

Title: "How the Tree Works!"

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Abstract:

This activity is intended to follow the viewing of the film TreeTender. In particular, the video clip in the learning modules, shows how the Tree of Life can be used to determine the relationships between all organisms on life and reinforces the concept of a common ancestor to differing species. This activity provides students with the opportunity to test these concepts using internet based resources.

Subject, Grade, Level:

*Biotechnology 1- 9th and 10th graders
Biology/AP Biology*

Learning objectives:

*Students will access internet based websites to study evolution and biodiversity.
Students will consider the relationships between all living organisms to reinforce the concept of evolution
Using an interactive visual student will learn how evolutionary genealogy involves humans and all other creatures, alive and dead.
Students will come to appreciate the insignificant numbers and evolutionary age of humans compared to other life forms.*

Timeframe:

One class period

List of materials:

Students will need a computer with audio and worksheet

Procedure and general instructions (for instructor). REQUIRED.

Remind students of the content of the TreeTender movie and specifically review the clip "How the Tree Works." Move to computers, or as a class, view the video "Evogeneao Tree of Life Introductory Video". Complete worksheet using the two websites Evogeneao and One Zoom

Procedure and general instructions (for students).

Instructions are on the handout. Worksheet follows

TreeTender: Protecting Biodiversity

How the Tree Works!

Name _____

This activity will require accessing three websites:

1. <https://www.treetender.org/> → (review the learning module: How the tree works!)
2. <https://www.evogeneao.com/> → (view the video: Evogeneao Tree of Life Introductory Video)
3. <http://www.onezoom.org/> (An interactive map of the evolutionary relationships between species of life on earth)

Consider a quote from Evogeneao Tree of Life Introductory Video

“All creatures on earth, living or dead, are related by descent with modifications from common ancestors”

“Unpack the quote by explaining the following:

Descent with modifications _____

Descent from common ancestors _____

Define the following from the Evogeneao Tree of Life Introductory Video

Brothers and sisters share common ancestors removed by one generation. What about first cousins?

First cousins are how many generations from a common ancestor? _____

Along lines of descent, how are the position of cousins calculated? _____

What causes a split in a line of descent in a family tree? _____

When a new species is created, how are they related to the original species? _____

Using the Interactive Tree of Life

The Interactive Tree of Life provides the ability to trace lineages back to a common ancestor of humans.

Use this tool to compare humans, completing the table below.

Organism compared to modern humans	Level of Taxonomic Differences	Cousin#	Common Ancestor
Another Human	None	50th	
Neanderthals	Species	24thousandth,1,500X	24 th thousandth
A mammal (Which?)			
A mammal (Which?)			
A bird (Which?)			
A reptile (Which?)			
An amphibian (Which?)			
A fish (Which?)			
An echinoderm(Which?)			
A plant (Which?)			
A prokaryote(Which?)			

Visit the **OneZoom website**. Access the tree of life explorer.

Can you find humans on this tree of life. Recall mammals make up a very small percentage of organisms on the tree. Answer the following using the explorer.

The number of millions of years ago (Ma) at which humans diverged from

_____ old world monkeys and apes

_____ apes

_____ three species diverged from apes

_____ chimps and bonobos diverged to become two species.

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Consider a quote from Evogeneao Tree of Life Introductory Video

“All creatures on earth, living or dead, are related by descent with modifications from common ancestors”

“Unpack the quote by explaining the following:

Descent with modifications characteristics of organisms are inherited, or passed from parent to offspring. .. As a result, there will be a change in populations over generations

Descent from common ancestors Similar organism all share a common ancestor, and in fact, oldest common ancestor of all living things was recently identified as Luca, a single-cell, bacterium-like organism.

Define the following from the Evogeneao Tree of Life Introductory Video

Brothers and sisters share common ancestors removed by one generation. What about first cousins?

First cousins are how many generations from a common ancestor? Two-generations (grandparents)

Along lines of descent, how are the position of cousins calculated? The number of generations to a common ancestor minus 1

What causes a split in a line of descent in a family tree? Mutational events will create a new species. It is an important evolutionary event

When a new species is created, how are they related to the original species? They share a common ancestor in a line of descnt.

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Both belong to the genus HOMO

Differ at the level of species

Answers will vary

Visit the **OneZoom website**. Access the tree of life explorer.

Can you find humans on this tree of life. Recall mammals make up a very small percentage of organisms on the tree. Answer the following using the explorer.

The number of millions of years ago (Ma) at which humans diverged from

25Ma (million years ago) old world monkeys and apes

18Ma (million years ago) apes

6Ma (million years ago) three species diverged from apes

1.3Ma (million years ago) chimps and bonobos diverged to become two species.

