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Darwin: Evolution By Means of Natural Selection

(Chapter 16, 19-1, a bit of 19-2, 19-3)

I. (16.2) Historical Thoughts and Influence on Evolutionary Thought

a. Historical Thoughts

- **Greeks** - _____
- **Literal Biblical view** -

  _____

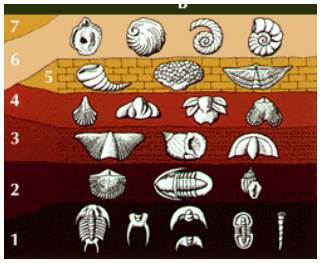
  _____

b. Influence of Geology-

- **James Hutton** - _____
  - Things that change the earth are very slow and take a long time.
- **Charles Lyell** -

  _____

  _____
  - Stressed that scientists must explain past events in terms of processes that they can actually observe.



c. Influence of Paleontology-

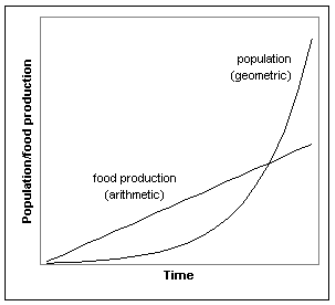
- **William Smith**
  - _____
  - _____
- **George Cuvier**
  - _____

d. Influence of Economics/Sociology

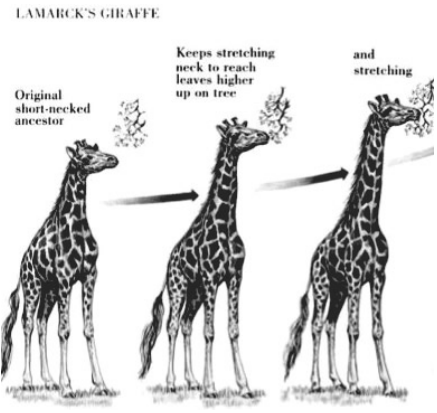
- **Thomas Malthus**
  - _____

    _____
  - _____

    _____
  - _____



e. Influence of Naturalists



- **Jean Baptiste Lamarck**
  - Tendency toward perfection -

    _____

    _____
  - Use and Disuse -

    _____

    _____
  - Inheritance of Acquired Characteristics -

    _____

    _____
  - Why it is wrong?

    _____

    _____
  - How did he positively influence modern evolutionary thought?

    _____
- **Charles Darwin**

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_____
_____
_____
_____

- **Alfred Wallace**

_____
_____

II. (16.3) How does Natural Selection Drive Evolution?

a. Individual organisms of a population differ and much of this variation is heritable.

- **Morphology**-

_____
_____

- **Physiology-**

_____
_____

- **Adaptation** -

_____
_____

- **Fitness** -

_____
_____

- **Selective Pressure** -

_____
_____

b. Organisms produce more offspring than can possibly survive and those that do not survive _____.

c. (16.3) Each unique organism has different advantages and disadvantages in the struggle for existence. Individuals best suited to their environment survive and reproduce most successfully. **"Theory of Biological Evolution by means of Natural Selection" as stated in "On The Original the Species" by Charles Darwin who combined his ideas with Malthus and Lamarck: (p. 460-464); (p. 388-391): Summary of Darwin's Theory:**

- "Struggle for Existence" -
- "Survival of the Fittest" (Natural Selection)
  -
  -
- Natural selection- be careful with your wording not to sound Lamarckian!
  -
  -

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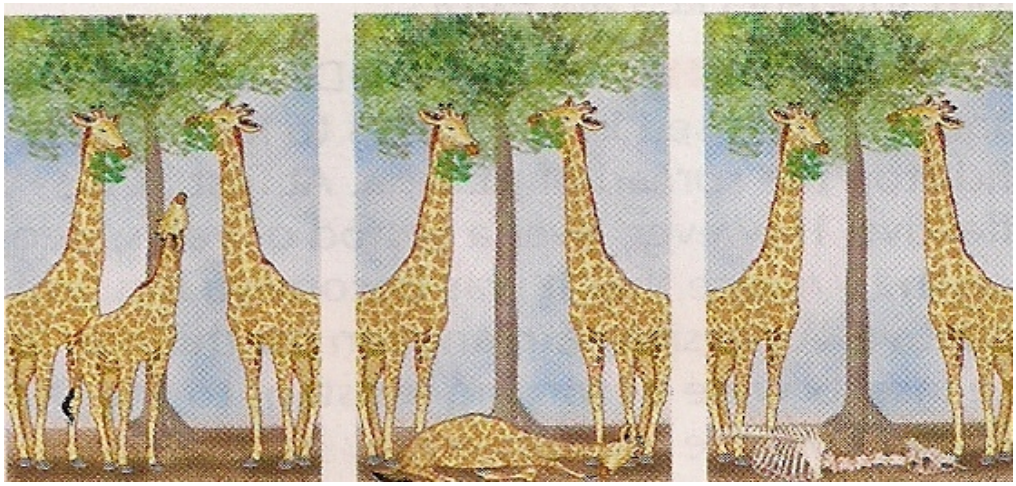
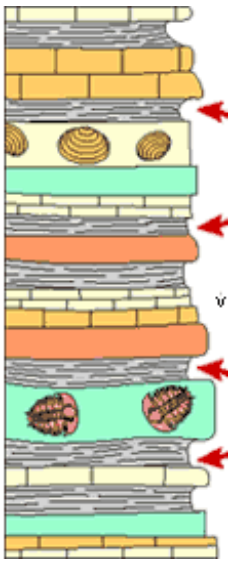
-



d. Species alive today are descended with modification from ancestral species that lived in the distant past.
    - This process by which diverse species evolved from common ancestors unites all organisms on Earth into a single tree of life.

e. The Modern Theory of Biological Evolution unites the work of _____ and _____.

III. (16.4) Evidence of Evolution (DNA fingerprinting, fossil records, similarities in morphology (Shape).



a. Geological Distribution of Living Species: Biogeography (p. 465) (p. 392)
    -
    -

b. Fossil data shows us: (16.4, 19.1, 19.2)
    -
    -
    -
        - **Transitional Forms** - _____
        - **Gradualism** - _____
        - **Punctuated Equilibrium** - _____

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_____

- **Stasis** -

  _____

_____

- **Relative Dating (19.1 (p. 540); (p. 451-452)** –

  _____

_____

- **Radioactive Dating** -

  _____

_____

c. (16.4) Embryology (p. 468-469); (p.393)

-
-

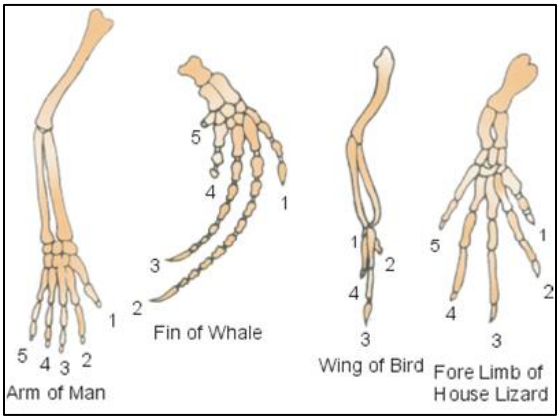
d. **Homologous Structures** -

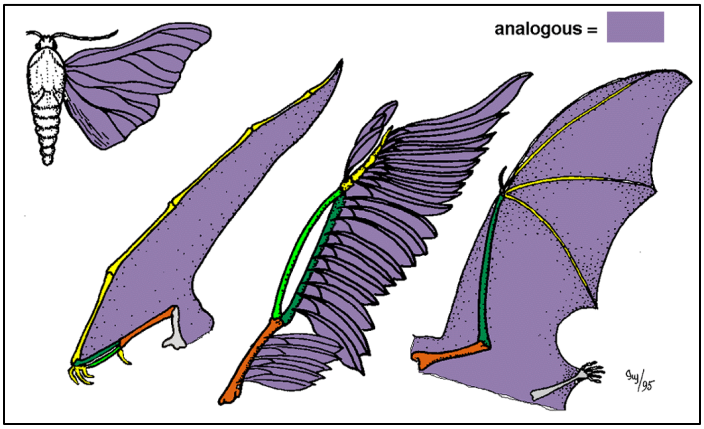
_____

_____

e. Analogous Structures (not evidence of evolution, but evidence of selective pressure causing organisms to resemble each other in response to their similar environment)

The clue to common descent is common structure, not common function!!!!!





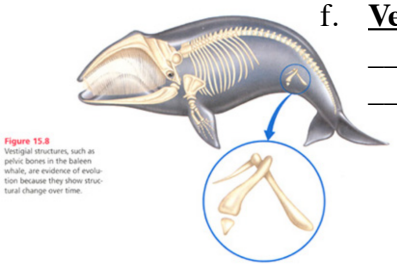


Figure 15.8
Vestigial structures, such as pelvic bones in the baleen whale, are evidence of evolution because they show structural change over time.

f. **Vestigial Organs** -

_____

_____

g. Genetic Data- can confirm what we thought based on morphology, or challenge what we thought…

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Vocabulary Practice

Matching *On the line provided, write the letter of the definition that best matches each term on the left.*

_____	**1.** evolution	a. change over time
_____	**2.** fossil	b. differences among individuals within a species
_____	**3.** natural variation	c. preserved remains of an ancient organism
_____	**4.** struggle for existence	d. survival of the fittest
_____	**5.** fitness	e. all species are derived from common ancestors
_____	**6.** adaptation	f. structures that develop from the same embryonic tissues, but have different mature forms
_____	**7.** natural selection	g. ability of an individual to survive and reproduce in a specific environment
_____	**8.** common descent	h. organ with little or no function
_____	**9.** homologous structures	i. competition for food, space, and other resources among members of a species
_____	**10.** vestigial organ	j. inherited characteristic that increases an organism's chance of survival