South Dakota State University Extension

Level: 1st-3rd Grades

INVESTIGATE POLLINATORS

Overview: In this lesson, youth will learn about the importance of pollinators and the plants they interact with.

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The Grow Getters Program originated as a Master Gardener project in 2020 and is now a multi-departmental effort among SDSU Extension staff and volunteers.

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Activities in this Lesson

- **Science Activity 1:** Pollination Players
- **Science Activity 2:** Seed Balls for Pollinators
- **Nutrition Activity:** Buzzing Bee Honey
- **Physical Activity:** Buzz, Buzz, Hive!

South Dakota Educational Standards

- **Science:**
  - **SEP: 2; DCI: LS2.A, ETS1.B; CCC: Structure/Function** Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.
- **Health:**
  - **4.2.2** Display listening skills to enhance health.
- **Physical Education:**
  - **S5.E4.2** Identifies the positive social interactions that come when engaged with others in physical activity.

Book

Books may be available at school or community libraries.

Flower Talk: How Plants Use Color to Communicate, by Sara Levine

Levine shows the readers the significance of different colors of flowers in terms of which pollinators (bees, bats, birds, etc.) different colors "talk" to.

- Purchase the book: Flower Talk: How Plants Use Color to Communicate
- Watch: Flower Talk: How Plants Use Color to Communicate read aloud by Riko's Reading Room
- Consider these follow-up questions:
  - What are some examples of pollinators? Bees, bats, birds
  - Do all flowers produce pollen? No
  - Why do flowers have different colors and scents? Flowers contain different pigments which produce different colors and scents come from different chemicals. Different pollinators are attracted by different scents.

Vocabulary:

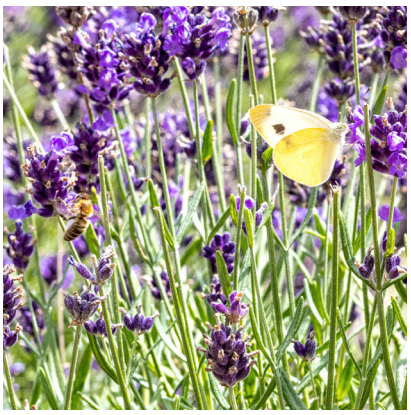
- **Antennae:** the smelling body parts of a bee that allow it to detect floral perfumes (smells)
- **Chrysalis:** the transitional stage between the caterpillar and butterfly where the caterpillar forms a protective covering around itself
- **Hive:** a special type of nest built by a group of bees
- **Nectar:** Sweet liquid made by plants, usually in the flowers to help attract pollinators
- **Pollen:** a powdery substance, usually yellow or orange in color, which is found within flowers, it is necessary for plants to make new seeds
- **Pollination:** the transfer of pollen within the same flower and between different flowers which helps in producing seeds; this can be done by animals, wind, or humans
- **Pollinator:** any animal that carries pollen from one place to another

POLLINATION PLAYERS

Science Activity
1st-3rd Grades

Students demonstrate the process of pollination by drawing and ordering the different pollination process "players" (plants, pollen, and flowers).

Time: 30 minutes



Materials

- Paper
- Coloring tool: crayons, pencils, markers, and/or erasers
- Tape

Instructions:

Teacher Tip: Start with this video, "Pollination for Kids" by Homeschool Pop on YouTube for a short lesson about pollination.

1. Assign each student one of three "pollination players": plants, flowers, or pollinators.
2. Have each child draw a picture of the pollination player they were assigned. Encourage students to be creative and draw whichever flower, plant, or pollinator comes to their mind.
   a. Teacher tip: Explain that there could be many correct different examples. Provide examples to the students in the pollinator group, such as bees, butterflies, bats, birds, flies, people, wind, etc.
3. Once they are done drawing, ask students to get up with their picture and find a group of three – one plant, one flower, and one pollinator.
4. Ask the students to stand in the order of what they think comes first, second, and third in the pollination process, holding their pictures.
   a. Optional: have students tape or pin their photos to a wall or bulletin board in the correct order.
   b. Teacher tip: The correct order is "plant, flower, pollinator", because a plant grows first, then a flower comes, and then the pollinator comes to the flower for pollen.

Guiding Questions:

Immediately after the setup:

- Ask: What is pollination?
  - Pollination is a very important part of the life cycle of plants. Pollinators, like insects, birds, bats and the wind, take pollen from flowering plants to other flowering plants, so the plants can make seeds and reproduce.

During the experiment:

- Ask: Are all insects pollinators?
  - No

- Ask: What factors affect flowering in plants?
  - Time, temperature, heat, water, etc.

After the activity:

- Ask: What flowers have you seen and what do they look like? What types of flowers do you think insects would like?
  - Let the children discuss different shapes, colors, and sizes of flowers that they think insects would be attracted to. Consider looking at pictures of flowers within garden magazines or seed catalogs.

- Ask: Can plants survive during winters?
  - Some plants do not survive cold winter temperatures, but some go dormant and can grow again in the spring

SEED BALLS FOR POLLINATORS

Science Activity
PreK-3rd Grades

In this activity, students will create seed balls to grow plants pollinators will love.

Time: 30 minutes

Materials

Teacher Tip: For estimating "parts", if one "part" is equal to one cup, this should make about 30 seed balls.

- 2 parts potting soil
- 5 parts pottery clay mix from your local art store
- 1-2 parts water
- 1-2 parts pollinator seeds of your choice
  - Examples of fast-growing annuals: Cosmos, bachelor's buttons, sweet alyssum, zinnia, dill, and sunflowers
  - Examples of native perennials: Bee balm, milkweed, liatris, and prairie clover
  - Recommendation: Try to provide 4-5 different types of seeds.
  - Seeds can be sourced from local garden centers, online native plant catalogs, and even local agricultural cooperatives may sell native perennial flower seeds.
  - Teacher Tip: For more information on native plants in South Dakota visit sdstate.edu/npi
- Liquid measuring cup
- Large tub to mix ingredient
- Large box to dry and store seed balls

Instructions:

1. Lay out all of the materials in a way that students can reach everything and help.
2. Using the large tub, help students mix the soil, clay, and 1-part water well so that there are no lumps. You may want to have several tubs and encourage students to work in pairs or small groups.
3. Have the students slowly add more water until the mixture has the consistency of modeling clay.
4. Next, ask the students to add the seeds to their mixture. Encourage students to examine the different seeds as they are mixing them in. Have the students knead the dough with their hands until the seeds are well mixed and add more water if needed.
5. Instruct the students to make seed balls about one-inch in diameter (or about the size or a marble to golf ball) by taking some of the clay mixture and rolling it into a ball in their hands. Show them an example.
6. If storing: Place the seed balls in the box and let dry for 24-48 hours.
   a. Teacher tip: You may choose to have students check the seed balls each day to determine if they are dry. store seed balls in plastic containers with lids versus plastic bags so they don't get crushed.
7. If planting immediately: Plant the seed balls on bare ground by tossing them on top of the soil. Teacher tip: This can be a fun activity for students. Let them go one at a time to stretch out the fun. Don't bury or water the balls.

Guiding Questions:

Immediately after setup:

- Ask: What is a seed ball?
  - A seed ball is a ball made of clay, earth, and seeds which is used to replant areas where there are little to no flowering plants.

During the Activity:

- Ask: How would you describe the different seeds?
  - Encourage students to discuss the colors, shapes, and sizes of the seeds.

After the Activity:

- Ask: What do flowers provide to pollinators?
  - Food, water, and shelter.

- Ask: Where can you plant your seed ball?
  - Discuss placing it in the garden or somewhere in their yard or placing it somewhere on the school grounds (with permission) to watch for seeds in the future.

BUZZING BEE HONEY

Nutrition Activity
PreK-3rd Grades

In this activity, students will sample honeys from different sources to observe differences.

Time: 20 minutes

Materials

- Different types of honey, small or sample-size bottles (4-5 are recommended)
  - Sourcing: State and regionally produced honey can be found at local food or gift shops, restaurants, farms, food hubs, or farmer's markets. Many grocery stores do also sell local honey or honey produced across the US.
  - Teacher tip: Some honey producers list the type of plants the bees used for making the honey; the different plants result in unique honey flavors. Consider looking at the honey websites ahead of time to see if you can find this information for comparison.
- Craft sticks or spoons
- Note taking supplies: Paper and pencils

Instructions:

Teacher Tip: start with a helpful video on how bees make honey, such as one of the following:

- "How Do Bees Make Honey?" by Peekaboo Kidz on YouTube
- "Busy Bees!" by SciShow Kids on YouTube

1. Before removing the honey from the jars or bottles, have the students observe the different honeys to notice any differences, such as color or transparency.
2. Instruct the students to dip spoons or craft sticks into one honey jar.
3. For younger learners, have them describe verbally the taste, texture, consistency, etc. For older learners, ask them to quietly write down their observations on a piece of paper.
4. Repeat steps 3 and 4 for each honey. Teacher tip: This could also be accomplished with rotating through the different honeys as stations in small groups.
5. When through all the honeys, discuss the differences the students noticed. Students could also discuss or vote on the honey they like the least or the most.

Guiding Questions:

Immediately after setup:

- Ask: What is honeybee farming called?
  - Apiculture or beekeeping

- Optional: show a photo of a honeybee farm/hive. Ask: does this look like what you expected a honeybee hive to look like? Have you seen a honeybee hive in a field when they drive through the country?
  - Answers will vary.

- Ask: What is the state insect of South Dakota?
  - The Honeybee

During the Activity:

- Ask: Can you guess how many different types of honey there are in the US?
  - More than 300!

After the activity

- Ask: Why do you think bees that eat from different plants produce different flavors of honey?
  - The color and flavor of kinds of honey differ depending on the nectar source (the blossoms) visited by the honey bees.

Modification notes:

Advanced: Engage the students in a discussion of differences among the honey by where it is was produced using a map of SD or the region or country.

Advanced: Share any information about the honey farms that come from the labels or your own research to help the children understand more about local farming practices and the difference between honeys.

Extension: Walk through the “Fun Facts About Bees” sheet.

Extension: Print and color the “South Dakota State Symbols Activity Map” from Simple Living Creative Learning.

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GROW GETTERS

FUN FACTS ABOUT BEES AND HONEY

South Dakota is the second leading honey producer in the US.

Properly sealed and stored honey can last thousands of years because most microorganisms can't grow in it. Honey that was discovered in Egyptian Tombs and over 5,000 years old was still edible!

A single bee will produce less than a teaspoonful of honey in her lifetime

In the United States, the month of September is known as Honey Month. Honey Month was created to help promote and celebrate beekeepers and beekeeping.

This material was funded by USDA's Supplemental Nutrition Assistance Program - SNAP.

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BUZZ, BUZZ, HIVE!

Physical Activity
PreK-3rd Grades

Students play a Honeybee version of the popular game “Duck, Duck, Goose”.

Time: 15 minutes

Materials

- Wings and antennae costume pieces or other items to identify two teams (e.g., jerseys, or stickers)

Instructions

Teacher tip: Start with the following video to get students thinking about how bees fly. “How do Bees Fly” by FoxAndBeeMedia on YouTube.

1. Ask students to sit in a circle, either inside or outside. Tell them they are now sitting in their “hive”.
2. Place students in two groups of “honeybees” by giving every other student either antennae or wings, or other team identifiers. Let them know they are all now “honeybees” on two different teams.
3. Select one student to go first. This student “flies around the hive” (walks laps around the circle of students) and taps each “honeybee” on the shoulder, saying “BUZZ”.
4. At any point while “flying around the hive,” (on the first lap or after several laps) the student exclaims “HIVE!” while tapping on a student of the opposite team and begins to run around the hive. Ensure that students know to only select someone from the other honeybee team.
5. The honeybee selected gets up and attempts to tag the first honeybee before the first honeybee sits down into the open spot in the “hive” (circle).
   a. If the honeybee gets back before getting tagged the new honeybee becomes “it” and continues by selecting another honeybee (from the other team).
   b. If the honeybee is tagged before getting to the open spot in the hive, they are now “out of the hive” and sit off to the side.
6. The game continues until only members of one honeybee team remain in the hive. This team has now won and “rules the hive”.

Modification Notes:

- **Modification:** For a group of students including students with mobility impairments, a ball or other soft object could be passed around the “hive” in place or walking/running laps. A timer could be used to simulate a runner’s speed, and a specific time limit would provide the goal necessary to complete the activity, or “tagging”. For example, a student selected as the honeybee would begin passing the ball around the circle and announce Hive. Then, the group would have 15 seconds to get the ball around the circle and back to the honeybee’s space.

Additional Resources

If you liked this lesson, you may also like these other educational materials from SDSU Extension.

Nutrition and Physical Activity

- Pick it! Try it! Like it! Preserve it! materials are filled with tips for selecting, preparing, and preserving a wide variety of fruits and vegetables. Colorful fact sheets, recipe cards, and educational videos provide educators and families with fun, engaging tools to enhance any dietary curriculum!
- Growing Active Readers is a series of book-based lessons to help young children understand the benefits of making healthy decisions involving nutrition and physical activity.
- South Dakota Farm to School Resource Guide walks through the basics of starting farm to school programs in South Dakota, including local food selling/purchasing, school gardens, and in-class education.
- Preservation this page provides a suite of educational materials and programs offered by SDSU Extension related to food preservation.
- Physical Activity View all SDSU Extension physical activity content.

Horticulture

- Garden and Yard this page provides easy access to all the educational materials and programs related to garden and yard by SDSU Extension. This frequently updated landing page includes sections for fruits, vegetables, problems and solutions, master gardener volunteer program, garden hour, and more.
- Vegetable Gardening in South Dakota this booklet will help you with basic vegetable gardening information and tips to get started.
- Fertilizing Gardens in South Dakota this booklet by SDSU Extension provides information on soil testing, types of fertilizers, and methods of application.
- An Identification Guide to Native Pollinator Plants of South Dakota for Managed Landscapes In this guide, learn about the perennial plants native to South Dakota that attract pollinators and can be incorporated in to gardens.
- Tree Pest Alert stay updated and informed with this weekly resource for selecting, planting, and caring for trees and shrubs all year round.