

8th Grade Evolution and Earth History Resources

NGSS Performance Expectations in this Unit.

LS3-1. Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.
LS4-5. Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
LS4-1. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
LS4-2. Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
LS4-3. Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.
LS4-4. Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.
LS4-6. Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.
ESS1-4. Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.
ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.
*ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.
*ETS1-2. Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.
*ETS1-3. Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.
*ETS1-4. Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

Engineering Standards- These are not to be taught as stand alone standards, but while working on engineering projects that are tied to the other standards.

A packet has been created with the relevant pages and articles from the 7th grade CPO text. These help to address the content of the NGSS but not the Science and Engineering Practices or the Crosscutting Concepts. They also do not consistently use a phenomenon or problem to drive instruction. In this time of transition teachers should try to make lessons and units as “NGSS” as possible. But since there are no adopted NGSS materials, this is not expected all the time. We have time to make the shifts. It is available to order from reprographics.

The Chapter 10 pages go well beyond what middle schoolers need to know about protein synthesis and mutations. The labs are included, but students are not going to be tested on the details of nucleic acid or protein structure or on the processes. The goal is for students to understand that changes in DNA lead to changes in proteins which affect traits. The details in the chapter provide good background, but don't waste time on details of structure, process, or vocabulary in this chapter.

Here are some other resources that can help with this unit:

California Education and the Environment Units (EEI) are approved by the California Board of Education and use California problems and phenomena to drive the storyline. See Units 7.3a, 7.3e, and 7.4g for strong connections to this unit.

Curriculum Units are available as free PDFs (which can be printed at reprographics) at:

<http://www.californiaeei.org/curriculum/>

If you are asked for a password, use – teacheei

If you take an online training at: <http://www.californiaeei.org/training/webinars/>
They will send you a full color unit with student workbooks.

An excellent resource for understanding the fossil record that can be easily adapted to meet the Science and Engineering Practice of Argument from Evidence is the “Great Fossil Find” at:

<http://www.indiana.edu/~ensiweb/lessons/gr.fs.fd.html>

Many useful genetic resources at:

<http://learn.genetics.utah.edu/>

Instead of doing lab 11B in the CPO Textbook for Natural Selection, there are many variations that work better. Gregg suggests using the FOSS website which collects data as you go:

see address below:

http://www.fossweb.com/delegate/ssi-foss-ucm/Contribution%20Folders/FOSS/multimedia_ms_1E/PopulationsandEcosystems/simulations/stebbins2.html

There are lots of resources on the old wiki but be choosy- some are more aligned to NGSS than others and many are more high school appropriate:

<https://psusdscienceresources.wikispaces.com/Genetics>

<https://psusdscienceresources.wikispaces.com/Evolution>