**3.1 - Natural Changes in Ecosystems**



**A long time ago….**

* The **\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_**of the oceans was much **\_\_\_\_\_\_\_\_\_\_\_** than they are today
* As the water dropped, new lakes were formed and some species of fish were **\_\_\_\_\_\_\_\_\_\_\_\_\_**: some in the ocean, some in the lakes

**Natural Selection and Adaptive Radiation**

* The fish in the lakes needed to eat different food, and had different predators than those in the ocean
* When a species environment changes, their bodies also change to adapt to that environment and new species are created from one original species
* This is called **\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* The ability of living organisms to change to better adapt to their environment is called **\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* The changes allow the organisms to have an advantage over other members of that species, and they will have better chance to mate, and these advantages are passed on to their offspring

**Darwin's Finches Example:**

****Example: **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_** Sticklebacks

* Sharp spines and armour-like plates on the body protects against many large marine (ocean) predators

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**\_\_\_\_\_\_\_\_** Sticklebacks

* Top: bottom feeding stickleback has a large body and big mouth, less armour
* Bottom: open-water feeding stickleback has smaller, thinner body and more armour…..why?



Can you think of any other examples of adaptive radiation?

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_:
	+ African Elephants have larger ears
	+ Helps them keep cool in warmer environment
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: (pg. 110)
	+ These birds eat different foods, so their beaks changed to better suit their diet

**Definition:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Succession**

* Natural, gradual changes in the types of species that live in an area; can be **\_\_\_\_\_\_\_\_\_\_\_\_ succession** or **\_\_\_\_\_\_\_\_\_\_\_\_\_\_ succession**
* The gradual replacement of one plant community by another through natural process over time
	+ Primary: \_\_\_\_\_\_\_\_\_ of years
	+ Secondary: \_\_\_\_\_\_\_\_\_ of years

**Primary Succession**

* Begins in a place without any soil
	+ Sides of volcanoes, landslides, flooding
* Starts with the arrival of living things such as **\_\_\_\_\_\_**and**\_\_\_\_\_\_\_**that don`t need soil to survive
* Called **\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Soil starts to form as lichens and the forces of \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_ help break down rocks into smaller pieces
* When lichens die, they \_\_\_\_\_\_\_\_\_\_\_\_\_\_, adding small amounts of organic matter (and \_\_\_\_\_\_\_\_\_\_\_) to the rock to make soil
* Simple plants like \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_ can now grow
* These simple plants die, adding more **\_\_\_\_\_\_**, organic material, and **\_\_\_\_\_\_\_\_\_\_**
* The soil layer thickens, and larger plants such as **\_\_\_\_\_\_\_\_\_\_** can grow and begin to take over
* These plants die, add more nutrients to the soil, larger \_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_ can survive now
* **\_\_\_\_\_\_\_\_\_\_\_**, small **\_\_\_\_\_\_\_\_**, and **\_\_\_\_\_\_\_\_\_\_\_\_\_** have begin to move in
* What was once bare rock now supports a variety of life
* ****A stable group of plants and animals that is the end result of the succession process is called a **\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* **Does not always mean big trees!** Ex. grasses in the prairies, cacti in deserts

**Secondary Succession**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Succession** is different from primary succession because it begins in a place that already has **\_\_\_\_\_\_** and was once the home of living organisms
* It occurs **\_\_\_\_\_\_\_\_\_\_** and has different pioneer species (grass, flowers) than primary succession
* Example: **\_\_\_\_\_\_\_\_\_ \_\_\_ \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_**

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**Natural Events That Affect Ecosystems🡪**\_\_\_\_\_\_\_\_\_: **Definition**

* Occurs when below-average amounts of **\_\_\_\_\_\_\_\_\_\_\_\_** in an area over a period of many **\_\_\_\_\_**
* Most often a biome can recover

**Drought: Effects**

* The effects of prolonged drought can:
	+ Destroy **\_\_\_\_\_\_\_\_\_\_,** cause \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_ to die, result in \_\_\_\_\_ failure and \_\_\_\_\_\_\_\_\_\_ death

**\_\_\_\_\_\_\_\_\_\_\_\_\_**: **Definition**

* + Huge, rapidly moving ocean wave caused by **\_\_\_\_\_\_\_\_\_\_** waves (released by an earthquake or volcanic eruption)

**Tsunamis: Effects**

* + On land, force of the wave carries away or destroys plants and animals; and can disrupt habitat and food webs
	+ The large volume of **\_\_\_\_\_\_\_** carried onto the shore can change the composition of the **\_\_\_\_\_\_\_**, causing plants to be unable to grow

**\_\_\_\_\_\_\_\_\_\_\_\_\_**: **Definition**

* Occurs in **\_\_\_\_\_\_\_\_\_\_** areas, **\_\_\_\_\_\_\_\_\_** and **\_\_\_\_\_\_\_\_\_**, when the volume of water exceeds the ability of the water body to contain it
* Can be part of a normal cycle, result of heavy rainfall, increased run-off, or an extreme natural event

**Flooding: Effects**

* Can result in soil **\_\_\_\_\_\_\_\_\_\_\_\_** and soil **\_\_\_\_\_\_\_\_\_\_\_\_\_** if toxic chemicals are present
* Can cause widespread **\_\_\_\_\_\_\_\_\_\_\_** among humans when toxins or bacteria from sewage enters drinking water

**\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: Effects**

* Insects play a natural role in forest succession, **\_\_\_\_\_\_\_\_\_\_\_\_\_** nutrients to the soil.
	+ Younger, healthy trees produce resin to defend against insects by flushing them out of the tree
	+ When too many insects attack, like in an infestation, the natural defense systems are no longer effective
	+ This changes the natural pattern of succession because \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ both old and young trees, leaving none unaffected

