on opposable thumbs. Students build operational models of muscle-bone systems to see how muscles move bones. They investigate their skin by making and analyzing fingerprint patterns.</p> <p>Assessment: Investigation 4 I-Check</p> <p>Unit Activities/Projects: TBD</p>	
<p>What criteria will be used in each assessment to evaluate attainment of the desired results?</p> <p>Rubrics related to each will be developed.</p>	<p>OTHER EVIDENCE:</p> <ul style="list-style-type: none"> • Checklists of collaborative behaviors in investigations • Checklists of collaborative behaviors in class discussions • Science Journal Entries • TO CONSIDER FOR LATER: UNIT TEST(S) 	<p>Differentiation Considerations:</p> <p>For journal entries, consider that some students may wish to:</p> <ul style="list-style-type: none"> • Draw instead of write entries • Write in their first language • Explain responses verbally <p>If challenges arise with the complexity of the task(s), some students may need:</p> <ul style="list-style-type: none"> • Additional incremental steps • An alternative activity