Adaptations and Evolution

Adaptations

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Evolution

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IT IS NOT THE STRONGEST NOR MOST INTELLIGENT SPECIES THAT SURVIVES, BUT THE ONE MOST ADAPTABLE TO CHANGE.
— CHARLES DARWIN
Adaptations

3 Basic Types of Adaptation
Structural
Physiological
Behavioral
Evolution

• Some Important Starting Points
  – What is a Theory
  – Evolution is not a theory, it is a fact
  – Evolution by Natural Selection is a theory


http://anthro.palomar.edu/evolve/evolve_3.htm
It’s Not a Controversy

1. Why do most scientists support the Theory of Evolution?
   - Evidence exists to support the theory
   - No SCIENTIFIC EVIDENCE has been provided that supports a BETTER alternative theory.
Crash Course in Natural Selection

1. What is natural selection
   • Natural selection is the process whereby certain inherited traits make species more likely to survive and reproduce, thus changing the genetic makeup of the population over time

2. Who identified the process of natural selection and in what book did he publish it
   • Charles Darwin – *On the Origin of Species*

3. What evidence did Darwin observe that supported his theory?
   • The adaptations and variations of plants and animals, especially finches

4. What is meant by fitness
   • Relative ability to survive and create offspring
5. Four basic principles of natural selection include

- **Variations** – Different members of a population have a variety of characteristics (phenotypes)
- **Heritability** – These traits can be passed on to offspring
- **The struggle for existence** – Populations can have way more offspring than the environment can support so there is a struggle to exist
- **Survival and reproductive rates** – Those with more favorable traits are more likely to survive and reproduce
6. Describe the different modes of selection

• **Directional Selection** – Population shifts from one extreme to another because it helps ensure survival and

• **Stabilizing Selection** – Selects the majority or norm because it provides survival

• **Disruptive Selection** – Selects the extremes against the majority

• **Sexual Selection** – Selects for the individual more likely to be chosen for reproduction – beauty and brawn

• **Artificial Selection** – Human selection of traits that are desirable to humans
Crash Course in the Evidence for Evolution

1. Compare Evolution the Fact with The Theory of Evolution
   Evolution is the change of organisms over time – we can see this happening in bacteria, fish, etc. The theory of evolution is a lot of ideas that explains how this happens and how all living things are connected.

2. How do fossils help provide evidence for evolution
   Fossils show how living things have changed over time. They show how diversity has changed. They show how animals living in an ecosystem are similar to organisms that lived in those ecosystems long ago.

3. What are homologous structures and how do they support the theory of evolution?
   Homologous structures are similar structures found in related organisms (i.e. arm and hand bones) even when those structures are no longer used (i.e. fingers in a whale fin). They show that very different organisms evolved from a common ancestor.
4. How do DNA and RNA support the theory of evolution
   All living things contain DNA and RNA and show we evolved from a common ancestor. DNA can also be used to show how closely related two organisms are.

5. How are the theory of evolution and biogeography related
   Animals that are most similar and most closely related live close to each other and geographic barriers will result in differences among organisms. Geographic barriers could be oceans, mountains, etc.

6. Can we directly observe evolution? Explain
   Yes - We have observed resistance of mosquitoes, bacteria and weeds to pesticides and antibiotics and introduced species are undergoing changes to adapt to their new environments.