

Biodiversity and Ecosystems

Middle School
NGSS: [MS-LS2-5](#)



FIELD.
MUSEUM

Lesson Description

In this lesson students will investigate the difference between native and invasive species of plants. They will demonstrate their learning by designing a garden of native plants.

Driving Phenomenon

In some cases, plants are not healthy for an environment. Invasive plants can damage ecosystems and prevent healthy native plants from growing and allow for other native plants and animals to thrive there.

Driving Questions

- How do invasive plants affect an ecosystem?
- How can we prevent invasive plants by utilizing native plants?

Learning Objectives

- Students will investigate the differences between native and invasive plants through the lens of Illinois wildlife.
- Students will demonstrate learning by creating a model of a native plant garden.

Time Requirements

- Two to three 45 minute class periods

Prerequisite Knowledge

- Basic understanding of biodiversity
- Basic ecology

Teacher Resources

1. [Native and Invasive Plant Species](#)
2. [Volunteers Restore Wetlands at Eggers Grove](#)
3. [Invasive Species Game](#)
4. [Keller Action Center Video](#)

Student Resources

1. [Cornell Notes](#)
2. [Four Reasons to Add Native Species to your Garden](#)
3. [Garden Planning Document\(s\)](#)
4. [Field Guides](#)
5. [How to Grow Native Plants in your Garden](#)
6. [How Milkweeds Can Save Monarchs and Beautify your Garden](#)
7. [Monarch Habitat Field Guide](#)

Acknowledgements

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How can we prevent invasive plants by utilizing native plants?

Full lesson procedures begin on the next page

Engage 10 minutes	
Students will make observations about images of plants. They will try to identify the invasive plants and discuss what makes a plant invasive.	Notes
Teacher Resources: 1.0	
Explore 25 minutes	
Students watch the video: <i>Volunteers Restore Wetlands at Eggers Grove</i> and take notes on important themes of the video. The class creates a group definition of native and invasive species.	Notes
Teacher Resources: 2.0 Student Resource: 1.0	
Explain 15 minutes	
By reading an informational article, students will gain a deeper understanding of why native plants are important and how they are different from invasive species in an ecosystem.	Notes
Student Resources: 2.0	
Elaborate 45 minutes	
Students apply what they've learned about native and invasive species by creating a native plant garden. They will plan a garden to attract monarch butterflies or one that includes native plants from around Illinois.	Notes
Student Resources: 3.0 , 3.1 , 3.2	
Evaluate 20 minutes	
Once they have planned their gardens, students will post their work around the classroom. Students should complete a gallery walk and give feedback on each other's gardens by utilizing post-its.	Notes

How can we prevent invasive plants by utilizing native plants?

Engage

- 1 Have students look at the image and make observations about the plants that they see. Once they have made their initial observations, explain to them that there is one plant that doesn't belong (Tatarian Honeysuckle is invasive). Have students share out their guesses. While students are sharing out, ask them why they made that guess. What about each plant caused them to think it didn't belong?
- 2 Share with students the idea that an invasive species is a species that is not native to a specific location (an introduced species). Usually, humans carry them while traveling. These species tend to spread to a degree believed to cause damage to the environment, human economy, or human health.

Explore

- 1 Once they have completed writing the definition, students should watch the video: *Volunteers Restore Wetlands at Eggers Grove*. They should take notes on the most important themes of the video. They may use the Student Resource 1.0: Cornell Notes handout in the student resources to gather their information.
- 2 Once students have watched the video, work with the class to come up with a group definition of native and invasive species. You may want to write it on chart paper or project it on a Smartboard for easy reference. Have students write the definition in a notebook.

Explain

- 1 Have students read Student resource 2.0: *Four Reasons to Add Native Plants to your garden* in order to answer the question "**Why are native plants important?**" Once students have read and taken notes, have students share out why they think native plants are important. List the reasons on a white board or chart paper for reference.
- 2 Ask the class to consider the following questions: **How are native plants and invasive plants linked? Which type of plant is better for the environment? Can we use one to combat the other?** As the conversation evolves, ensure students understand that planting native plants creates a healthy environment which helps to prevent invasive species from spreading.

OPTIONAL ENRICHMENT:

Explore

If students need further investigation into the idea of invasive species, they can play [Invasive Species Game](#) which takes the player through what happens when an invasive species enters and ecosystem.

How can we prevent invasive plants by utilizing native plants?

Elaborate

- 1 In order to assess knowledge, students will create a plan for a native garden. Students should plan their gardens using Student Resource 3.0 or 3.1 depending on which project they choose. Depending on the type of garden the students choose, there are several helpful resources students can use to plan their garden.

Select an option from the list below, and have students follow the guidelines to plan their garden.

Option 1: Monarch Butterfly Garden (narrow scope)

Design a garden that will attract monarch butterflies. Monarch butterflies migrate each year from Mexico and need way stations to eat and rest along their way. Native Illinois plants are critical for their survival and your mission is to design a garden that will attract and help the monarch during migration.

The parameters of this garden are as follows:

- Garden is 10' x 12'
- Garden must include
 - at least 1 pathway
 - 5 types of native plants
 - one sitting area
- Garden must be inviting to monarchs and people
- Use color to make your design easy to understand

Option 2: Illinois Native Garden (wider scope)

There are several native plant ecosystems that exist in Illinois. Each one is important to the native wildlife in Illinois. Illinois has woodlands, ravines, dunes, prairies, and several other plant habitats which all provide beautiful landscape and important function. Create a garden that is a part of one of the natural habitats.

The parameters of this garden are as follows:

- Garden is 10' x 12'
- Garden must include
 - at least 1 pathway
 - 5 native types of native plants
 - one sitting area
- Garden must be inviting to local wildlife and people
- Use color to make your design easy to understand

SUGGESTED RESOURCES

Elaborate

1. [Garden Planning Document\(s\)](#)
2. [Field Guides](#)
3. [How to Grow Native Plants in your Garden](#)
4. [How Milkweeds Can Save Monarchs and Beautify your Garden](#)
5. [Monarch Habitat Field Guide](#)

How can we prevent invasive plants by utilizing native plants?

Evaluate

- 1 Have students post their work around the room. The class can then complete a gallery walk and provide feedback on each other's models as they walk around.
- 2 Once students have completed the gallery walk, instruct students to improve their garden model. Students may choose to use their classmates' suggestions or new ideas they have formed.

How do invasive plants affect an ecosystem?

Teacher Resource 1.0

Native and Invasive Plants

Teacher Resources



Pleated Foxtail Moss



Box Elder Tree



Tatarian Honeysuckle



Silvery Glade Fern

Cornell Notes

Student Resource 1.0

Questions or Topics	Main Ideas or Notes
Summary	

Student Resources

Four Reasons to Add Native Plants to your Garden

Student Resource 2.0

There are easy and specific things everyone can do to help the monarch butterfly and other native pollinators. One action you can take is to beautify your yard: plant native plants, especially milkweeds, in your garden or in containers.



Chicagoland used to be a vast prairie buzzing with life and supporting thousands of species of insects, birds, and other animals. As the area was developed and farmed, the landscape became fragmented, leading to the demise of many animal and plant populations. A recent—and very much publicized—effect has been the decline of the monarch butterfly, an insect that migrates annually from Mexico to Canada, spending a lot of time in the Midwest along the way.

Although this information can be discouraging, there are easy and specific things everyone can do to help the monarch butterfly and other native pollinators. One action you can take is to beautify your yard: plant native plants, especially milkweeds, in your garden or in containers on your porch or balcony. You can also work with institutions that are a part of your everyday life, like schools and places of worship, to add native species to their gardens. Native plants are ones that are found naturally in a given region and evolved over thousands of years to the conditions that surround them. In turn, the animals that depend on them evolved with them.

So, why give native plants a helping hand? Here are just a few reasons to incorporate them into your open spaces: They provide a home and food source for a variety of butterflies, including monarchs, and other insects. As native plants attract more pollinators, you'll begin seeing even more beautiful blooms.

1. They're low maintenance. Native plants require a lot less water and pampering than non-native plants. Prairie plants have evolved to deal with the summer heat and drought, and their roots are strong. They don't need fertilizer, saving you money and keeping excess nutrients out of our waters.
2. They give back. Native plants are good for your health and the environment. Native gardens are able to absorb a lot more storm water (keeping it out of your basement) and improve air quality. They support good soil quality and help prevent erosion.
3. They are simply beautiful. Native plants come in all colors, shapes, and heights so it is easy to integrate them into an existing garden or design a new space. You might even know a couple of them, like the black-eyed-Susan (*Rudbeckia hirta*) and the purple blazing star (*Liatris*).
4. They connect us to the natural world. Having native plants in our own living spaces allows us to get in touch with our roots and realize that nature is right here in our own backyards. They show us that cities and nature can work together. They're also a great way to foster conversations about our natural habitat and pay tribute to our natural heritage.

At The Field Museum, we hope to lead by example. When you visit this spring, you'll notice the early stages of a transformation happening just outside the building. Over the last few months, we have been busy putting in the Rice Native Plant Gardens around our campus, and we hope to welcome more monarch butterflies stopping by. To spot monarchs in your own native plants garden, use this easy guide to identify the monarch butterfly, the milkweeds that are its host plants, and other plants you can put in your garden. Learn more about how to get started and grow your own native garden.

Monarch Butterfly Garden Planning Document

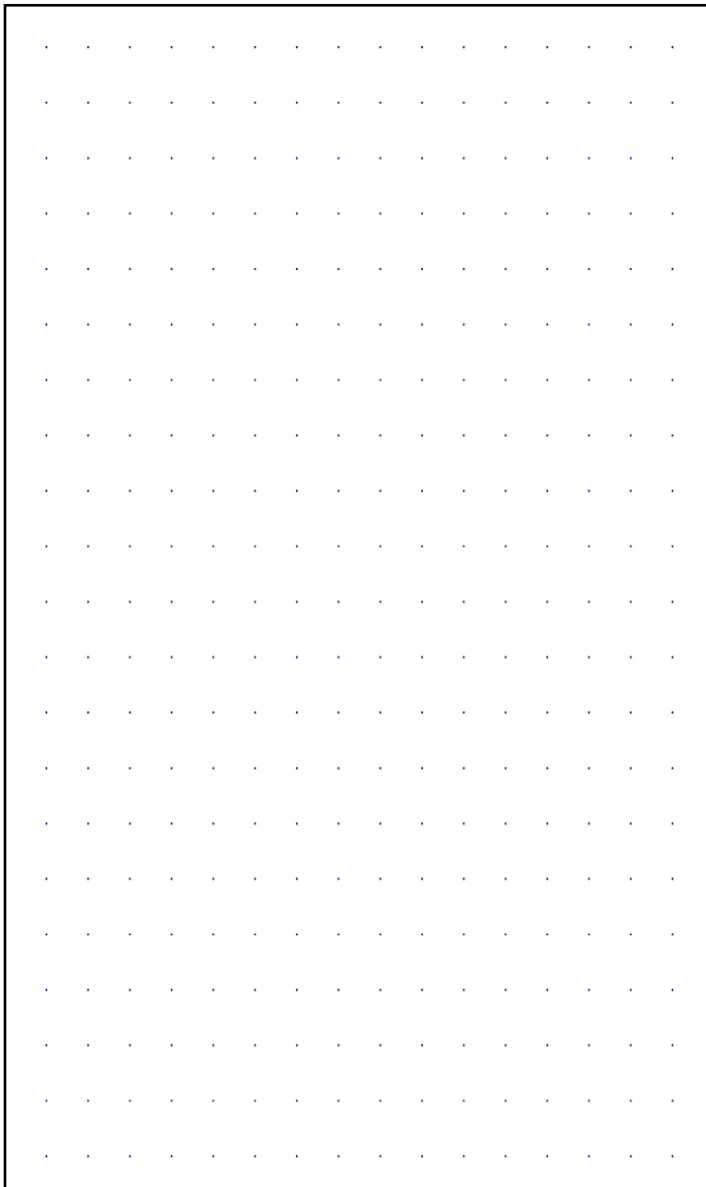
Student Resource 3.0

Monarch Butterfly Garden

Design a garden that will attract monarch butterflies. Monarch butterflies migrate each year from Mexico and need way stations to eat and rest along their way. Native Illinois plants are critical for their survival. Your mission is to design a garden that will attract and help the monarch during migration.

Garden Parameters

- Garden is 10' x 12'
- Garden must include
 - at least 1 pathway
 - 5 types of native plants
 - one sitting area
- Garden must be inviting to monarchs and people
- Use color to make your design easy to read



Plant Name	Why you chose it



Key

Illinois Native Garden Planning Document

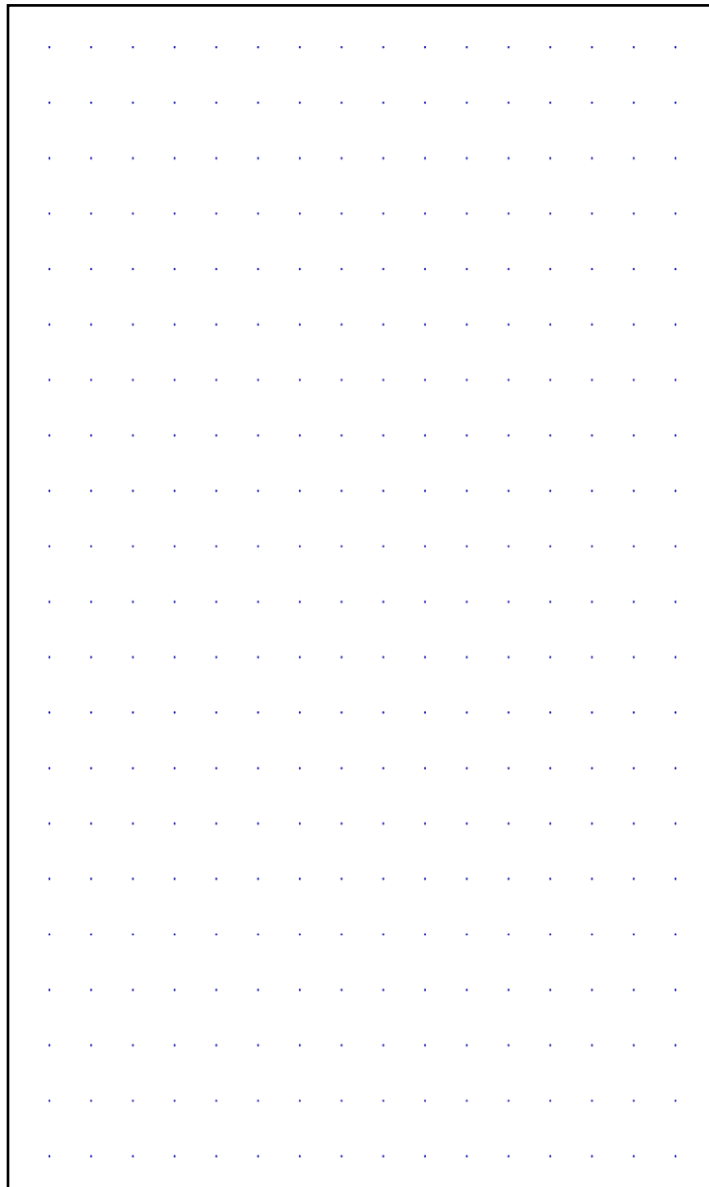
Student Resource 3.1

Illinois Native Garden

There are several native plant ecosystems that exist in Illinois. Each one is important to the native wildlife. Illinois has woodlands, ravines, dunes, prairies, and several other plant habitats which all provide beautiful landscape and important function. Create a garden that is a part of one of the natural habitats.

Garden Parameters

- Garden is 10' x 12'
- Garden must include
 - at least 1 pathway
 - 5 types of native plants
 - one sitting area
- Garden must be inviting to local wildlife and people
- Use color to make your design easy to read



Plant Name	Why you chose it



Key

Illinois Native Garden Planning Document – Sample Garden

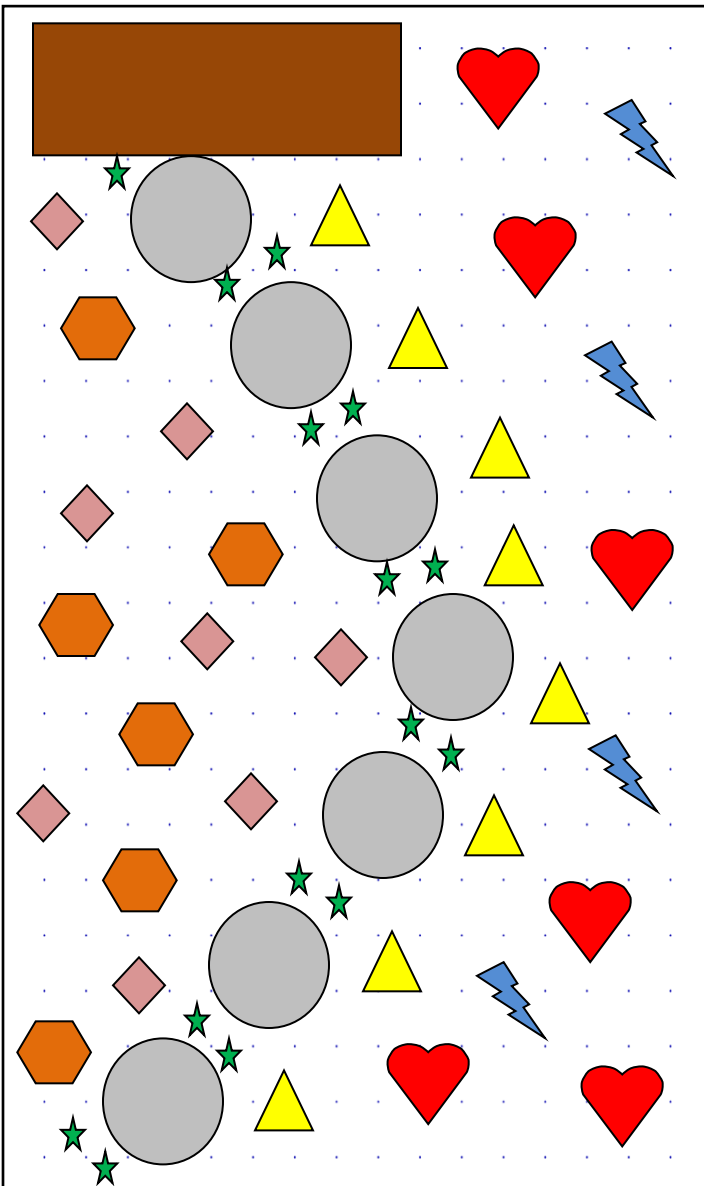
Student Resource 3.2

Illinois Native Garden

There are several native plant ecosystems that exist in Illinois. Each one is important to the native wildlife. Illinois has woodlands, ravines, dunes, prairies, and several other plant habitats which all provide beautiful landscape and important function. Create a garden that is a part of one of the natural habitats.

Garden Parameters

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Plant Name	Why you chose it
Nodding Wild Onion	Has white flowers and attracts bees.
Butterfly Weed	Is orange and attracts butterflies and Monarchs.
Purple Prairie Clover	Has purple flowers that attracts bees.
Purple Coneflower	Has purple flowers that attracts bees.
Pleated Foxtail Moss	Grows between cracks and is a pretty green.
Rattlesnake master	Is a native plant.

○ Path	■ Bench	▲ Wild onion
⚡ Rattlesnake master	⬡ Butterfly weed	♥ Purple coneflower
★ Foxtail moss	◆ Purple prairie clover	