

How Do Organisms Change Over Time? - Review

- Read through the **Reasoning** in the first column and determine what **Evidence** from class supports that reasoning. (labs, simulations, etc.)

Reasoning	Evidence
Selective Breeding - Small differences between parents and offspring can build up in future generations so that descendants are very different from their ancestors. - Farmers often choose the best animals to breed and the best plants to collect seeds from. Therefore they will have the best <u>traits</u> passed on from generation to generation. - Selection for specific traits imposed by humans, either deliberately or otherwise, upon wild or domesticated plants and animals is called <u>selective breeding</u>. - A trait is a <u>characteristic</u> that an organism can pass along to its offspring through its genes.	
Natural Selection - Individuals that are better adapted to their environment are more likely to survive and <u>reproduce</u>. - Factors that affect natural selection are <i>overproduction, competition, and variation</i>. - A species is a group of similar living things that can mate with each other and produce offspring. - Most species produce far more offspring than can possibly survive. Overproduction makes it more likely that some offspring will survive. - Members of a species must compete with each other for resources. Some members of a species may not find enough to eat, so they do not survive. - Some variations (difference between individuals) make individuals better adapted to their environment. Individuals that are better adapted are more likely to live and produce more offspring. Their offspring may inherit these helpful variations. After many generations, more members of the species will have the helpful variations. Adaptation - a change or the process of change by which an organism or species becomes better suited to its <u>environment</u>.	
Darwin's Observations - Charles Darwin was a British Naturalist and Clergyman who lived from 1809 – 1882. - In 1831, Darwin left from England on a ship (called The Beagle) that made many stops along the coast of South America. Darwin's job was to learn about the living things he saw. - Darwin saw many plants and animals that he had never seen before. The living things he saw in South America were all very different from those in England.	

Galápagos Organisms

- Darwin saw that the plants and animals on the Galápagos Islands were much like those on the mainland of South America.
- Galápagos plants and animals have important differences from those on the mainland. ex. Galápagos iguanas had larger claws than mainland iguanas.
- Darwin thought that some plants and animals came to the Galápagos Islands from the mainland. Eventually, the offspring of these plants and animals became different from their mainland relatives.
- Darwin also saw that tortoises and finches were different from one Galápagos island to the next. Finches, for example, had different beak shapes.
- This is an example of an adaptation. An **adaptation** is a trait that helps an organism survive and reproduce.

Evolution

- The gradual change in a species over time is called evolution.
- Darwin concluded that the organisms that came to the Galápagos Islands from the mainland had changed over time. The populations changed so that they could better survive in the island environment.
- Darwin's ideas are often called the **Theory of Evolution**. A **scientific theory** is a well-tested idea.

The Fossil Record

- Fossils are the remains, imprints, or traces of organisms that were once alive. By studying fossils, scientists can learn where, when, and how those organisms lived.
- Fossils are usually found in sedimentary rocks. This is because the intense pressure and heat that create igneous and metamorphic rocks often destroy fossils.
- Scientists use special fossils, called index fossils, to date rocks. Index fossils are from species that existed on Earth for relatively short periods of time and were abundant and widespread. Index fossils found in a sedimentary rock layer can be used to help date the layer.
- The Principle of Superposition states that in undisturbed layers of rock, the oldest rocks are on the bottom and the youngest rocks are towards the top.
 - This can be impacted by the movement of the Earth's plates.
- Absolute dating uses the radioactive decay of radioactive isotopes of minerals in rocks to determine the age of the rock. This is the most accurate method