**Forms of selection demonstrations**

Below is a description of a demonstration for each of the three forms of natural selection (directional, stabilizing, disruptive). The specific materials described below can easily be substituted to better fit the specifics of your class. Each of these demonstrations follows the same general outline. Half of the students will be hiding a set of creatures with variable traits, and the other half of the students will try to collect one (and only one) of the creatures that appears the most obvious to them. The creatures will all have an assigned trait value that allow the students to calculate the average phenotype before and after half of the class has the chance to collect creatures (e.g. before and after selection).

**Directional selection**:

This demonstration will have half of the students hiding “creatures” that vary in body size within a grass field. The other half of the students will act as predators and will each grab (“prey upon”) one of these creatures.

To create the “creatures” use a cotton ball with four pipe cleaner legs (for added fun add googly eyes!). To create variation in body size use different lengths of pipe cleaners for the legs. You can vary the number of creatures you create for the demonstration depending on your class size.

On each creature attach a tag (e.g. small piece of masking tape) and write a trait value score for its body size, large creatures get a larger score (e.g. large creature may get a value of 10 while small creatures get a value of 2).

Before students hide the creatures calculate the average body size score for the population. While half of the students are hiding the creatures make sure the other half are not watching. When the hiding is complete have the other half of the students each collect one creature that is the most obvious for them to see.

After the collection calculate the average trait score for the “surviving” (uncollected) creatures. Discuss with your students how larger bodied creatures were easier to see/collect and how the average trait value shifted towards smaller bodies.

**Stabilizing selection:**

This demonstration proceeds in much the same way as the directional selection demonstration above, but the creatures and the environment are different. To create the creatures use a brightly colored oval construction paper cut-out with googly eyes. On some of the creatures attach two pipe-cleaner “horns”. These horns will either be short or very long so that in total there are three types of creature (no horns, short horns, long horns).

This demonstration needs to take place in a sandy or dirt environment. Tell the students who hide the creatures that these animals use their horns to burrow just under the surface. Students hiding creatures with horns can place a thin layer of dirt/sand over the top of the creature (they cannot bury or flatten horns however, the horns must be allowed to protrude from the ground). Creatures without horns cannot burrow under the sand/dirt and must simply hide on the surface.

As with the directional selection demonstration assign each creature a trait score related to horn length (for example, no horns = 0, short horns = 5, long horns = 10). Calculate the average trait score for the creatures before and after collection as described and discuss with students how the intermediate trait value (small horns) was the best at hiding and discuss how the average trait value remained the same.

**Disruptive selection:**

The creatures in this demonstration consist of beetle shaped construction paper cut-outs that are colored either brown, green, or brown and green striped. Assign each creature a trait value score based on their coloration such that solid brown has a low value, solid green has a high value, and brown and green striped has an intermediate value. On the back of each creature attach a piece of double sided tape.

Inform the students hiding the creatures that these animals like to live either on tree bark or on tree leaves. Have the students hiding the creatures stick them either to tree bark or leaves. This should create a scenario where the solid brown blends in well on the bark, the solid green blends in well on the leaves, but the brown and green striped does not blend in well on either background.

As with the other demonstrations calculate the average trait value before and after students collect the creatures. Discuss how the average phenotype remains the same with disruptive selection.