

Lesson: Pollinator Relay

Grade Level: Second Grade, Life Sciences

Overview: In this lesson, students will learn how honeybees pollinate flowers. Students will also learn how different types of flowers have unique blends of pollen nutrition. Pollen provides bees with a blend of protein and lipids. Just like humans, our food sources are full of nutrients and give us energy throughout the day. Students will demonstrate understanding of bee pollination by embodying honeybees. The teacher will guide students outside to model bee pollination by playing the game, *Pollinator Relay*. Students will act as a colony of bees in beehives. There will be flower buckets acting as a cluster of different types of flowers. Each bucket will be full of pollen balls, (ping pong balls). The flower buckets will be located around the beehive. One bee at a time will leave the hive to collect pollen. The goal is for students to work together and to collect as much pollen as possible. Students will also receive “extra pollen points” when collecting different types of pollen that are enriched with high protein.

Science Content & Standards:

Pennsylvania New Academic Standards for Science-

<https://www.pdesas.org/Page/Viewer/ViewPage/11>

Life Science: Ecosystems: Interactions, Energy, and Dynamics

Standard- 2-LS2-2: Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

Science Practices:

APPENDIX F – Science and Engineering Practices in the NGSS

<https://www.nextgenscience.org/sites/default/files/Appendix%20F%20%20Science%20and%20Engineering%20Practices%20in%20the%20NGSS%20-%20FINAL%20060513.pdf>

Practice 2 Developing and Using Models

- Develop and/or use models to describe and/or predict phenomena.
- Use a model to test cause and effect relationships or interactions concerning the functioning of a natural or designed system.

Practice 4 Analyzing and Interpreting Data

- Analyze and interpret data to make sense of phenomena, using logical reasoning, mathematics, and/or computation.
- Compare and contrast data collected by different groups in order to discuss similarities and differences in their findings.

Math Content & Standards:

Pennsylvania Academic Standards for Mathematics-

<https://www.stateboard.education.pa.gov/Documents/Regulations%20and%20Statements/State%20Academic%20Standards/PA%20Core%20Math%20Standards.pdf>

2.2 Algebraic Concepts

2.4 Measurement, Data, and Probability

Standard- CC.2.2.2.A.2 Use mental strategies to add and subtract within 20.

Standard- CC.2.4.2.A.4 Represent and interpret data using line plots, picture graphs, and bar graphs.

Math Practices:

Pennsylvania Common Core State Standards for Mathematical Practices.

https://static.pdesas.org/content/documents/Math_Practices_and_Grade_Progressions_rev%201-24-13.pdf

- Model with mathematics.
- Make sense of problems and persevere in solving them.

Science & Math Connection:

<https://static.nsta.org/ngss/PracticesVennDiagram.pdf>

Relationships and Convergences Found in the Common Core State Standards in Mathematics (practices), Common Core State Standards in ELA/Literacy*(student portraits), and A Framework for K-12 Science Education (science & engineering practices) *Venn Diagram NSTA Science, Math, & ELA*

- M4.Model with mathematics
- S5. Use mathematics & computational thinking

Materials:

- 3-4 hula hoops, (optional- something that can be used to act as bee-hive zones for each group.)
- Different color ping pong balls or other small balls to act as pollen, (30-150 count total).
- 4-5 buckets or bowls, (flower stations)
- pencils

Resources:

- "Pollen Relay Graph Worksheet"
- "Pollinator Relay Student Guide"
- Read aloud, *Summer's Flight, Pollen's Delight.: Meet the Bees, Butterflies, Birds and other Creatures Who Keep Our World Green and Alive!* By Flora Caputo
<https://www.amazon.com/Summers-Flight-Pollens-Delight-Butterflies/dp/169624899X>
- Student resource video, "How Pollination Works" <https://youtu.be/qWc8X6YeTv8>

Learning Objectives:

- Students will learn about the importance of bee pollination.
- Students will act and model as bees collecting pollen for their hive.
- Students will work in teams to collect pollen/data.
- Students will take collected data and create a bar graph.

Procedure:

- 1.) The teacher will introduce the lesson by showing the short video, *"How Pollination Works"*
- 2.) The teacher will have a classroom discussion post video to explain how bees collect pollen.
- 3.) The teacher will guide students into explaining directions and rules for the Pollen Relay game.
(Please follow game directions below.)
- 4.) The teacher will take students outside and model how to play the game.
- 5.) Students will be placed in small teams and each group should be stationed at a "beehive", (hula-hoop).
- 6.) Give teams time before the game to brainstorm ideas on collecting pollen. The goal is to collect as many pollen points as possible.
- 7.) Give students 15-20 minutes to collect pollen and play the game.
- 8.) At the end, have students count how much pollen each team has collected.
- 9.) When the relay is completed, give students time to complete the Pollen Relay Bar Graph worksheet.
- 10.) The teacher can end the lesson by guiding students in a review discussion and reading out loud the book, *"Summer's Flight, Pollen's Delight"* by Flora Caputo.

**Game Directions-
Pollen Relay**

Set-up: Use the following diagram to set-up the Pollen Relay game. The hula hoops will be used as the team's hive. The buckets will be used as the flower stations to collect pollen. The yellow ping pong balls will be the main source of pollen. The other two color ping pong balls will be higher in protein and will be for extra points. The buckets will represent a cluster of different types of flowers. Fill each bucket with the yellow ping pong balls and a few high protein pollen balls.

The Goal: For each hive to collect as many pollen points as possible.

Directions: One person from each group will run to a flower bucket and collect one pollen ball at a time. That person will run back to their hive and place the pollen ball inside the hive, hula hoop. Once that person has completed collecting pollen, the next bee in the hive will go. Bees will go till time is called.

The Rules:

- All students will participate by acting as bees.
- Each group is in charge of their own collection of pollen.
- Only one bee can leave the hive at a time.
- **IF** pollen falls out of the designated hive area then the bees can not collect that pollen again.
- **IF** a bee is collecting pollen and drops the pollen before entering the hive, **THEN** that pollen can not be collected. The bee will have to return to the hive with no pollen.

Pollen Relay Game Set-up

