![Conservancy of Southwest Florida - OUR WATER, LAND, WILDLIFE, FUTURE.]

Explore Activity - Introduction to Sampling:

Backyard/ Schoolyard Quadrats

Objectives:

- Students will be able to define biodiversity, categorize local terrestrial arthropods, and calculate species abundance
- Students will understand factors that impact habitat suitability and population density
- Students will utilize common scientific surveying techniques and organize data collected to answer a scientific question

Materials:

- Two pieces of 8.5x11 notebook paper
- Four rocks, sticks, or other accessible items that can be used as markers
- Notebook and writing utensil
- Datasheet (provided in this lesson)

Background:

When studying the habitats within earth's varied ecosystems, it is critical for scientists to structure and quantify their observations. These types of observations often include a variety of surveys which can help assess an area's biodiversity. Calculating biodiversity - which incorporates metrics like species richness, relative abundance, and population density - helps us better understand how different biological communities interact and are responding to factors like climate change.

In this activity you will be conducting a simplified abundance survey using quadrats and your yard or a schoolyard as a study site. Instead of quantifying what plants are available as food, you will be sampling what kind of food is available for anoles using quadrats! Quadrat sampling is a technique used because it is impossible to count every living and nonliving thing in an ecosystem.

In Southwest Florida, brown anoles are common in most urban habitats and yards. Anoles feed on small arthropods such as crickets, moths, grasshoppers, cockroaches, spiders, and worms. While anoles will sometimes eat ants, many ants are distasteful and anoles will avoid them. To determine what kind of food there is in your local habitat for anoles, you'll need to sample ground dwelling arthropod species and see what the relative abundance is for ants and non-ants.

Activity Introduction Questions:

- What is a quadrat and how is it used by field biologists?

- What is relative abundance?

- Why do you think scientists need standardized methods of sampling?

Activity Instruction:

1. Begin by considering your study site. Choose an outdoor space that is large enough to examine four separate sampling areas, each roughly the length and width of an average person (≅5-6').
   a. We are studying anole food availability so placement of our quadrats needs to be in areas anoles could inhabit. If you see anoles in the area, that is a good sign!

      If you completed the anole population survey activity, then the sampling locations here will be similar to that study.

   b. Your **quadrat** will need to be used in **four areas**; two open natural spaces more than two paces away from a perch and two natural spaces within two paces of a perch (a place for an anole to rest off the ground).
      i. Perches can refer to a tree, wall, ledge, tree stump, bush, etc....
      ii. "Paces" refers to the natural walking stride or step you take while walking. One pace is one step.
   c. Additionally, observe the area's substrate and vegetation that will be recorded later on your datasheet.

Open natural space

Natural space near a perch

2. <u>Assembling your Quadrat:</u> You will need **two pieces of 8.5x11 notebook paper** and **four rocks**, sticks, or other accessible items that can be used as markers.

    a. Fold your paper in half, along the long edge.

    b. Then rip your paper in half along the fold.

    c. Rip each of those strips in half (along the long edge) one more time.

        i. You should now have **8 strips of paper.**

    d. Use the pieces to **assemble to the border of your quadrat square.**

3. Scientists would use a frame for this process, but we are just approximating the size of your quadrat for this exercise.

    a. Now, **mark the corners** of the square with sticks or rocks.

    b. Then remove the paper, but imagine there is still a border between your four corners creating a square.

4. On your data sheet, mark which type of habitat you are sampling - open natural space or natural space near a perch.

    a. Then make a simple sketch of the sampling area within your quadrat, including notable features, like a large rock, tree, artificial substrate, etc…

    b. Clearly label any perches.

    c. Also, circle which type of habitat you are sampling on your datasheet (Open Natural Space/ Near a Perch).

5. Sit or kneel on the ground beside your quadrat. Make sure you are not sitting in or have your hands placed near an ant mound. Using your datasheet (attached), **start** your count in the **top left corner** and **move from left to right** then **top to bottom.**

    a. **Count** how many individual arthropods are inside the quadrat as you slowly scan the sampling area from left to right.

    b. Arthropods are small and often difficult to see. Look carefully and closely!

    c. Tally the arthropods as either **ants** or **non-ants** on your datasheet with a hashmark.

    d. As you come across an arthropod make a mark on your datasheet, in the appropriate quadrat.

    e. Move slowly and evenly throughout the square to ensure an accurate count.

    f. You will also need to note whether or not the arthropod you observe is an ant or non-ant by following the guide below.

Ants	**Non-ants you could confuse with ants**

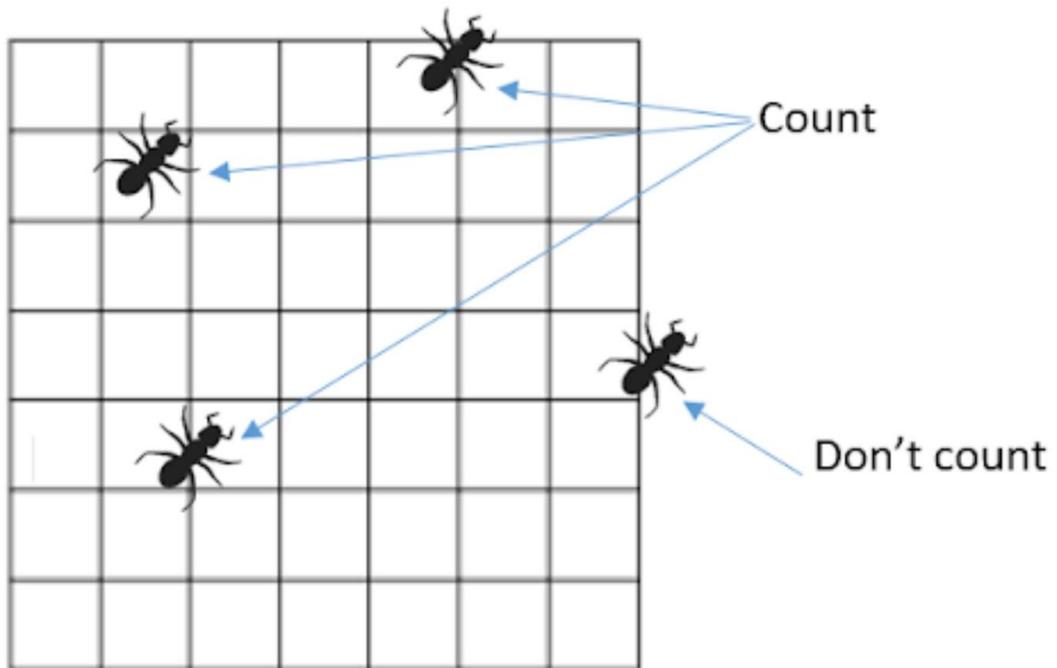|	
Carpenter Ant	Termite
Twig Ant	Winged Termite
Fire Ant	Ant-mimicking Jumping Spider
Sugar Ant	Ant-like Longhorn Beetle

|	
Flying Ant	Thread-waisted Wasp

6. Arthropods along the edge of your quadrat may be difficult to count, follow the image below as a guide*

*if an arthropod is MORE THAN HALFWAY OUTSIDE YOUR BOUNDARY do NOT count

7. Repeat steps 2 through 5 three more times. Remember to create your quadrats in **two open areas and two areas near a perch.**
   a. Sketch a map of your entire sample area and label each of your quadrats. Refer to the example below:
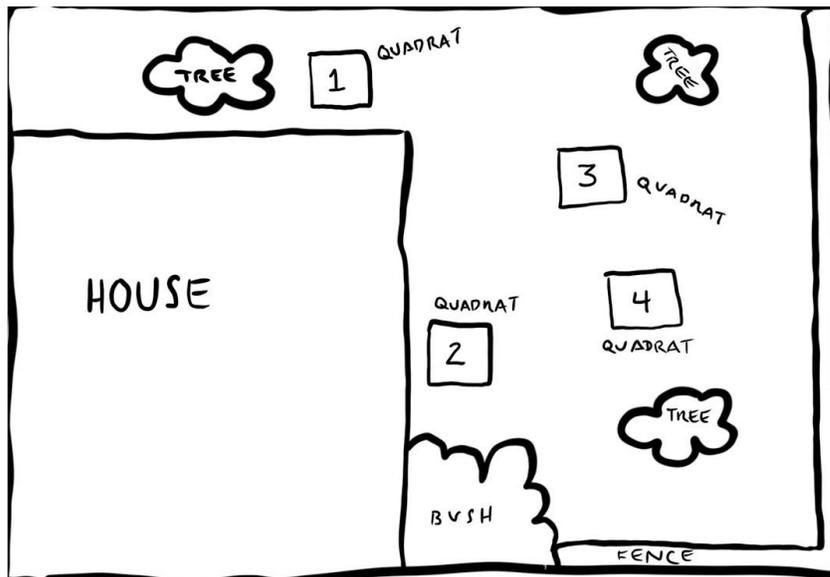
b. Upon finishing, you should have completed four separate species counts in four quadrat areas and one sketch of your entire sample area.

Discussion Questions:

1. What was the <u>total</u> number of ants observed in all your quadrats?

2. What was the <u>total</u> number of non-ants observed in all your quadrats?

3. What is the <u>ratio</u> of ants to non-ants based on these totals?

4. Based on your data, is there a difference between total arthropod abundance near perches and total arthropod abundance in open areas?

5. Based on your data, do you think your study site would support a population of anoles? Why or why not? What could make the area more or less suitable for anoles?