**Cladogram and Dichotomous Key Activity**

**Activity Objective:** Students will create a cladogram. Students will also construct a dichotomous key, based on their cladogram.

**Materials:**

- 6 animal notecards
- 5 color-coded defining characteristic cards
- Large poster color-coded cladogram (see below)
- Student worksheet

This activity should be done in small groups (2-4 students). Students will be given the stack of 11 cards (6 animal cards and 5 defining characteristic cards). A large poster containing a color-coded cladogram should be provided, with empty boxes for the characteristic and animal cards (see below). Students have to place their cards in the correct boxes. They will use the cladogram to construct a dichotomous key. A few questions follow the key activity.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Animals</th>
</tr>
</thead>
<tbody>
<tr>
<td>A – Vertebral column</td>
<td>1 – Tiger</td>
</tr>
<tr>
<td>B – Hinged jaw</td>
<td>2 - Turtle</td>
</tr>
<tr>
<td>C – Four legs</td>
<td>3 - salamander</td>
</tr>
<tr>
<td>D – Amniotic sac</td>
<td>4 – clown fish</td>
</tr>
<tr>
<td>E – Hair</td>
<td>5 - lamprey</td>
</tr>
<tr>
<td></td>
<td>6 – lancelet (outgroup)</td>
</tr>
</tbody>
</table>
This activity assumes that students have some knowledge of evolution and dichotomous keys.

Creating dichotomous keys is a popular high school activity. I’ve combined this activity with an exercise in which students interpret a phylogenetic tree. I’ve adapted this activity in a couple of ways for ELL students. I’ve color-coded the tree and defining characteristic cards to make it a little easier to interpret. I’ve also provided boxes for the characteristics and animals. On the animal and defining characteristic cards, pictures and definitions of difficult terms are provided.

The dichotomous key has also been adapted for ELL students. Using information from their cladogram, students must fill in the blanks on the key provided. This task is designed to be done in small groups of 2-4 students. This will provide scaffolding opportunities for ELL students and allow them to work and discuss their ideas with students who speak English more proficiently. This activity should take approximately 30 minutes to complete.
Reference

“Making Cladograms” - http://www.indiana.edu/~ensiweb/lessons/m clad.html

Amniotic Sac Image - http://www.daviddarling.info/encyclopedia/A/amniotic_sac.html

Amniotic Egg Image - http://www.flickr.com/photos/44701969@N04/6038235719/

Clown Fish Image - http://www.flickr.com/photos/tank6b/502662475/

Four Legs Image #1 - http://www.flickr.com/photos/serlunar/3261428102/

Four Legs Image #2 - http://www.flickr.com/photos/glossyboy/3573506339/

Hair Image #1 - http://www.flickr.com/photos/kat7677/5009561271/

Hair Image #2 - http://www.flickr.com/photos/moxmox/172143606/


Lamprey Image - http://fish.dnr.cornell.edu/nyfish/Petromyzontidae/sealamprey.html


Salamander Image -
http://www.virginiaherpetologicalsociety.com/amphibians/salamanders/eastern-mud-salamander/Eastern_Mud_Salamander_Pseudotriton_ml r.jpg


Vertebral Column Image - http://www.flickr.com/photos/vectanim/5727402314/