**Outcome Practice: Understanding Cladograms**

**(Outcome 13)**

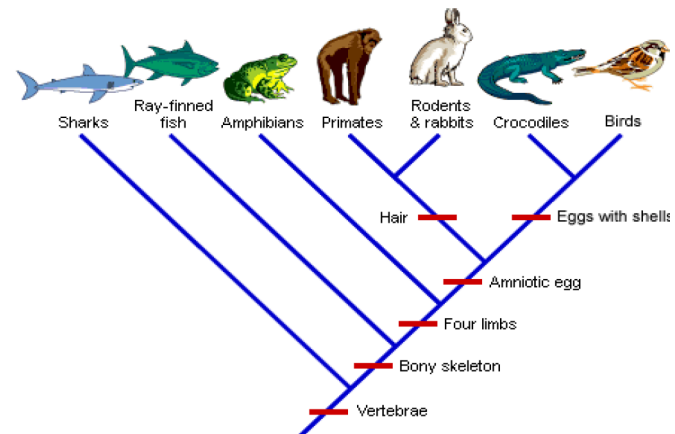
**Biology 11 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Directions:** Answer the questions below, you may need to do some additional research to be able to complete the questions if you are unaware which organisms contain each characteristic.

1. Fill out the following character matrix to assist you in creating a cladogram from the information. To do this, mark an “X” if an organism has the trait mentioned.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **Multicellular** | **Jaws** | **Lungs** | **Claws/Nails** | **Fur/Mammary Glands** |
| **Hagfish** |  |  |  |  |  |
| **Perch** |  |  |  |  |  |
| **Salamander** |  |  |  |  |  |
| **Lizard** |  |  |  |  |  |
| **Mouse** |  |  |  |  |  |

1. Create a cladogram based on your matrix.
2. According to your cladogram, which two species are more closely related: hagfish and salamanders or hagfish and lizards? **Justify** your answer.
3. According to your cladogram, what species are mice most closely related to?
4. Add a pigeon to your cladogram based on its characteristics and adding an additional derived characteristic of feathers.



\*\*Use the cladogram to answer questions 6 to 11.

1. What trait separates sharks from Ray-finned fish?
2. Which organism is most related to the bird? **Justify** your answer.
3. Which 5 traits do the bird and its closest relative share?
4. Which organism’s DNA will differ the most from the birds? **Justify** your answer.
5. What separates rabbits/primates from the crocodiles?
6. Which organism is most related to the rodents and rabbits?