**Unit 2: Evolution – Evidence of Evolution** Date: \_\_\_\_\_\_\_\_\_\_\_\_\_

By the end of the lesson you should be able to:

* State 4 lines of evidence **AND explain** the significance of each



**Evidence of Evolution**

Four approaches to studying evolution are:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Comparative \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. Comparative \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**1. Fossil Evidence**

* Fossils are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the past.
* Fossils allow us to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and follow evolution through history.
* Fossils are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and the closest we have to a time machine.
* Allow us to compare \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in fossils to species alive today.

**2. Comparative Anatomy**

* Comparing homologous structures of species alive today.
* Can be any homologous organs, not just bones.

*Homologous Structures*

* Many organisms have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

* Therefore they must have had a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Similar \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_



**3. Comparative Embryology**

* A growing embryo \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

- the basic structures of a common ancestor

**4. Molecular Evidence**

* This method examines the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or its product, a protein. (remember the protein synthesis story??!)
* This new method is lab intensive but provides some of the most convincing evidence for evolutionary relationships.

1. DNA Comparisons

* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and genes from one organism can be transferred in a lab from organisms to another and still function
* Members of the same species have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Interbreeding species distribute any mutations that occur quickly through the gene pool.
* Isolated species collect their own \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which become subject to different environmental pressures, leading to the creation of a new species.
* This new species will have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the previous



2. Molecular Clocks

* Inheritable mutations occur in any population at the same rate. The longer the

two populations are isolated, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

* Differences in DNA sequences act as a “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” to approximate how long the gene pools have been separated.



**More DNA Evidence**

**– Watch the PBS video "Proof of Evolution Is Hiding in Your DNA" and summarize the main points**

1. Chromosome 2
2. NANOG
3. Vitellogenin

**Even More DNA Evidence!**

**- Watch the Stated Clearly video "DNA Evidence That Humans & Chimps Share A Common Ancestor: Endogenous Retroviruses" and summarize the main evidence**

1. Endogenous Retroviruses

**Bonus! \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Structures**

* Structures that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ but were useful structures in earlier ancestors
	+ Examples: Ear muscles
	+ Human tailbone
	+ Whale hip bones
	+ Appendix??

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**Summary**

* By putting data from all methods together, we can determine the evolutionary history of a group of organisms.
* This is also used to determine the correct classification of living organisms.
* We will be doing classification next! ☺

**Can you …**

 **… state 4 lines of evidence AND explain the significance of each?**