Unit 8 Topic 2 Review
Evolution

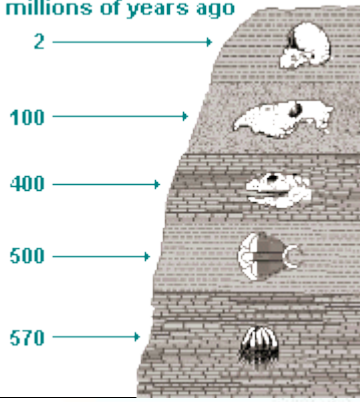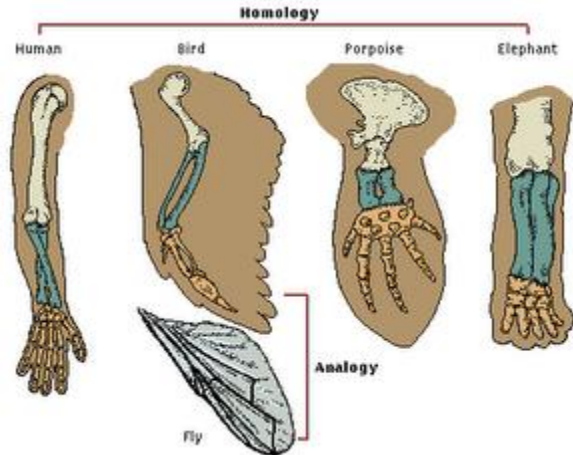Define evolution: The **change** in **populations** over time.

What is a population? **A group of organisms in the same species living in the same area**
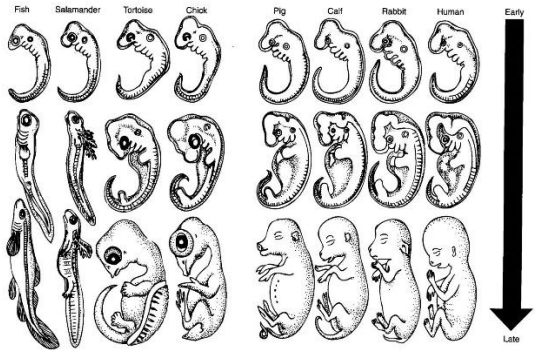
Subtopic 1: Lamarck and Darwin's Theories

Scientist	Theory (name and description)	Example
Jean Baptiste Lamarck	**Theory of Acquired Traits/Use and Disuse….** **Evolution has to do with desire to be better/live in the environment** **He believed that individuals CAN evolve and if they do evolve, their offspring will inherit their acquired traits**	**An elephant can stretch its trunk to make it longer. The trunk will stay long and then when the elephant reproduces, its offspring will have long trunks.**
Charles Darwin	**Theory of Natural Selection – nature selects organisms best suited/adapted for their environment (believed there is variation in populations- some variations are better than others. Organisms with the good adaptations survive and reproduce.)**	**Some elephants are born with short trunks, some with long, and some with mid-size trunks. Only the elephants that are able to get food and drink will survive and reproduce.**

How are Darwin's finches related to evolution? **Different islands in the Galapagos and these different islands have different food sources. Birds with beaks that allow them to eat will be able to survive. Different bills allow for different food source intake.**

Subtopic 2: Evidence for Evolution

Evidence	Picture	Describe
Fossils	millions of years ago 2 100 400 500 570	What is a fossil? **A trace of an organism from long ago (minerals replace soft tissue)** What can we learn from them? **Age, diet, habitat, activity**
Comparative Anatomy	Homology Human Bird Porpoise Elephant Analogy Fly	Define and provide an example of… 1. Homologous Structures: **seen in organisms that share a common ancestor; similar in structure; DIVERGENT evolution** 2. Analogous Structures: **seen in organisms that do not share an ancestor but have similar function; CONVERGENT EVOLUTION** 3. Vestigial Structure **no longer serve a purpose and are reduced in size; tailbone, appendix, wisdom teeth**

Comparative Biochemistry	**Species / Sequence of Amino Acids in the Same Part of the Hemoglobin Molecules** Human — Lys–Glu–His–Iso Horse — Arg–Lys–His–Lys Gorilla — Lys–Glu–His–Lys Chimpanzee — Lys–Glu–His–Iso Zebra — Arg–Lys–His–Arg	**What is comp. biochemistry? Comparing sequences of DNA or amino acids** **How can you tell if organisms are closely related or not? The fewer the differences, the more closely related two organisms are**
Comparative Embryology	Fish Salamander Tortoise Chick Pig Calf Rabbit Human Early ... Late	**Define Embryo: unborn or unhatched offspring in the process of development** **What do you look for in comp. embry? Similarities throughout all stages of development**

Subtopic 3: Speciation

- Define species: **organisms with similar internal and external structures that are able to mate**
- What is speciation? **Formation of a new species**
  - Compare geographic isolation and reproductive isolation: **G.I. is when there a physical barrier separating populations (rivers or mountains); R.I. is when organisms are not going to reproduce because of things like different mating calls or periods of activity or body structures**
  - Compare gradualism with punctuated equilibrium: **Gradualism is the idea that speciation is slow and constant (millions of years for new species to evolve); P.E. is the idea that there are periods of no change followed by rapid change, causing evolution of new species (environmental pressures)**
  - Coevolution (define and example): **two organisms evolve at the same rate in response to one another (predator/prey) … moth and orchid flower**
  - Contrast Convergent and Divergent evolution: **C: two unlike organisms become more and more similar, analogous structures (dolphin and shark); D: two related organisms become more and more different (wolves, dogs)**
  - Adaptive radiation (define, example): **extreme form of divergent evolution (darwin's finches)**
- Explain artificial and sexual selection: **Artificial: human select traits (dogs, plants/crops); sexual selection: females select a male with certain characteristics (birds)**
- Discuss the three types of natural selection (stabilizing, directional, disruptive) and draw an image for each:
  - **Stabilizing: average form of a trait is most successful**
  - **Directional: one of the two extremes is most successful**
  - **Disruptive: both extremes are successful, average form is not**