

# Variation and Heredity

### Objectives

You will be able to

- Identify animal behaviors and plant structures that are associated with reproduction.
- Construct an argument identifying the correct explanation for how an animal behavior results in successful reproduction.
- Summarize key points in video clips.
- Debate competing ideas with peers.
- Listen to others' ideas.
- Construct an argument based on evidence.



How do the environment and genetics affect who we are and how we are similar or different?

### **Evaluation and Feedback**

To evaluate your work, you will

- Use the "Engaging in Arguments from Evidence" row of the Science and Engineering Practices Rubric.
- Use other criteria determined by your teacher.

# **Task 2: Traits Leading to Successful Reproduction**

### As a group:

- Watch video clips to determine different animal behaviors that help animals successfully reproduce.
- Watch video clips to determine how specialized plant structures help plants successfully reproduce.
- Analyze guppy mating data and make an argument about why female guppies prefer certain male traits when predators are absent and when they are present.

#### Vocabulary

- attract
- life cycle
- mate
- mating
- offspring
- ovaries
- plant structure
- pollen
- pollination
- predator
- seed dispersal
- successful reproduction

### Connect to the Culminating Project

Plan and organize your children's book in your Individual Project Organizer:

- Decide on two traits your main character has that will help attract a mate.
- Identify behaviors of the parents or offspring that help the offspring survive.



### Introduction

In the previous task, you conducted an experiment that illustrated how certain traits, like plant growth, can be influenced by the environment. Traits can also be influenced by genetics, which are passed on from parent to child. One of the most important characteristics of life is this passing on of traits from parent to child, otherwise known as *reproduction*. Organisms have certain traits that help them reproduce more successfully, and that is what you will be exploring today.

• Attracting a mate in order to create offspring is an important part of every organism's life cycle. Can you think of any traits (physical or behavioral) of plants and animals you have seen that may help them attract a mate?

### Part I • Explore How Animal Behavior Helps Animals Successfully Reproduce

Watch these four video clips. Then answer the two questions that follow for **each** video clip.

Video clips:

- Pronghorn bucks battle for dominance: <u>https://youtu.be/qJ9s6WF68LQ</u>
- Peacock mating dance display: <u>https://youtu.be/jTBHiZtnCsA</u>
- Matriarch Elephants Protect Baby Elephant from Crocodile Attack: <u>https://youtu.be/BGY0BHmjEtg</u>
- Amazing Animal Babies: Emperor Penguin Chicks: https://youtu.be/lf26jtJfL30
- 1. What animal behaviors are the animals displaying in the video?



2. Cause and Effect: How does the behavior attract a mate or help the babies survive?





# Part II • Explore How Specialized Plant Structures Help Plants Successfully Reproduce

#### A. Introduction to Plant Reproduction

Watch these two video clips to introduce you to the process of plant reproduction.

Video clips:

Flower Reproduction: <u>https://youtu.be/YqM6rgB\_l\_o</u> Pollination Rock: <u>https://youtu.be/V5yya4elRLw</u>

### Analysis:

- 1. On the diagram of a flower below, use red to color in the area where the pollen (flower sperm) is made.
- 2. On the diagram below, use green to color in the area where the ovaries (eggs) are found.



3. Write a brief description of pollination and its role in plant reproduction.





#### **B. Successful Reproduction**

Watch the following four video clips. Then answer the two questions that follow for **each** video clip.

Video clips:

Seed Dispersal: <u>https://youtu.be/j1hRxuy1ezQ</u> Biggest Flower in the world: <u>https://youtu.be/FHaWu2rcP94</u> Butterfly pollination: <u>https://youtu.be/gLJIcKpzH5E</u> Pine pollen blown by the wind: <u>https://youtu.be/V\_9palHvAIc</u>

Analysis:

1. What did you observe in the video about the plant or about the animals around the plant?



2. **Cause and Effect:** How does the **plant structure** or **animal behavior around the plant** help the plant successfully reproduce?





# Part III • Analyze Guppy Mating Data

- Female guppies always choose their male guppy mate. Watch the video clip, which shows a male guppy doing a mating dance for a female guppy. Video clip: <u>https://youtu.be/1tKOIc0qReQ</u>
- 2. Two scientists studied guppy mating habits while predators were around (PRESENT) and when predators were not around (ABSENT). A **predator** is a fish that wants to eat a guppy. A guppy predator is a **cichlid**.



The data below shows the traits female guppies prefer in male guppies when predators are **absent** and when they are **present**.

Type of Male	Percent of Time Female Chooses a Male When Predators Are	
	Absent	Present
Colorful	55	24
Drab (dull or not colorful)	12	44
Lots of Orange Spots (physically fit)	33	32



# Traits Leading to Successful Reproduction

- 3. These scientists then compared each other's data and came up with two different arguments to explain what is happening with guppy mating. Read the arguments below and discuss which you think is better and why.
  - Scientist 1: Female guppies choose to mate with the most brightly colored males simply because they are easier to spot and imply good genes, no matter whether predators are present or not. The only reason females would not choose these colorful males is if they were all eaten by predators. This choice of mates makes their offspring more likely to have bright colors, attract mates, and reproduce in the future.
  - Scientist 2: Female guppies prefer orange-spotted males for the physically-fit genes they will pass on to their offspring. They prefer colorful males because their offspring would then be flashier and more likely to reproduce; this is especially true when predators are absent. When predators are present, females choose colorful males less often because they know that they are more easily seen and thus eaten more often by predators; by choosing a drab male, females help their offspring's chance of survival.
- 4. Using the scientific ideas you learned in Part I and Part II of this task, as well as the data above:



- **Cause and Effect:** Choose the better argument and use the evidence provided to write your own scientific argument to explain **why female guppies prefer certain male traits when predators are absent or present**.
- Use the claim, evidence, reasoning format.

### REFLECT

At the beginning of this task, you were asked whether you could think of any traits (physical or behavioral) of plants and animals you have seen that may help them attract a mate. Look back at your response. Is there anything you can add to your answer based on what you have learned through this task? What types of examples had you never thought about before this task?

### Part IV • Connect to the Culminating Project and Assessment

Complete the Individual Project Organizer for this task.

