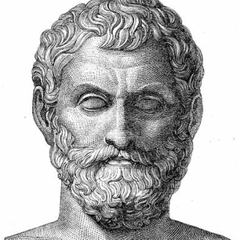
**4.3: Evolution**

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| A Timeline of Evolutionary Thought |

**Empedocles (5th century BC)**

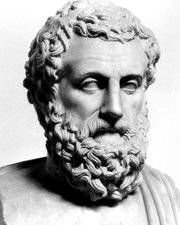
Heads, limbs, and other organs are joined at \_\_\_\_\_\_\_\_\_\_ and only some combos are fit \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!

**Anaximander (6th century BC)**

Species are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. We’re all descended from \_\_\_\_\_\_\_\_\_\_\_!

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (384-322 BC)**

A deity created templates, from which we are all created.

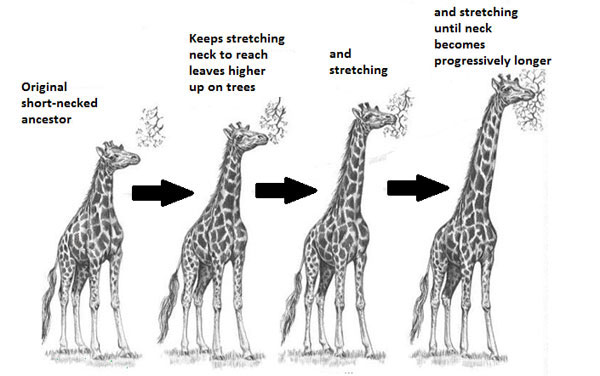
**Christianity (1800s)**

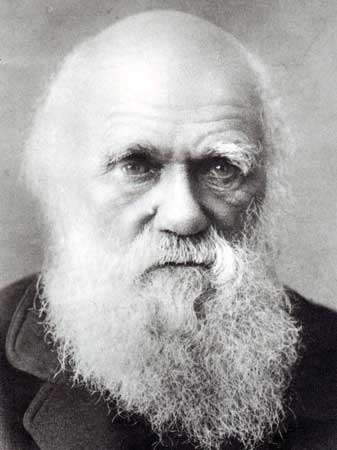
God created all living things. Living things are unchanging because God’s \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_.



**Lamarck (1744-1829)**

Giraffe’s long necks developed because \_\_\_\_\_\_ \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_. If an \_\_\_\_\_\_\_\_\_\_\_\_\_\_ changes during life in order to adapt those changes are passed on to its offspring. IfIf an organism changes during life in order to adapt to its environment, those changes are passed on to its offspring.





**Gregor \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (1856)**

\_\_\_\_\_\_\_\_\_\_\_\_ are how phenotypes are passed from one \_\_\_\_\_\_\_\_\_\_ to the \_\_\_\_\_\_\_.

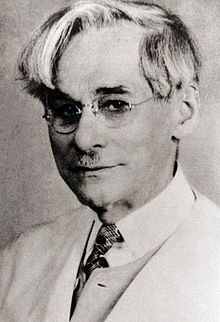
**Darwin (1859)**

All species, living and extinct, have descended without interruption from one or a few \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_forms of life. Differences in the survival and reproduction of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, leading to differences in their contribution to the next \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, result in a change of frequency of heritable phenotypic variations in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over time. I am not really sure HOW all this happens though.

**Miescher (1869)**

I tried to isolate \_\_\_\_\_\_\_\_\_\_\_\_, but instead I found \_\_\_\_\_\_\_\_\_.

**Chargaff (1950)**

DNA sequence \_\_\_\_\_\_\_\_\_ among species, but A always pairs with T, and G with C.

**Levene (1929)**

DNA is made up of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ group, deoxyribose sugar, and nitrogenous \_\_\_\_\_\_\_\_.

**Watson & Crick (1953)**

We have discovered \_\_\_\_\_\_’s 3D structure



**Rosalin Franklin (1953)**

Actually, it was me who discovered the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

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| Natural Selection |

Darwin was influenced by his observations of **\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ selection** and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

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| **Think**: What is artificial selection and selective breeding? Where/why would this be used? Give some examples. |

He then travelled to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and observed populations of birds (he called them finches). It was there that he developed the idea of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

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| **Watch:** [**https://www.youtube.com/watch?v=s64Y8sVYfFY**](https://www.youtube.com/watch?v=s64Y8sVYfFY)  **Summarize**:What were Darwin’s observation at the Galapagos?  Image result for galapagos island finches |

**Natural selection** is a mechanism that can be broken down into **four steps**:

1. There is \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a population.
2. Overproduction of offspring leads to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Individuals with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ most likely to survives to sexual maturity to pass on their genes.
4. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of those individuals that survive and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ will become more common in a population.

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| **Natural Selection Examples**: In the following flow diagrams, explain what is happening. |

In artificial selection, \_\_\_\_\_\_\_\_\_\_\_\_\_ are doing the selecting whereas in natural selection, it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_.

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| Evidence for Evolution |

1. descent with modification (a change in population allele frequency)

**Evidence to support evolution in addition to real-time direct observations of the world:**

|  |  |  |
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|  | **Expected Observations If** | |
| Evidence | If Evolution is True | If Evolution is False |
| 1. **The Fossil Record** The entire collection of fossils we have |  |  |
| 1. **Geographical Patterns in the Fossil Record** |  |  |
| 1. **Transitional Forms**   Intermediate forms between fossil and more current day organism |  |  |
| 1. **Developmental Homologies** Similarities in how offspring develop |  |  |
| 1. **Structural Homologies** Similarities in structure among organisms |  |  |
| 1. **Vestigial Structures** Structures that have no apparent function |  |  |
| 1. **DNA Records** |  |  |

**Questions:**

1. Does Natural Selection support Evolution? Explain.
2. How are Darwin’s finches a good example of natural selection?
3. How has our understanding of evolution changed over time?
4. Does it take long for adaptations (evolution) to occur? Explain.
5. Humans, whales, birds and lizards all have similar arm bones. What is this phenomenon called and what does it signify?