

### Making Cladograms

Cladograms are diagrams that depict the evolutionary relationships between different groups of *taxa* (plural of *taxon*) called *clades*. By depicting these relationships, cladograms reconstruct the evolutionary history AKA *phylogeny* of the taxa. Cladograms can also be called “phylogenies” or “trees”. Cladograms are constructed by grouping organisms together based on their shared derived characteristics or homologous structures.

Define the following:

- Taxa
- Clade
- Phylogeny
- Cladogram

An example:

1. Given these characteristics and taxa...

Taxa

Characteristic	Shark	Bullfrog	Pigeon	Kangaroo	Human
Vertebrae	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Two pairs of limbs		<b>X</b>	<b>X</b>	<b>X</b>	<b>X</b>
Terrestrial egg			<b>X</b>		
Mammary glands				<b>X</b>	<b>X</b>
Placenta					<b>X</b>

2. Draw a Venn diagram. Start with the characteristic that is shared by all of the taxa on the outside (the biggest, outer circle). Write the name of the only taxa that have that characteristic along the edge of that circle. The next circle is drawn within the biggest circle and should include the characteristic that is shared by all of the remaining taxa. Continue until there are no more taxa. You may have to have to make two circles for unshared characteristics.

3. Convert the Venn diagram into a cladogram. Use the examples in your notes to guide you.

The practice:

Convert the following data table into a Venn diagram and cladogram **on a separate sheet of paper**:

Characteristic	Sponge	Jellyfish	Flatworm	Earthworm	Snail	Fruitfly	Starfish	Human
Cells w/ flagella	X	X	X	X	X	X	X	X
Symmetry		X	X	X	X	X	X	X
Bilateral symmetry			X	X	X	X	X	X
Mesoderm				X	X	X	X	X
Head develops 1 <sup>st</sup>				X	X	X		
Anus develops 1 <sup>st</sup>							X	X
Segmented body				X		X		
Calcified shell					X			
Chitinous exoskeleton						X		
H <sub>2</sub> O vascular system							X	
Vertebrae								X