**Phenomenal Science Unit 3.3 No Place Like Home**

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| **Unit 3.3: No Place Like Home****Unit GOALS** |
| **Established Goals:** | **Transfer:** |
| DCI: **LS1.B: Growth and Development of Organisms*** Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles. **(3-LS1-1)**

 [LS3.A: Inheritance of Traits](http://www.nap.edu/openbook.php?record_id=13165&page=158)* [Many characteristics of organisms are inherited from their parents. (3-LS3-1)](http://www.nap.edu/openbook.php?record_id=13165&page=158)
* [Other characteristics result from individuals’ interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. **(3-LS3-2)**](http://www.nap.edu/openbook.php?record_id=13165&page=158)

**LS3.B: Variation of Traits*** Different organisms vary in how they look and function because they have different inherited information. **(3-LS3- 1)**

  **LS4.A: Evidence of Common Ancestry and Diversity*** Some kinds of plants and animals that once lived on Earth are no longer found anywhere.*(Note: moved from K-2)* (3-LS4-1)
* Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1)

 **LS4.C: Adaptation*** For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

  | Performance Expectations: Students who demonstrate understanding can . . . **3-LS1-1** Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. [Clarification Statement: Changes organisms go through during their life form a pattern.] [*Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants. Assessment does not include details of human reproduction.*]**3-LS3-1** Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.]**\*\*3-LS4-1** Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. [Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Assessment Boundary: Assessment does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.]**\*\*3-LS4-3** 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. [Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]\*\* Allow for local, regional, or Michigan specific contexts or examples in teaching and assessment. |
| SEP:1.   Asking questions  and defining problems**2.  Developing and using models**3. Planning and carrying out investigations**4.  Analyzing and interpreting data**5.  Using mathematics and computational thinking6. Constructing explanations (for science) and designing solutions (for engineering)**7.  Engaging in argument from evidence**8. Obtaining, evaluating, and communicating information | CCC: 1. **Patterns**
2. **Cause and effect**
3. **Scale, proportion, and quantity**
4. Systems and system models
5. Energy and matter
6. Structure and function
7. Stability and change
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| **Possible Naive Conceptions:** | **Meaning:** |
| * Inability to tell the difference between acquired traits and inherited traits.
* Only large land animals are considered “animals” or “alive.”
* Traits evolve in a specific animal rather than a specific species.
* Fossils are limited to “dinosaur bones.”
* Birth is defined in their minds as “live birth” but does not include things like seeds, eggs hatching, etc.
* The term “long ago” may be ambiguous to students - needing clarification for misunderstanding (10 yrs., 100 yrs, 1000 yrs.?)
* Lack of or limited knowledge of the large variety of habitats
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 | Essential Question(s): Students will keep considering . . . **How do traits help organisms survive in a specific habitat/environment?**   |  * Students will identify patterns and develop models demonstrating understanding that organisms (mainly plants and animals)  have unique and diverse life cycles, yet all include birth, growth, reproduction and death.
* Students will demonstrate  understanding by analyzing and interpreting data to provide evidence that plants and animals inherit a variety of traits from their parents.
* Students will analyze and interpret data about fossils which provides evidence about the organisms and the environments organisms lived in many years ago.
* Students will argue from evidence  that in different habitats some organisms survive well, some survive less well or some do not survive.
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| **Expected Prior Knowledge:** | **Acquisitions: (IC Level Performance Expectations)** |
| Prior PEs –*.*K.ESS3.A *-* Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. 2.LS2.A  Animals need “food, water,  shelter, and a favorable temperature” to survive in a given environment.“Plants depend on air, water, minerals (in the soil) and light to grow.” (Framework for K-12 Science Education, p. 151) 2.LS4.D  1.LS3.A1.LS3.B *.* | Students will be able to explain and apply concepts that...* Plants and animals have unique and diverse life cycles and reproduction is essential for continued existence.
* Many characteristics of animals and plants come from their parents  and other characteristics result from interaction with the environment.
* Organisms (plants/animals) look and function differently because of different inherited information (characteristics)
* Some kinds of plants and animals no longer exist and are not found anywhere.
* Fossils provide evidence of organisms from long ago and tell us about the environment in which they lived.
* Dependending upon the environment, some kinds of organisms survive well, some less well and some do not survive at all in a specific environment.

 Students will be able to…* Develop models to demonstrate knowledge that different kinds of organisms share common life cycle stages (birth, growth, reproduction and death).
* Provide evidence by analyzing and interpreting data that supports the understanding that organisms inherit traits from their parents.
* Provide evidence that organisms in families or related groups are not exactly the same. (variation)
* Analyze and interpret evidence from fossils about the environment where  organisms lived long ago.
* Construct arguments from evidence that some organisms in particular environments either survive well, less well or not at all.

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| **Focus Questions:** | **Conceptual Flow/Teacher Background** |
| *Should be one focus question listed here for each Instructional Cycle / Phenomenon* Instructional Cycle 1:* How does a painted turtle survive the cold temperatures of a Michigan winter?

 Instructional Cycle 2:* How can the life cycle of a maple tree help us predict what will happen next to a bird egg in a nest.

 Instructional Cycle 3:* Why do puppy litter mates (siblings) look like each other but aren’t exactly the same?

  | *Teacher background content information. Also how the concepts will build coherently upon each other for student understanding. May include more depth of knowledge than students will need to build.*\*\*Based on the Michigan Science Standards, this unit allows for local, regional, or Michigan specific contexts or examples in teaching and assessment.Therefore, as we think about how to address the performance task and this overall unit, links to the following information are very intentional (though are not intended to be limiting). Many plants and animals are specific to Michigan’s environment which is quite diverse. Even within freshwater environments there is great diversity - wetlands including bogs and swamps, rivers and creeks with either fast or slow moving water, ponds or lakes - with great variation in size, depth and average temperatures. Along with the diversity of water environments and habitats we find tremendous variety of living organisms - large and small, common and uncommon. Michigan (and surrounding states, as well as Canada) is also very diverse in landforms, nutrients and topography which provides variation in habitats and ecosystems.  Organisms interact with the environment and their habitat in a systematic way. How  well each plant or animal survives in its habitat is very dependent upon the traits passed on to each organism from their parents. Traits help certain plants and animals survive well, survive less well or not survive at all within various habitats.  Conditions within habitats are constantly changing. Sometimes change within a habitat is significant enough that some organisms (plants and animals) can no longer survive because the habitat no longer meets the needs of the plant or animal. Sometimes the change in habitat results in a new type of habitat which better suits plants and animals that have different traits than the organisms which once lived in a geographic area.. Michigan fossils indicate and provide evidence that the habitats found today which meet the needs of many plants and animals surviving well here, are very different from those habitats of long ago.   Below are several resources:**Websites and Resources for Informational Books and websites*****Michigan Habitats****Michigan Habitat Guide*[*http://www.biokids.umich.edu/guides/michigan\_habitat/*](http://www.biokids.umich.edu/guides/michigan_habitat/)*Michigan’s Natural Communities*[*http://mnfi.anr.msu.edu/mnfi/communities/index.cfm*](http://mnfi.anr.msu.edu/mnfi/communities/index.cfm)*U.S. Fish and Wildlife Service: Wildlife and Habitat*[*http://www.fws.gov/refuge/Michigan\_WMD/wildlife\_and\_habitat/index.html*](http://www.fws.gov/refuge/Michigan_WMD/wildlife_and_habitat/index.html)*Ecosystems*[*http://www.metroparks.com/Ecosystems*](http://www.metroparks.com/Ecosystems)*National Park Service: Natural Features and Ecosystems (Michigan)*[*http://www.nps.gov/slbe/learn/nature/naturalfeaturesandecosystems.htm*](http://www.nps.gov/slbe/learn/nature/naturalfeaturesandecosystems.htm)*DEQ: Ecosystems and Biodiversity*[*http://www.nps.gov/slbe/learn/nature/naturalfeaturesandecosystems.htm*](http://www.nps.gov/slbe/learn/nature/naturalfeaturesandecosystems.htm)***Michigan Plants and Animals****Michigan Department of Natural Resources: Wildlife & Habitat*[*http://www.michigan.gov/dnr/0,4570,7-153-10370---,00.html*](http://www.michigan.gov/dnr/0%2C4570%2C7-153-10370---%2C00.html)*Kids’ Café (lists of ecosystems and plants and animals)*[*http://www.schoolwave.com/kidscafe/ecosystems.html*](http://www.schoolwave.com/kidscafe/ecosystems.html)*Michigan Plants and Animals*[*http://www.environmentforgirls.org/plants-animals.php*](http://www.environmentforgirls.org/plants-animals.php)*Department of Natural Resources: Wildlife Species*[*http://michigan.gov/dnr/0,4570,7-153-10370\_12145---,00.html*](http://michigan.gov/dnr/0%2C4570%2C7-153-10370_12145---%2C00.html) Wisconsin DNR informational cardshttp://dnr.wi.gov/topic/parks/getoutdoors/wildcards.html  |