

HOW TO COUNT LIKE A SCIENTIST!



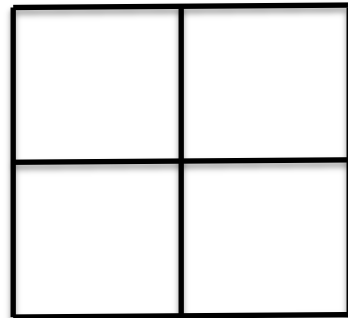
When scientists make observations, they often make observations with numbers. We call observations with numbers **quantitative observations**. All that really means is scientists count things!

Scientists often collect data to quantify, or count, the living components of ecosystems. It would be impossible to physically count *ALL* of the organisms in a habitat, but we *CAN* count the number of organisms in a small area of that habitat. Can you think of a way to count the number of plants and animals found in a habitat, like your schoolyard or backyard at home?

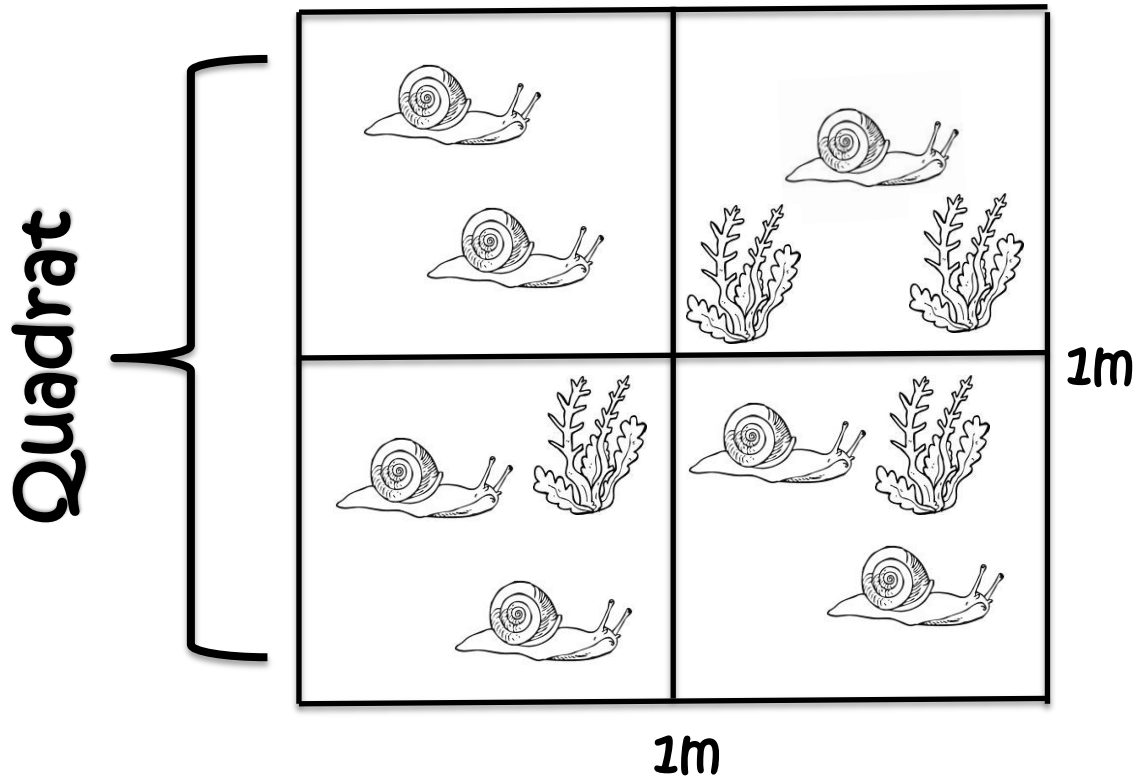
There are many methods that could be used to quantify the life in the marsh above. One method of counting organisms is by using quadrats.

Quadrats

Quadrats are used to estimate the number of whatever is being looked at by counting in a small area of a known size. A quadrat is a square shaped plot (typically 1 meter in length) that is sectioned off into equal sized squares with rope or string. Organisms (both plants and animals) that fall within each square of the quadrat are counted and the results are recorded.



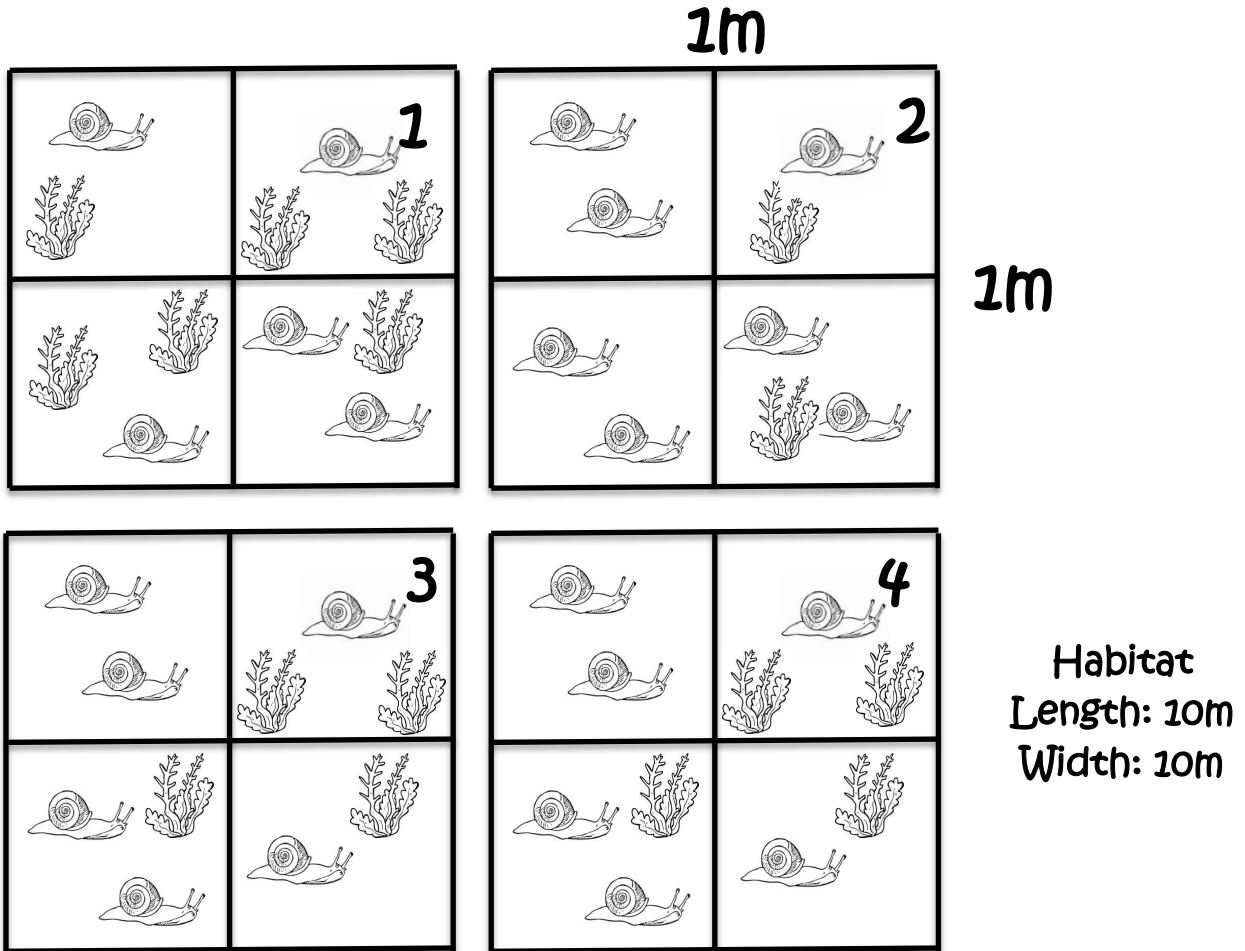
Let's practice!
Quadrat #1 Marsh Habitat



1. What area is represented by this quadrat? (*Hint: think of calculating the area of a square, length x width*) ____ m²
2. How many organisms are found in this quadrat? ____
3. How many snails are found in this quadrat? ____
4. How much seaweed is found in this quadrat? ____
5. What fraction of the organisms found in this quadrat are snails? ____
6. What fraction of the organisms found in this quadrat are algae? ____

Counting with quadrats can give us an accurate estimate of the population within habitat. If we know the average number of organisms found in a quadrat, the area of the quadrat, and the area of the habitat, we can use multiplication and division to estimate the population of the organisms that live in that habitat!

Now let's try quantifying the snails and algae in marsh habitat with four quadrats.
 Answer the questions on the following page using the images below.



Quadrat area: _____m²

Habitat area: _____m²

Follow the instruction below to complete the table.

Quadrat	# Snails	# Algae		
1				
2				
3				
4				
Total			# Of quadrats that fit in habitat	
Mean			x	=
Mean			x	=

Quadrat area (m ²)	
Habitat area (m ²)	

- Record the number of snails for each quadrat.
- Record the number of algae for each quadrat.
- Calculate the total number of both snails and algae.
- Calculate the mean (average) number of snails for all four quadrats. (*Hint: divide the sum of snails by 4*)
- Calculate the mean number of algae for all four quadrats.
- Find the area of each quadrat. (*Hint: Area = length x width*). Record answer on table.
- Find the area of the habitat. Record answer in table.
- Calculate how many quadrats would fit in your habitat. (*Hint: Divide the area of the marsh habitat by the quadrat area.*) Record this number twice in your table.
- Estimate the population of snails in this habitat.
To do this, multiply the mean number of snails by the number of quadrats that would fit in the habitat.
- Estimate the population of algae in this habitat.