



LESSON OBJECTIVE

- Students will learn about how some animal behaviors help species survive and be more successful at reproduction.

GRADE

- 8

STANDARDS

- Life Science

TIME REQUIRED

- 60-90 min

VOCABULARY

- Adaptation
- Natural selection
- Evolutionary fitness
- Adaptive evolution
- Gestation
- Biodiversity

MATERIALS

- Scissors

RECOMMENDED ASSESSMENT

- Student Handout

Introduction

Students will be tested on their knowledge of animal adaptations, use empirical evidence to create an argument for the best behaviors for successful reproduction in animals, and can then play a matching game that connects animal adaptations and behaviors with plant adaptations.

State Standards

MS-LS1-4: Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors affect the probability of successful reproduction of animals.

Lesson Plan

Background Knowledge –

- *Adaptation*: a feature with a genetic basis that improves the survival, reproductive success, and therefore fitness of an individual. Adaptations are traits that exist within a population at high frequency due to the process of natural selection.

Natural selection is a process in which organisms with favorable traits are more likely to survive and reproduce. This process increases or decreases certain biological traits within a population, thereby selecting for individuals with greater evolutionary fitness (fitness is about success at surviving and reproducing, not about exercise and strength). Natural selection drives adaptive evolution by selecting for and increasing the occurrence of beneficial traits in a population.

Activity –

1. Review with students the ideas of animal adaptations and natural selection (above). It's all about survival: if an animal can survive, it has a better chance of reproducing. Remember that some animal adaptations/traits are innate (hereditary) and some are learned (acquired).
2. Split students into groups for 3-4 for this activity. Students will need a sheet of paper for the first activity, which will be a trivia quiz. Students should work as a group to come up with as many correct responses as possible.
 - a. There are many different traits and behaviors that help animals survive. Read out each category and have the students come up with **examples** for each category (THINK: how does that trait help the animal survive and successfully reproduce?). They will

get points for each correct answer. Some correct responses are listed after each category.

- 100 points: Animal appearance (Ask: "How does an animal's appearance help it to survive? List as many examples as you can think of.")
 - Ex: camouflage to avoid predators or to hunt prey, bright colors to indicate poisonous status/attract a mate
 - 100 points: Vocalizations
 - Ex: mating calls, warning calls to indicate predator nearby
 - 200 points: Gestation time (pregnancy time) and number of offspring produced at one time
 - More babies = higher chance of survival; faster birthrate = more chances to have babies
 - 200 points: Courtship behavior
 - Fighting between males, mate guarding/territorial behaviors, group hierarchy, feather display/animal dances (think Peacocks)
 - 300 points: Chemical secretions
 - Skunk warning spray, pheromones to attract a mate
 - 300 points: Acquired traits/learned skills
 - Polar bears learning to swim, animals learning how to hunt, raccoons learning how to open trash cans, etc.
 - 400 points: Parental investment/energy and effort given by the parents
 - Elephants raise young in groups, male seahorses carry young in their pouch, birds bring food back to their nest for babies, dolphins teach their young where to find food
 - 400 points: Asexual reproduction
 - Animals that can do this include sharks, Komodo dragons, starfish, some types of crayfish and other fish, some ants, and wasps
 - 500 points: Biodiversity/reproductive isolation
 - The variety of life in a particular area and the animal's ability to adapt to different mating locations/times/or rituals depending on the variety of life there
- b. Students should add up their points and see which team won. They will continue to work in these teams for the next part.
3. Next, project the animal behaviors page onto the board. Read through these as a class or have each group read through them.
 4. Students will be using the handout to organize their thoughts. They will go through the 7 different example animal scenarios and choose which organism their group believes has the best behaviors for reproductive success. They will create an argument to defend their position.
 5. Students can present these to the class if there is time.



Animal Behaviors



Post Activity –

Matching game: Cut out the sets of animals, plants, and descriptions. There are 5 sets of organisms and descriptions, each with unique evidence and challenges. Have students try to match all 5 sets. If there is extra time, have them explain what evidence they used to match them.

Discover Further

Extending the Lesson –

Have the students turn their arguments into an essay.

Learn More –

The Fort Wayne Children's Zoo has 81 species that are currently participating in Species Survival Plans, which includes special breeding programs to ensure the survival of endangered species and the genetic diversity in zoo-dwelling populations. Learn more about the zoo's conservation programs at kidszoo.org/conservation/.



Emperor penguins: Once a female lays an egg, she gives it to the male. He then keeps the egg warm by balancing it on his feet and under a fold of skin, not eating or doing anything else until it hatches two months later. When the female gets back from hunting at sea, she feeds the chick, and the male can take his turn exploring and feeding.



African bullfrogs: females lay their 4,000 eggs in a shallow pond or puddle. Males will guard the pool and if it starts to dry up, they will dig a canal to a new water source to keep the eggs from drying out.



Bowerbirds: Male bowerbirds have a fancy dance to woo the lady birds. They will also decorate their nests with anything they can find (plastic, your car keys, string, and more). Female birds choose their mate based on how well he has danced and decorated.



Octopuses: Some species can lay between 50,000 to 200,000 eggs at once. After laying the eggs, the mother octopus will organize them based on things like shape, size, and how big of a chance she feels they have of surviving. Then, she sits on and around the eggs for two months protecting them and pushing fresh water towards them. This is so exhausting that she will likely die once the eggs hatch.



Killdeer birds: Mother killdeer birds put a lot at risk to raise their chicks. When a predator gets too close to her nest for comfort, she will exit the nest and pretend she has a broken wing, while walking/waddling/hopping away.



Elephants: Herds take raising a baby seriously. The whole herd will help the mother care for the baby. It takes quite a bit of time and energy for the herd to watch one or two newborns so carefully, but as they say, "It takes a village to raise a child."



Brown-headed cowbirds: Instead of raising their offspring themselves, they have surrogate mothers raise them. They will lay their eggs in another bird's nest and let the other mother bird raise them. She will stick around to make sure her babies are being properly cared for by their surrogate mother and will attack the nest if she feels like they aren't getting the care they need.

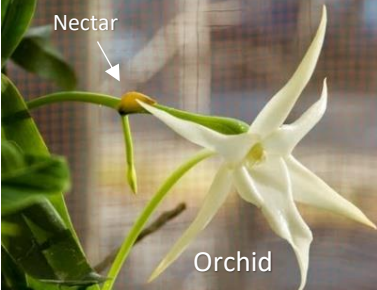











Group Members: _____

Directions: In your group, read the descriptions for how each different organism behaves to help increase the chances of successful reproduction. Choose the organism that you believe has the best behaviors for being successful at raising their young. Create an argument using the guide below to defend your position.

Claim	Support	Counterclaim & Rebuttal
<p><i>Which organism has the best behaviors for reproduction?</i></p>	<p><i>Defend your claim, using evidence and logical reasoning (real life experiences, etc.)</i></p>	<p><i>The counterclaim is the opposite of your claim. What would people with different opinions argue to discredit your claim? The rebuttal is where you explain how/why the counterclaim is wrong.</i></p>
<p>Conclusion: <i>This is where you summarize your whole argument.</i></p>		



<p>This flower only allows very specific organisms to pollinate it. The nectar is far back in the flower, requiring a very long tongue to access delicious nectar hidden inside.</p>	 <p>Nectar</p> <p>Orchid</p>	 <p>Darwin's Moth</p>
<p>This plant has brightly colored flowers with a wide opening for access to the nectar. They are often curved or drooping slightly, so the organism that pollinates when accessing the nectar must have a feeding structure to accommodate this.</p>	 <p>Hook-billed Hummingbird</p>	 <p>Mitre Flower</p>
<p>This small island tree has fruits about the size of a lemon. When they fall to the ground, they are eaten by an animal with strong jaws. When the animal digests the fruit, the seeds are protected by their tough outer layer. This way, when the animal defecates, the seeds are dispersed.</p>	 <p>Galapagos Tortoise</p>	 <p>Guava Tree</p>
<p>These trees have fruits that have a very hard outer shell. Small animals often bury the fruits, but never retrieve them, which can lead to germination (growth).</p>	 <p>Squirrel</p>	 <p>Walnut Tree</p>
<p>The berries of this plant are not only eaten by other organisms, but they are also sticky. When the berries are digested, the seeds stay intact and are dispersed through waste. When the berries stick to an organism, they are often rubbed off in new locations.</p>	 <p>Phainopepla</p>	 <p>Mistletoe</p>

<p>This flower's fruit smells like rotting flesh, which lures and traps flies to it. The flies attract other animals, who end up eating some of the fruit. The seeds spend time in the animal's stomach, making them more likely to germinate when the animal defecates and leaves them behind.</p>	 <p>Lilford's Wall Lizard</p>	 <p>Dead Horse Arum</p>
<p>This leafy plant seems like a great meal for caterpillars, but when attacked, it gives off a chemical smell to alert another animal to come to its defense. The animal stings the caterpillars and lays eggs on them, which hatch and eat the caterpillar from the inside out.</p>	 <p>Paper Wasp</p>	 <p>Tobacco Plant</p>
<p>This spikey tree has an army of protectors who will attack any creatures who try to eat it. In exchange, the tree provides sweet nectar to eat and hollow thorns to live in.</p>	 <p>Ant</p>	 <p>Acacia Tree</p>
<p>This animal has stinging tentacles. One animal is immune to the sting and uses the tentacle animal as a home to stay safe from predators. The animal will help keep its home free of parasites and their bright color attracts small prey for its home to eat.</p>	 <p>Clown Fish</p>	 <p>Anemone</p>
<p>This microscopic organism is eaten by an animal that can't digest food. The organism gives the animal the energy it needs to survive, and the animal spends part of its day in the sun, so the organism gets the sunlight it needs to grow inside of the animal.</p>	 <p>Mint Sauce Worm</p>	 <p>Algae</p>



Animal Behaviors

