BACKYARD NATURE SURVEY

Duration: 20 minutes – 1 hour

Grade Level: K-8

Location: Anywhere with some soil and plants.

Recommended Resources: https://www.nationalgeographic.com/photography/proof/2015/05/12/all-the-creatures-you-can-find-in-one-cubic-foot/

Materials: A ruler, a piece of paper for notes and sketching, colored pencils, pencils, a clipboard or hard portable surface to write on outside, a magnifying lens (optional), and a printed copy of the worksheets provided (optional).

VOCABULARY

Ecosystem: Includes all of the living and nonliving things in an area including plants, animals and other living things that make up the communities of life in an area. Nonliving things include rocks, water, soil, and sand.

Biodiversity: The variety of living things in the world or in a particular habitat or ecosystem.

Quadrat: A simple device, usually a square, used for marking out a small area within a habitat to focus on local selection of plants, insects, animals, and nonliving parts of an ecosystem.

Goals:

- Conduct a 'nature survey,' involving a focused investigation on a 'square foot' of land in an outdoor space.
- Children will work to record individual observations and the observations of their parent/caregiver using sketching and notes.
- Learn how much biodiversity exists in a very small area!

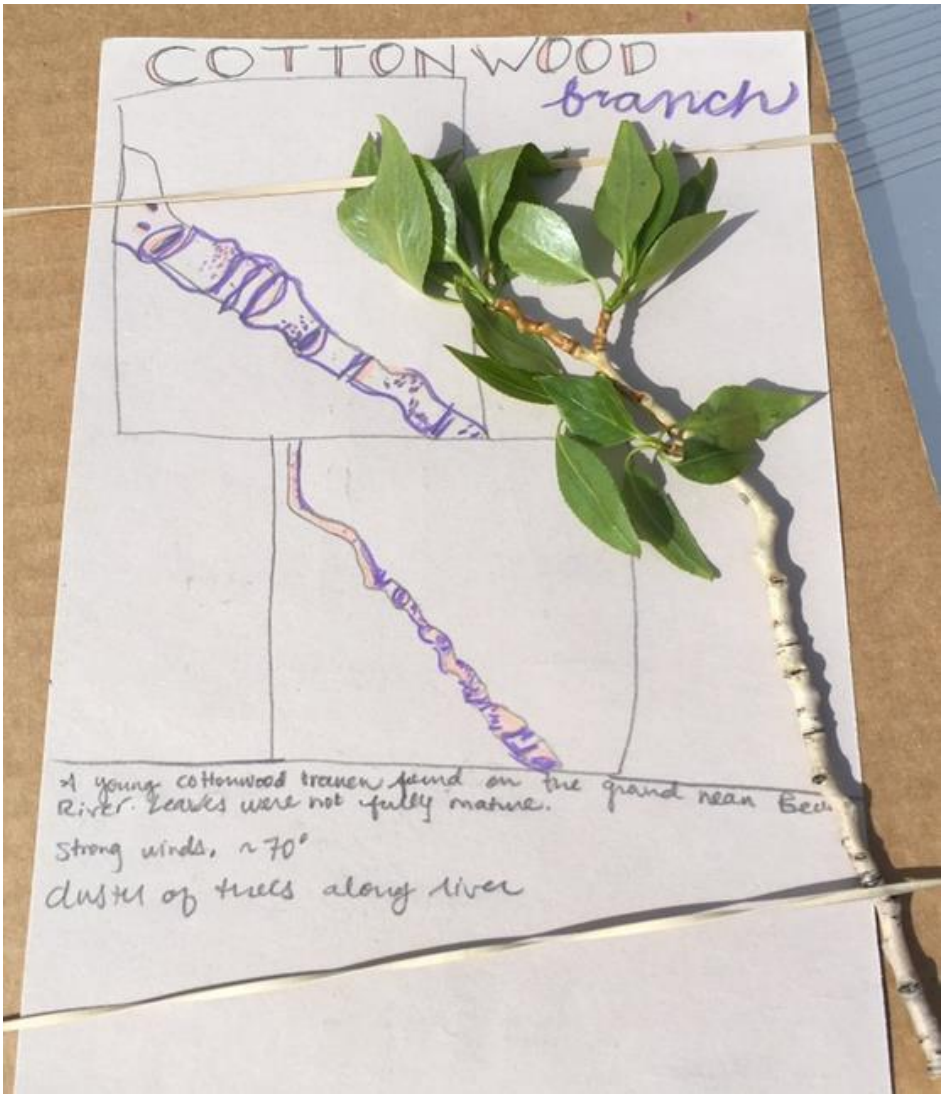
Introduction (*5-10 minutes*):

Start a discussion about what might be living in the natural spaces outside your house/apartment. Consider not only what we might see when we look out the window, but also what we might find if we were to zoom in on one small area of the yard. Introduce the concept of biodiversity. Simply put, **biodiversity means the variety of living things in the world or in a particular habitat or ecosystem.** Reference the "Nature Survey Explained" sheet, and/or read the article/watch the short clip from this National Geographic article "All The Creatures You Can Find in One Cubic Foot" for backstory. For this survey, we'll be working with a Square foot (1ft x 1ft) vs a 3D cubic foot (1ft x 1ft x 1ft).

Activity (*20 minutes to 1 hour*): If you'd like to stretch out this activity, you can start by reviewing skills in drawing and note taking inside or outside. If you'd like to simply head outside and start the investigation, go right ahead! If this is the case, skip ahead to "Nature Survey".

DRAWING & NOTE TAKING

When you are recording what you see within your square foot, drawing and taking notes on that insect, plant, soil, dead leaf, acorn shell, etc., can help in the identification process. Every organism possesses traits that make it unique from another organism. Some organisms' shape or appearance are more rounded or skinny than others. Even two blades of grass or two dead leaves will have differences you can draw. You don't have to be a Picasso or a Michelangelo! Adding notes beside the drawings of any colors or traits will help with identification. Below you'll see a fun example of using sketching and notes to zoom in and out of an object we might otherwise walk right by.



Follow the **ABCDE**'s of scientific sketching!

A: Accurate
B: Big
C: Colorful (or referencing color)
D: Detailed
E: Explained

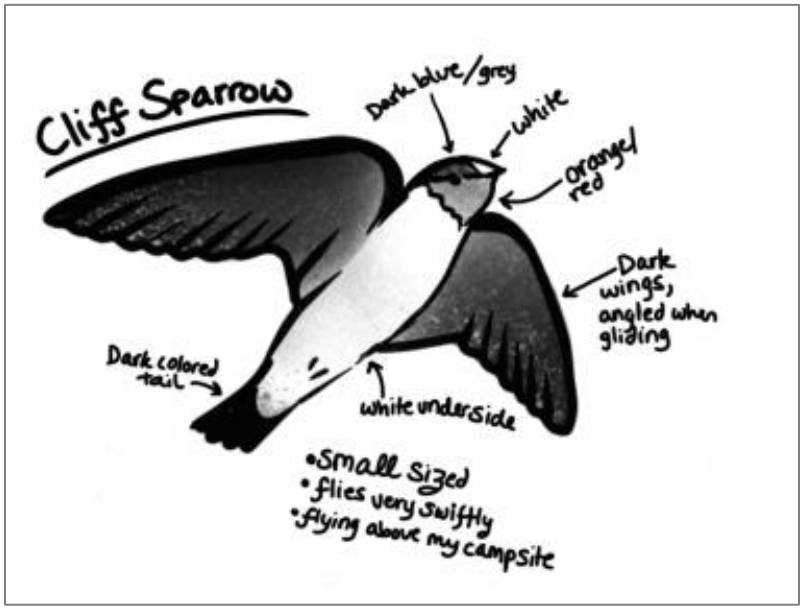
Give constructive feedback! "Rather than praising a drawing as "pretty," you can say, "Great job making your sketch **big**; it really helps me see the details," or "I'm glad you included **explanations** in your sketch; they will help another scientist understand what's important." For constructive feedback, try: "What could you do to make this sketch more **accurate**?" or "I bet adding **color** would help another scientist understand what the object really looks like.""

https://www.calacademy.org/educators/lesson-plans/introduction-to-scientific-sketching

Here are some questions that can help aid your child to draw & take notes:

What color is it? Does it have more than one color? What is its shape? What size? Is it big, medium, or small? Does it have distinct features? Does it (plants) have a certain smell? Where was it found? Did it have a certain behavior? Are there more than one? Count as many things as you can see! *You can practice inside with any object you find around the house, or even a house plant or vegetable from the fridge.*

While you may not be drawing birds during your survey, below is an example of notes and sketching without colors. Does this sketch follow the ABCDE's?



Nature Survey

Gather materials before you head outside. A ruler or a square-like frame, pencils, coloring materials, something hard and portable to write on (like a book or cardboard), and paper to draw and take notes. If you can print the worksheet we've provided, great! If not, you can read it ahead of time and reference some of the questions with your child. If you have a backyard, you can find an area with plants, soil, grass, a mix, or the base of a tree. Anywhere works! If you don't have a yard, you could use a small landscaped area near a sidewalk, or even a planter in the window. As long as there is something natural occurring, it can work for this activity.

Using the prompt page "Nature Survey Explained" talk about the National Geographic activity. Using a cubic foot, they surveyed biodiversity in many different global ecosystems and recorded the life they found within. How many living things did they find? Reveal (by turning over the back of the page). "There is more life in one cubic foot than anyone could look at in a month," says photographer David Liittschwager (National Geographic, 2015)

Introduce the square foot. Measure a square foot using your ruler, and possibly mark the area using twigs, string, pencils, etc. Use the worksheet provided to guide your investigation. We'll study the life inside this square foot! This is our sample which will help us understand the biodiversity of our yard (or park). Your child can choose where the investigation will take place! Record and draw what you find within that area.

There will be more than meets the eye if you just look closely. Take turns sharing and recording observations. If your child is 2nd grade or younger, perhaps ask more prompting questions and actively participate in the activity to maintain engagement. Ask your child what they notice. If you run out of things to draw, have them write about what it makes them think of. If you run out of things to write, zoom in on an individual object and draw as many details as you can! Label the colors or color it in! If you lose focus, encourage your child to count as many different types of living or non-living things they can see, or even count blades of grass or dead leaves. Ask, are they all the same? How are thy different?

Inquiry Q's:

- Can we count the living and non-living objects in this square foot/area?
- Are there creatures hiding underneath other things, like rocks, sticks, or leaves (nearby or within the quadrat)?
- What do you See? Hear? Smell? Feel? How can you show this in your drawing?
- What things were put here by humans and what things found their own way to this natural space (refer to the outdoor space as a whole—big picture, and also focus on the square foot specifically—small picture)?
- Would this space be the same in the Spring? Summer? Fall? Would we see anything different?

Conclusion (*5-10 minutes*):

Review what was found within the square foot. Talk about the drawings, notes, and any answers to questions your child came up with. If there are other areas you'd like to explore outside, move the square foot to another zone and repeat the activity. Ask your child if anything surprised them about the activity. Was it challenging? Easy? Did they learn something new?

Optional expansion for older students (additional 20 minutes):

Use the nature survey to compare the biodiversity by placing quadrats in two different spaces (ex: in the grass vs under a bush, in an area disturbed by humans vs an undisturbed area). Make a prediction about which space would have more or less species then conduct the nature survey to gather data. Have your student make a claim about which space had more biodiversity and use evidence to explain their reasoning.

Nature Survey Explained:

1. Let's find out what's growing together in the yard or garden!
2. How can people possibly study life in an ecosystem when there is so much of it?
3. It's hard to account for everything in the yard, so we are 'zooming in' on one square foot.
4. We'll study the life inside this square foot! Since it's a standard size, we can compare what we find to different habitats and over time to see if it changes.

Take a look at all of the life that was found in this cubic foot (1ft x 1ft x 1ft) in Central Park in New York City! Can you guess how many individual organisms they found? (National Geographic, 2015).

We can find many organisms if we look closely and focus!

The following organisms were found:

"There is more life in one cubic foot than anyone could look at in a month," says photographer David Liittschwager (National Geographic, 2015).

Nature Survey

What's the weather like outside? Observe the clouds, temperature, wind, rain, etc. Think about what the weather was like this morning, what it's like now, and what it might be like later today.

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Directions:

1. Place square anywhere in the yard or even simply in an area of dirt near landscaping on the sidewalk or at the park!
2. Take turns making observations with your parent/caregiver.
3. Record group observations. Label items if you can! Add color or label colors.

Questions to consider:

- Are there creatures hiding underneath other things, like rocks, sticks, or leaves?
- What do you See? Hear? Smell? Feel? How can you show this in your drawing?
- What things were put here by humans and what things found their own way to the garden?
- How do you think the weather/climate would affect the biodiversity of this square foot? If you're conducting this activity on a sunny day, perhaps repeat it on the next cloudy or rainy day. If today is cloudy, repeat on a sunny day in the future to compare!