

Biodiversity and BioBlitzes for Students and Teachers

Educational Resource Packet



**BE A
BACKYARD
BIOLOGIST!**

LEARN HOW TO DO YOUR OWN
BIOBLITZ!



*Woodlands Nature Station
Land Between the Lakes National Recreation Area*



Become a backyard biologist and study the life found in your backyard! Do as much of the booklet as you are able. To challenge yourself and continue learning, check out the Bonus Ideas after some of the activities! As you build up your scientific observation skills, you will prepare for a backyard bioblitz found at the end of the booklet! What will you discover?

Science Vocabulary

Draw a line matching the word to its definition.

Biologist	A scientist who studies birds.
Ornithologist	Active at night.
Chromatography	A feature or behavior that helps an animal to survive.
Chlorophyll	An animal's role in the ecosystem.
Adaptation	Active during the day.
Pollination	A tool to identify an item or species.
Nocturnal	A method of separating components from a mixture.
Niche	A scientist who studies life.
Diurnal	Water that falls from clouds including rain and snow.
Dichotomous key	The variety of life on earth.
Species	The transfer of pollen from plant to plant.
Precipitation	A group of similar living organisms.
Biodiversity	A green pigment found in plants that is necessary for photosynthesis.

Map Your Backyard

Draw a map of your home or study site. Make sure to draw in and label all habitat features like trees, lawn, ponds, driveway etc. You can also go to Google Earth and type in your address to get a satellite view and use that to help you draw the map.

Bonus: Challenge yourself to draw your map to scale and include a compass rose. Check out these National Geographic resources!

<https://www.nationalgeographic.org/activity/measuring-distances-map/>

<https://www.nationalgeographic.org/activity/cardinal-directions-and-maps/>

Bonus: Research biomes of the world. What biome does your backyard belong to?

The Weather Report

When biologists need to study their research site, they always note the weather. Go to a weather website like www.weatherunderground.com to find out the weather in your area, or, if your family has equipment like an outdoor thermometer, find the information yourself!

- Temperature: _____ F
- Sunny/Cloudy _____
- Wind Speed _____
- Wind direction _____
- Precipitation _____

How does the weather affect you?

How do you think the weather affects wildlife?

Backyard Colors Scavenger Hunt

Search your backyard to test your skills of observation and see what colors you can find!

<i>Red</i>	<i>Yellow</i>	<i>White</i>
<i>Black</i>	<i>Green</i>	<i>Grey</i>
<i>Pink</i>	<i>Brown</i>	<i>Purple</i>
<i>Blue</i>	<i>Orange</i>	<i>Your Favorite Color</i>

Bonus: Set a timer for 5 minutes and tally as many objects of each color as you can! Graph your results to see how common each color is in your backyard. What do you think your results mean?

Flowers-Sketching from Nature

Find a flower in your backyard. Examine the flower, how big is it? What color is it? How many petals does it have? Record your observations by sketching the flower below.

Scientists ask questions! Write down 3 questions you have about your flower and see if you can research the answers!

Pollinator Survey

Biologists study nature and record their findings to learn more. Study your flower and record any visitors to the flower to learn more about pollinators in your backyard. Pollinators transport pollen from flower to flower helping plants to make seeds! Plants can be pollinated by insects, birds, mammals, and even the wind!

Procedure: Set a timer for 3 minutes. Sit very quietly a few feet from your flower and fill out the data below.

Time: _____

Flower Color: _____

Flower Species: _____

Number Seen:	Type of Pollinator:	Notes:
	Bees	
	Butterflies	
	Birds	
	Other Species	

Bonus: Do this survey for multiple flowers or for the same flower at different times of the day. Do you notice any patterns? Are pollinators more active at a certain time? Do some types of pollinators prefer a certain color or type of flower?

Day vs Night

Compare a moth, a nocturnal (nighttime) creature, and a butterfly, an diurnal (daytime) creature. If you choose to observe these insects from life, look for butterflies on flowers during the day. Check for moths in the evening near lights or on night flowering plants. If you cannot find a live specimen, check the internet for pictures! Sketch your insects below and note any differences or similarities between the two.

Butterfly

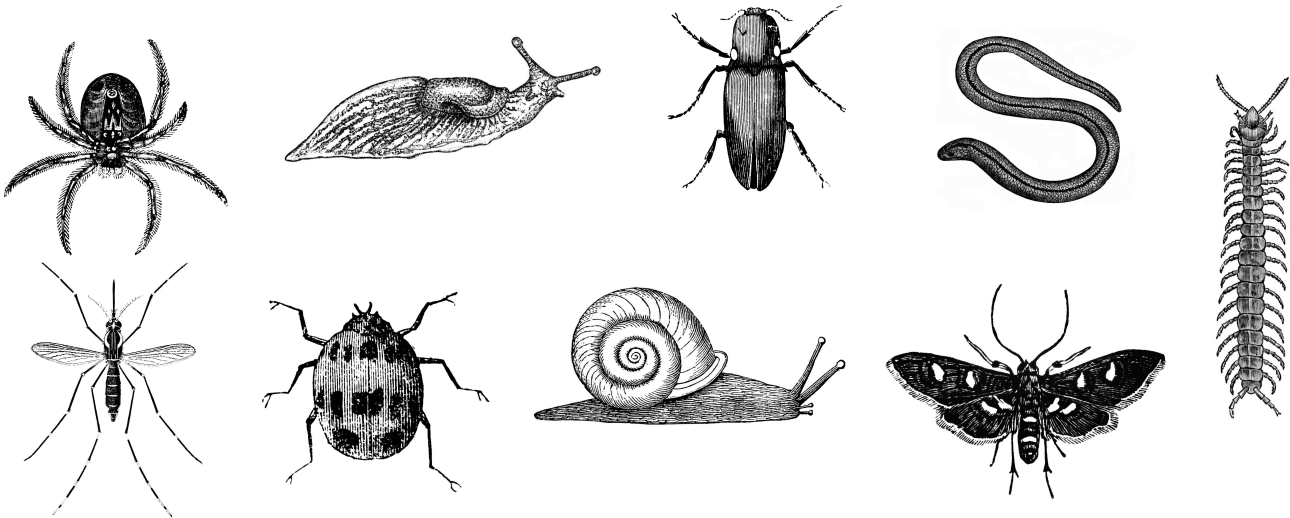
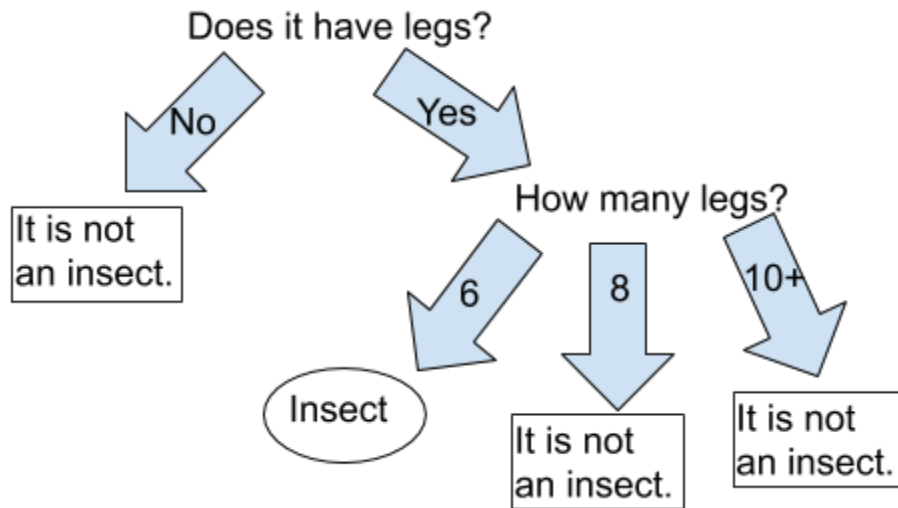
Species: _____

Moth

Species: _____

Insect ID

Use the dichotomous key below to determine which of the creatures pictured below are insects. A dichotomous key is a tool that helps identify an item by asking simple questions that eventually lead to the correct answer. Use this simple key to identify insects and learn how dichotomous keys work. Circle insects and cross out the creatures that are not insects. (Hint: Double check when counting legs that you don't count antennae!)



Noticing Niches

A niche is the plant or animal's role and habitat in the ecosystem. (For example some birds may sit on the ground, eating seeds, while others sit in treetops catching bugs, each bird is occupying a different niche!) By observing a species and learning where it spends its time scientists can learn more about its niche and habitat.

Procedure:

1. Select a common bird you often see in your backyard or study site.

Common backyard birds include: Northern Cardinal, Mourning Dove, Woodpecker, Carolina Chickadee, Robin, and Sparrow.

2. Observe your bird for 3 minutes, every 30 seconds, record where your bird is. (For example, you may write in Tree, Ground, Feeder, or any other location. If your species leaves your study site during your observation, write its location as Gone from site, this is still important data that can help you learn more about the species!).

Species:

Time	Location
30 seconds	
1 minute	
1 minute 30 seconds	
2 minutes	
2 minutes 30 seconds	
3 minutes	

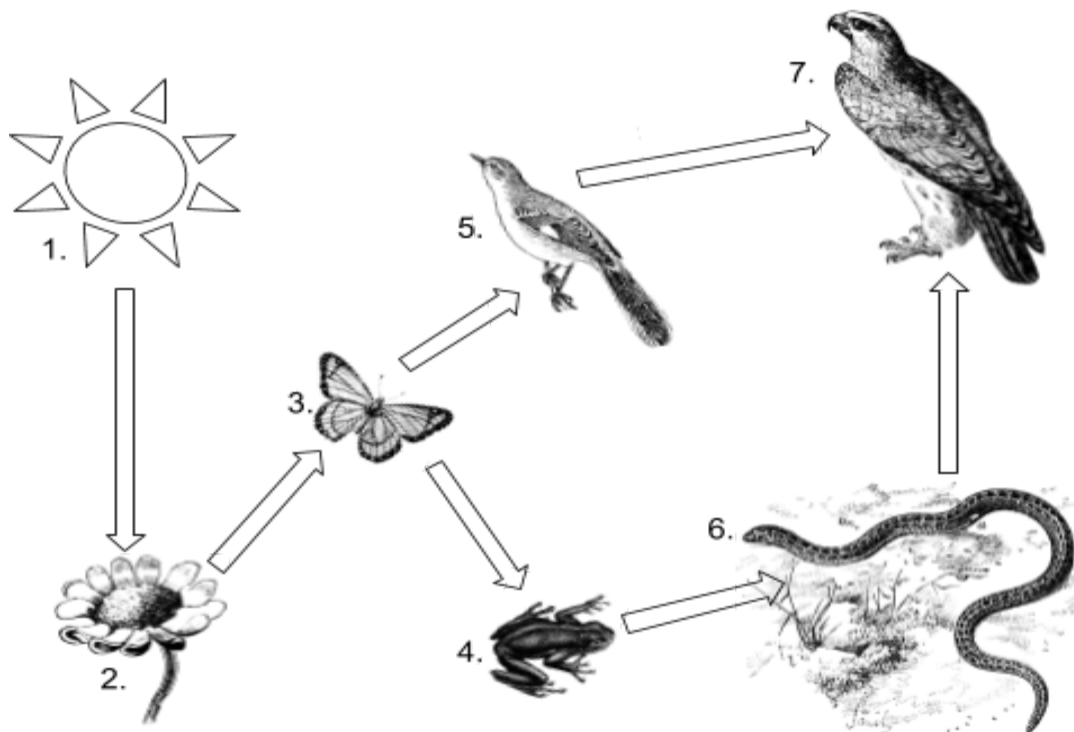
Where did your species spend the most time? What do you think is this species's niche in your backyard?

Note: If no birds are around you can still do this study! Try following an insect, mammal, pet, or even family member for your study!

Bonus: Try repeating this experiment with other species and comparing the results!

Food Web (Spanish)

A food web shows how different species are connected and how energy flows between species. Fill out the english and spanish names for the species in the food web below.



English	Spanish
1. _____	_____
2. <u>flower</u>	<u>la flor</u>
3. _____	<u>la mariposa</u>
4. _____	_____
5. _____	_____
6. _____	_____
7. <u>hawk</u>	_____

English	Spanish
*frog	*el sol
*sun	*la rana
*bird	*el halcon
*butterfly	*el pajaro
*snake	*la serpiente

Hints: The food web begins with *el sol*. Nothing eats *el halcón*. *El halcón* eats both *el pájaro* and *la serpiente*. *El pájaro* eats *la mariposa*.

Bird Call Mnemonics

A mnemonic is a memory device that helps a person learn something. Ornithologists (scientists who study birds) often use different mnemonics to memorize bird calls! One method is to use words to represent the calls of the birds. Check out the mnemonics listed below and see how many backyard birds you can identify by call!

1. Carolina Chickadee: Chick-a-dee-dee-dee
2. Blue Jay: Jay, Jay, Jay
3. Barred Owl: Who cooks for you? Who cooks for you alllll?
4. American Crow: Caw, caw, caw
5. Northern Cardinal: Cheer, Cheer, Cheer, birdy, birdy, birdy
6. Eastern Phoebe: Phoebe! Phoebe! Phoebe!
7. Tufted Titmouse: Peter, Peter, Peter!
8. Red-winged Blackbird: Conk-la-Ree!
9. Carolina Wren: Cheeseburger, cheeseburger, cheeseburger!
10. Great Horned Owl: Who, Who, Who?

Being able to identify an animal by sound is an important skill for a biologist and allows them to identify species of animals in an area even when they are unable to see them!

Check out the Cornell lab's bird guide to learn more about the species of birds you see in your backyard! You can even play audio clips of each bird.

<https://www.allaboutbirds.org/guide/>

Bonus: If you want to learn more bird calls, Thayer's Birding Software is free for student birders! Use the code: LBLYoungBirder.

<https://www.thayerbirding.com/>

Sound Map

Listening is an important skill for backyard biologists. Choose a spot in your backyard. Close your eyes for 1 minute and listen to the sounds around you. Create a sound map below. Draw yourself in the middle of the page and draw or write out the sounds you hear around you.

Bonus: Identify the cause of an unfamiliar sound. Try to follow the sound to its source to discover if it is a bird, bug, the wind or something else!

Biology Research

A biologist needs to know a lot of information about the plants and animals they study, especially from the work other biologists have done before. Let's find out more about one of the following backyard animals and answer the questions below using books or the internet.

Pick one of the following backyard animals to research:

- Deer Mouse
- Zebra Swallowtail Butterfly
- Five-lined Skink
- Cope's Grey Treefrog
- Northern Millipede
- Downy Woodpecker

Fill out the information below:

Common Name:

Scientific Name:

What food does it eat?:

How much does it weigh?:

How big is its home range(the space it needs to live)?:

How long does it live?:

What kind of habitat does it live in?:

Where does it raise its young?:

Identification Resources

Identifying an organism can help you to learn more about it. Check out these resources below for help in identifying the living things found in your backyard! The easiest to use resources are marked with a star*.

Plants and Fungi

*What Tree Is It: <https://tree.oplin.org/>

Videos on tree ID by University of Kentucky: https://forestry.ca.uky.edu/tree_id_videos

Checklist-Vascular plants of TN (by county):

<https://herbarium.utk.edu/vascular/county-checklist.php>

Checklist-Vascular plants of KY: <https://herbarium.eku.edu/vascular-plant-checklist>

Kentucky native flowers and grasses by Louisville Water Company:

https://www.louisvillewater.com/sites/louisvillewater.com/files/user_uploads/Water%20Quality/Wellhead%20Protection/SRAG%20200%20%20Pocket%20field%20guide%20Ky%20wildflowers.pdf

Invasive Plants in Southern Forests: https://www.srs.fs.fed.us/pubs/gtr/gtr_srs119.pdf

Mushroom field guide: https://www.fs.fed.us/nrs/pubs/gtr/gtr_nrs79.pdf

Bugs

Invertebrate ID Guide (Dichotomous Key):

http://www.biokids.umich.edu/guides/invert_id/InvertIDGuide2004.pdf

*Ladybug Field Guide: http://www.lostladybug.org/file_uploads/FieldGuide.pdf

*Urban Spider Chart: <https://entomology.ca.uky.edu/spider-chart>

Birds

Audubon Bird Guide App: <https://www.audubon.org/app>

All About Birds: <https://www.allaboutbirds.org/guide/>

Snakes

*Snakes of KY: <https://fw.ky.gov/Wildlife/Documents/kysnakebook.pdf>

Amphibians

*Frogs and Toads of KY:

<https://fw.ky.gov/Wildlife/Pages/Frogs-and-Toads-of-Kentucky.aspx>

General

*Seek by iNaturalist: https://www.inaturalist.org/pages/seek_app

*Wildlife Diversity in KY: <https://fw.ky.gov/Wildlife/Pages/Wildlife-Diversity.aspx>

Discover Life: <https://www.discoverlife.org/>

Other Resources

Your local library may have online field guides you can check out. You can also email a clear picture of your finds to woodlandsnaturestation@gmail.com, or message us on facebook [@woodlandsnaturestation](https://www.facebook.com/woodlandsnaturestation) or www.facebook.com/woodlandsnaturestation, to see if any of the Nature Station naturalists can identify it!

Bioblitz

A bioblitz is an event (usually 24 hours long) where people work together to identify as many species as possible to learn more about the biodiversity of an area. Biodiversity is the variety of life found in a particular habitat. Your bioblitz will measure the biodiversity of your own backyard!

Supplies Needed:

- Homeschool Activity booklet to record your results
- Pen or Pencil
- Extra paper (optional) to draw any interesting finds
- Camera (optional) to take pictures of your finds
- Field guides and identification resources (check options on the previous page)

Safety: Use caution and work with an adult! Some plants have thorns or can cause an allergic reaction while some animals can bite or sting! Observe plants and animals safely and be respectful of all the living things you find.

Procedure:

1. Pick a day/time for your bioblitz.
2. During your bioblitz time period, write down each species you find(see, hear, or find evidence of). When you don't know a species name, write a description, sketch it, or take a picture to help you to try to identify it later.
3. After your bioblitz see how many of your unknown species you can identify.
4. Analyze your results.
5. If you'd like to share your results message us on facebook! (optional)

Notes: A bioblitz can take place over 24 hours but younger students may need to set a shorter time period or break the day up into "sections". For example, setting a timer for 10 minutes and finding as many species of birds as you can, then resetting the timer and next looking for bugs can help students focus.

You may be unable to identify all the species you find and that's okay! There are many species out there and it is always amazing to find something you have never seen before!

Bioblitz Plants, Fungi, and Bugs

Write each species you find in the sections below.

Plants:

Fungi:

Bugs:

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Total #: _____

Total #: _____

Total #: _____

Bioblitz Birds, Mammals, and Reptiles

Write each species you find in the sections below.

Birds:

Mammals:

Reptiles and Amphibians:

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Total #: _____

Total #: _____

Total #: _____

Analyzing Your Data

Total # of species found:_____

(Add all of your species totals together to find this number)

Plants:_____%

(What percent of your total were plant species? Do the following equation to find the answer.)

Total # of Plants ÷ Total # of Species= 0.XX

Move the decimal point two places to the right → to get your percent XX%.

Fungi:_____%

(Use the same equation as above but using Total # of Fungi.)

Bugs:_____%

Birds:_____%

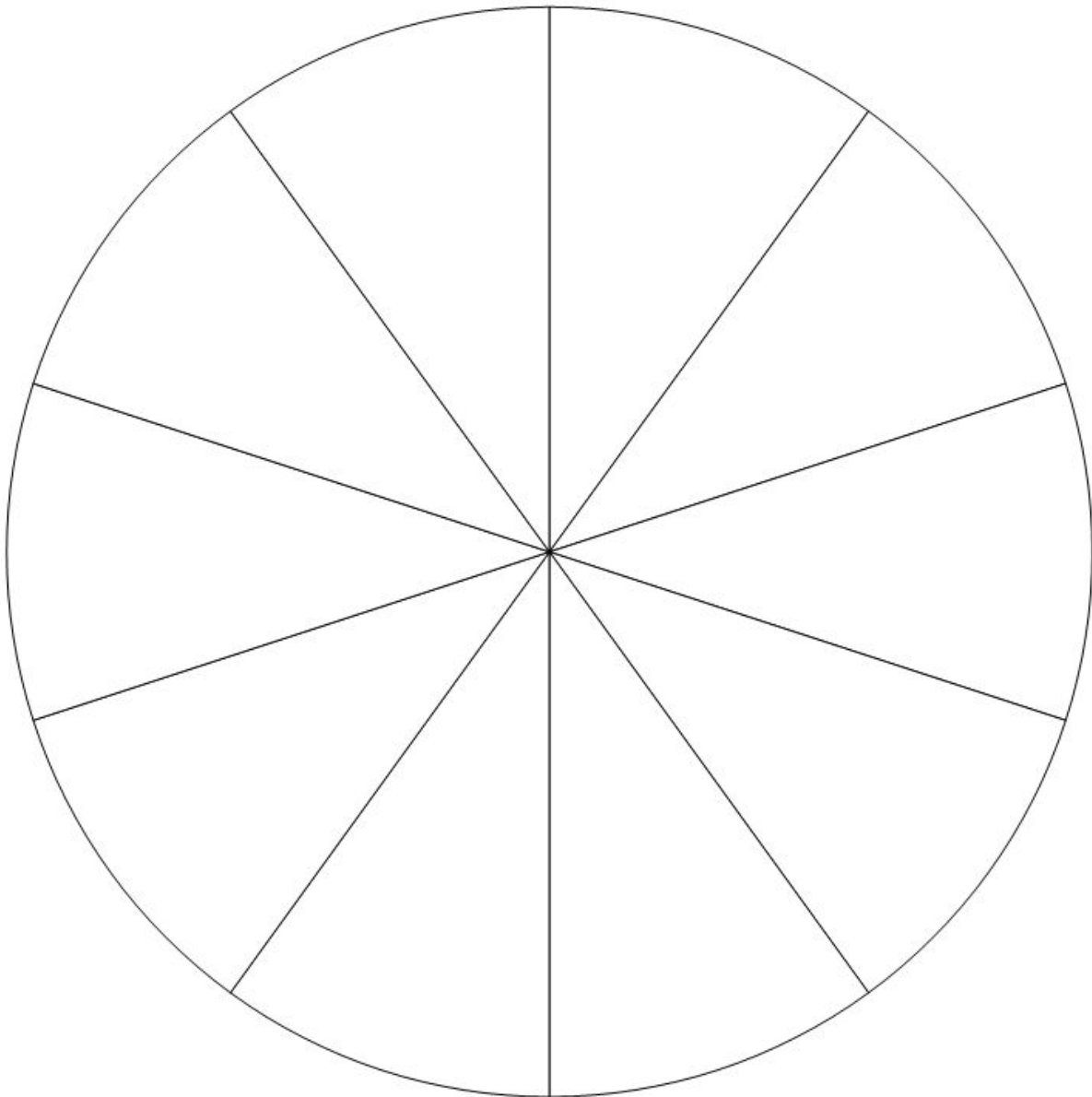
Mammals:_____%

Reptiles and Amphibians:_____%

What group was most common in your yard? Why do you think it was so common?

Analyzing Your Data

Using a pie chart can be another way to visualize your data. Graph your results onto this pie chart using a different color to represent each group. Label each color with the group it represents. Each “slice” of the pie represents 10%, so to represent 20% you would color two “slices”, to represent 5% you would color half a “slice”.



Continue Learning

Try keeping a nature journal! Writing and drawing interesting nature finds is a great way to learn more about the world around you.

Some nature journaling ideas:

- Visit the same tree in spring, summer, fall, and winter. Sketch it and record your observations on how the tree changes with the seasons.
- Observe the clouds and sketch the shapes you find.
- Draw or trace the shape of leaves.
- Write a nature poem.
- Try soil painting. Mix a little water into soil and paint a picture with it. See how many different colors of soil you can find.
- Put up a birdfeeder and track what birds visit it.

Why not try out a citizen science project? You would be conducting real research and helping out scientists!

- Project Feederwatch: <https://feederwatch.org/>
- Great Sunflower Project: <https://www.greatsunflower.org>
- Journey North: <https://journeynorth.org/>
- The Lost Ladybug Project: <http://www.lostladybug.org/index.php>

Learn by coloring!

- Moths: <https://docs.google.com/file/d/0B4lboeCKa0vaWHZuN1llbmpRZzg/edit?pli=1>
- Wildflowers: <https://www.fs.fed.us/wildflowers/kids/coloring/index.shtml>
- Birds: <https://www.birdorable.com/fun/coloring-pages/>

