




KEYSTONE REVIEW SESSION #7

Evolution




EVOLUTION

- **Keystone Standards:**
- **BIO.B.3.1.1** Explain how natural selection can impact allele frequencies of a population.
- **BIO.B.3.1.2** Describe the factors that can contribute to the development of new species (e.g., isolating mechanisms, genetic drift, founder effect, migration).
- **BIO.B.3.1.3** Explain how genetic mutations may result in genotypic and phenotypic variations within a population.
- **BIO.B.3.2.1** Interpret evidence supporting the theory of evolution (i.e., fossil, anatomical, physiological, embryological, biochemical, and universal genetic code).
- **BIO.B.3.3.1** Distinguish between the scientific terms: hypothesis, inference, law, theory, principle, fact, and observation.

NOT JUST DARWIN'S IDEAS; INFLUENCES ON DARWIN

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- Malthus- an economist that described how food limited human growth in the early 1900s
 - Lamarck- children get their traits from their parents
 - Lyell- a geologist- Earth changed over time; species must change
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4 CAUSES OF EVOLUTION

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1. Natural selection (**the only one of these that is proposed by Darwin**)
 2. Gene flow- immigration, emigration, birth, death
 3. Genetic drift (includes bottleneck and Founder's effect)
 4. Mutation- random change in DNA
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WHY DOES NATURAL SELECTION HAPPEN?

1. Genetic Variation- variation within a population- can be very slight
2. Overproduction of offspring- too many born for the environment to support
3. Struggle to survive- because there's too many, there is competition for food and resources
 - A trait that makes an organism more suited is called an adaptation
4. Differential reproductive success – some will have success living long enough to mate; some won't mate at all



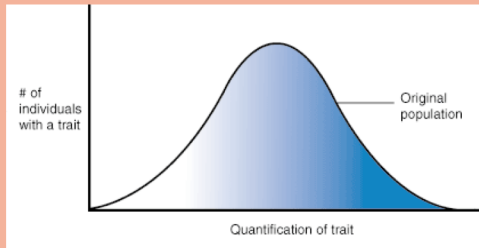
WHAT IS FITNESS?

- It's NOT.... being the biggest (smartest, fastest, most/least colorful)
- It IS... leaving the most descendants
- Sexual selection- select mate based on heritable traits
- Mating successfully*= winning (**producing live offspring that can reproduce*)
- Adaptations- increase fitness

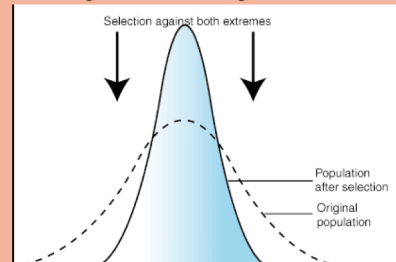


NATURAL SELECTION PATTERNS

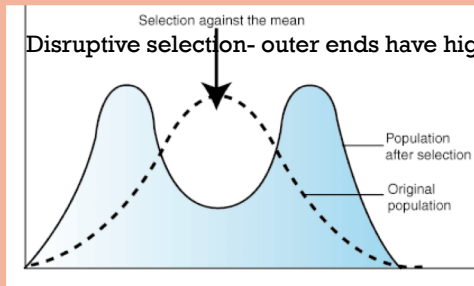
Normal “bell curve” distribution



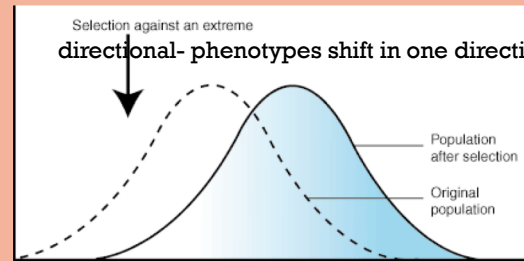
stabilizing selection- Against both extremes



Disruptive selection- outer ends have higher fitness

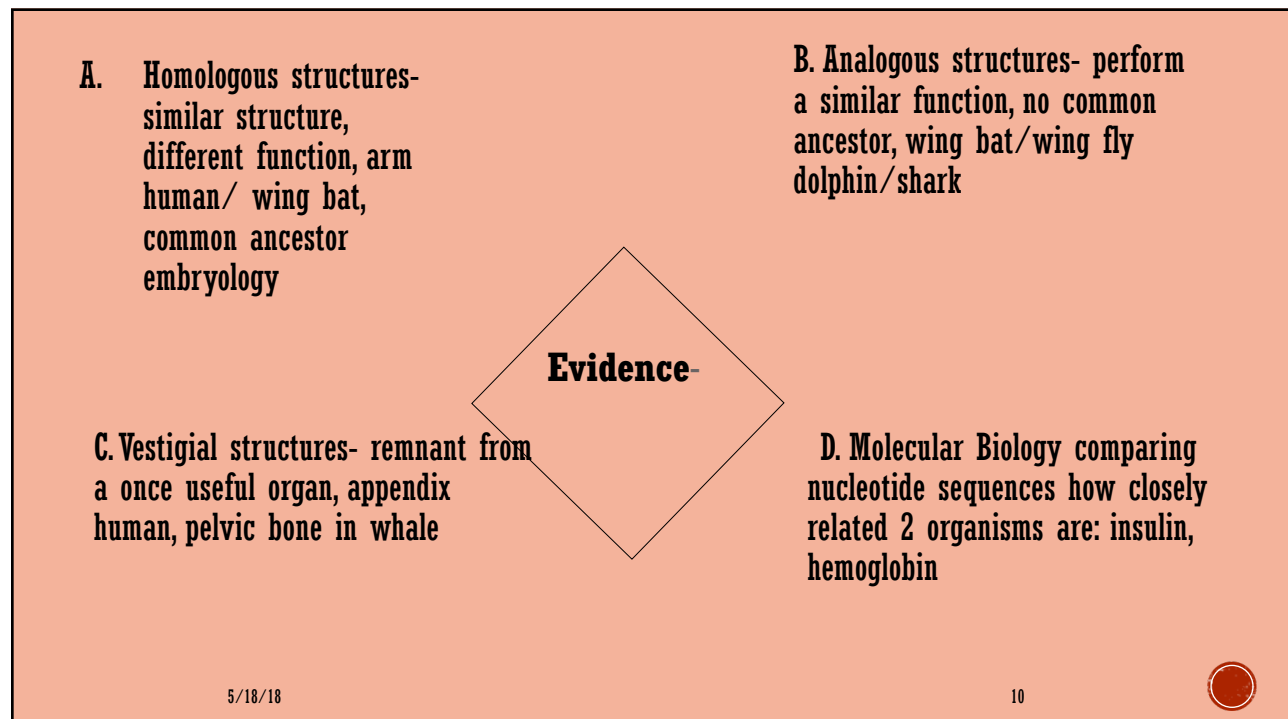
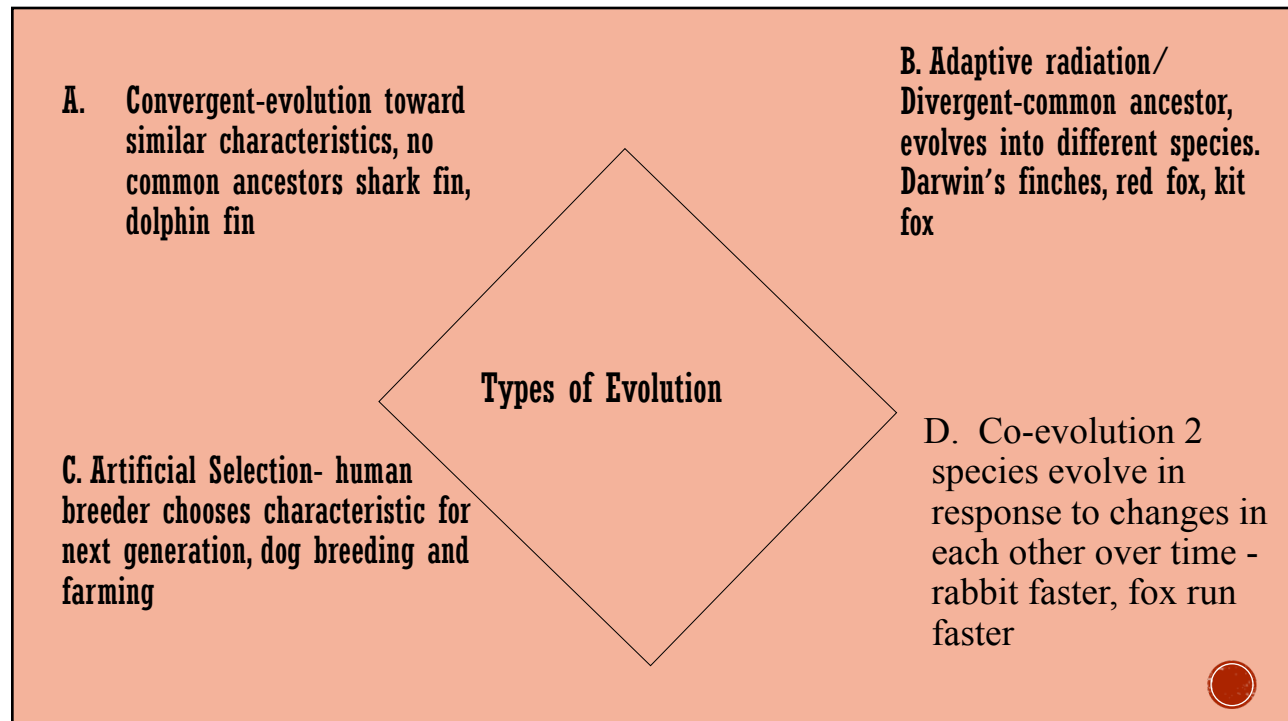


directional- phenotypes shift in one direction



REPRODUCTIVE ISOLATION MECHANISM THAT LEAD TO SPECIATION (C, D, & E ARE PRE-ZYGOTIC. PRE-ZYTOTIC MEANS A ZYGOTE WON'T FORM

- A. In reproductive isolation, organisms can't or won't reproduce
- B. over time, the “isolation” leads to speciation; then breeding between the 2 groups (interbreeding) stops
- C. Behavioral isolation- rituals differ (Ex: song, dance etc)
- D. Geographic isolation- physical barrier (Ex: mountain or river)
- E. Temporal Isolation- timing is wrong (Ex. spring vs fall maters)
- F. Post- zygotic- can mate, but offspring are not born alive or not fertile (or their offspring are nonviable or infertile)



VIDEO REVIEW

- Amoeba sisters natural selection
- Hank Green: Natural selection crash course
- Evolution clearly stated:
<https://www.youtube.com/watch?v=GhHOjC4oxh8> or
<https://tinyurl.com/otcubhy>

