Big Idea 1

Content Area: **Template**
Course(s):
Time Period:
Length:
Status: **Published**

State Mandated Topics Addressed in this Unit

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N/A	N/A

Big idea 1: The process of evolution drives the diversity and unity of life

Learning Objectives

- 1.A. Change in the genetic makeup of a population over time is evolution
- 1.B Organisms are linked by lines of descent from common ancestry.
- 1.C Life continues to evolve within a changing environment.
- 1.D The origin of living systems is explained by natural processes.
- LO 1.1 The student is able to convert a data set from a table of numbers that reflect a change in the genetic make up of a population over time and to apply mathematical methods and conceptual understanding to investigate the causes and effects of this change. [SP 1,2]
- LO 1.10 The student is able to refine evidence based on data from many scientific disciplines that support biological evolution. [SP 5]
- LO 1.11 The student is able to design a plan to answer scientific questions regarding how organisms have changed over time using information from morphology, biochemistry, and geology [SP 4]
- LO 1.12 The student is able to connect scientific evidence from many scientific disciplines to support the modern concept of evolution [SP 7]
- LO 1.13 The student is able to construct and/ or justify mathematical models, diagrams or simulations that represent processes of biological evolution [SP 1, 2]
- LO 1.14 The student is able to pose scientific questions that correctly identify essential properties of shared, core life processes that provide insights into the history of life on Earth.
- LO 1.15 The student is able to describe specific examples of conserved core biological processes and features shared by all domains or within one domain of life, and how these shared, conserved core processes and features support the concept of common ancestry for all organisms [SP 7]
- LO 1.16 The student is able to justify the scientific claim that organisms share many conserved core processes and features that evolved and are widely distributed among organisms today [SP 6]
- LO 1.17 the student is able to pose scientific questions about a group of organisms whose relatedness is described by a phylogenetic tree or cladogram in order to identify shared characteristics, make inferences about the evolutionary history of the group and identify character data that could extend or improve the phylogenetic tree [SP 3]

- LO 1.18 The student is able to evaluate evidence provided by a data set in conjunction with a phylogenetic tree or a simple cladogram to determine evolutionary history and speciation. [SP 5]
- LO 1.19 The student us able to create a phylogenetic tree or simple cladogram that correctly represent evolutionary history and speciation from a provided data set. [SP 1]
- LO 1.2 The student is able to evaluate evidence provided by data to qualitatively and/or quantitatively investigate the role of natural selection in evolution. [SP 2,3]
- LO 1.20 The student is able to analyze data related to questions of speciation and extinction throughout the Earth's History. [SP 5]
- LO 1.21 The student is able to design a plan for collection data to investigate the scientific claim that speciation and extinction have occurred throughout the Earth's History. [SP 4]
- LO 1.22 The student is bale to use data from a real or simulated population, based on graphs or models of types of selection to predict what will happen to the population in the future [SP 6]
- LO 1.23 The student is bale to justify the selection of data that address questions related to reproductive isolation and speciation. [SP4]
- LO 1.24 The student is able to describe speciation in an isolated population and connect it to change in gene frequency, change in environment, natural selection and genetic drift [SP 7]
- LO 1.25 The student is able to describe a model that represents evolution within a population [SP 1]
- LO 1.26 The student is bale to evaluate given data sets that illustrate evolution is an ongoing process [SP 5]
- LO 1.27 The student is able to describe a scientific hypothesis about the origin of life on Earth [SP 1]
- LO 1.28 The student is able to evaluate scientific questions based on hypotheses of the origin of life on earth [SP 3]
- LO 1.29 The student is able to describe scientific questions based on hypotheses of the origin of life on Earth [SP 6]
- LO 1.3 The student is able to apply mathematical methods to data from a real or simulated population to predict what will happen to the population in the future. [SP 2]
- LO 1.30 The student is able to evaluate scientific hypotheses about the origin of life on Earth [SP 6]
- LO 1.31 The student is able to evaluate the accuracy and legitimacy of data to answer scientific questions about the origin of life on Earth [SP 4]
- LO 1.32 The student is able to justify the selection of geological, physical, and chemical data that reveal early Earth conditions [SP 4]
- LO 1.4 The student is able to evaluate data-based evidence that describes evolutionary changes in the genetic make up of a population over time
- LO 1.5 The student is bale to connect evolutionary changes in a population over time to change in the environment
- LO 1.6 The student is able to use data from mathematical models based on Hardy-Wienberg equilibrium to analyze genetic drift and effects of selection in the evolution of specific populations [SP 1, 2]
- LO 1.7 The student is able to justify the selection of data from mathematical models based on Hardy-Wienberg equilibrium to analyze genetic drift and effects of selection in the evolution of specific populations [2, 4]
- LO 1.8 The student is able to make predictions about the effects of genetic drift, migration and artificial selection on the genetic makeup of a population [SP 6]
- LO 1.9 The student is able to evaluate evidence provided by data from many scientific disciplines that support biological evolution. [SP 5]

Essential Skills

- 1.A.1 Natural Selection is a major mechanism of evolution.
- 1.A.2 Natural Selection acts on phenotypic variation is populations.
- 1.A.3 Evolutionary change is also driven by random processes.
- 1.B.1 Organisms share many conserved core processes and features that evolved and are widely distributed among organisms today.
- 1.B.2 Phylogenetic trees and cladograms are graphical representations of evolutionary history that can tested.
- 1.C.1 Speciation and extinction have occurred throughout the Earth's history.
- 1.C.2 Speciation may occur when two populations become reproductively isolated from each other.
- 1.C.3 Populations of organisms continues to evolve
- 1.D.1 There are several hypotheses about the natural origin of life on Earth, each with supporting scientific evidence.
- 1.D.2 Scientific evidence from many different disciplines supports models of the origin of life.
- 1-A.4 Biology evolution is supported by scientific evidence from many disciplines, including mathematics.

Standards

Instructional Tasks/Activities

- Activity 1
- Activity 10
- Activity 2
- Activity 3
- Activity 4
- Activity 5
- Activity 6
- Activity 7
- Activity 8
- Activity 9

Assessment Procedure

- Classroom Total Participation Technique
- Classwork
- DBQ
- Essay

- Exit Ticket/Entrance Ticket/Do Now
- Journal / Student Reflection
- Kahoot
- Other named in lesson
- Peer Review
- Performance
- Problem Correction
- Project
- Quiz
- Rubric
- Teacher Collected Data
- Test
- Worksheet

Recommended Technology Activities

- Appropriate Content Specific Online Resource
- Chromebook
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here
- Copy/Paste Content Specific Link Here
- Gimkit
- GoGuardian
- Google Classroom
- Google Docs
- Google Forms
- Google Slides
- Kahoot
- MagicSchool AI
- Other- Specified in Lesson
- Quiziz
- Screencastify

Accommodations & Modifications & Differentiation

Accommodations and Modifications should be used to meet individual needs. Their IEP and 504 plans should be used in addition to the following suggestions.

Gifted and Talented

- Compare & Contrast
- Conferencing
- Debates
- Jigsaw
- Peer Partner Learning
- Problem Solving
- Structured Controversy
- Think, Pair, Share
- Tutorial Groups

Instruction/Materials

- alter format of materials (type/highlight, etc.)
- color code materials
- eliminate answers
- extended time
- extended time
- large print
- modified quiz
- modified test
- Modify Assignments as Needed
- Modify/Repeat/Model directions
- necessary assignments only
- Other (specify in plans)
- other- named in lesson
- provide assistance and cues for transitions
- provide daily assignment list
- read class materials orally
- reduce work load
- shorten assignments
- study guide/outline
- utilize multi-sensory modes to reinforce instruction

Environment

- alter physical room environment
- assign peer tutors/work buddies/note takers
- assign preferential seating

- individualized instruction/small group
- modify student schedule (Describe)
- other- please specify in plans
- provide desktop list/formula

Modifications

1. Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)
2. Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community.
3. Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures,
illustrations, graphs, charts, data tables, multimedia, modeling).
4. Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple
representation and multimodal experiences).
5. Engage students with a variety of Scientific practices to provide students with multiple entry points and multiple ways to demonstrate their
understandings.
6. Use project-based science learning to connect science with observable phenomena.
7. Structure the learning around explaining or solving a social or community-based issue.
8. Provide ELL students with multiple literacy strategies.
9. Collaborate with after-school programs or clubs to extend learning opportunities.

Resources

- Campbell Biology Chapters: 1, 2, 6, 5, 7, 13, 19, 21, 22, 23, 24, 25, 26, 31, 32, 39, 43, 48, 53,
- Campbell Biology Chapters: 1, 5, 12, 17, 22, 23, 24, 25, 26, 28 29, 30, 32, 33, 56,
- Campbell Biology Chapters: 1, 6, 7, 12, 17, 23, 25, 26, 27, 28, 29, 30, 31, 32, 34, 35, 47, 49, 50, 51,
- Campbell Biology Chapters: 3, 4, 22, 25, 27, 28, 29
- Resource 5