



Who is the fittest?

Why do animals look the way they do? The answer is survival. Through this activity students learn about the predator/ prey relationship, and how and why external features of animals are key survival adaptations.

Time

- 45-60 min

Next Generation Science Standards

- 3-LS4-3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all.
- 4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Utah Science Standard

5.5 Students will understand that traits are passed from the parent organism to their offspring, and that sometimes the offspring may possess variations of these traits that may help or hinder survival in a given environment.

Materials

- Cones to mark the area being used on a grassy field
- 120 m&ms (before the activity you must count out 20 blue, 20 green, 20 brown, 20 red, 20 yellow, and 20 orange). They may be then placed into the same bag.
- Chopsticks– enough for each student in the chopstick group
- Spoons– enough for each student in the spoon group
- Forks– enough for each student in the fork group
- Knives– enough for each student in the knife group
- 4 cups– labeled with adaptation

Background

Animals have internal and external structures that support their survival. Without these particular characteristics or traits, their survival would be jeopardized. How do animals evolve these characteristics that help them to survive? Natural selection. All of life on Earth is made up from genes and DNA. Reproduction and natural gene mutations create small variations in populations. Some of these variations prove advantageous and those individuals survive well. Over time those characteristics, that have particular advantages, become widespread and normal adaptations. This is how natural selection works.

Why is a certain animal a certain color? Does it help it survive? Why do certain animals have certain external features? Do they help with hunting and survival? The answer is *Yes!* This activity will clearly demonstrate this to your students.

Directions

- Review animal adaptations with your students. You may want to use some of the videos on our website. Look for them on the Video tabs on the lesson plan here:
<http://www.greatbasinobservatory.org/lesson-plans/who-fittest>
- Review the concepts of predator and prey. Prey are animals that other animals hunt and eat to survive. Predators must hunt and eat animals for survival.
- Introduce your students to the idea of natural selection. Natural selection is what allows animals that are best suited for an environment to survive, while others can not compete as well. These others may die off. Therefore the animals most well adapted to specific environments survive and thrive over time.
- Tell students that in this activity you will be examining what **prey** will survive best in an environment due to their **color**. Ask, “*why is the color of an animal important?*” If an animal blends in well to it’s environment it will be camouflaged, or hidden, and be less likely to be eaten. Remind students that color is an external feature of an animal.
- We will also be looking at external features that **predators** have that help them survive. Ask, “*what features can you think of that help predators survive?*” Make a list on the board. Features can be items such as– claws, sharp teeth, long legs for jumping, excellent eyes, ears, and nose for finding prey,
- Now explain the activity. You will be doing a challenge to see which prey has the best adaptation to survive. The prey will be m&ms in different colors– blue, green, brown, red, yellow, and orange. The environment they need to survive in is a grassy field.
- You will also be testing which predator is best adapted to hunt our m&m prey. The adaptations, or external features for hunting, we will be testing will be chopsticks, spoons, forks, and knives. *How could these represent real external features on animals?* Claws, mouth parts, ...
- Split the class into 4 groups. Assign a team leader for each group. Groups should have the same number of individuals in them to be fair in the challenge.
- Give each person in each group their adaptation utensil. Group 1– chopsticks, Group 2—forks, Group 3—knives, Group 4—spoons.
- Give each team leader a cup.
- Set up a border on the grassy field with the cones to delineate the hunting ground. A 10 by 10 or slightly larger space should work well.
- Set up the challenge. After you throw the m&ms into the space, all students will rush in to *hunt*. Students should place the m&ms into the group leaders cup as they *hunt*.
- **Important:** Tell students that they can only use their adaptation to hunt! If they use something else you will disqualify them. Students may only use one hand with the forks, knives, and spoons. They may not use any other body part other than their one hand holding the utensil– or you will disqualify them. Chopsticks can use one in each hand if they want. You will set a time, and allow students to only hunt until the time is called.
- Throw the m&ms as evenly as possible into the space.
- Let students all run into the space at once to pick up as many m&ms as possible and place the m&ms into the group leaders cup.
- Call the end of the activity. You may want to give students about 2-5 minutes to hunt. About half or less of the m&ms will be collected.
- Collect the cups of m&ms and have students help pick up the remaining m&ms in the grass to be tossed into the garbage.

Directions continued

- Return to the classroom.
- Pass a Lab Sheet to each student.
- Have each team leader place the m&ms into piles by color on their desk.
- As a class fill out the Lab Sheet together, by asking each team leader how many of each color m&m they collected and filling in the Lab Sheet as you go.
- Now the students are scientists. The Lab Sheet is their data. What do they observe? What can they conclude from looking at the results of the experiment?
- Which prey survived the best? Which was eaten the most? Why?
- Which hunting adaptation worked the best? Which adaptation did not work? Why?
- What would students expect to happen if these were the animals in a given environment? How would natural selection work over time? Who would survive? Who would die out?

Extension

- Discuss with students how long they think natural selection takes to occur. Point them towards the idea that usually it takes a very long time– tens of thousands of years.
- Ask students, *do you think humans can ever observe natural selection?* Usually we cannot. But, there have been some instances that we have.
- Show the video titled, Storytime A Very Special Moth.
- After the video discuss what type of animals may change quickly and why. Organisms that have quick reproductive cycles have opportunity to adapt more quickly.
- Now challenge students to think about how a particular environment may change through human and non-human events. Ask them to brainstorm in groups how fast and slow environmental changes could effect organisms through natural selection.
- Walk around and check for understanding.
- End with a group discussion about why some species adapt quicker or slower to environmental changes. Remind students that most natural selection occurs over thousands of years, the moth story was extremely unusual. What does this mean when humans change an environment quickly. *Can most species adapt?*