**Active Learning Exercise 1.1**

to accompany

*Vertebrate Life*, Tenth Edition

Pough • Janis

**Fish (or Lizard) Evolution**

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**Introduction**

This exercise simulates the two basic processes of evolution: variation from parent to offspring, and the effect of a selective force (e.g., predation, sexual selection). Variation is produced by students attempting to duplicate a drawing of an animal. Some of these “offspring” are then subjected to some outside force that determines whether they survive and/or reproduce. These survivors then are allowed to “reproduce” again, and the subsequent generations are then compared. It allows students to review the mechanisms of evolution (sexual selection, predation, drift, etc.). This takes 20 minutes or so. If you also build the phylogeny and note the features of that, it can easily run twice that time.

**Preparation**

Before you go to class, you will need to assemble a variety of markers or crayons of different colors, one per student.

Each student also needs 3–5 pieces of paper or index cards big enough that if you post them in the front of the room, everyone will be able to see them (unless you’re going to project this). I typically have fewer than 30 students so half-sheets of paper work, or 4×6 inch index cards.

You also need tape to post the drawings.

**Activity**

1. Pass around a box of markers, instructing each student to take one. Make sure, however, that the students do not know what they will be using the markers for. This way they are not biased toward what kind of marker they choose.

2. Once everyone has a marker, distribute the paper.

3. Draw an outline of a simple fish or lizard on the board and instruct everyone to make a copy of it.

4. For one-third of the class, tell the students to place all their “offspring” together and, as a group, pick the three most likely to catch prey and post these together.

5. For the second-third of the class, tell the students to place all their offspring together and, as a group, pick the three “prettiest” ones and post these together.

6. For the final third of the group, randomly select three and post together.

7. Now have each student copy a fish of their choice *within their own group’s* offspring.

8. Return to the predation group and place their five survivors on the other overhead. Differences between the three groups of offspring should be apparent. (Gee, why is that?)

9. Repeat this whole process once or twice and then get the class to explain to you what has happened in each group: sexual selection, natural selection, genetic drift, etc.

10. At this point you could stop, or you could get into phylogenies by creating one with the three branches of drawings. The class should be able to come up with ancestral and derived characteristics, maybe synapomorphies, maybe convergent evolution, maybe more.