

EVOLUTION, ADAPTATION, AND NATURAL SELECTION

THINK, PAIR, SHARE



- How is this fish adapted to its deep sea environment?



What I need
is a good
fur coat!

UNDERSTANDING EVOLUTION

University of
California
Museum of
Paleontology

<http://evolution.berkeley.edu/>



Understanding Evolution

your one-stop source for information on evolution

THE FUNDAMENTALS OF EVOLUTION: VIST

V - Variation

All life forms vary genetically within a population. Selection works on this genetic variation.

I - Inheritance

Genetic traits are inherited from parents and passed on to offspring

S - Selection

Organisms with traits that are favorable to their survival live, reproduce and pass their genes on to the next generation.

T - Time

Evolution takes time. Change can happen in a few generations, but major change such as speciation often takes a long time.

NATURAL SELECTION...

- ❖ Is the differential survival or reproduction of individuals with different genotypes in a population.
- ❖ Leads to changes in the gene frequencies in a population.
- ❖ Acts for the good of the species.
- ❖ Is a process that selects among whatever variations exist in a population.
- ❖ Produces organisms perfectly suited to their environment.
- ❖ Gives organisms what they need.

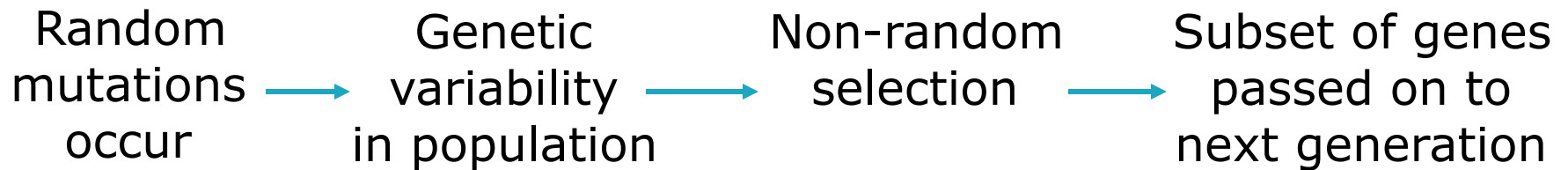
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Natural selection does not...

- ❖ have goals.
- ❖ produce perfection.
- ❖ strive to produce progress.

Natural selection is not a process that perfects organisms.
But it is not a random process, either.

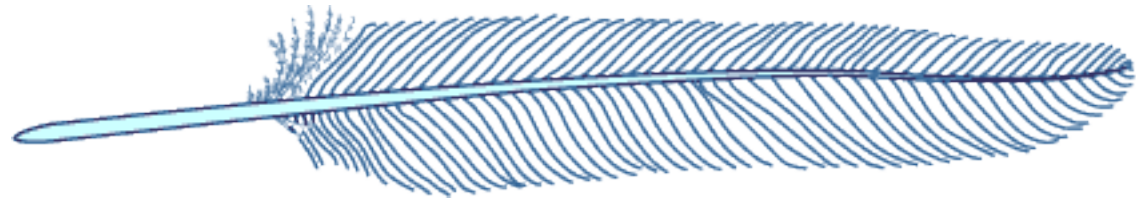


TERMS AND CONCEPTS TO KEEP IN MIND WHEN TALKING ABOUT ADAPTATIONS

- Evolution is not progress or improvement or a one-way process from simple to more complex.
- Avoid “primitive” and “advanced”.
- Don’t assume that more complex or more specialized is “better.”
- Individuals do not evolve or adapt. Populations evolve over time.

But don't do this!

It is tempting to look for
the evolutionary
advantage of
any trait of an organism.



Possible Adaptations for Movement

The (organism's) (body shape or body parts) might help it (how it moves) so it can (do something that helps it survive).

The shark's streamlined body and lunate tail might help it to swim quickly through the water so it can chase and catch prey.

TRY TO USE THESE TERMS INSTEAD:

Feature, structure or behavior -

not adaptation

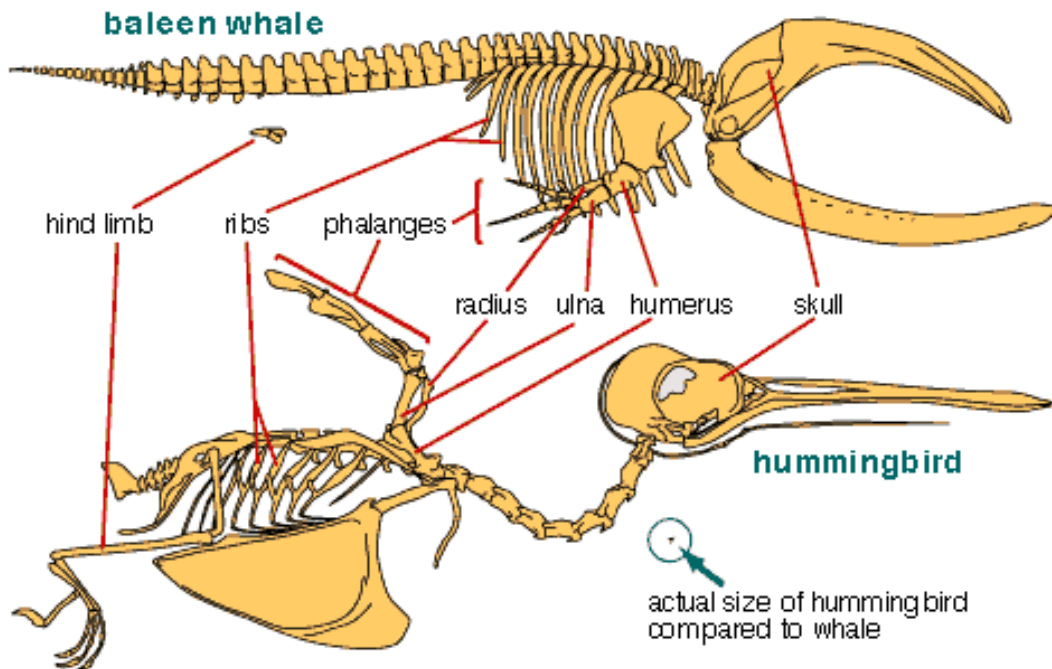
(unless you know for sure it is an adaptation)

Function - not design or purpose

MAKING COMPARISONS: BIOLOGICAL SIMILARITY

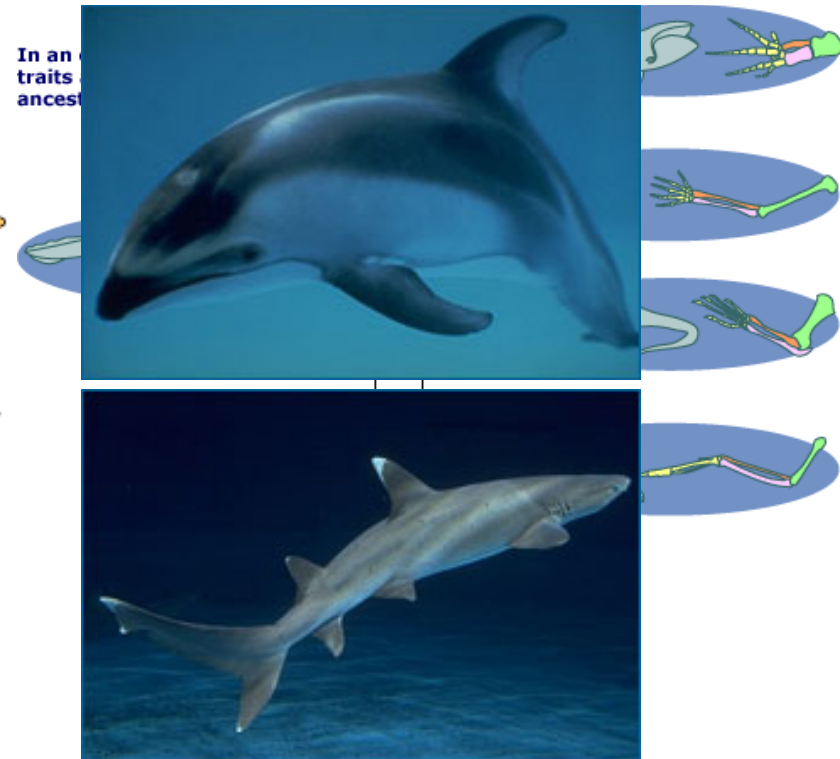
Homology

Similarity inherited from a common ancestor



Analogy

Similarity due to convergent evolution



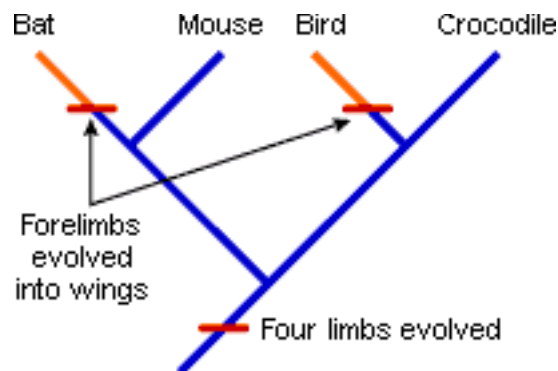
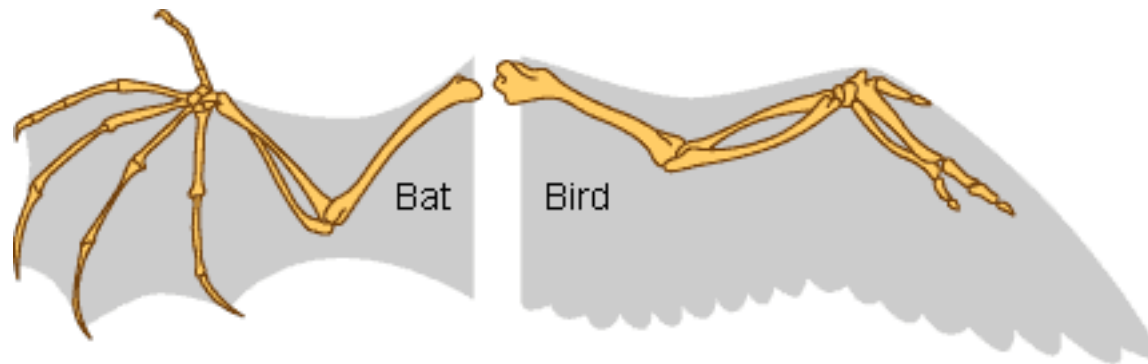
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Turn and Talk

What was one thing you found interesting or surprising in this presentation about adaptation, evolution, and natural selection (and how to talk about these topics)?