PEER Life Science Ecosystems Natural Selection Notes Outline

**Why It Matters**

* Most of the species that have existed on Earth are \_\_\_\_\_\_\_\_\_.
* If an organism has traits that are suited for an environment, it is \_\_\_\_\_\_\_\_\_\_ to those conditions.
* A \_\_\_\_\_\_\_\_ is an hypothesis or system of ideas meant to explain an idea or phenomenon that is supported by observable evidence and data but cannot be proven.
* Darwin observed that each species has a \_\_\_\_\_\_\_ (role, function, and place of an organism in the environment) in their environment. He observed that :
  + A species survives when enough of its members are \_\_\_\_\_\_\_\_ to the niche in which they live.
  + Members of a species are adapted because they have special \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_ that fit that niche.
  + The niche specifies what it takes for an animal to \_\_\_\_\_\_\_\_\_ in that particular niche.
  + New species can emerge if \_\_\_\_\_\_\_\_\_ change occurs by mutation or gradual accumulation of genes that make the descendants fit for an available niche.

**How We Know**

* While in the Galapagos, Charles Darwin studied finches to help develop his theory of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. He noticed that the birds had specialized \_\_\_\_\_\_\_ for the type of \_\_\_\_\_\_ they ate.
* The theory of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ describes the large-scale motion of seven large plates and several smaller plates of the Earth’s lithosphere over time. One supercontinent that used to exist is \_\_\_\_\_\_\_\_.
* \_\_\_\_\_\_\_\_\_ of different life forms are formed from sediments in lakes and marshes. They are found in different layers of sediments based on when they died.
* Humans can learn about natural selection through “artificial selection” or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ where humans dictate which genes are passed from generation to generation. This can be seen with crops, farm animals, and pets.
  + Humans can also affect natural selection unintentionally when they \_\_\_\_\_\_\_ the environment or introduce plants and animals to new \_\_\_\_\_\_\_\_.
* Another selection force we can observe is repeated use of \_\_\_\_\_\_\_\_\_\_\_\_\_. Members of a species that happen to have genes that impart \_\_\_\_\_\_\_\_\_\_\_\_ to an antibiotic can survive administration of that drug while non-resistant members die. These surviving, resistant members then \_\_\_\_\_\_\_\_\_\_\_ and pass on the resistant genes.
* Some elements are radioactive and decay at a constant rate. Knowing this, we can tell the age of fossils and other objects through \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* If nothing alive today resembles a fossil, we assume that the species is \_\_\_\_\_\_\_\_\_. Name a reason they might not have survived:
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**What We Know**

* While bacteria are the oldest living organisms, it is difficult to find fossils of them because they are \_\_\_\_\_\_\_ and have no \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Bacteria can live in almost all/very few environments.
* Stephen Gould hypothesized that more/less complex organisms are evolving because that is the only direction left to go. Life cannot become any simpler than bacteria.
* Humans are at the top of the mammal group and insects are at the top of the invertebrate group due to the presence of complex \_\_\_\_\_\_\_\_\_ systems.
* Sexual reproduction increases the spread of gene mutations and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Species are also defined by whether or not they can interbreed. Members of one species can/cannot breed with members of another species and produce offspring that can \_\_\_\_\_\_\_\_\_\_\_ with that same group.
* While the idea of evolution had been around for a long time, Darwin proposed that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ caused evolution.
* Natural selection is based on the ideas that:
  + \_\_\_\_\_\_\_\_\_\_ is the passage of genetic information from generation to generation.
  + Individuals in a population are genetically \_\_\_\_\_\_\_\_.
  + \_\_\_\_\_\_\_\_\_\_\_\_\_\_ produces more offspring than are needed for a species to survive.
  + The genetic traits that are passed on to new generations are those that are best \_\_\_\_\_\_\_\_\_ to the available niches.
  + As each generation reproduces, the incidence of favorable traits gradually \_\_\_\_\_\_\_\_\_\_\_ and comes to dominate the population. That population may become genetically isolated, thus forming a new \_\_\_\_\_\_\_\_\_.
* Scientific evidence supports the view that life began in the \_\_\_\_\_.
  + List the most likely progression of the appearance of the following organisms in fossils on land from oldest to newest (plant-eating animals, animal-eating animals, plants)
    - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
  + \_\_\_\_\_\_\_\_\_\_\_\_ were the first land animals.
* Evolution occurs at two levels: small-scale \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and large-scale \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* While extinction is a natural phenomenon, humans have changed the \_\_\_\_\_\_\_\_\_\_\_ forces in nature, forcing many species into extinction.