



Group Activity: Future Evolution

Objectives of this Activity:

1. Predict how particular traits in particular species may evolve in the future.
2. Analyze the predictions of your classmates, determining whether each prediction is evolutionarily feasible.

Instructions:

1. This is a game with the following rules:
 - a. You are to work in pairs of your own choosing (if necessary, one group of three is allowed).
 - b. Your goal is to provide as many correct “predictions” and “analyses” as you can in the time allotted.
 - c. To start, you must perform a prediction on the front side of the supplied “play sheet”. Instructions for making a prediction are provided below.
 - d. When you have completed your prediction, bring it to the front of the room and clip it to the whiteboard.
 - e. If there are play sheets from other groups on the board, you can take one to analyze; otherwise, wait until another group brings up a new prediction.
 - f. On the opposite side of the other group’s play sheet, analyze their prediction. Instructions for performing an analysis are provided below.
 - g. You receive 1 point for each feasible prediction you make. You receive 1 point for each correct analysis you perform.
 - h. The group(s) with the highest point total will receive 10 EXTRA CREDIT quiz points (equivalent to getting 100% on one week’s quiz) per person.
2. How to make a prediction:
 - a. Consider a particular trait in a particular species that you think is likely to change due to biological evolution. Then consider whether this prediction is “evolutionarily feasible”. To be “evolutionarily feasible”, you should be able to explain how natural selection on existing trait variation could lead to a change in this trait in the overall population of this species. *Note:* you don’t actually have to make this explanation... that will be the job of another group.
 - b. On the first side of the play sheet, clearly list the particular species that you are making a prediction about. When possible, use the common name (although avoid using common names that are above the level of species... for example “birds”).
 - c. Clearly list the trait that you are making a prediction about. Make sure it is entirely clear what trait you believe will change.
 - d. In the space provided, describe what change will occur in this trait over time. Please note that you should not explain *why* or *how* this trait will change, just *what* change in the trait will occur. This description should include both the current state of the trait and where the trait will “end up” after the evolutionary change occurs.
 - e. In the space provided, describe the environmental factors that might drive this change. These factors may be abiotic or biotic or both, and should have the potential to act as a “force of natural selection” on this trait. As with your prediction of what changes will occur in the trait, you should not explain *how* these environmental factors cause this change, just list *what* environmental factors might drive the change. *Note:* you should, however, have a good sense

of *how* these environmental factors might cause this change... if you don't, the other group may label your prediction as NOT feasible.

- f. *Game-winning tip:* Be edgy! If you can come up with a prediction that is on the edge of feasibility (either narrowly feasible or narrowly unfeasible), you are likely to make the “analysis” job of another group more difficult.
3. How to perform your analysis of another group’s prediction:
 - a. Carefully review the prediction made by the other group. Decide whether their prediction is “feasible”, “NOT feasible”, or “too vague”. Check the appropriate box on the second side of the play sheet.
 - b. If their prediction is “feasible”, your job is to describe an evolutionary scenario that might produce this change. As with all the other “evolutionary stories” we have learned to tell in this course, your scenario should:
 - include the role of existing variation in this trait in making change possible;
 - establish that this trait can be genetically passed on from parent to offspring;
 - explain how environmental factors translate to differences in survival and/or reproductive rates; and
 - explain how these differences in survival and/or reproduction lead to the predicted change in this trait.
 - c. If their prediction is “NOT feasible”, explain why this change is unlikely to be produced by biological evolution. This explanation could include arguments that:
 - there is not sufficient natural variation to produce the predicted change;
 - the trait described is not heritable (cannot be passed genetically from parent to offspring);
 - the environmental factor described by this group is unlikely to result in differences in survival and/or reproductive rates; or
 - differences in survival and/or reproduction are unlikely to lead to the predicted change in this trait.
 - d. If their prediction is “too vague”, explain what information is missing from their prediction. Explain why you cannot analyze this prediction without this information.
 - e. *Game-winning tip:* Be persnickety! If you can find any faults in the prediction of this group, all you need to do is explain these faults. In particular look for sloppy work in the form of vague and unclear predictions. These are “easy marks” for your group.