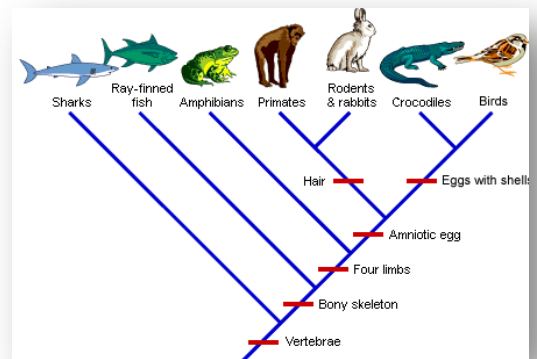


Cladogram

Activity

In cladistics, similar characteristics that come from a common ancestor are used to divide organisms into groups. A cladogram will begin by grouping organisms based on a characteristic displayed by all the members of the group. Subsequently, the larger group, or clade, will contain increasingly smaller groups (clades) that share the traits of the clades before them, but also exhibit distinct changes as the organism evolves. All descendants to the right of a branch point share that new feature; none of the creatures to the left does.



Procedure

1. Determine features that are shared among organisms and those that are unique. Copy the data table below into your lab journal and then fill out the table using the first page of this activity.

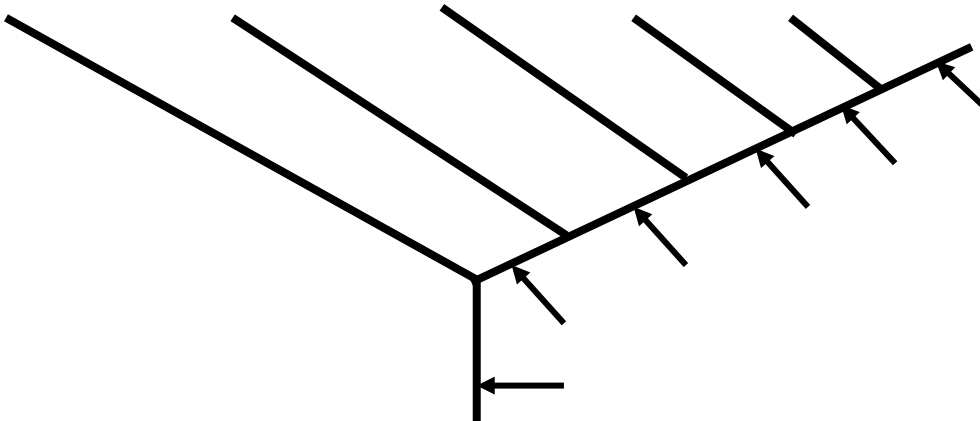
Species	Two eyes	Non-branched or branched antennae	# of body segments	No legs, legs and/or jointed legs
1				
2				
3				
4				
5				
6				

2. Use the characteristics (morphologies) in your data table to determine the positioning of the species on the cladogram. You will draw organisms that are ancestral on the left of the cladogram and more recently evolved organisms toward the right.

Cladogram

Activity, continued

3. Copy down in your lab journal the cladogram below and then construct the cladogram.



4. Include on your cladogram the following:

- Determine where you think each species should be placed.
- Write the species number on the branch you believe it belongs to (at the top of the arrow.)
- Label the arrows along the bottom of the tree with the characteristic that is shared with the clade above or to the right of it.

*There may be several ways to represent this cladogram. Remember that cladograms are hypothetical (based on evidence, but still a hypothesis), so do not worry if yours looks different from others in the room.

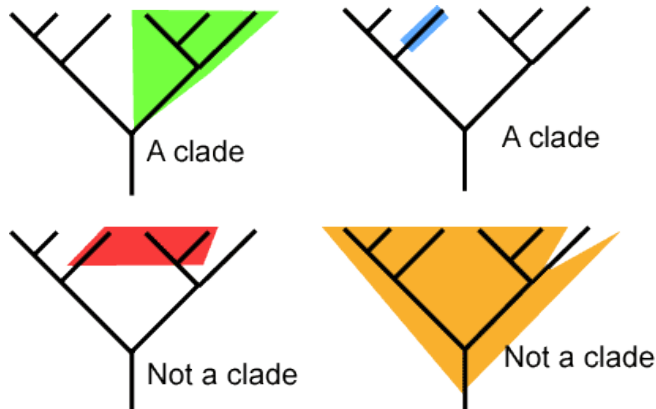
5. Recently, biologists discovered a new species (Species #7—see picture below) that is very similar to Species #3. Although this new species is very similar to Species #3, it has developed a curly tail. Draw this Species (#7) on you constructed cladogram in your lab journal. You will have to draw your own branch where you think this organism belongs, add its title (Species #7), and its trait.



Cladogram

Activity, continued

6. On your cladogram, circle the clade of organisms with two body segments. A clade is a grouping that includes a common ancestor and all of its descendants (living and extinct). See the example below:



7. Once your cladogram is complete, pair with another student and share your cladograms. If there are points for argumentation and discourse, complete the protocol to make a final cladogram to turn in with this activity.
8. Answer the Analysis Questions in your lab journal.

Analysis Questions:

1. When a branch (lineage) splits on a cladogram, this represents a speciation event. See image below. A speciation event occurs when a single ancestral lineage gives rise to two or more daughter lineages. For example, when insects were evolving one lineage-developed wings and the other did not. This is a speciation event that leads to the diversity of modern insects. Write a claim and evidence explaining one example of where on the cladogram that you drew a speciation event occurred.



2. Write a claim describing a common ancestor for all seven of the species in your cladogram. Support your claim by drawing a hypothesized picture of that organism as your evidence.
3. Give a claim and two pieces of evidence to support why the curly tail found in Species #7 may have evolved.