



SELF-GUIDED FIELD TRIP

Educator Guide Grades 6-8

Self-guided field trips allow teachers to use New England Botanic Garden as a place of learning and exploration. This field trip does not include educator led programs from Teacher Naturalist staff. Your self-guided visit will be led entirely by your teachers and chaperones. Upon booking you will be provided with an activity book for students to use at the Garden. Try the optional pre- and post-visit activities on the following pages to extend your learning experience before and after your trip. Please use this guide to plan your visit and prepare your students and chaperones for a day at the Garden. Enjoy your visit to New England Botanic Garden at Tower Hill!

WHAT'S INSIDE

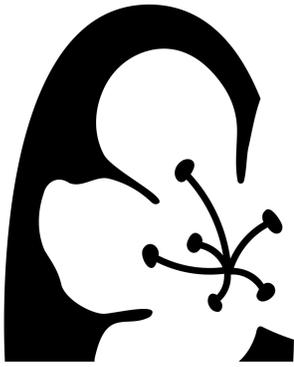
- Overview & Standards.....2
- Planning Your Visit Guide.....3
- Garden Maps.....7
- Bus Parking Map.....9
- Pre-Visit Activity Guide.....10
- Post-Visit Activity Guide.....11

CONTACT INFORMATION

Phone: 508-869-6111 x132

Email: youtheducation@nebg.org





GARDEN DISCOVERIES

6-8 Self-Guided Activity Book

Thank you for booking a self-guided Garden Discoveries program at New England Botanic Garden. Each self-guided group is given access to our student activity books that can be printed at school and used during your field trip to engage students in garden topics that connect to what they are learning in school.

OVERVIEW

When registering for a self-guided field trip, educators will be given access to our 12-page student activity book that includes vocabulary, discussion questions, games, drawing activities, scavenger hunts, and more! If you choose to use our Garden Discoveries activity book, your class will observe plant and animal adaptations, create food chains and webs, and learn about sustainability at the Garden. All content in the activity book connects to Massachusetts state standards. Educators will be given the booklets in PDF form after they register for their self-guided field trip and will be able to print them for their students to use onsite. We recommend bringing large clipboards, pencils, and coloring supplies for your students on the day of your trip.

STANDARDS

2016 MASSACHUSETTS SCIENCE AND TECHNOLOGY/ENGINEERING CURRICULUM FRAMEWORK

7TH GRADE

7.MS-LS1-4. Construct an explanation based on evidence for how characteristic animal behaviors and specialized plant structures increase the probability of successful reproduction of animals and plants.

7.MS-LS2-2. Describe how relationships among and between organisms in an ecosystem can be competitive, predatory, parasitic, and mutually beneficial and that these interactions are found across multiple ecosystems.

7.MS-LS2-3. Develop a model to describe that matter and energy are transferred among living and nonliving parts of an ecosystem and that both matter and energy are conserved through these processes.

8TH GRADE

8.MS-LS1-5. Construct an argument based on evidence for how environmental and genetic factors influence the growth of organisms.

8.MS-LS3-2. Construct an argument based on evidence for how asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation. Compare and contrast advantages and disadvantages of asexual and sexual reproduction.

8.MS-LS4-4. Use a model to describe the process of natural selection, in which genetic variations of some traits in a population increase some individuals' likelihood of surviving and reproducing in a changing environment. Provide evidence that natural selection occurs over many generations.

PLANNING YOUR VISIT

Review this guide for information on how to register your group for a self-guided program at New England Botanic Garden. Read on for FAQs and general information about what to expect and how to ready your class and chaperones.

ABOUT

Self-guided field trips offer an opportunity for your group to explore at their own pace and use our student activity books to engage in outdoor nature investigations. The student activity books incorporate fun games, activities, and discussion topics for your class, while also connecting to state standards.

SCHEDULING YOUR VISIT

PAYMENT

Self-guided groups rates are \$9 per student and a maximum of one chaperone for every 5 students is admitted free of charge. Additional chaperones will receive a group rate discount of \$18/adult. Payment may be made in advance, on the day of the program, or within one month of the program in the form of cash, credit card, or check. Please make all checks payable to New England Botanic Garden at Tower Hill.

CHANGES & CANCELATIONS

Please contact us as soon as possible if you would like to postpone, reschedule, or cancel your self-guided visit. A full refund will be made if the cancellation is requested at least two weeks before the date of the program. If extenuating circumstances force the Garden to close for the day, we will contact you immediately and reschedule your visit. If there is a cancellation due to snow, we will work with you to reschedule your visit within the school year. If your group is running late, please contact us at 508.869.6111 and update us with your new arrival time.

BEFORE ARRIVAL

Share the Chaperone Guide with your chaperones and review our garden expectations policy with students prior to arrival. Please prepare your students for the days weather and encourage them to dress for the weather and wear close-toed shoes if possible.

UPON ARRIVAL

Buses should unload at the garden entrance using the drop-off lane. Buses may park in the designated bus parking spaces until returning to the drop-off lane for pick up. Please see bus parking map on page 9. If you plan to pay on the day of your visit, please send the group leader into the Visitor Center, check in with accurate group numbers, pay balance, and collect admission stickers for adults. One of our educators will greet your bus upon arrival and direct your students into the garden.

FREQUENTLY ASKED QUESTIONS

How many students can I bring?

Self-guided field trips are limited to 150 students for one day. If your group is larger than 150, we ask that you book your visit over two days. At the time of booking please provide an estimated number of students, chaperones, and teachers that will be attending.

Can we eat lunch at the Garden?

Picnicking is allowed in any of the mowed lawn areas or at the picnic tables under the pavilion in the Ramble children's garden. We ask that you follow our pack in, pack out policy for large groups. Please bring a trash bag and dispose of your trash back at school or ask students to pack trash back in lunch bags. We appreciate your help keeping our garden spaces clean. We have a cafe on site, groups of 10 or more must order in advance. Please let us know if you wish to order through the cafe.



Is the garden ADA accessible?

The formal gardens, Visitor Center, and the Ramble (children's garden) are ADA accessible (all marked in blue on the map). The forest and meadow trails at the Garden are made of natural materials; the terrain is uneven and steep in certain areas. If you have students in your group that require mobility assistance, please share this information with our staff when you register for your trip.



Can my group visit the gift shop?

Absolutely, if you have a group of more than 10 students please let us know when your group plans to visit the gift shop during the day so our staff can be prepared to welcome your large group. For large groups, we recommend sending your group into the gift shop with an adult in groups of 8 students or less.

How should students dress?

We recommend closed-toed and slip resistant shoes or boots in rainy, muddy, or snowy conditions. Please note the forest trails are often muddy after a rain storm. Please bring insect and tick repellent or apply before you leave school. Students should also bring water, hats, sunscreen, or rain or winter coats depending on the weather.



What happens in the case of inclement weather?

Self-guided field trips are held rain or shine, please have students dress appropriately. We follow the Boylston school schedule. If the Garden is closed or your school is closed due to weather, we will work with you to reschedule your visit within the school year if possible.

CLASSROOM TEACHER GUIDE & CHECKLIST

To take advantage of all the garden has to offer, please take the time to familiarize yourself with the garden maps and expectations. We are a living plant museum and we thank you in advance for helping to protect our collection, both inside our conservatories and in our outdoor gardens. Educators are welcome to tour the gardens and trails before your scheduled program. Show your MTA card at the information desk and receive FREE general admission!

GARDEN EXPECTATIONS

- Please stay on the paths, trails, or lawns to ensure that all plants and animals are left undisturbed.
- Please do not pick any plants or climb the garden trees.
- Please keep the garden clean and carry out all lunch trash with you.
- Shirt and shoes are required at all times.
- Please remember the garden is a shared space. Do your best to share pathways and make room for other visitors and vehicles.
- Please use your walking feet in the garden to ensure the safety of all other visitors, the plants, and yourselves.
- Students should be with a chaperone at all times and should not be exploring the garden on their own.
- Recreational equipment (frisbees, balls, etc.) should be left at home or at school.

- Register for your field trip via phone or email.
- Review the Self-Guided Field Trip Educator Guide.
- Review the field trip schedule and go over expectations with students and chaperones. Be sure to stress the importance of proper attire.
- Pack water, sunscreen, insect repellent, first aid kit, lunches, and trash bags (if staying for lunch), extra chaperone guides, extra garden maps, student activity books, clipboards, pencils, and coloring supplies.
- Print the Chaperone Guide and garden maps on the following page, and distribute to teachers and chaperones who will be attending.
- Notify chaperones of the designated meeting location after the program ends.
- Review the Bus Parking Map on page 9 and discuss with your bus driver upon arrival. Unload bus in the drop-off lane in front of the garden entrance.
- Present your confirmation letter and updated student and chaperone counts to a visitor services staff member in the Visitor Center and complete payment if prepared to do so. Visitor Services staff will give you your admission stickers to distribute to your chaperones.
- Enjoy your field trip experience and share your feedback or student work with us after the program at youtheducation@nebg.org.

CHAPERONE GUIDE

You don't need any special knowledge to be a chaperone, just a willingness to participate and actively take part in student learning!

CHAPERONE RESPONSIBILITIES

- Know the names of students in your group and keep them together at all times.
- Help students follow garden expectations and maintain group safety.
- Encourage students to participate in group activities and fully explore the gardens.
- Familiarize yourself with the garden map and note where the restrooms are.
- Know your itinerary, including meet-up locations, garden shop visit plans, lunch, and departure times.
- Come prepared to explore outdoors, rain or shine.
- If you are arriving by car please wait at the bus lane to greet the students.
- Be a role model and have fun!

GARDEN EXPECTATIONS

- Please stay on the paths, trails, or lawns to ensure that all plants and animals are left undisturbed.
- Please do not pick any plants or climb the garden trees.
- Please keep the garden clean and carry out all lunch trash with you.
- Shirt and shoes are required at all times.
- Please remember the garden is a shared space. Do your best to share pathways and make room for other visitors and vehicles.
- Please use your walking feet in the garden to ensure the safety of all other visitors, the plants, and yourselves.
- Students should be with a chaperone at all times and should not be exploring the garden on their own.

MY GROUP LIST

Student names

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Meet-up Location:

Starting Location:

Departure Time:

GARDEN MAP

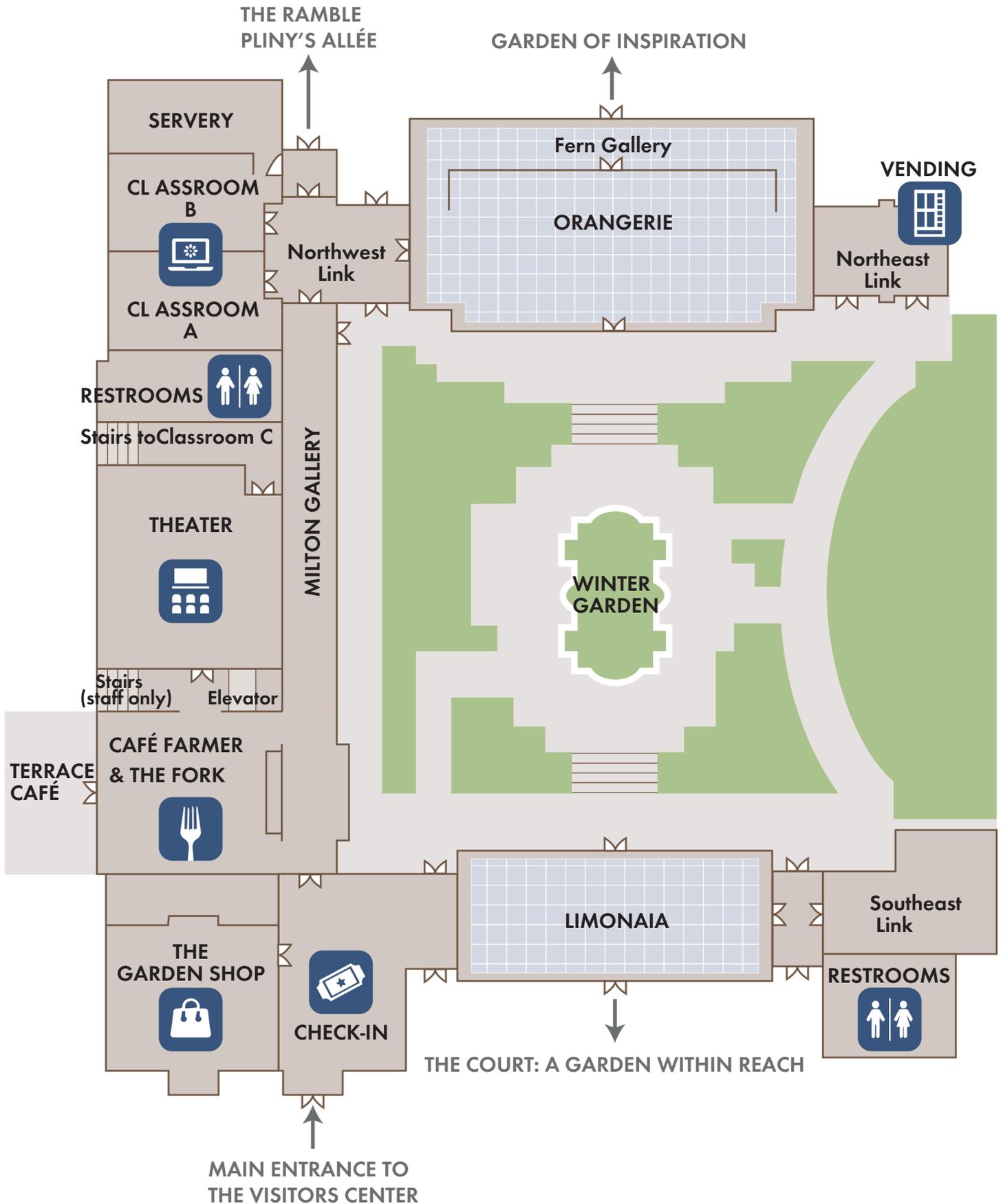


TRAIL TYPE

- Paved/Concrete or Brick Paths (Easy)
- Gravel/Packed Stone or Dirt Paths (Moderate)
- Rocky & Steep Terrain (Hard)

VISITORS CENTER

STODDARD EDUCATION CENTER



BUS PARKING MAP

If you arrive before 10am, the entrance gate will be closed, it will automatically open upon approach. When you enter the Garden follow signs for “buses”, pull up and over in the bus drop-off lane to unload. The bus will then follow the “bus parking” signs that will direct them to park in the bus parking spots at the far end of the parking lot until pick-up.



PRE-VISIT ACTIVITY GUIDE

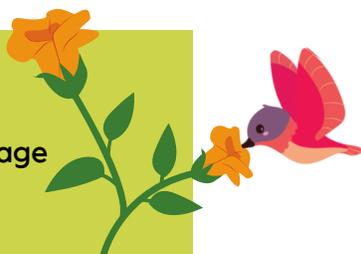
The following optional pre-visit activities are designed to support the understanding of concepts that will be addressed during the Garden Discoveries self-guided field trip.

RELATIONSHIP MATCH-UP

Students will learn about symbiotic relationships as they play this guessing game.

Materials

Relationship Match-up page
Organism Cards



Create organism cards (2 sets) with pictures and names using the list on the "Relationship Match-up" page below. Then introduce the four different symbiotic relationships to the class. Define the different relationships and give examples of each.

Split the class into two groups and give each group a set of organism cards. Each group will be working together to create symbiotic relationships by matching up pairs. The teacher will call out one of the four relationship categories. The groups will then discuss and choose two photos of organisms that have that relationship. Once the group has their answer, they will raise their hand to have their answer checked. If the group is correct, they receive a point. If they are wrong, check the next group's answer to see if they can win the point.

For example, you called out the relationship "competition". One of the groups pairs a lion and a cheetah before the other group. Since they are correct and paired the organisms first they get the point.

Continue playing new rounds but remind students they cannot use the same pair twice.

CREATE A CULTIVAR!

Students will learn about cultivars before exploring the Garden and be challenged to create a new cultivar from an existing flower.



Materials

Flower cards	Paper
Computer	Pencil

Artificial selection is used in gardening to create unique plants. Scientists can choose the genes and characteristics that are pretty or beneficial for the new generation of their crop or plant. This is unlike natural selection where the environment changes plants over time. Many plants at botanic gardens are cultivars meaning they have been artificially created through stem cutting, cross pollination, etc. Today, each student will be using flower cards to "breed" a new cultivar.

Give every student a flower to start. Make sure they know the flower color, height, number of petals, and leaf shape. Then assign each student cultivar characteristics that they must try to create by breeding their flower with other flowers. For example, they may start with a short, white daisy with 10 petals and circular leaves. Their goal is to breed this daisy with other flowers, one at a time, to create a tall, purple flower with >15 petals and heart-shaped leaves.

Students will search flowers online to find flowers to breed their assigned flower with. They can only breed one trait at a time. Have the students keep track of what flower species they bred for each gene and have them name their new cultivar that they create.

Extra: You can create additional rules for the breeding process. For example: to change the flower color it must go one color at a time following rainbow order, before changing yellow to blue you must breed with a green flower first.

POST-VISIT ACTIVITY GUIDE

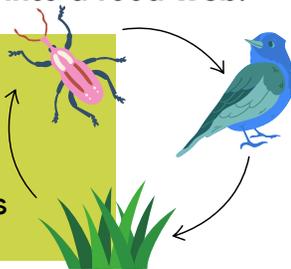
The following optional post-visit activities are designed to support the understanding of concepts that will be addressed during the Garden Discoveries self-guided field trip.

FOOD WEB WEAVING

Students will work together to connect the organisms of the ecosystem into a food web.

Materials

String Pencils
Cardstock Coloring Supplies



Review with the students what a food chain is and how energy is passed between each organism in the chain. Talk about some examples that they learned about at the Garden. Explain that food chains combine to create a food web.

Choose an ecosystem to focus on and discuss what producers and consumers would live there. Assign each student a producer or consumer, give them a blank card and have them draw and label their organism on the card. As the teacher, create a sun card.

Have everyone sit in a large circle with their card. Explain that today they will be creating a food web using string. Each person will toss the ball of string to the person whose card comes next in the food chain. All chains will start with the Sun and once a food chain finishes the string will return to the Sun to start another. When someone catches the ball of string, make sure they hold onto a piece before they toss it to the next person.

Afterwards discuss who is holding the most amount of string, what the string represents, and how many food chains were created.

GREEN SOLUTIONS

Students will create a persuasive presentation about a green solution that they can establish at their school or organization.



Materials

Garden Activity Booklet
Computer

Discuss the sustainable practices that New England Botanic Garden at Tower Hill has implemented. Ask the students to raise their hands for whether they chose the rain barrel or rain garden on the *Sustainability* page in the booklet and why.

Students or groups will be pitching a green sustainability project that they want to see implemented at their school. They will be researching ideas that other gardens, schools, or organizations use, whether that be the creation of a vegetable garden, planting a tree, a recycling program, or installing solar panels.

Each student or group will be presenting their ideas to the class. Their presentations should include the following:

1. Description of the project
2. How it would benefit the school/organization
3. Their steps to carry out the project
4. Location at school/organization
5. Costs
6. Future maintenance and upkeep
7. Why this is the best option

Once all projects are presented in class, have the class vote on your favorite idea and explain why they chose that option. Take the project a step further and have the students present or write a report to the principle or school board about why this sustainable project should be implemented and how it would be beneficial.

RELATIONSHIP MATCH-UP

Use the list of organisms below to create photo cards of the different organisms. Each group will receive all the same cards. Feel free to add other organisms to the card sets that aren't on this list. Refer to the check list to make sure the students created correct pairs.

Organism List

- Poison Ivy
- Virginia Creeper
- Lynx
- Black Bear
- Barred Owl
- Barn Owl
- Morning Glory
- Honeysuckle
- Lion
- Leopard
- Red-Tailed Hawk
- Cottontail Rabbit
- Skunk
- Grub
- Red Fox
- Mouse
- Otter
- Crayfish
- Pitcher Plant
- Fly
- Monarch Butterfly
- Milkweed
- Mockingbird
- Blackberry
- Oak Tree
- Gray Squirrel
- Honey bee
- Lavender
- Queen Anne's Lace
- Crab Spider
- Clownfish
- Anemone
- Flea
- Coyote
- Leech
- Catfish
- Deer Tick
- White-tailed Deer
- Chipmunk
- Slug
- Barnacle
- Whale
- Fungi
- Algae
- Mites
- Opossum
- Lamprey
- Mosquito
- Human



Field Mouse



Red Fox

Check List

Competition	Mutualism	Predatory	Parasitic
<ul style="list-style-type: none"> • Poison Ivy & Virginia Creeper • Lynx & Black Bear • Barred Owl & Barn Owl • Morning Glory & Honeysuckle • Red-tailed Hawk & Fox • Gray Squirrel & Chipmunk 	<ul style="list-style-type: none"> • Monarch Butterfly & Milkweed • Mockingbird & Blackberry • Oak Tree & Gray Squirrel • Honey Bee & Lavender • Queen Anne's Lace & Crab Spider • Whale & Barnacle • Clownfish & Anemone • Fungi & Algae (=Lichen) 	<ul style="list-style-type: none"> • Red-Tailed Hawk & Cottontail Rabbit • Skunk & Grub • Red Fox & Mouse • River Otter & Crayfish • Pitcher Plant & Fly • Chipmunk & Slug • Deer Tick & Opossum 	<ul style="list-style-type: none"> • Flea & Coyote • Leech & Catfish • Deer Tick & White-Tailed Deer • Mites & Honey Bees • Lamprey & Catfish • Mosquito & Human