



Pollinators



Lesson Plans



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Additional resources available at
www.teachers-going-green.com



LESSON: Be the Bees Pollination Game

GRADE: K

TIME: 45 min.

SUMMARY:

Students will play a game to simulate the importance of flowers in a bee's habitat. Working as groups, they will count and compare the amount of nectar they can collect when their habitat undergoes changes. They will also learn how bees make honey. To show their learning, they will create drawings showing the relationship between the needs of bees and the places they live.

OBJECTIVES: Iowa Core

Subject

Science

- **K-ESS3-1.** Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.

Mathematics

- **K.CC.B.5** Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.
- **K.CC.C.6** Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.

21st Century Skills

- **21.K-2.ES.1** Communicate and work appropriately with others to complete tasks.



MATERIALS & RESOURCES:

- Chart paper or white board
- Jar of honey (or photo)
- 15 small paper cups
- Over 150 counters (examples: noodles, poker chips, etc.)
- 4 ice cube trays or muffin tins
- Technology for viewing the video:
https://www.youtube.com/watch?v=F_0SyWHsYSk
- Timer
- Photos of pollinators <http://ento.psu.edu/pollinators/image-galleries/photos>

PRESENTATION / INTRODUCTION:

Show students a jar of honey (or a photo). Ask students what foods they like to eat with honey. Make a list on chart paper. Where does honey come from?

Watch the nearly 5 minute video for the full honey making process:
https://www.youtube.com/watch?v=F_0SyWHsYSk The first minute summarizes how bees produce the honey. Stop here, or watch the rest that describes how humans extract and process honey.

Today we are going to learn about the habitat where a bee lives.



DIRECTIONS:

1. What do we know animals need to survive? Answers include food, shelter, water, and space. Where do they get the things they need? Discuss habitats and how animals are part of a larger system. Then have students think about what they saw in the video. What do bees need to survive? Answers include a hive, water, space, and nectar from flowers to make honey. Where do the bees get nectar? Flowers! Nectar from 2 million flowers is used to make just one jar of honey. Bees need to visit a lot of flowers. The following game shows why flowers are important for bees.
2. **Set up:** Divide students into 4 groups. Put one ice cube tray (bee hives) for each group on the ground. Put about 10 counters (nectar) in each cup (flower). Place each cup randomly 5-30 feet from the ice cube trays.
3. **Explain the simulation:** You are now a honeybee. Your group members are your hive. Each group has an ice cube tray to represent your hive. The cups represent flowers with nectar inside. Bees need to bring nectar back to the hive where it can be made into honey.
4. **Goal:** Bees will try to bring as much nectar back to their hive as they can in 30 seconds. They may only carry one counter (nectar) at a time. They may choose to visit any flower, but may not steal nectar from another hive.
5. **Play the game.** Time students as they fill their hives with as much nectar as they can in 30 seconds.
6. **Count and reflect on learning:** How much honey did you make? (How many counters did they get back to their ice cube tray?) Which flowers did you get nectar from first? Why? How could you get more nectar to turn into honey in the next round?

Variations:

1. Encourage students to organize their nectar. Perhaps 5 counters will become 1 square of honeycomb. Have them organize their groups so that some worker bees leave the hive to gather nectar while others stay in the hive to organize the nectar into honey.
2. Shrink their habitat. (Cause & effect) Each following round, decrease the number of flowers available for the following reasons:
 - a. A business decided to turn a field into a paved parking lot.
 - b. A developer built houses on a field.
 - c. Pesticides were used that killed flowers.
 - d. A family changed their landscaping to bushes rather than flowering plants.
 - e. A farmer turned a field of wildflowers into cropland.
 - f. Discuss what actions people can take to improve their habitats.
 - For example: plant a backyard pollinator garden or a
 - School garden, avoid insecticides, provide water sources
 - For pollinators
3. Count and reflect on their learning. How much honey did you make? More or less than you did before? Did you visit flowers closer or further from your hive? Why?
 - a. How are the flowers helping the bees?
 - b. Answers include:
 - Providing nectar that the bees turn to honey.
 - The bees are also helping the flowers - When bees gather nectar, without realizing it, they are moving tiny grains of pollen that allow a flower to make seeds and fruit. (Show photo of a bee covered in pollen. See below)
 - We call bees pollinators. Without them we would not have many of the fruits and vegetables we love.

REFLECTION/JOURNAL PROMPT:

1. Discuss what they learned:
 - a. How did your group of bees work together to create honey?
 - b. How was each person important to reaching your goal?
 - c. What things made it easier to gather nectar?
 - d. What made it harder to gather nectar?
 - e. What does a bee need to survive?
 - f. What habitats would be good for bees?
 - g. How are the bees and flowers part of a system?
2. **Draw a diagram.** Students will draw a diagram showing the relationship between the needs of the bee and its habitat. Flowers, bees, and a hive should be clearly displayed in their drawings.





LESSON: Mapping Our Neighborhood Pollinators

GRADE: 1st

TIME: 60 min.

SUMMARY:

Students will learn about pollinators and their habitat. They will then examine their own neighborhoods and map pollinator habitat. Back in the classroom, they will use their maps to discuss ways humans and the environment impact each other. Finally, students will imagine ideal pollinator habitats.

OBJECTIVES: Iowa Core

Subject

Social Studies

- **SS-K-2.G.1** Understand the use of geographic tools to locate and analyze information about people, places, and environments.
 - Understand representations of locales and regions on maps and globes.
- **SS-K-2.G.1** Understand how geographic processes and human actions modify the environment and how the environment affects humans.
 - Understand humans impact the environment in positive and negative ways.
 - Understand the environment impacts humans in positive and negative ways.

MATERIALS & RESOURCES:

- Photos of pollinators <http://ento.psu.edu/pollinators/image-galleries/photos>
- Examples of maps
- Clipboards
- Paper
- Pencils
- Devices that take photos (optional)



PRESENTATION / INTRODUCTION:

Have the kids imagine a world without insects.

- There would be some good aspects – bees or wasps, harassed by flies, etc, would no longer sting them.
- What would be the negative consequences? Without insects, we would have no chocolate, strawberries, apples, almonds, coffee, etc. (Additional food examples can be found at http://pollinator.org/list_of_pollinated_food.htm) Why is this?

Explain that creatures called pollinators help many of these fruits and vegetables grow. Pollinators and flowers work together. A pollinator (often an insect) helps flowers create seeds, fruits, and vegetables. Show photos of pollinators.

Where do pollinators live? Today students will be creating a map of neighborhood pollinator habitat and examining how humans and the environment influence each other.



DIRECTIONS:

1. Discuss where students think insects like to live. What would attract them? What would repel them? Point out that pollinators will want to be near flowers and their nectar.
2. Explain that students will create a map of pollinator habitat near the school. Review mapping concepts, examine examples of maps, and discuss symbols and legends. Distribute clipboards, paper, and pencils, and model setting up the map.
3. Remind students of expectations outdoors. Discuss specific ideas to look for outdoors. Have them dress for the weather and line up to go outside.
4. Walk through the neighborhood and point out different pollinator habitat zones. It could be an extensive prairie or as simple as a single flowering plant. Take “mapping breaks” periodically so students can sit down and add pollinator habitats to their maps. Optional: Cameras could photograph the different habitat and later added to the maps.
5. When they return to the classroom, have them add finishing touches. Discuss what they saw. Was there a lot of habitat for pollinators? What areas on the map had a lot of flowers? Where would it be helpful for there to be additional habitat? What are things people could do to help pollinators? What are things that could negatively affect pollinators? How could pollinators be harmful for people? How do pollinators help people?

REFLECTION/JOURNAL PROMPT:

Ask students to imagine being a pollinator. What would a perfect habitat include? Students will draw pictures of a habitat where pollinators would thrive. Before beginning, have students brainstorm items to include. After they finish, have students do a museum walk to see their peers’ ideas.



LESSON: Who Will Pollinate Our Garden?

GRADE: 2
TIME: 45 min

OBJECTIVES: Iowa Core

Ecosystems: Interactions, Energy, & Dynamics

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

MATERIALS & RESOURCES:

- Paper and pencil
- Clip boards
- Photos of garden plants in bloom and pollinator insects
- Book: Brilliant Bees by Linda Glaser
- Access to websites (optional):
 - Buzz About Bees - <http://www.buzzaboutbees.net/plant-pollination-process.html>
 - Anne Leonard Lab - <http://www.anneleonard.com/buzz-pollination> (good photos and video of bees pollinating)
- Camera (optional)

PRESENTATION / INTRODUCTION:

Pollination is important when we grow vegetables for their seeds, fruit, or seedpods. Without pollination the seeds and fruit will not develop. Most plants need insects to do this work, although there are a few ways in which plants are pollinated. Did you know insects make it possible for you to eat? Wow! Think about that next time you think about killing a bee, fly, wasp, or other crawly organism. We need them! Read aloud Brilliant Bees by Linda Glaser

DIRECTIONS:

1. The best time to do this activity is when the plants are in bloom. If this is not possible, use photos from books, magazines, or Internet to show the kids what the plants look like when blooming and setting fruit. (*See note below about the terms “vegetable” and “fruit”.)
2. Go into the garden and spend some time so the students can observe pollinators.
3. If a camera is available, it could be fun to try to take photos.
4. While in the garden talk about which parts of the plants we eat. Is it the seed, fruit, or seedpod? If so, these are the plants that need pollinators to help them. Also, if you want to collect seed from the plant to grow next season, it will need pollinated. This is true of plants in grown in home and school gardens as well as plants for the grocery store.
 - Vegetables that need pollinators all the time:
 - Cucumbers
 - Melons and watermelons
 - Berries
 - Tree fruits
 - From what plants do we eat the seed, fruit or seedpod?
5. Make a list of plants that need pollination. Have the kids draw pictures of the plants.

Now make a list of pollinators that are likely to visit the garden. Have the kids draw pictures of the pollinators with the plants.

 - Some pollinator examples:
 - Honey bees
 - Bumble bees
 - Flower beetles
 - Hover flies
 - Butterflies
6. After observing and drawing in the garden, talk about how to attract pollinators to the garden. (Encouraging a diversity of plant and animal species, planting species that are specific to the pollinator, abstain from using chemicals and other hazardous substances, doing our part in reducing climate change.) Also, discuss the ways in which humans deter pollinators. (Reducing diversity of plant species, using chemicals, artificial lighting, changing the climate, etc.)
7. Talk about how kids feel about insects. Often they are fascinated and fearful. Their fear is usually a result of something they see and hear from the adults in

their life. Adults have the opportunity to role model respect for insects and nature. Though we don't have to cuddle with a honeybee, it does seem a good idea to respect and support them...after all, our food depends on pollinators.

8. Additional activity: study pollination in depth by looking at diagrams and illustrations of plant parts, different ways plants can be pollinated, how pollination occurs, as well as the parts of pollinator insects. Links for informational websites and videos about pollination can be found in the MATERIALS & RESOURCES section above.

**Note about the terms "fruit" and "vegetable" get confusing when discussing this topic. Scientifically, a fruit develops from the ovary of a plant containing seeds. Vegetables include all other edible plant parts: roots, tubers, stems, leaves, flower clusters, and other softer plant parts. However, in common usage, the classification of plants as vegetables is largely determined by custom, culture, and usage. The usual example is the tomato, which is a fruit, but is eaten as a vegetable, as are cucumbers, peppers, melons, and squashes.*

REFLECTION/JOURNAL PROMPT:

WHAT?

- Name something new that you learned about pollinators.
- Did you see lots of insects in your garden?

SO WHAT?

- How do you feel about bees, flies, and other insects now?
- As citizens of this planet, do humans have some responsibility to take care of the habitat in which we, and all the other organisms, live?

NOW WHAT?

- Do you and your classmates need to take action to attract more pollinators to your garden?
- Will you consider being more supportive of insects?



LESSON: Beach Ball Bee Pollination Game

GRADE: 3rd

TIME: 60 min.

SUMMARY:

Students will observe flowering plant life cycles. Then, they will play a game to simulate the relationship between the pollinator and flowers. They will discover the challenges and benefits in this system and compare it to other life cycles they have studied.

OBJECTIVES: Iowa Core

Subject

Science

- **3-LS1-1.** Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death.

Literacy

- **W.3.10** Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline—specific tasks, purposes, and audiences.

MATERIALS & RESOURCES:

- Photos of pollinators and flowers <http://ento.psu.edu/pollinators/image-galleries/photos>
- Two inflated beach balls
- Post-it notes – 4 colors
- Flowers with visible pollen, for example: lily or amaryllis, or photos
- The simulation in the lesson was adapted from <http://www.seplessons.org/node/799>. Visit their site for additional ideas.
- Paper and pencils for journaling



PRESENTATION / INTRODUCTION:

Begin in the school garden or an outdoor nature space observing flowering plants. What stage of the life cycle are they currently in? Germination? Growth? Flowering, ready to reproduce? Developing fruit to disperse seed? Death? Discuss the patterns in the life cycle of a flowering plant.

Plants cannot stand up and walk around to greet other flowers, yet they need pollen from another flower in order to create a seed and/or fruit. How do they get that pollen? Pollinators, often insects, unknowingly move tiny pollen grains from flower to flower as they gather nectar. (Share photos.) When a flower has pollen from another flower of its species, it can reproduce by forming a seed. Brainstorm some common pollinators to your area (bees, butterflies, ladybugs, hummingbirds, etc.). Today we will learn more about the pollination process by playing a game.

DIRECTIONS:

1. Prepare the supplies: For round 1, prepare one beach ball and one set of post-it notes. Number the post-it notes so there is one for each student. For example, yellow post-it notes are numbered 1-24.
 - a. For round 2, number 4 different colors of post-it notes; each child receives just one post-it. For example, number 1-6 on yellow, 1-6 on green, 1-6 on blue, and 1-6 on red sticky notes.
 - b. For round 3, add another beach ball.
2. Explain the simulation: Each of you is now a flower called a lily. Each of you has pollen, which is represented with a yellow post-it. The post-it has a number on it to show that it represents you. The beach ball represents a bee. When the bee (beach ball) is thrown to you, you need to share your pollen by sticking your post-it note to it. You then throw it to someone else. They will take a post-it note while also sharing one of theirs. In this way, each flower has a chance to share their pollen while also getting another lily's pollen.
3. Goal: Let's see how many flowers can get pollinated in 30 seconds. Flowers need to be fast and efficient with your sticky notes because the bee wants to get back to the hive.
4. Play Round 1.
5. Reflect on Round 1: How many flowers were pollinated? How could we be more efficient so more flowers get pollinated? Try this round again if you like.
6. Variation for Round 2: In nature, there isn't just one type of flower, but many. This time we will have 4 colors of post-it notes, each representing a different flower. Each student will have one color, and may only pick that color note up from the ball. This may result in many students catching the ball, putting a post-it on, but not able to take a post-it off. Discuss how this influenced pollination numbers. Did adding flowers make it easier or more difficult to pollinate? What could increase the number of flowers pollinated?
7. Variation for Round 3: Add another beach ball, representing another pollinator, perhaps a hummingbird. Did adding pollinators make it easier or more difficult to pollinate? What could increase the number of flowers pollinated?
8. Discuss patterns in pollination and how pollinators work with flowering plants. Does the bee need pollen? Does the flower need the bee? Why?



REFLECTION/JOURNAL PROMPT:

Reflecting on the patterns in life cycles, how is a flowering plant's life cycle similar or different to other life cycles the class has studied? How could they use their observations to make predictions? Have students journal their observations. They could use storyboards to brainstorm ideas or as illustrations in their writing.



LESSON: Design a Flower, Attract a Pollinator

GRADE: 4th

TIME: 90 min.

SUMMARY:

Students will observe flower structures and their impact in attracting pollinators. They will use recycled materials to design and build an ideal flower, journaling observations that flowering plants have structures supporting survival and reproduction.

OBJECTIVES: Iowa Core

Subject

Science

- **4-LS1-1.** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

21st Century Skills

- **21.3-5.ES.4** Demonstrate initiative, creativity, self-direction, and entrepreneurial thinking to produce successful outcomes.

MATERIALS & RESOURCES:

- Photos of a variety of flowers and pollinators
<http://ento.psu.edu/pollinators/image-galleries/photos>
- Flowers with visible pollen, for example: lily or amaryllis (optional)
- Recycled items including egg cartons, plastic cups, plastic food containers, lids, straws, cardboard, Q-tips, cotton balls, cloth and paper scraps
- Glue gun and glue sticks
- Tape
- Scissors
- Sticky notes

PRESENTATION / INTRODUCTION:

Quick sketch: How many different types of flowers can you draw? Students will quickly sketch as many different flowers as they can in 1 minute. Flowers must be something they have seen in person or in photos. Discuss how different species have similar and different structures – responses may include similar basic design with stems, flower, leaves, petals, similar lifecycles, different colors, scents, shapes, seasonality, etc. What are some reasons for the differences?

Today we will use our observations of flowers to design a flower with structures that support pollination.

DIRECTIONS:

1. Point out that some flowers differ because they are trying to attract different pollinators. Flowers need pollen from another flower in order to form a seed and reproduce. Pollinators, often insects, unknowingly move tiny pollen grains from flower to flower as they gather nectar. When a flower gets pollen from another flower of its species, it can reproduce by forming a seed. Brainstorm some common pollinators to your area (bees, butterflies, beetles, hummingbirds, etc.). Take a walk to the garden, observe different flowers or photos of flowers, and discuss how their shape attracts certain pollinators.
2. Draw a t-chart on a white board or chart paper. Label it with “Pollinators” and “Flowers”. How does the pollination process benefit each of these groups? Why does the flower want to attract pollinators? How does the flower attract pollinators? How are they each part of a larger system?
3. Design a flower: Tell students it is time for them to draw a flower again, but this time it must be an imaginary flower of their own design. They should consider that a flower’s goal is to attract a pollinator. Thus, they should first choose which pollinator to try to attract. They will then think about what features may attract them. Finally, they will draw a picture of an ideal flower, labeling key features that will bring in the pollinators.
4. Build a flower: Students may use any of the recycled items to create their ideal flower. Before they begin, review expectations for self-directed work and use of materials, including safety precautions for glue guns.



5. Museum walk: When students finish, showcase their work on their desks and allow students to view others' work. Have them leave positive comments on sticky notes as they walk around the room.

REFLECTION/JOURNAL PROMPT:

Discussion:

- What structures did you see commonly on flowers that would attract pollinators? What features did you think were especially innovative?
- Why are pollinators important? What could be done to help pollinators prosper?

Journal entry: What evidence have you observed that flowering plants have structures supporting their survival, growth, behavior, or reproduction? How are your observations of flowering plants similar or different to other animal or plant systems?



LESSON: Pollinators Migration Madness

GRADE: 5th

TIME: 60 min.

SUMMARY:

Students will gain an appreciation for the important role pollinators play in the foods we eat every day. They will then examine maps of the monarch butterfly migration, noting how their community is involved. Then, they will play a game simulating the loss of butterfly habitat to understand the challenges butterflies face. Finally, they will reflect on ways their community is helping to protect monarchs.

OBJECTIVES: Iowa Core

Subject Science

- **5-ESS3-1.** Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Social Studies

- **SS.3-5.G.1** Understand the use of geographic tools to locate and analyze information about people, places, and environments.
- **SS.3-5.G.4** Understand how physical processes and human actions modify the environment and how the environment affects humans.

MATERIALS & RESOURCES:

- Cloth shopping bag with examples of pollinated foods, for example: chocolate, coffee, nutmeg, apple, banana, almonds, grapes – or other examples found at http://pollinator.org/list_of_pollinated_food.htm
- Photos of flowers with visible pollen <http://ento.psu.edu/pollinators/image-galleries/photos>
- Map of monarch migration:
http://monarchjointventure.org/images/uploads/documents/Monarch_Watch_Migration_Map.pdf
- Hula hoops or carpet squares – approximately 10
- Poker chips or other counters – at least 5 per student
- Timer

PRESENTATION / INTRODUCTION:

Explain that you have a shopping bag of food and all of the food items have something in common. Select students to reach into the bag and pull out a food item to show the class. What do these items have in common? They are all pollinated foods!

Pollinated foods are those that are created when a pollinator, often an insect, moves tiny pollen grains from one flower to another. Show photos of flowers. Once the flower gains pollen from another flower, it can form the fruits, vegetables, and seeds we enjoy eating. It's an incredible system!

“Pollinators are essential to the production of food, and in the United States, honey bees pollinate an estimated \$15 billion of crops each year, ranging from almonds to zucchinis,” said Dr. Ann Bartuska, USDA Deputy Under Secretary for Research, Education and Economics. “This new data will add to USDA's robust scientific body of knowledge on the inventory, movement and death loss of honeybees in the United States.” Bees are just one type of pollinator. What are other creatures that could act as pollinators? (Butterflies, hummingbirds, beetles, etc.)

Today we are going to focus on one particular pollinator: the monarch butterfly. We have learned a little about why they are important. Next, we are going to learn about some of the challenges they are facing and how communities are working to protect them.

DIRECTIONS:

1. Ask students to examine the monarch migration map. Where do butterflies migrate in the fall? Where do they live in the winter? Where do they migrate in the spring? Where do they live in the summer? What time of year do we see monarchs in Iowa? Why? (Discuss caterpillar/butterfly life cycle.)
2. What do animals need to survive? Water, food, shelter, and space. What do monarchs need to survive?
 - a. **Water**
 - b. **Food** - Caterpillars need milkweed, but adult butterflies need nectar from many kinds of flowers.
 - c. **Shelter** - A place to hide. If we look at a backyard through human eyes we like to see mowed grass. Weeds and dead trees may look messy to us, but pollinators prefer it that way. In Mexico, fir trees provide winter shelter for monarchs. Pollinators need habitat in Iowa, too. Brush and leaf litter provides perfect hibernation homes.
 - d. **Space:** Lead discussion to how monarchs need habitat in two different countries and many states in between for their migration.
3. Migration Madness Game: In this role-playing game students will become monarch butterflies. Their task is to migrate safely between their winter and summer habitats. Not only will they encounter dangers such as predators and unfavorable weather conditions during their long journey, but they also face loss or degradation of habitat.
 - a. Students will line up on the North America side of the playing field. Their goal is to make it safely to Mexico (across the field), where they will overwinter.
 - b. Set up: Laid out in the field are hula hoops/carpet square which represent a milkweed plant or flowers (habitat). Only one person is allowed to rest in the habitat at each time. If a “butterfly” is on a habitat they cannot be tagged. On each habitat are poker chips (food and water). In order to get enough nutrients to survive the migration to Mexico, each monarch must gather at least five chips. They cannot grab a chip when another monarch occupies a hula-hoop. They are only allowed to take one chip from each habitat.
 - c. Play the first round with no challenges. All monarchs should survive.

- d. **Round 2:** Have students return chips back to the habitat spaces and play again. This time explain that herbicides and pesticides have been sprayed on fields, as well as grassy areas being turned into housing developments and parking lots. Remove some of the habitat and coins. Play again. Set a timer and after a few minutes have an early winterkill any remaining butterflies that are not yet in Mexico.
- e. **Round 3:** (*similar to a game of tag*) Any butterflies who died in the last round become cars or birds who can tag butterflies. Tagged butterflies should sit down. **If you want to add an additional challenge, you can use rope or string as boundaries that create a "road" (Interstate 35).* What factors made the journey difficult? What was the biggest factor that caused them to die? What could we do to help?

Possible extensions:

- Allow students to manipulate carpet squares/chips to implement their ideas for how to help and run the game one more time with positive results.
- The instructor can have designated "trees" in "Mexico" available to students and have the remaining butterflies, that made it safely to Mexico, pick a tree. Then the instructor becomes a logger, and removes a tree. Those butterflies then die. Used to discuss logging and policy.

REFLECTION/JOURNAL PROMPT:

- What challenges are monarchs facing?
- What could happen if we don't help to protect them?
- How could pollinator gardens at schools help protect monarchs?
- Using the map, where would we need to place these pollinator gardens?
- How could changes we make in our community help the larger system?

Journal entry: How is our community helping protect monarchs and other pollinators? Why are monarchs an important part of the system?



BACKGROUND INFORMATION:

Pollinator Loss Basic Stats:

- Honey bee populations down 50% since 1945
- Iowa colonies' winter losses=54% per year
- Native bee declines-est. 4000 native bee species, 300-400 in IA originally
 - Can be more efficient pollinators than honey bees, esp. for New World crops-squash, tomatoes, cranberries, and blueberries-and wildflowers
 - Think of ecological connections—bees are food and make food, 25% of birds rely on berries and fruits for food, raccoons, bears, etc.
- 28% of Iowa's butterfly species listed as of special concern or higher designation
- Monarchs—population high in '96-'97 at over 18 hectares
 - 2000s--populations begin to decline
 - '13-'14—0.67 hectares
 - '14-'15—1.13 hectares (rebound)
 - IA centered in core breeding area (50% of population in Upper Midwest tallgrass region)

Causes of Loss:

- **Habitat:** Recent estimated habitat loss per year about 2 million acres; 167 million acres = size of Texas
 - Conversion to row crop
 - Reduced ditches and margins
 - Development
 - Round-up Ready crops: before GMOs corn and soybean fields produced more monarchs than any other single habitat.
 - Illegal logging in Mexico (over wintering homes)
 - Not enough shelter to protect them from weather elements.
- **Weather:** Droughts, no food, rain, hail, high winds, freezing temps,
- **Food source timing and availability**



What's being done to help?

In Iowa, planting native grasses, wildflowers, and other vegetation along our roads has helped. The concept of integrated roadside vegetation management (IVRM) uses native and other select types of vegetation with appropriate management techniques to produce a cost-effective, environmentally sound management alternative for roadsides. To achieve Iowa's IRVM objectives, the state's IRVM Plan is implemented along federal and state highways through the coordination of the Iowa Department of Transportation. Additionally, many counties and cities have adopted an IRVM plan for managing vegetation along their roadsides. To date, more than 50,000 acres of federal, state, county, and city roadsides in Iowa have been planted to native grasses, wildflowers, and other select types of vegetation. For more information visit: <http://www.iowadot.gov/lrtf/irvm.html>

In June 2014, President Obama created a Presidential Memorandum that created a federal strategy to promote the health of honeybees and other pollinators. As part of the project, things like the I-35 Corridor were created. Interstate 35 is an especially important roadway for honeybees and other pollinators. As native grasses, wildflowers, and other vegetation are planted along the road, a 1,500-mile "butterfly corridor" is being created to help Monarchs get from Mexico to Minnesota. This expands habitat along the interstate, almost like creating a path for the monarchs to follow.