



Biogeography

Amazonia Cladogram

Name: _____

Section: _____

Score: ____ / 5

Directions: Watch the youtube video called Creating A Cladogram

(https://www.youtube.com/watch?v=46L_2R1k3k) about what a cladogram is and what it tells us about the phylogeographic connections about the species from a certain area. Once you are done complete the thought questions about the process and then work through the steps to create your own cladogram for a region of your choice.

| | Otter | Anaconda | Scarlet Macaw | Jaguar | Howler Monkey | Poison Dart Frog | Sloth | Spider Monkey |
|---------------|-------|----------|---------------|--------|---------------|------------------|-------|---------------|
| Vertebrate | | | | | | | | |
| Amniota | | | | | | | | |
| Eutheria | | | | | | | | |
| Boreoeutheria | | | | | | | | |
| Carnivora | | | | | | | | |
| Primate | | | | | | | | |
| Saurias | | | | | | | | |

Directions: Cladogram Table – Fill out the following table by placing an X in the box if the animal has the characteristic (Hint - Search the characteristic not the animal). This will help determine which animals have the most shared traits.

Maned Three Toed Sloth - *Bradypus torquatus*

Jaguar - *Panthera onca*

Giant Otter - *Pteronura brasiliensis*

Scarlet Macaw - *Ara macao*

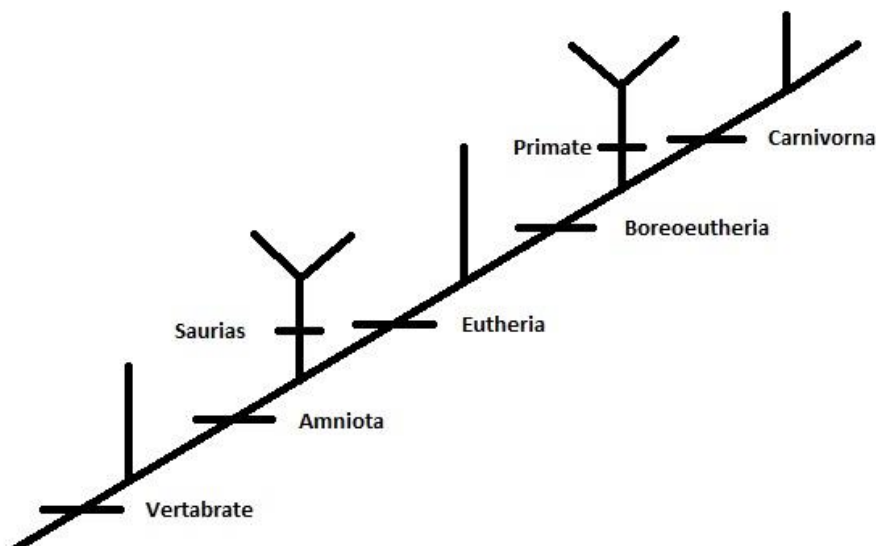
Duellman's Poison Dart Frog - *Ranitomeya duellmani*

Brown Howler Monkey - *Alouatta guariba*

Green Anaconda - *Eunectes murinus*

Spider Monkey – *Ateles*

Once you have completed the table, fill in the cladogram model below that has been adapted for these particular species. Place the species in the appropriate spots based on the traits they possess.



Once you are finished with creating your cladogram for the Amazon region answer the following series of questions. You can check your work on the cladogram against the example here <http://itol.embl.de/tree/21316591127284521537454266>

1. In this example which species happens to be the outgroup?
2. What about them makes them the outgroup? What trait do they not have that the rest of them do?
3. Which species is the most closely related to the Jaguar?
4. Which species is most closely related to the Howler Monkey?
5. Which species is most closely related to the Anaconda?
6. Which species is the least related to the Jaguar?
7. In your own words explain how the ideas of phylogenetics (study of evolutionary relationships), connect with geography to form Phylogeography?
8. Create a Cladogram for a region of your choice

Step 1: Choose a geographic region and do some research to find 6 different species that live within that region (can be birds, mammals, reptiles, fish, amphibians, insects)

Step 2: For the six species look them up and find their scientific name (Copy them down into a file somewhere) (Use the National Center for Biotechnology Information website to lookup scientific names - <https://www.ncbi.nlm.nih.gov/taxonomy>)

Step 3: Copy the scientific names into the Phylogenetic Tree Generator (In the big white box, copy them in and separate them with a comma) (<https://phylot.biobyte.de/>)

Step 4: Once they are all entered scroll down and have the website generate a Visualization in iTOL

Step 5: On the generated cladogram (arranged horizontally, not slanted) hover your mouse over the T intersections to see which characteristic is the reason for the separation

Step 6: Design a slanted cladogram like the one you did for the Amazon region for the region that you studied. Make sure you include the characteristics that cause the separations.