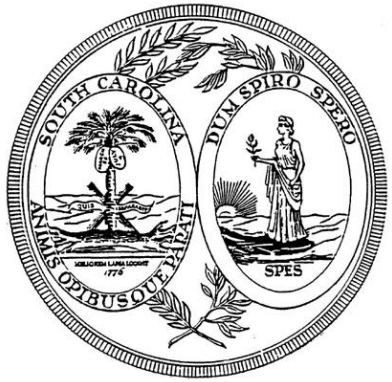
South Carolina Academic Standards and Performance Indicators for Science 2014



Instructional Unit Resource

8th Grade

South Carolina Academic Standards and Performance Indicators for Science 2014
Eighth Grade Science Instructional Unit Resource

As support for implementing the *South Carolina Academic Standards and Performance Indicators for Science 2014*, the standards for Eighth Grade have been grouped into possible units. In the Overview of Units below, the titles for those possible units are listed in columns. Refer to the Overview document to note these unit titles and how Standards, Conceptual Understandings, Performance Indicators, Science and Engineering Practices, and Crosscutting Concepts align. Following the Overview of Units, an Instructional Unit document is provided that delivers guidance and possible resources in teaching our new *South Carolina Academic Standards and Performance Indicators for Science 2014*. The purpose of this document is to provide guidance as to how all the standards in this grade may be grouped into units and how those units might look. Since this document is merely guidance, districts should implement the standards in a manner that addresses the district curriculum and the needs of students. This document is a living document and instructional leaders from around the state will continuously update and expand these resource documents. These documents will be released throughout the 2016-2017 school year with the intentionality of staying ahead of instruction. Teachers should also note that links to the Standards document, A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas, the SEP Support Document, and the Support Document 2.0 are embedded throughout the Instructional Unit format for reference.

Acknowledgments

Jean Baptiste Massieu, famous deaf educator, made a statement that is now considered a French proverb. “Gratitude is the memory of the heart. Indeed, appreciation comes when you feel grateful from the depths of your heart. The head keeps an account of all the benefits you received and gave. But the heart records the feelings of appreciation, humility, and generosity that one feels when someone showers you with kindness.” It is with sincere appreciation that we humbly acknowledge the dedication, hard work and generosity of time provided by teachers and instructional leaders across the state that have made and are continuing to make the Instructional Unit Resources possible.

Grade Eight Overview of Units

Unit 1	Unit 2	Unit 3	
Physical Science: Forces & Motion	Physical Science: Waves	Earth Science: Earth's Place in the Universe	
Standard	**Standard**	**Standard**	
8.P.2	8.P.3	8.E.4	
Conceptual Understanding	**Conceptual Understanding**	**Conceptual Understanding**	**Conceptual Understanding**
8.P.2A	8.P.3A	8.E.4A	8.E.4B
Performance Indicators	**Performance Indicators**	**Performance Indicators**	**Performance Indicators**
8.P.2A.1 8.P.2A.2 8.P.2A.3 8.P.2A.4 8.P.2A.5 8.P.2A.6 8.P.2A.7	8.P.3A.1 8.P.3A.2 8.P.3A.3 8.P.3A.4 8.P.3A.5 8.P.3A.6	8.E.4A.1 8.E.4A.2	8.E.4B.1 8.E.4B.2 8.E.4B.3 8.E.4B.4 8.E.4B.5 8.E.4B.6
Science and Engineering Practices	**Science and Engineering Practices**	**Science and Engineering Practices**	
8.S.1A.2 8.S.1A.3 8.S.1A.4 8.S.1A.5 8.S.1A.6	8.P.1A.2 8.P.1A.4 8.P.1A.6 8.P.1A.8	8.P.1A.2 8.P.1A.4 8.P.1A.6 8.P.1A.7 8.P.1A.8	
Cross Cutting Concepts	**Cross Cutting Concepts**	**Cross Cutting Concepts**	
2, 4, 3,7	1, 2, 6	1, 2, 3, 4	

**Teachers have the discretion to enhance the selected SEP's and CCC's.*

Grade Eight Overview of Units

Unit 4			Unit 5	
Earth Science: Earth Systems & Resources			Earth Science: Earth's History & Diversity of Life	
Standard			**Standard**	
8.E.5			8.E.6	
Conceptual Understanding	**Conceptual Understanding**	**Conceptual Understanding**	**Conceptual Understanding**	**Conceptual Understanding**
8.E.5A	8.E.5B	8.E.5C	8.E.6A	8.E.6B
Performance Indicators	**Performance Indicators**	**Performance Indicators**	**Performance Indicators**	**Performance Indicators**
8.E.5A.1 8.E.5A.2 8.E.5A.3 8.E.5A.4 8.E.5A.5	8.E.5B.1 8.E.5B.2 8.E.5B.3	8.E.5C.1	8.E.6A.1 8.E.6A.2 8.E.6A.3 8.E.6A.4 8.E.6A.5	8.E.6B.1 8.E.6B.2
Science and Engineering Practices			**Science and Engineering Practices**	
8.P.1A.2 8.P.1A.4 8.P.1A.6 8.P.1A.7 8.P.1A.8 8.S.1B.1			8.P.1A.2 8.P.1A.4 8.P.1A.6 8.P.1A.7 8.P.1A.8	
Cross Cutting Concepts			**Cross Cutting Concepts**	
1, 2, 4, 5, 6, 7			1, 2, 3, 4, 7	

**Teachers have the discretion to enhance the selected SEP's and CCC's.*

Unit Title
Earth Science: Earth's History and Diversity of Life
Standard http://ed.sc.gov/scdoe/assets/file/agency/ccr/Standards-Learning/documents/South_Carolina_Academic_Standards_and_Performance_Indicators_for_Science_2014.pdf
8.E.6 The student will demonstrate an understanding of Earth's geologic history and its diversity of life over time.

Conceptual Understanding
8.E.6A. The geologic time scale interpreted from rock strata provides a way to organize major historical events in Earth's history. Analysis of rock strata and the fossil record (which documents the existence, diversity, extinction, and change of many life forms throughout history) provide only relative dates, not an absolute scale. Changes in life forms are shaped by Earth's varying geological conditions.
New Academic Vocabulary **Some students may need extra support with the following academic vocabulary in order to understand what they are being asked to understand and do. Teaching these terms in an instructional context is recommended rather than teaching the words in isolation. A great time to deliver explicit instruction for the terms would be during the modeling process. Ultimately, the student should be able to use the academic vocabulary in conversation with peers and teachers. These terms are pulled from the essential knowledge portion of the Support Doc 2.0 (http://ed.sc.gov/instruction/standards-learning/science/support-documents-and-resources/) and further inquiry into the terms can be found there.**

Geologic time scale	Era	Period	Fossil record	Mass extinction	Paleontologist
Paleozoic Era	Pangaea	Mesozoic Era	Cenozoic Era	Diversity of Life	Epoch
Relative age	Fossil	Fossil record	Index fossil	Law of superposition	Climatic change
Taxonomic group					

Performance Indicators **Text highlighted below in *orange* and *italicized/underlined* shows connections to SEP's.**
8.E.6A.1 *Develop and use models* to organize Earth's history (including era, period, and epoch) according to the geologic time scale using evidence from rock layers. 8.E.6A.2 *Analyze and interpret data* from index fossil records and the ordering of rock layers to infer the relative age of rocks and fossils. 8.E.6A.3 *Construct explanations from evidence* for how catastrophic events (including volcanic activities, earthquakes, climatic changes, and the

impact of an asteroid/comet) may have affected the conditions on Earth and the diversity of its life forms.
8.E.6A.4 *Construct and analyze scientific arguments* to support claims that different types of fossils provide evidence of (1) the diversity of life that has been present on Earth, (2) relationships between past and existing life forms, and (3) environmental changes that have occurred during Earth's history.
8.E.6A.5 *Construct explanations* for why most individual organisms, as well as some entire taxonomic groups of organisms, that lived in the past were never fossilized.

***Science and Engineering Practices**

Support for the guidance, overviews of learning progressions, and explicit details of each SEP can found in the Science and Engineering Support Doc (http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf). It is important that teachers realize that the nine science and engineering practices are not intended to be used in isolation. Even if a performance indicator for a given standard only lists one of the practices as a performance expectation, scientists and engineers do not use these practices in isolation, but rather as part of an overall sequence of practice. When educators design the learning for their students, it is important that they see how a given performance expectation fits into the broader context of the other science and engineering practices. This will allow teachers to provide comprehensive, authentic learning experiences through which students will develop and demonstrate a deep understanding of scientific concepts.

8.P.1A.2 Develop, use, and refine models to (1) understand or represent phenomena, processes, and relationships;(2) test devices or solutions; or (3) communicate ideas to others.
8.P.1A.4 Analyze and interpret data from informational texts, observations, measurements, or investigations using a range of methods (such as tabulation, graphing, or statistical analysis) to (1) reveal patterns and construct meaning or (2) support hypotheses, explanations, claims, or designs.
8.P.1A.6 Construct explanations of phenomena using (1) primary or secondary scientific evidence and models, (2) conclusions from scientific investigations, (3) predictions based on observations and measurements, or (4) data communicated in graphs, tables, or diagrams.
8.P.1A.7 Construct and analyze scientific arguments to support claims, explanations, or designs using evidence from observations, data, or informational texts.
8.P.1A.8 Obtain and evaluate scientific information to (1) answer questions; (2) explain or describe phenomena; (3) develop models; (4) evaluate hypotheses, explanations, claims, or designs; or (5) identify and/or fill gaps in knowledge. Communicate using the conventions and expectations of scientific writing or oral presentations by (1) evaluating grade-appropriate primary or secondary scientific literature or (2) reporting the results of student experimental investigations.

***Cross Cutting Concepts** **(http://www.nap.edu/read/13165/chapter/8)**

The link above provides support from the Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas (2012). The text in blue and *italicized/underlined* below provides a brief explanation of how the specific content ties to the CCC's.

1. Patterns*:* The National Research Council (2012) states that "observed patterns of forms and events guide organization and classification, and

they prompt questions about relationships and the factors that influence them" (p. 84). *Evidence from the fossil record can be compared to present day life forms to determine if relationships exist between them and provide evidence as to why the relationship may exist.*

3. Scale, proportion, and quantity: The National Research Council (2012) states that "in considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance" (p. 84). *The fossil record and the ordering of the rock layers can be used to infer the relative age of rocks and fossils.*

4. Systems and systems models: The National Research Council (2012) states that "Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering" (p. 84). *Key events from the Earth's geologic record divide the Earth's history into eras, periods, and epochs and are used to develop the geologic time scale.*

**Teachers have the discretion to enhance the selected SEP's and CCC's.*

Prior Knowledge
• 5.E.3 (Natural processes and human activities affect the features of Earth's landforms and oceans) • H.E.4 (Earth's conditions over geologic time and the diversity of organisms)
Subsequent Knowledge
• NA

Possible Instructional Strategies/Lessons **Strategies and lessons that will enable students to master the standard and/or indicator.**
• 8.E.6A.1 ○ It's a Matter of Time: Students develop an understanding of geologic time and the Late Triassic Period as represented by the geologic and fossil records at Petrified Forest National Park. Students create individual personal timelines on paper, by placing events in their lives onto a straight line and create a geologic timeline as a class activity. https://www.nps.gov/pefo/learn/education/classrooms/upload/paleo_lesson3.pdf ○ Geologic Timeline Activity: Students create a scale model of the geologic time scale using adding machine tape. http://www2.mbusd.org/staff/pware/pdf/GeologicalTimeline.pdf

- 8.E.6A.2
  - Fossils and Geologic Time: Students develop an understanding of the development of the geologic time scale. Also, students are introduced to the major time periods in Earth's history, as well as to the role fossils play in helping us understand this history. http://sciencenetlinks.com/lessons/fossils-and-geologic-time/

  - Who's on First? A Relative Dating Activity: This activity models what paleontologists do to date fossils in geologic columns. With this lesson, students will sequence the fossils. They will state claims on which types of environments each lived in and give examples supporting their claims. A third objective of this lesson is to identify which fossils are index fossils and why these fossils are examples of index fossils. http://www.ucmp.berkeley.edu/fosrec/BarBar.html

- 8.E.6A.3
  - Will It Happen Again? Examining Mass Extinctions on Earth: Students learn about mass extinctions, map extinction events to a geologic timeline, as well as explore whether human influences may lead to another major extinction event. http://learning.blogs.nytimes.com/2011/04/06/will-it-happen-again-examining-mass-extinctions-on-earth/?_r=0

  - The Day the Mesozoic Died: This three-act film produced by the Howard Hughes Medical Institute tells the story of the detective work that solved the mystery surrounding the disappearance of the dinosaurs. The interactive version of this film, that includes pause points as well as quiz questions, is available. http://www.hhmi.org/biointeractive/day-mesozoic-died

  - Weighing the Evidence for a Mass Extinction - In the Ocean: Students will make observations and measurements on photomicrographs of research samples of fossilized protists called foraminifera (or forams). Their observations emulate the observations made by researchers documenting a mass extinction at the end of the Cretaceous period about 66 million years ago. http://www.hhmi.org/biointeractive/weighing-evidence-mass-extinction-ocean

  - Weighing the Evidence for a Mass Extinction - On the Land: Students will analyze graphs and data on pollen grains and fern spores to form a picture of the living landscape before and after the K-T event. This activity complements the hands-on activity "Weighing the Evidence for a Mass Extinction, Part 1: In the Ocean," where students study data on fossils of foraminifera. http://www.hhmi.org/biointeractive/weighing-evidence-mass-extinction-land

- 8.E.6A.4
  - Life Has a History: This interactive tour introduces students to the history of life and how it results in today's biodiversity. Students will learn about geologic time, fossils, ancestral relationships, cladograms, variation, natural selection, and extinction. http://www.ucmp.berkeley.edu/education/explorations/tours/intro/

- 8.E.6A.5
  - Fossilization and Adaptation: Activities in Paleontology: These three activities allows students to evaluate the importance of fossils to our knowledge of the past, identify conditions necessary for fossilization to occur, construct possible scenarios for the formation of fossils, understand how organisms are adapted to their environments, and understand the relationships of modern and ancient communities with their environments. This resource can be found at http://www.ucmp.berkeley.edu/fosrec/Breithaupt2.html.

Resources

- Explorations Through Time: This interactive site from the University of California Berkeley has lessons that support some of the indicators in this unit. Note: One lesson, *Adventures at Dry Creek,* is no longer supported, but the other lessons work fine. http://www.ucmp.berkeley.edu/education/explotime.html

- Patterns in Time: Students gradually build a conceptual model of geological time using familiar linear analogs relative to their short lifetimes. Students will associate the earliest member of each group of vertebrates with the geologic time of its emergence, on their "familiar scale" of relative distances from their school. This activity and it's stair-step pattern of emergence leads to an inquiry for an explanation, with the hypothesis that each group (class) originated from a previous group. http://www.indiana.edu/~ensiweb/lessons/pat.in.time.html; http://www.indiana.edu/~ensiweb/lessons/pat.time.article.pdf

- Learning from the Fossil Record: This site contains multiple links to lessons related to fossils, absolute and relative dating for all abilities and grade levels. Sample lessons are applicable to all parts of this unit. http://www.ucmp.berkeley.edu/fosrec/Learning.html

- Teaching Resources- Mass Extinction of Large Dinosaurs and More: This website includes resources to help the teacher present content regarding mass extinction. Key concepts addressed include extinctions at the end of the Cretaceous, causes of mass extinction events, interpreting ecosystem changes through the fossil record, reconstructing ancient environments, and technology used by paleontologists. Resources include webcasts and podcasts, printable lessons, online activities, science literary resources, posters and worksheets, websites,

and videos. https://qrius.si.edu/teachers/online/science-teaching-resources/mass-extinction-large-dinosaurs

- Fossils-facts-and-finds.com: The site has some general lesson plans relating to fossils (for example "The Process of Fossilization: Create Your Own Fossil Dig"). http://www.fossils-facts-and-finds.com/fossil_lesson_plans.html

Sample Formative Assessment Tasks/Questions

Additional sample formative assessment tasks/questions for grade bands are located at the end of each of the SEP Support Doc. (http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf)

Sample Formative Tasks:

- Use A & D statements: Students analyze fact or fiction statements by either agreeing, disagreeing, or identifying whether they need additional information. They should be specific in what type of additional information they need. More specific information can be found at http://www.s2temsc.org/uploads/1/8/8/7/18873120/agree_and_disagree_statements_strategy.pdf.

Example:

Statement	
The type of fossils found in an area can explain the environmental changes that have occurred.	○agree ○disagree ○need more information What I need:
Marine organisms have a greater likelihood of forming fossils.	○agree ○disagree ○need more information What I need:

- Analogies: During class, have students complete the following statement: A fossil is like _____ because _____. If used at the beginning of class, have students share their thoughts. The formative assessment can be used at the end of class for active closure.

- Sort the Events: Prior to introducing the geologic time scale, create a timeline that is about 4.6 meters long (1 mm = 1 million years). Clearly indicate the beginning of the timeline and the present day end of the timeline. Divide students into groups and give each group a set of sticky notes with major events on them (first bacteria, first invertebrates, vertebrate fish, arachnids and insects, first amphibians, first reptiles, mosses, cone-bearing plants, flowering plants, first mammals, first birds, age of the dinosaurs, first humans). Have students decide as a group how long ago they believed each event occurred and place their sticky notes along the timeline. Then lead a class discussion about the patterns that appear and ask students to defend their thinking. Finally, reveal the accepted scientific ideas about the unfolding of these events. This activity gives the teacher valuable insight into current student thinking.

Sample Formative Questions:

- Which is older: the Earth, the Sun, or the Milky Way?
- Explain the relationship between the units of geologic time.
- What happened at the end of each era in the Phanerozoic eon?
- What happens to the diversity of life as time passes?
- How do catastrophes affect biological diversity?

Unit Title
Earth Science: Earth's History and Diversity of Life
Standard http://ed.sc.gov/scdoe/assets/file/agency/ccr/Standards-Learning/documents/South_Carolina_Academic_Standards_and_Performance_Indicators_for_Science_2014.pdf
8.E.6: The student will demonstrate an understanding of Earth's geologic history and its diversity of life over time.

Conceptual Understanding
8.E.6B. Adaptation by natural selection acting over generations is one important process by which species change in response to changes in environmental conditions. The resources of biological communities can be used within sustainable limits; but if the ecosystem becomes unbalanced in ways that prevent the sustainable use of resources, then ecosystem degradation and species extinction can occur.
New Academic Vocabulary **Some students may need extra support with the following academic vocabulary in order to understand what they are being asked to understand and do. Teaching these terms in an instructional context is recommended rather than teaching the words in isolation. A great time to deliver explicit instruction for the terms would be during the modeling process. Ultimately, the student should be able to use the academic vocabulary in conversation with peers and teachers. These terms are pulled from the essential**

knowledge portion of the Support Doc 2.0 (http://ed.sc.gov/instruction/standards-learning/science/support-documents-and-resources/) and further inquiry into the terms can be found there.
Adaptations Traits Variations Natural selection Natural factors Man-made factors Extinct
Performance Indicators **Text highlighted below in *orange* and *italicized/underlined* shows connections to SEP's.**
8.E.6B.1 *Construct explanations* for how biological adaptations and genetic variations of traits in a population enhance the probability of survival in a particular environment. 8.E.6B.2 *Obtain and communicate information* to support claims that natural and human-made factors can contribute to the extinction of species.
***Science and Engineering Practices** **Support for the guidance, overviews of grade level progressions, and explicit details of each SEP can found in the Science and Engineering Support Doc (http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf). It is important that teachers realize that the nine science and engineering practices are not intended to be used in isolation. Even if a performance indicator for a given standard only lists one of the practices as a performance expectation, scientists and engineers do not use these practices in isolation, but rather as part of an overall sequence of practice. When educators design the learning for their students, it is important that they see how a given performance expectation fits into the broader context of the other science and engineering practices. This will allow teachers to provide comprehensive, authentic learning experiences through which students will develop and demonstrate a deep understanding of scientific concepts.**
8.S.1A.6 Construct explanations of phenomena using (1) primary or secondary scientific evidence and models; (2) conclusions from scientific investigations; (3) predictions based on observations and measurements; or (4) data communicated in graphs, tables, or diagrams. 8.S.1A.8 Obtain and evaluate scientific information to (1) answer questions; (2) explain or describe phenomena; (3) develop models; (4) evaluate hypotheses, explanations, claims, or designs; or (5) identify and/or fill gaps in knowledge. Communicate using the conventions and expectations of scientific writing or oral presentations by (1) evaluating grade-appropriate primary or secondary scientific literature or (2) reporting the results of student experimental investigations.
***Cross Cutting Concepts** **(http://www.nap.edu/read/13165/chapter/8)** **The link above provides support from the Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas (2012). The text in blue and *italicized/underlined* below provides a brief explanation of how the specific content ties to the CCC's.**
2. Cause and effect: Mechanism and explanation: The National Research Council (2012) states "events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such

mechanisms can then be tested across given contexts and used to predict and explain events in new contexts" (p. 84). *Natural and man-made factors cause extinctions.*

7. Stability and change: The National Research Council (2012) states that "For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study" (p. 84). *Variations allow for natural selection in a population. Natural selection explains how these variations allow species to change over time.*

**Teachers have the discretion to enhance the selected SEP's and CCC's.*

Prior Knowledge
• NA
Subsequent Knowledge
• H.E.4 Earth's conditions over geologic time and the diversity of organisms

Possible Instructional Strategies/Lessons
Strategies and lessons that will enable students to master the standard and/or indicator.

- 8.E.6B.1
  - Natural Selection-a PhET Simulation: Students explore the process of natural selection by controlling the environment and causing mutations in a population of bunnies. Through this simulation, students construct explanations of how adaptations and genetic variations in a population might enhance survival in a particular environment. Included on the PhET site are several teacher-created activities to choose from to help students make meaning from the simulation. https://phet.colorado.edu/en/simulation/legacy/natural-selection

  - Owl Family Survival: In this classroom simulation, students experience how adaptations affect the survival of a species. They will explore how talon adaptations of owl parents affect the parent's ability to successfully gather and deliver food to their owlets. Reflection questions require the student to explain why certain talon adaptations enhanced survival while others did not. http://middle3.fatcow.com/owlfamily.pdf

  - Squirrel Island: In this activity, students are assigned an island with given a set of environmental conditions and are asked to design a squirrel with adaptations that would help it be successful in the assigned environment. Students must justify the behavioral and

structural adaptations they choose for the squirrel. This activity can easily be modified for any animal depending on the prior knowledge of students. http://science-class.net/archive/science-class/Lessons/Ecology/Ecosystems_Biomes/squirrel_island.pdf

- The Perfect Beak: Students use the concept of natural selection to obtain information and explain the importance of genetic variation in a species. http://www.teacherstryscience.org/lp/perfect-beak

- 8.E.6B.2
  - Will It Happen Again? Examining Mass Extinctions on Earth: Studetns obtain information about mass extinctions, map extinction events to a geologic timeline, and explore current ideas about whether human influences may lead to another major extinction event. http://learning.blogs.nytimes.com/2011/04/06/will-it-happen-again-examining-mass-extinctions-on-earth/?_r=0

  - Why did the woolly mammoth die out? : This is a *National Geographic* article that summarizes the factors that led to the disappearance of these large herbivores. Prior to reading the article, students could make a claim about why they believe the woolly mammoth died out, then use the article to research the factors that lead to the extinction, and then construct an explanation as to why these animals became extinct. http://www.nationalgeographic.com.au/history/why-did-the-woolly-mammoth-die-out.aspx

Resources

- Natural Selection Lesson Plans: This website contains a wide variety of activities and resources useful for teaching about natural selection, biological adaptations, and genetic variation. http://www.ngsslifescience.com/science.php?/biology/lessonplans/C394/

- cK-12 Adaptation and Evolution of Populations : This website has various resources to illustrate the terms adaptation, variation, and trait. http://www.ck12.org/book/CK-12-Earth-Science-Concepts-For-High-School/section/10.9/

- Origin of the Species- The Beak of the Finch: This film focuses on Peter and Rosemary Grant's research on the volcanic island of Daphne Major. The film shows natural selection in action and describes how the Grants carried out their research. There is also a good selection of ancillary lessons for accelerated students in data analysis and statistics. The sorting activity is a good follow up to the film and requires students to make observations on the appearance of the birds and their songs to sort the birds according to genus. http://www.hhmi.org/biointeractive/origin-species-beak-finch and http://www.hhmi.org/biointeractive/sorting-finch-species

- The Galapagos Finches: From Northwestern University, this interactive website contains information on the biota and ecology of Daphne

Major. Clicking through the lesson gives the students good practice in data collection and analysis. The activity can be tailored for all levels. http://bguile.northwestern.edu/introduction.html

Sample Formative Assessment Tasks/Questions

Additional sample formative assessment tasks/questions for grade bands are located at the end of each of the SEP Support Doc. (http://ed.sc.gov/scdoe/assets/File/instruction/standards/Science/Support%20Documents/Complete_2014SEPsGuide_SupportDoc2_0.pdf)

Sample Formative Tasks

- Juicy Question: The Grand Canyon was carved, separating what had once been a single population of squirrel into two separate populations. What do you think happened to those populations over time?

- Add to the Answer: How are the terms variation, adaptation, and trait related?
  Group students into groups of two. Have students write an answer to the question on paper. Exchange the paper with another group who will add to the answer given. Do the exchange again and have students edit answers they are given. Collect answers and select the most complete to use as activating prior knowledge for the next lesson.

- Wall graffiti: Write five questions on chart paper and post them around the room. (What is one natural factor that could cause an extinction? What is one man-made factor that has caused extinctions? Define adaptation. Illustrate a trait that is considered an adaptation. Define the term variation. Why is natural selection considered to be a positive process?) Do not permit students to duplicate answers that have already been given. Assign students to groups and give each group a different color marker to write answers to the questions on the chart paper. Give each group about three minutes to discuss and write their answers. Display and go over responses.

Sample Formative Questions

- How are a cat's claws an adaptation for survival?
- Which sustainable practices might prevent "man-made" extinctions?

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