**Evidence of Evolution: Station Activity**

*Directions: This station activity shows the various sources of evidence that scientists use to study evolution. You will be working with a partner on this activity. You will be assigned a station to start at. You will then circulate around the room and answer the questions on this worksheet using the information at each station. MAKE SURE TO READ WHEN YOU GET TO EACH STATION!!!*

**Station #1 – Comparative Embryology:**

1. Define Embryo: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Define Vertebrate: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Is it easier to distinguish which embryo represents each animal in the earliest stage of embryo development or in the

latest stage? Explain.

1. Look at the earliest stage of embryo development at the top of the first picture. List three characteristics that all of

 these vertebrate embryos share in common. *(Hint: They are labeled on the picture.)*

* 1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ b. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ c. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
1. Guess who!!! Take a look at the picture of the four embryos at the bottom of the page. Determine which embryo is a cat,

 cow, horse and human.

a. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ b. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ c. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ d. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Station #2 – Comparative Anatomy – Homologous Structures:**

1. Define Homologous Structures:
2. Define Divergent Evolution:
3. Which bones do all of these organisms’ forelimbs share in common? *(Hint: They are labeled on the picture.)*
4. Why are the forelimbs of whales and horses structured differently? *(Hint: Explain how they have adapted to different environments.)*
5. Homologous structures have a **similar / different** structure and a **similar / different** function.
6. Homologous structures can be found in organisms that are **related / not related** and have adapted to **similar / different** environments.

**Station #3 – Comparative Anatomy – Analogous Structures:**

1. Define Analogous Structures:
2. Define Convergent Evolution:
3. Are birds, bats and insects closely related to each other?
4. Are bird, bat and insect wings similar in structure? Explain your answer using what you see in the picture.
5. Why have birds, bats, and insects all evolved to have wings? *(Hint: Think about convergent evolution.)*
6. Analogous structures have a **similar / different** structure and a **similar / different** function.
7. Analogous structures can be found in organisms that are **related / not related** and have adapted to **similar / different** environments.

**Station #4 – Comparative Anatomy – Vestigial Structures:**

1. Define Vestigial Structures:
2. How do vestigial structures show that evolution has occurred in a species?
3. Explain how the wing structures of the kiwi bird and the ostrich are different from the wing structure of the eagle. *(Hint: Take a look at the bird skeleton pictures and reflect on the size of the wings in each organism.)*
4. Why might kiwi birds and ostriches have vestigial wings? Explain why these birds do not need to be able to fly in their habitats.
5. Why does an eagle need to have functional wings? Explain your response.
6. Vestigial structures in an organism have **no purpose / an important purpose**.
7. Vestigial structures in an organism are **increased / reduced** in size.

**Station #5 – Comparative Biochemistry:**

1. How are DNA and protein sequences used as evidence for evolution?
2. For each primate in the amino acid sequence chart at station #5, count the number of amino acids that are different from the human sequence. Record these numbers in the data table below.

|  |  |
| --- | --- |
| Primate | # of Amino Acids Different from Humans |
| Baboon |  |
| Chimpanzee |  |
| Gorilla |  |
| Lemur |  |

1. Use the information in the data table from question #27 to answer the following questions.
	1. Which two primates are most closely related to humans?
	2. Which two primates are the least closely related to humans?
2. Now take a look at the evolutionary tree. Does the information in this image support your answers to question #28? Explain.

**Station #6 – Fossil Evidence:**

1. Explain how the fossil record is used as evidence for evolution.
2. Define Derived Traits:
3. Define Ancestral Traits:
4. Discuss how an ancient Glyptodont fossil is different from a modern armadillo. What changes have evolved over time? List several observations.
5. Discuss how the ancient Eohippus is different from the modern horse. What changes have evolved over time? List several observations.