Evidence for Evolution: Scavenger Hunt

Lesson Plan

Grade
9-12

NGSS Standards
HS-LS4-1, HS-LS4-2

21st Century Skills
Critical thinking, problem solving

Materials
Access to D&D Virtual Reality Exhibit, worksheets, powerpoint slides

Estimated time
1-2 hours

Difficulty
Medium

Vocabulary
Biogeography, embryology, radiometric dating, natural selection, strata,

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Museum of Idaho

Objective

Students will learn the definition and importance of evidence from a scientific standpoint and be able to connect the various evidences of evolution to real world, relevant examples from within the scope of the exhibit.

Activity

Lesson begins with a class discussion of the definition of evidence and the different types of evidence that support the theory of evolution. Students fill out a worksheet based on a presentation by the teacher (slide presentation) which will help them when they proceed to the scavenger hunt.

Teacher facilitates initial class discussion, defines "evidence" types, (slide presentation) and provides the assignment sheet and map of exhibit.

Students visit the museum exhibit or the 3D Virtual Exhibit individually or with a partner to complete the scavenger hunt.

Students should be sure to engage with the interactives, including VISTA, the Galápagos Islands Exploration Table and the Origin of Birds, as well as other components of the exhibit.

Assessment

There are six (6) questions each worth 5 points (30 points total). Answers can be found in the exhibit. The student quiz is printed and handed in for scoring. An answer key is provided in the teacher section of this lesson plan, but there are numerous possible answers to each question so student answers must be evaluated beyond the answer key.

Lesson plan based on Darwin & Dinosaurs Exhibit
More lesson plans at darwindinosaurs.com

Evidence for Evolution: Scavenger Hunt

Teacher's Copy of Worksheet

Defining Evolution

Evolution is the ___PROCESS___of change within a population's ___GENE POOL ___over time.

Evolution happens to ___INDIVIDUALS___ , not ___POPULATIONS___ .

Natural Selection (the driving force behind evolution) was originally proposed by ___CHARLES DARWIN ___in 1859.

What is evidence?

Evidence is the available ___FACTS___ or information indicating ___PROOF___of a __THEORY__ .

Different ___BRANCHES___ of science provide evidence that contribute to the idea of evolution.

Biogeography

The ___GEOGRAPHIC___distribution of organisms shows evidence of ___COMMON DESCENT___ .

Galápagos tortoises
___ISABELA ___ Island tortoise eats plants that grow __NEAR__to ground.
___HOOD ___ Island tortoises can ___REACH HIGHER___to get at sparser vegetation off the ground because their shell turns up behind their necks.

Darwin's finches
Darwin observed finches with different ___BEAKS___ on the different islands, an adaptation to different diets.

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Evidence for Evolution

Comparative Anatomy

The ___SIMILARITIES___ and ___DIFFERENCES___ in ___ANATOMY___ between species regarding ___STRUCTURE___ and __FUNCTION__ .

Homologous structures. Same ___STRUCTURE___ , different ___FUNCTION___ , shows descent from common ancestor.

Vestigial structures. Structures that are ___TRACES___ of homologous structures and no longer have a ___FUNCTION___ show descent from common ancestor.

Analogous structures. Structures that are have same ___ FUNCTION ___ but different ___STRUCTURE___ indicate species not closely related.

Fossil Record

Fossils act as a ___RECORD___ of organisms that lived on Earth in the past and often show small incremental ___CHANGES___ indicating evolution.

Geology

Lower strata are relatively ___OLDER___ than ___HIGHER___ strata.

Strata act as a ___TIMELINE___ for the ___RELATIVE ORDER ___ of dates and events.

Geological forces like tectonic movement and volcanic activity can deform strata. Deformed strata indicate that Earth is ___VERY OLD___ .

Evidence Worksheet

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Evidence for Evolution

DNA Analysis

The more ___SIMILAR___ their DNA the more ___CLOSELY RELATED___ the organisms.

The number of ___DIFFERENCES (MUTATIONS)___ in DNA can predict how long ago two organisms split off from a ___COMMON ANCESTOR___.

Radiometric Dating

Only ___IGNEOUS___ rocks can be dated using radiometric dating.

Fossils are only found d in ___SEDIMENTARY___ rocks, so igneous layers above and below the fossil level are dated to create a date ___RANGE___ for the fossils.

Uranium-235 decays into ___LEAD-207___ , and the half life is ___700___ million years.

The date for an igneous rock layer is calculated using the ___RATIO___ of U-235 atoms to LEAD-207 atoms.

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Teacher Answer Key

No.	Type of evidence	Example in exhibit	Explanation	Pts.
1	Biogeography	Galápagos tortoises	Different tortoise shell shapes on different islands show adaptation/ evolution	5
2	Comparative anatomy	Similarity of limbs of plesiosaur, dinosaurs, and pterosaurs	Illustrates relatedness between groups	5
3	Fossil record	Origin of birds	Evolutionary link between dinosaurs and modern birds	5
4	Geology	Siccar Point, Hutton's analysis of rocks	Earth is old and changes over time creating new environments that drive natural selection	5
5	DNA	VISTA interactive on variation	DNA clock shows hum and and chimpanzees split 5 mya	5
6	Radiometric dating	Deep Time component of VISTA	Dating of dinosaurs types over 240 million years	5

OTHER ANSWERS ARE POSSIBLE AND SHOULD BE EVALUATED

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Student Worksheet

Defining Evolution

Evolution is the _____of change within a population's _____ _____ over time.

Evolution happens to _____ , not _____ .

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What is evidence?

Evidence is the available _____ or information indicating _____ of a _____ .

Different _____ of science provide evidence that contribute to the idea of evolution.

Biogeography

The _____ distribution of organisms shows evidence of _____ _____ .

Galápagos tortoises

_____ Island tortoise eats plants that grow _____to ground.
_____ Island tortoises can _____ _____to get at sparser vegetation off the ground because their shell turns up behind their necks.

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NAME	CLASS
URL my.matterport.com/show/?m=fv3NZ9XP6Zd	

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2	Comparative anatomy			5
3	Fossil record			5
4	Geology			5
5	DNA			5
6	Radiometric dating			5