Names _____ Block _____ Date _____

Evidence for Evolution Stations Lab

STATION 1 – COACH BOOKS

Use the information on pages 196 – 207 to answer the following questions.

1. How is a **homologous structure** different from an **analogous structure?**

2. Identify which – **homologous** or **analogous** – helps to determine evolutionary relationships. Explain why.

3. Describe one example of an **analogous structure** and one example of a **homologous structure**.

4. Define **"fossil"** and provide two examples. _____

5. Contrast **relative dating** with **absolute dating**. _____

6. Describe two methods of "dating" a fossil (radiometrics and superposition). _____

7. Define **"embryology."** _____

8. Describe three (3) methods of comparing **biochemical information** among species for the purpose of identifying evolutionary relationships.

   I. _____

   II. _____

   III. _____

STATION 2 – COMPARING MOLECULAR INFORMATION

Part 1 - Comparing Genetic Sequences

1. List the order of species in terms of their similarity to the living species, from most closely related to least closely related.

_____

2. How did you determine this order? _____

_____

3. How does this type of information support the idea that all organisms are descended from one common ancestor? _____

_____

Part 2 - Analyzing Amino Acid Sequence Differences

Cytochrome *c* Evolution

Organism	Number of amino acid differences from humans
Chimpanzee	0
Rhesus monkey	1
Rabbit	9
Cow	10
Pigeon	12
Bullfrog	20
Fruit fly	24
Wheat germ	37
Yeast	42

1. As the evolutionary relationship between two organisms becomes more distant, do the number of amino acid differences between them increase, decrease, or stay the same? Explain your answer.

_____

_____

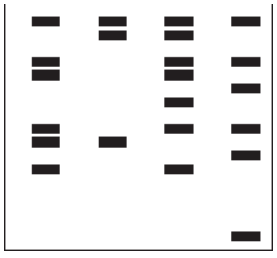
2. What species is most closely related to humans – the cow or the rabbit? Explain how you know based on the amino acid data. _____

_____

3. Why are amino acid sequences an indicator of evolutionary relationships? (hint: Amino acid sequences are controlled by DNA sequences. Mutations cause amino acid differences.) _____

_____

Part 3 - Classification with DNA Fingerprinting



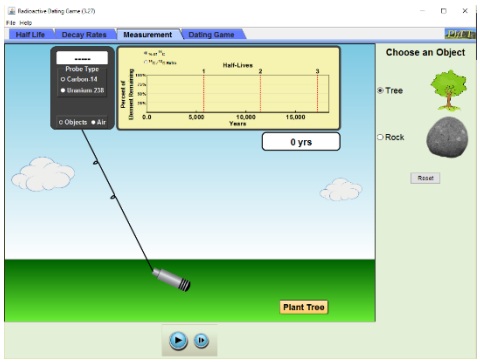
1. Based on the DNA fingerprints, which two species are most closely related? Explain your answer. _____

_____

_____

STATION 3 – FOSSIL DATING PhET SIMULATION

Part 1 – "Measurement" Tab



1. How does the amount of radioactive energy in the tree change over time after the tree dies?

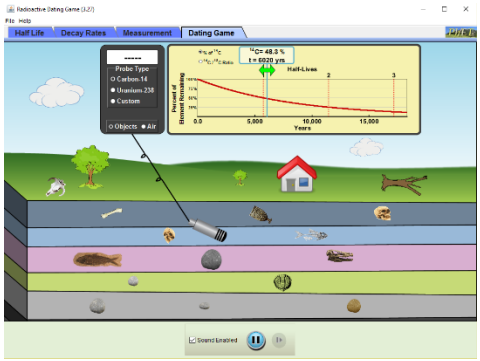
   _____

   _____

2. How does the amount of radioactive energy in the rock change over time after its initial formation? _____

3. Fill in the blanks: As a fossil or rock becomes older, its radioactive energy will _____. Recent fossils have _____ radioactivity than more ancient fossils.

Part 2 – "Dating Game" Tab



1. Without using radioactivity, how can you tell that the wooden cup is more recent than either of the fish fossils? _____

   _____

2. Put the following fossils in order of age, from youngest to oldest: bone, dinosaur skull, fish bones. Explain how you determined the correct order.

   a. Order: _____

   b. Explanation: _____

3. How does the amount of radioactive energy change as you measure deeper layers of rock?

   _____

4. Put the following fossils in order of age, from youngest to oldest: rock 3, rock 4, rock 5. Explain how you determined the correct order.

   a. Order: _____

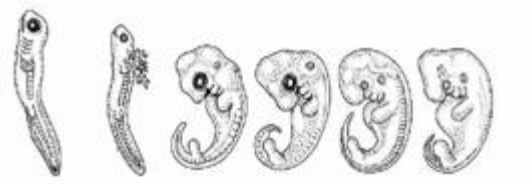
   b. Explanation: _____

STATION 4 – EMBRYOLOGY AND COMPARATIVE ANATOMY

Part 1 – Embryology

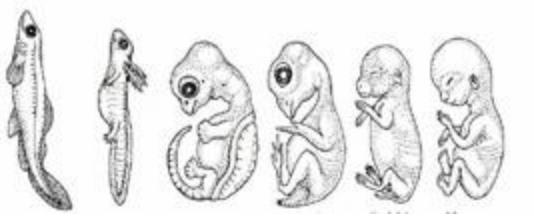
1. Based **only** on the earliest embryo forms, can you identify which embryo is human? Why or why not?

_____



2. Based on the second set of embryo forms, are there any embryos you can tell are definitely NOT human? Which ones, and why? _____

_____



3. Based on the third set of embryo forms, which do you think is human? How can you tell?

_____

_____

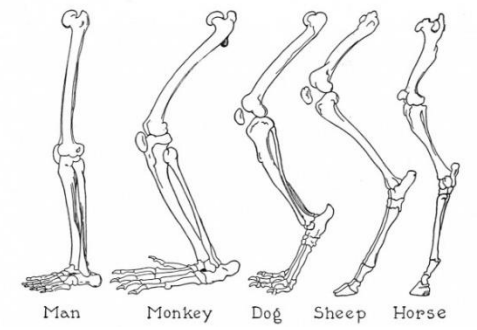
4. Taken as a whole, which species is most closely related to humans? How can you tell based on your observations? _____

_____

5. Taken as a whole, how does this information indicate that all these species descended from one common ancestor? _____

_____

Part 2 – Comparative Anatomy



1. What similarities do you see among the various species' limb bone structure?

_____

_____

_____

2. Why do these similarities support the theory of common ancestry among different species?

_____

_____