Brought to you by the Farm Families who own Cabot Creamery Co-operative
THE FUELING HEAD TO TOE PATCH
 teaches children the importance of a healthy lifestyle, one that includes regular physical activity and proper nutrition. The hands-on activities provide kids the practical tips and tools to stay fit and healthy, now and in the future.

THE B CORP PATCH
 teaches kids the importance of strong, healthy communities. The lessons help children understand how they can contribute to their community, and explains how B Corps contribute to the health of their community.

THE GRATITUDE PATCH
 focuses on the importance of expressing gratitude in both what one says and does through one’s actions. The activities guide kids to focus and appreciate the good things and special people in their lives.

THE CO-OPS FOR COMMUNITY PATCH
 will introduce young people to the co-operative model and help them design their own business.

THE CALCIUM CHALLENGE PATCH
 encourages individuals to learn about the importance of calcium in a healthy diet for stronger bones and body.

THE SMALL STEPS TOWARD SUSTAINABILITY PATCH
 encourages youth to make small changes toward a more sustainable home and community by becoming more involved in local efforts.

Several of the patches include activity choices that help scouts fulfill steps for earning girl scout Badges and Daisy Petals. The suggested badges are identified in the patch materials.
Learn More at cabotcheese.coop/patches
Dear Group Leaders and Parents,

The farm families of Cabot Creamery Co-operative and KidsGardening are so pleased that you have chosen to complete the Pollinator Patch with your group!

Our goals for this program are to help your group understand the importance of pollinators in our world and teach them practical ways they can help protect and preserve pollinator populations. As dairy farmers, we understand the importance of pollinators. Without pollinators, our cows wouldn't get to feed on their favorite foods, including clover and alfalfa. In fact, pollinators directly sustain the vital plant communities necessary for grazing cows. So, without pollinators, we might not be able to provide you with our delicious dairy products! We hope you and your group enjoy learning how pollination is connected to most foods we eat every day.

If you and your group enjoy the activities in this booklet, please check out the other free patch programs to help your group learn about the importance of gratitude, how to take small steps toward sustainability, the value of strong communities, and the importance of healthy food choices and exercise. You can find all these resources at cabotcheese.coop/patches.

Please do not hesitate to reach out to healthinfo@cabotcheese.com if you need any assistance as you work on the patch.

The farm families of Cabot Creamery Co-operative and everyone at KidsGardening hope you and your group will enjoy completing this educational patch program.

With Gratitude,

Sara Wing, RD
Director, Wellness & Community Programs

Sarah Pounders
Senior Education Specialist, KidsGardening
GROUP LEADERS

Did you know?

More than 150 of our common food crops, from **Avocados** to **Zucchini**, rely directly on pollinators to move pollen among flowers to facilitate fertilization, which ultimately leads to the development of fruits and seeds. Pollination by bees, hummingbirds, moths, bats, butterflies, flies, and beetles ensures the continued existence of millions of plant species, and in turn, of most animal species, including humans. An estimated one of every three mouthfuls of our food depend on pollinators!

Studies show that pollinator populations throughout the world have been declining, leading to concerns about the future of our food supply. Disruptions to fruit and vegetable crops are what first come to mind, but looking at our food web, we quickly discover that pollinators impact more than our produce aisles. For example, dairy cows consume both clover and alfalfa, two plants that rely on pollinators for successful seed production. This means, a decrease in pollinators could impact the availability of products like milk, cheese, yogurt, and ice cream too!

By completing this Patch Program, you and your group will learn about how choices we make at home and in our communities can help preserve pollinator habitats and protect these small but mighty creatures.

ADDITIONAL RESOURCES FOR LEADERS

Need more background information about pollinators? Review the Apple Pollination Cycle handout, found in the Resource Section, for an explanation of the entire cycle; from a pollinator visiting a flower, to the plant’s production of fruit and seeds.

NEXT STEPS:

Once your group has completed the activities, please fill out the online survey to receive your FREE Patches and Treat Pack! You can find the survey at [emcspritt.survey.fm/pollinator](http://emcspritt.survey.fm/pollinator).

If you have any questions about this patch program, please email [healthinfo@cabotcheese.com](mailto:healthinfo@cabotcheese.com).
Steps to Earning Your Pollinator Patch:

STEP 1: WHAT DO POLLINATORS DO?
STEP 2: WHY ARE POLLINATORS IMPORTANT?
STEP 3: WHY ARE POLLINATOR POPULATIONS IN DECLINE?
STEP 4: HOW CAN WE HELP PROTECT POLLINATORS?

Learning Objectives

When I have earned this patch, I will...

• Understand how pollinators help plants make fruits and seeds.
• Discover the many foods I eat, and products I use, every day that depend on the work of pollinators.
• Be able to identify the insects, birds, and animals that perform the role of pollinator.
• Understand the reasons why pollinator populations are in danger in our environment.
• Recognize the ways I can help protect pollinator habitats and populations.
Many plants need a little help to produce seeds — an essential step if a species is to survive. In order for some types of plants to produce fruit and seeds, pollen from the stamen (the male part) of one flower needs to move to the pistil (the female part) of another flower. This process is called pollination. Sometimes this movement occurs with the help of natural forces like wind or water. However, many flowers rely on animals called pollinators to help with the delivery.

Pollinators may also eat some of the protein and vitamin-rich pollen, but plants produce plenty to share. This partnership is a win-win for both the plant and the pollinator.
Complete at least one of the following activities.

**ACTIVITY ONE**

**COLOR THE ANATOMY OF A FLOWER**
(Picture found in the Resource Section.)
Although flowers look very different, they all share the same basic parts. Most flowers have:

- A pistil which includes the stigma and style leading down to the ovary where seeds are formed.
- Stamens made up of anthers (where pollen is held) and filaments.

In order for the flower to produce seeds, pollen must move from the anther to the stigma. To lure pollinators, such as honeybees, flowers produce sugary nectar in special glands called nectaries, often located at the base of the petals. As pollinators work their way in toward the nectaries to take a sip, they brush up against the anthers, and some of the sticky pollen grains adhere to their bodies. When they visit the next flower, they unintentionally but fortuitously transfer some of the pollen.

**ACTIVITY TWO**

**MAKE YOUR OWN FLOWER**
You can make flowers from any craft materials available to you, such as those suggested below. Using the 'Anatomy of a Flower' handout as a guide, make sure your flower includes petals, sepals, pistil, stamens, and pollen. Be creative about what each structure looks like. For example, you can color and draw patterns on your petals, vary the length and position of pistils, or change the number and arrangement of the stamens. After making your flower, explain how the pollen from the stamen will move to the pistil. Will it be blown by the wind? Or, will it require a pollinator to help — and if so, what type of pollinator?

**Possible Materials Needed**
Assorted craft materials such as construction paper, pipe cleaners, feathers, cotton balls, straws, toothpicks and glitter.
Crafting tools including tape or glue, crayons, markers, and scissors.
Complete at least one of the following activities.

**ACTIVITY ONE**

**POLLINATOR PREFERENCE CHART**

Because attracting pollinators is so important to the survival of plants, flowers have evolved ways to draw their attention. Along with the promise of food, flower petals are often brightly colored and/or patterned and may be broad and flat to provide good “landing pads.” Scent can also provide a means of attraction. Many night-blooming flowers like yuccas and moonflowers give off a pleasant, fruity scent to attract moths and bats. Other flowers, such as trilliums, smell like rotting meat to attract flies.

Use the *Pollinator Preference Chart* in the Resource Section to talk about the flower characteristics that attract some of our common pollinators.

**ACTIVITY TWO**

**PLAY THE FLOWER-POLLINATOR PAIRING GAME**

There are many different animal species that help with pollination. Use the Pollinator and Flower Profile Cards in the Resource Section to play the Flower-Pollinator Pairing Game.

Note: Make enough copies so that everyone in your group has either a Flower Card or a Pollinator Card (you may have duplicates, but make sure each Pollinator Card has a matching Flower Card).

1. With each child holding a card, invite the Pollinators and Flowers to mingle and compare the clues on their cards to discover which flowers have the traits that specific pollinators like.

2. Based on the clues, have them record the names of the pollinators or flowers they think make good partners, on the back of their cards (answer key is also in the resource section).

3. When everyone is done, discuss what they’ve learned.

**POLLINATION FUN FACTS**

The Pollinator Partnership ([https://www.pollinator.org](https://www.pollinator.org)) estimates there are more than 200,000 species of beneficial insects, including flies, beetles, wasps, ants, butterflies, moths, and bees, that help transport pollen. Additionally, they estimate there are close to 1,000 larger pollinators, including birds, bats, and other small mammals.
WHY ARE POLLINATORS IMPORTANT?

LEARNING OBJECTIVE

When I finish this step, I will know the many foods I eat, and products I use, that depend on the work of pollinators.

Complete at least one of the following activities.

ACTIVITY ONE

CREATE A POLLINATOR PLACEMAT

Make a pollinator placemat collage using magazine-clipped images or hand-drawn pictures of edible plants whose survival relies on the help of pollinators. You can use the Plants That Rely on Pollinators Chart in the Resource Section for inspiration.

Materials Needed:
- Paper
- Markers and crayons or old magazines
- Glue

ACTIVITY TWO

PLAN A POLLINATOR CELEBRATION SNACK

Celebrate the hard work of pollinators by planning a special snack featuring the fruits of their labor, to help create awareness about the important role pollinators play in our world.

Materials Needed:
- Fruits, vegetables, and seeds that rely on pollinators
- Other ingredients as needed
- Cooking utensils as needed

Continue the Learning at Home:
- Track your meals for one day and determine which of the items you consumed were produced through the hard work of pollinators. Use the Pollinator Menu Tracker in the Resource Section to compile your results. How many of your meals included foods that rely on pollinators?

POLLINATION FUN FACTS

Although not all plants rely directly on pollinators to help them make seeds, there are a lot of economically and nutritionally important plants that do. The Pollinator Partnership estimates that over 1,200 crops need the help of pollinators to reproduce.
WHY ARE POLLINATOR POPULATIONS DECLINING?

LEARNING OBJECTIVE
When I finish this step, I will know some of the dangers facing pollinator populations.

Researchers have documented a decline in many different pollinator populations over the last few decades. They have attributed this decrease to several factors, including:

- Loss of habitat, including decreasing food supply and disruption of nesting sites due to land development
- Pollution of air, water, and soil
- Misuse of chemicals, such as pesticides, that impact not only pest insects but also beneficial insects such as pollinators
- Disease and parasite problems
- Climate change

Complete at least one of the following activities

ACTIVITY
ONE

PLAY THE “BE THE BEE” GAME

Materials Needed:
5 to 10 buckets (or boxes or other similar containers).
Yellow construction paper (10-15 pieces per child).
Chart paper, or other paper to record results.
Timer

Setup
Set the containers around the room to represent flowers. Crunching the paper into balls, place them in the containers to represent pollen (making sure to deposit an equal number of balls into each container).

To Play the Game

1. Tell your group that they are going to be “bees” and when the timer starts, they need to go out and collect “pollen” grains (yellow paper) one at a time and bring them back to the “hive” (your starting line).

2. For the first round, give them 30 seconds and at the end of that time count how much “pollen” they collected and record the results on a piece of chart paper.
3. Return the “pollen” to the “flowers” to their original location. Follow up with a few more rounds demonstrating different factors that may impact pollinator populations. You can choose from the following situations (in any order) or devise your own:

To demonstrate loss of habitat: Explain that a new housing development has been constructed in your “bees” habitat and remove half of the “flowers” from the game. Once again give your “bees” 30 seconds to collect as much “pollen” as they can. Add your new count to your chart.

To demonstrate disease and parasite problems: Inform your “bees” that your hive has been infected with varroa mites. These tiny mites attack the bees and weaken them. If left untreated, the mites can lead to the death of the full colony. Ask half of your ‘bees’ to sit down and not participate in the next round. Give the remaining ‘bees’ 30 seconds to collect pollen, but ask that they walk instead of run from the flowers back to the hive. After 30 seconds, record the amount of ‘pollen’ collected. You can repeat this with the other half of the group, who were ‘impacted by mites’, so that all kids get to actively participate in the round.

To demonstrate misuse of chemicals: Tell your “bees” that a local homeowner treated their flowerbeds with a pesticide which killed half of your colony. Ask half of your group to sit down and then give the remaining “bees” 30 seconds to collect “pollen.” Add your results to the chart. You can repeat this round a second time, switching which half of the kids were impacted by the pesticides so that all kids get to actively participate in this round.

4. Compare the results of each round of the “Be the Bee” Game. Talk about each of the scenarios and discuss how they impacted the bees and the amount of pollen they were able to collect. Discuss what kind of impact decreasing pollinator populations might have on our environment and food systems.

ACTIVITY TWO

INTERVIEW A BEEKEEPER

People who raise bees in hives are called beekeepers. Invite a local beekeeper to speak to your group and ask them to provide a firsthand account of the life of a honeybee. Request that they also share information about honeybee populations in your area and talk about the challenges they face. Many counties and states have local beekeeper groups you can contact for speaker suggestions or you can use the search function available on the American Beekeeping Federation Website at: www.abfnet.org.

If you are unable to locate a local beekeeper, the US Forest Service has created an online resource titled PollinatorLIVE, which includes a collection of videos your group may view, at: https://pollinatorlive.pwnet.org/webcasts/index.php.

POLLINATION FUN FACTS

In 2019, the town of Cabot, Vermont passed a Resolution to be declared a Pollinator-Friendly Community, and that the Town encourages adoption of policies and practices that protect and support pollinator health by minimizing the sale and use of insecticides.
LEARNING OBJECTIVE

When I finish this step I will know many, practical ways I can help protect pollinator habitats and populations.

POLLINATION FUN FACTS

Here are some ways we can help pollinators:

- Plant a diversity of plants that bloom throughout the growing season at home, school, or at community centers. This will provide a continuous supply of pollen and nectar for pollinators.
- Plant native plants that provide shelter and a food source for pollinators in all stages of their life cycle.
- Leave areas of uncut grass or wildflowers to provide shelter for pollinators.
- Avoid using pesticides and herbicides.
- Spread the word to others! Teach your community about the importance of pollinators.

Complete at least one of the following activities.

<table>
<thead>
<tr>
<th>ACTIVITY ONE</th>
<th>CREATE A POSTER OR BROCHURE</th>
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<tbody>
<tr>
<td></td>
<td>Promoting the significance of pollinators is one of the most important things you can do to help pollinator populations. Create a poster or brochure for family and friends, at school or at home, to share all the information you learned about pollinators while completing this patch.</td>
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<table>
<thead>
<tr>
<th>ACTIVITY TWO</th>
<th>WRITE A LETTER</th>
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<td>Asking your school, local park, or community center to leave a small portion of their property wild and un-mowed to provide habitat for pollinators. If every citizen and business owner let a portion of their property grow wild and un-mowed, it would help create a connecting corridor of plants to provide habitats for the wild and native bees and other pollinators that are in trouble. Write a letter asking your school, local park, or community center to leave a small portion of their property wild and un-mowed to provide habitat for pollinators. Find out more at Wild for Pollinators at: <a href="https://kidsgardening.org/wild-for-pollinators-program">https://kidsgardening.org/wild-for-pollinators-program</a></td>
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ACTIVITY THREE

RESEARCH POLLINATORS NATIVE TO YOUR AREA

The Pollinator Partnership offers free Ecoregional Planting Guides available at http://pollinator.org/guides that are an excellent resource to begin your search. Make a list of plants you could plant to help attract and support your native pollinators. Remember to include plants needed in all stages of a pollinator’s life. For example, monarch butterfly larva (caterpillars) feed exclusively on milkweed.

ACTIVITY FOUR

DRAW A DESIGN

For a pollinator garden for a home, school, or community center. Include all the elements pollinators need for a supportive habitat, including a variety of native plants, a water source, and places for shelter. You don’t need a lot of space to start a pollinator garden. Even a few containers of flowers can attract hungry bees and butterflies. If resources allow, plant your dream pollinator garden too!
Anatomy of a Flower

A pollinator, such as this honeybee, transfers pollen from one flower’s stamen to another flower’s stigma.

The pollen grain germinates and its sperm contains travels down the flower’s style until it reaches the ovary.

Multiple ovules within the ovary hold the apple flower’s eggs. When a sperm fuses with an egg, it’s called fertilization.

Once the flower is fertilized, the petals wither and drop and the ovary begins to enlarge and develop into the apple fruit.

Each fertilized ovule develops into a seed.

Apple Pollination Cycle
## Pollinator Menu Tracker

<table>
<thead>
<tr>
<th>DATE/MEAL</th>
<th>MENU ITEM</th>
<th>TOP 3 INGREDIENTS IN MENU ITEM</th>
<th>DOES THIS MENU ITEM/INGREDIENT RELY ON POLLINATORS?</th>
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</table>
Plants That Rely on Pollinators

**FRUITS**
Apples, apricots, bananas, blackberries, blueberries, cherries, cranberries, figs, grapes, grapefruit, kiwi fruit, mango, melons, papaya, peach, pear, raspberries, strawberries

**NUTS**
Almonds, cashews, coconuts, macadamia nuts

**VEGETABLES**
Avocados, beets, broccoli, cabbage, carrots, cauliflower, cucumbers, onion, potatoes, pumpkin, squash, zucchini

**SEEDS**
Flax, sesame, sunflowers

**SPICES**
Anise, cardamom, coriander, nutmeg, peppermint

**OTHER**
Chocolate, coffee, vanilla, sugarcane, tea
Pollinator Flower Preferences

Bees
Yellow, blue, purple flowers. There are hundreds of types of bees that come in a variety of sizes and have a range of flower preferences. They can’t see red, but are attracted to some red flowers, such as bee balm, that reflect ultraviolet light. Small bees, which have short tongues, prefer packed clusters of tiny flowers (e.g., marigold, daisy, butterfly weed, aromatic herbs).

Butterflies
Red, orange, yellow, pink, blue flowers. They need to land before feeding, so prefer flat-topped flower clusters (e.g., Joe Pye weed, calendula, butterfly weed, yarrow, daisy) in a sunny location. They also need plants as food sources for caterpillars, their larval stage, and places to lay eggs. These include milkweed, aster, lupine, thistle, fennel, violets, hollyhock, black-eyed Susan.

Moths
Light-colored flowers that open at dusk, such as evening primrose.

Pollinating beetles
Wide-open flowers, such as aster, sunflower, rose, and butterfly weed.

Flies
Green, white, or cream flowers. They have short tongues, so prefer bowl-shaped or open-faced flowers, such as trillium or western skunk cabbage.

Hummingbirds
Red, orange, purple/red tubular flowers with lots of nectar (e.g., honeysuckle, sage, fuchsia, jewelweed, fireweed, cardinal flower, bee balm, nasturtium, century plant). No landing areas are needed since they hover while feeding.

Bats
Large, light-colored, night-blooming flowers with strong, fruity odor (e.g., many types of cacti).
**MONARDA**
- My petals are tubeshaped.
- I have lots of nectar.
- My petals are bright red or purple.

**SNAPDRAGON**
- My flowers have handy landing pads.
- I smell sweet.
- I have lots of small blossoms.
- My flowers come in many colors.

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- I smell sweet.
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- My flowers come in many colors.

**MAGNOLIA**
- I'm bowl-shaped.
- My petals are white.
- I open during the day.
- I have lots of pollen to offer.

**Zinnia**
- I have clusters of small flowers.
- I have a flat top to stand on.
- I come in bright colors such as yellow, red, and orange.

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**Zinnia**
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- I come in bright colors such as yellow, red, and orange.
**MOONFLOWER**
My flowers open at night.
My petals are white.
I have nectar to offer.

**SAGUARO**
I blossom at night.
I have white petals.
I smell like over-ripe melons.
I have lots of nectar to offer.

**MOONFLOWER**
My flowers open at night.
My petals are white.
I have nectar to offer.

**SAGUARO**
I blossom at night.
I have white petals.
I smell like over-ripe melons.
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**TRILLIUM**
My petals are dark purple.
I smell foul.
I have pollen to offer.

**TRILLIUM**
My petals are dark purple.
I smell foul.
I have pollen to offer.
**BEETLE**
- I eat lots of pollen.
- I like white flowers, open, bowl-shaped flowers.

**BUTTERFLY**
- I’m attracted to bright flowers.
- Nectar is my main food.
- I need a place to stand while I eat.

**HUMMINGBIRD**
- I hover to eat.
- My main food is nectar.
- I like red and purple flowers.
- I’m attracted to tube-shaped flowers.

**BAT**
- I feed on nectar.
- I like fruity fragrances.
- I am active at night.
BEE
I like sweet-smelling blossoms.
I like clusters of small flowers.
I eat nectar and pollen.
I like having a place to land while I eat.

BEE
I like sweet-smelling blossoms.
I like clusters of small flowers.
I eat nectar and pollen.
I like having a place to land while I eat.

FLY
I eat pollen.
I like dark or pale-colored flowers.
I’m attracted to foul odors.

FLY
I eat pollen.
I like dark or pale-colored flowers.
I’m attracted to foul odors.

MOTH
I am active at night.
I like white flowers.
I need lots of nectar.

MOTH
I am active at night.
I like white flowers.
I need lots of nectar.

Zinnia – Butterfly
Trillium (or western skunk cabbage) – Fly
Snapdragon – Bee
Saguaro – Bat
Honeyflower – Moth
Kohandra – Hummingbird
Hippocalis – Bumblebee
Magdalia – Beetle

Answer Key
Troop, Group, and Parent Volunteers - Get rewarded for volunteering!

Reward Volunteers is a free, easy way for volunteers to track the time they spend volunteering in their community and to earn rewards for their contributions.

Visit rewardvolunteers.coop to learn more!