Assignment Number:\_\_\_\_\_\_\_

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Block:\_\_\_\_\_

**The Start of Evolution**

**Evolution** is the process by which \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ over \_\_\_\_\_\_\_\_\_\_\_\_. New species \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ species over time.

**Charles Darwin** – an English naturalist who studied the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of life and proposed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for it

**Theory** – is a board explanation that has been scientifically \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, theories are constantly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Darwin’s Ideas**

During Darwin’s time people didn’t think that living things had changed over time, but Darwin saw \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Darwin’s evidence was collected on his global voyage on the \_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* Collected \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – began to notice that the fossils of extinct animals looked \_\_\_\_\_\_\_\_\_\_\_\_\_\_, but \_\_\_\_\_\_\_\_\_\_\_\_ identical, to those of animals still \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ today
* Galapagos Finches – collected several different species of finches, they were all very similar however had \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the size and shape of their \_\_\_\_\_\_\_\_\_\_\_\_\_
	+ He noticed that each beak seemed be matched with the \_\_\_\_\_\_\_\_\_\_\_\_ it consumed
* Noticed a lot of similarities of the island plants and animals to those found in \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_)
* Looked at the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of different species
	+ Found **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ structures** – bones or characteristics that are similar in two or more species and that have been \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of those species

Formed the idea of ‘**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_’** – he thought that there was one \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ finch species that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from South America, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ finches were modified over time as different groups by eating different types of food

Continued his studies and came upon the idea of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ selection**…

* Breed \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ based on \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ traits to pass on certain adaptations to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Called artificial selections because the breeding was \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ for by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (not naturally)

**What are some examples of artificial selection that happens today?**

So all this lead to the big idea that… \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that have \_\_\_\_\_\_\_\_\_\_\_\_\_\_ that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ suit their \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are more \_\_\_\_\_\_\_\_\_\_\_\_\_\_ to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – **natural selection**

Darwin’s theory of evolution by natural selection says that over time, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of individuals that carry advantageous traits will \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in a population

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – every population is capable of producing more offspring than can possibly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Variation – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ within every population in the form of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ traits
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ – having a particular \_\_\_\_\_\_\_\_\_\_\_\_ can make individuals \_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ likely to survive and have successful offspring
4. Adaptation –over time those traits that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ will become \_\_\_\_\_\_\_\_\_\_\_\_\_ common

**Darwin’s Strengths**

* Took a lot of time to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and organize ideas, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and examples
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ lots and lots of \_\_\_\_\_\_\_\_\_\_\_\_\_
* Gave a logical and testable mechanism for evolution – \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Changed the way people view \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, showed that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ were everywhere

**Darwin’s Weaknesses**

* He knew very \_\_\_\_\_\_\_\_\_\_\_\_\_\_ about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* So he had a lot of the basic concepts but \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the connection to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Natural Selection - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ change over time, based on these four concepts**

1. The potential for a population to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ its numbers
2. The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ variability of offspring due to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and recombination of genes
	1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Variation – slight genetic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between members of the \_\_\_\_\_\_\_\_\_\_\_\_ species
		1. Allows for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ within a species
		2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the chance that at least some members are adapted to the environment
		3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the chance that one event will wipe out the entire species
	2. Mutations – a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ change in an organism
		1. Remember… can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or have \_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_
		2. Provides genetic \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. A \_\_\_\_\_\_\_\_\_\_\_\_\_ supply of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ required for life
4. The ensuring selection from environmental pressures leaves some of those organism better able to survive and reproduce

Examples:

**Evidence of Evolution**

* Fossil Record
* Biogeography
* Embryology
* Anatomy
* Molecular and Biochemistry

**The Fossil Record**

* Fossils are the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of organisms or the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of organisms in rock
* Fossils are usually found in sedimentary rocks
* Fossils can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by the rocks they are found in or by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ dating parts of the organism

**Fossils are important because they…**

* Allow us to see \_\_\_\_\_\_\_\_\_\_\_\_\_ in organisms over \_\_\_\_\_\_\_\_\_\_\_
* Can give accurate \_\_\_\_\_\_\_\_\_\_\_\_ of events in the past
* Can give \_\_\_\_\_\_\_\_\_ to how the organism lived and what type of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ there was

**How can I figure out how old a fossil is?**

**Law of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** - rock layers on the \_\_\_\_\_\_\_\_ are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ than those on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Radiometric dating** – a method of determining the absolute age of an object, often by comparing the relative percentages of a radioactive (parent) isotope and a stable (daughter) isotope

**Biogeography**

* Different \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ biomes have \_\_\_\_\_\_\_\_\_\_\_\_\_\_ organisms
* Examples Rhea, Ostrich and Emu
* This suggests that similar \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ shape the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of organisms in a similar way

**Embryology**

* Scientists compare how organisms \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (fertilized eggs) until they become \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* By comparing the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the embryos go through you can determine if organism are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Example: All vertebrates have a \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_ at some point in their development

**Comparative Anatomy**

* The anatomy of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ organisms are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to see \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Homologous structures - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in two or more \_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Examples:
* Vestigial Structures – structures that are “\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_” from the \_\_\_\_\_\_\_\_ and have no clear \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Examples:

**Molecular and Biochemistry**

* Comparing the \_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of organisms for the number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are usually cause by some type of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the number of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between the organisms

**Two Theories of Evolution**

1. **Punctuated Equilibrium** – \_\_\_\_\_\_\_\_\_\_\_\_\_\_ change followed by \_\_\_\_\_\_\_\_\_\_ periods of \_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_ change
2. **Gradualism** - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ gradual change that occurs \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

In reality most scientists believe now days that a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of both of these theories is most likely.

**Reproductive Isolation** - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a species (geographical or genetically) causing them to be unable to produce successful offspring, this can cause \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* **Speciation** – the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of a new \_\_\_\_\_\_\_\_\_\_\_\_\_\_
* **Species** – is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ capable of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ AND creating \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ offspring