



DEPARTMENT OF BIOLOGY

COLLEGE OF ARTS + SCIENCES
Bloomington

Backyard Nature Notebook

*Focusing on Indiana Science, Math, and English/Language Arts Standards
Developed by Indiana University's Biology Outreach Department
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Grade level: K – 3, however with the appropriate extensions, this activity can address higher grade levels.

Learning Objectives:

The student will designate an outdoor study plot.

The student will produce a science journal to record their data.

The student will use developmentally-appropriate literature (online, books) to determine the species present.

The student will represent the abundance of species in their study plot with developmentally-appropriate graphing.

Science Standards:

K.LS.2: Describe and compare the physical features of common living plants and animals.

2.LS.3: Classify living organisms according to variations in specific physical features and describe how those features may provide an advantage for survival in different environments.

3.LS.3: Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Math Standards:

2.M.2: Estimate and measure the length of an object by selecting and using appropriate tools, such as rulers, yardstick, meter sticks, and measuring tapes to the nearest inch, foot, yard, centimeter, and meter.

2.DA.1: Draw a picture graph (with single-unit scale) and a bar graph (with single-unit scale) to represent a data set with up to four choices. Solve simple put-together, take-apart, and compare problems using information presented in the graphs.

3.M.7: Find perimeters of polygons given the side lengths or given an unknown side length.

3.DA.1: Create scaled picture graphs, scaled bar graphs, and frequency tables to represent a data set – including data collected through observations, surveys, and experiments – with several categories.

Solve one- and two-step “how many more” and “how many less” problems regarding the data and make predictions based on the data.

English/Language Arts Standards:

K.RN.1: Actively engage in group reading activities with purpose and understanding.

1.RN.1: With support, read and comprehend nonfiction that is grade-level appropriate.

2.RN.1, 3.RN.1: Read and comprehend a variety of nonfiction within a range of complexity appropriate for grades 2-3.

Materials: Notebook, pencil, something to mark your study area, ruler/tape measurer, nice but not needed: magnify glass, colored pencils / crayons / markers, collection jar



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This activity can be setup as a one-time event or this activity can be revisited daily or weekly. There are multiple extensions that you can choose to implement based on you and your child's needs. The different state standards that will be addressed will be determined based on the activity extensions that are implemented.

Link to reading of *Up in the Garden and Down in the Dirt* by Kate Messner, illustrated by Christopher Silas Neal. <https://youtu.be/HNdTdr8LbH8>

Another great book to supplement this lesson is *One Small Square: Backyard* by Donald M. Silver, illustrated by Patricia J. Wynne and Dianne Ettl.

Have your child:

- Select a study plot that they can access easily. This could be an area in your yard or a nearby park. *Tips for selecting a study plot: there will be a better chance of finding a variety of organisms if the plot has places for organisms to hide, such as rocks, leaf litter, mulch, etc.*
- Set-up a perimeter of the area that they want as their study plot. They can mark it and make a perimeter with sticks, a hula-hoop, or meter sticks. Depending on the age of your child, you can integrate math standards and have them measure the perimeter (and possibly the area, circumference, diameter) of their study area.
- With their notebook, they should record all the living things in their study plot. If it is allowable, have them dig in the ground, as well, to discover organisms under the soil.
 - Possible items to record in the journal (see below for a possible journal example):
 - Date, time, weather, living things found in the plot, how many, what are they doing.
 - Make a drawing of the organism along with physical description. Notice interesting physical features on the organism or behaviors. Make hypotheses about the function of the different features – why do they have it? What is the adaptation of that feature? Using a collection jar can be helpful for this step. It will allow your child a close examination of the organism. Make sure to release the organism back where it was found.
 - Have your child develop some questions about the organisms they observe.
 - Classify the organism, if known. Depending on the age of your child, if they do not know what it is, they can use an app like iNaturalist to upload a photo of the organism to identify it. Your child could also use nature identification books or other apps.
- The data that is recorded in the nature journal can be transcribed into a variety of graphs (or tables). Some options include:
 - Abundance of organisms (species on the x-axis, quantity on the y-axis).
 - Abundance of a single organism across time (time on the x-axis, quantity on the y-axis).



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- From the collected data, your child can determine which organism is the most abundant in their study plot or how organism abundance changes over time.
- Simple math problems can be made from the data. Some options include:
 - How many more organism A is there than organism B?
 - How many total organisms did you find?
 - Which organism was the most (or least) abundant?
 - How many would you have to add to organism B to equal the number of organism A?

Possible journal set-up (suitable for 3rd grade)

Date:

Time:

Weather:

Location:

Plot Description (*e.g. grassy / wooded / size*):

Organism	How many?	Physical / Behavior Feature	Adaptation of feature	Question
Pill Bug	2	Rolls into ball	Protection from predator	Can all pill bugs roll into balls?
		2 antennae	Senses their environment	Why does some have 2 appendages at the back end and not others?
		14 legs	Crawling through the soil	How long does a pill bug live?

