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Tree of Life

Inquiry Approaches

Initial Inquiry

Is all life on Earth related?

Yes, all life on Earth can be traced back to a common ancestor.

How might speciation take place in the real world?

Speciation can occur as a result of physical boundaries that separate populations. Once separated, behavioural and/or morphological changes in the dispersed population may eventually lead to specation.

What are some examples of naturally occurring physical boundaries in nature that may encourage speciation?

Some physical boundaries that may lead to speciation are mountains, bodies of water, islands and deserts (habitat fragmentation).

What are some examples of catastrophic events that might affect the survival of species?

Catastrophes that can affect species' survival include volcanic eruptions (which can destroy populations or change the environment), natural disasters such as hurricanes (which may disperse populations) and changes in global temperature.

Experimental Procedure Inquiry

How do new traits arise in a population? How might they be passed on?

New traits arise through mutations, which generate variability within populations. Traits that help the organism survive and reproduce may be selected for and become more common in the population over time.

What are primitive traits? What is an example of a primitive trait from the *Tree of Life* activity?

Primitive traits are characters present in the common ancestor. Examples of primitive traits will vary each time the activity is performed.

What are shared derived traits? What is an example of a shared derived trait from the *Tree of Life* activity?

Shared derived traits are characters that have evolved, are shared by members of a group and are different from the ancestral state. They can help us understand when a speciation event occurred. Examples of shared derived characters will vary each time the activity is performed.

In-Depth Inquiry

When tracing a lineage back in time, what are some of the difficulties faced by scientists?

Usually the fossil record is incomplete and it is very difficult to know if one species is directly ancestral to another.

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What are some ways in which past evolutionary events can be reconstructed?

We can use information from many different fields, including geology, biology, paleontology, ecology and anthropology to describe how evolution may have occurred in the past. For example, paleontologists can gather fossil evidence and geologists can date stratigraphic layers to determine the age of fossils.