



Chapter 6 - Habitat Study

- To visit and gain an overview of an ecosystem and the diversity of living organisms it contains.
- To identify several habitats from the selected ecosystem and identify five plants and five animals using simple keys.
- To identify and use a variety of collection instruments in an ecological study.
- To describe a qualitative survey and conduct a quantitative survey of plants and animals in a selected ecosystem, presenting data appropriately and identifying possible sources of error in the study.
- To describe the relationship between an organism's adaptation to a habitat and three abiotic factors in that habitat.
- To describe an organism's role in energy transfer and construct food chains, a food web and a pyramid of numbers in a selected ecosystem.
- To analyse and assess the results of an ecological study and prepare a report.

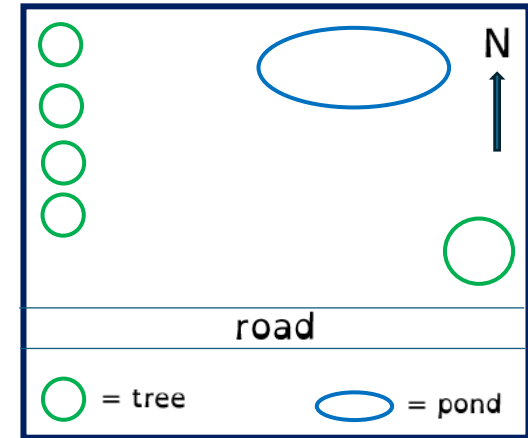




Woodland/Grassland Habitat

Draw the habitat and use a magnetic compass and legend.

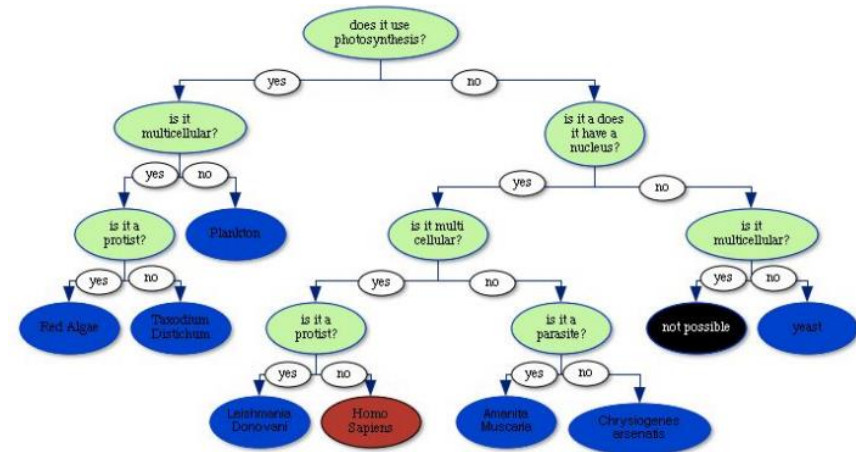
1. Draw a **map** of the area - use a legend and a compass



2. **Flora** - use a key



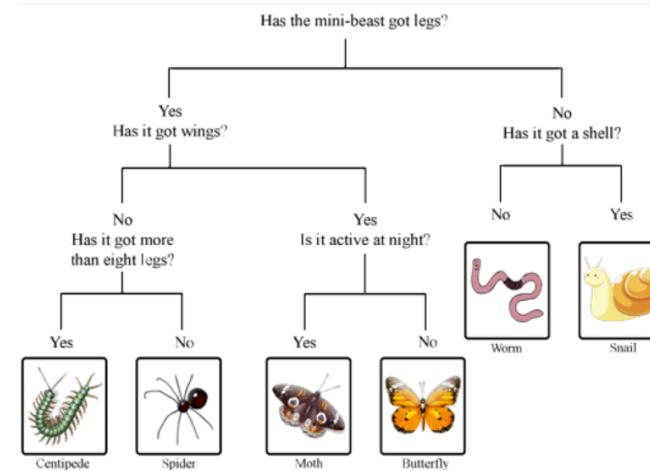
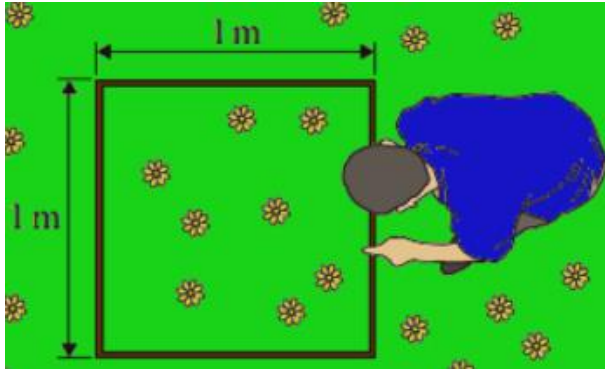
3. **Fauna** - use a key





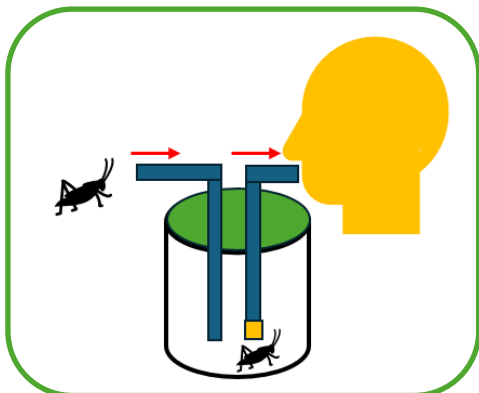
Use various instruments and identify 5 plants and 5 animals.

Plants - Quadrat and a key



Animals - Pooter, Pitfall trap, Beating tray and key

Pooter – suck in insect



Pitfall Trap – insect lured in



Beating Tray - catch





Example of 5 Animals and 5 Plants

Name	Location	Collection Method
Oak	In covered area	By Hand
Woodlouse	Rotten wood in shade	Pooter
Dandelion	In open area	Quadrat
Robin	Edge of covered area	By Sight
Beech	Edge of open area	By Hand
Ivy	On fence	By Hand
Rabbit	Edge of covered area	By Sight
Grass	In open area	By Hand
Slug	In covered area	Pitfall Trap
Spider	On Tree	Beating Tray

This is just an example of some typical flora and fauna that can be seen in a woodland/grassland habitat.





Using a Quadrat

A Quadrat is used for both **qualitative** (yes/no) and **quantitative** studies (numbers)
A pencil is thrown over the shoulder at random and the quadrat placed where it lands. The names of the plants present in the quadrat were written down. This was repeated 10 times, and each plant was ticked off when present.

Percentage Frequency – Qualitative (yes/no)

Name	1	2	3	4	5	6	7	8	9	10	Total	% Frequency
Grass	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	10	100%
Dandelion	✓	✓	✓	✗	✗	✓	✓	✓	✓	✓	8	80%
Buttercup	✓	✗	✓	✓	✓	✗	✓	✗	✓	✗	6	60%
Daisy	✗	✓	✓	✓	✗	✓	✗	✓	✓	✓	7	70%
Clover	✓	✓	✓	✓	✓	✗	✗	✓	✗	✓	7	70%
Doc	✗	✓	✓	✗	✓	✗	✓	✗	✓	✗	5	50%





Percentage Cover – Quantitative (numbers)

As before, a pencil is thrown over the shoulder at random and the quadrat placed where it lands. This time we look at the crosshairs on the quadrat. There are 36 places where the wires meet.



$$\% \text{ Cover} = \frac{\text{Total number of hits}}{\text{Total number of points} \times 100}$$

We check for the presence of a plant under each of these and add them to the table. We ignore grass as it would be close to 100%.

Name	1	2	3	4	5	6	7	8	9	10	Total Hits	Total Points	% Cover
Grass	-	-	-	-	-	-	-	-	-	-	-	360	%
Dandelion	10	9	8	9	10	7	9	8	10	7	87	360	24%
Buttercup	6	6	7	5	6	6	5	7	6	8	62	360	17%
Daisy	8	8	7	6	8	9	8	6	9	8	77	360	21%
Clover	8	9	7	6	7	6	7	8	9	9	76	360	21%
Doc	4	4	7	10	5	8	7	7	2	4	58	360	16%





To Estimate the Numbers of Animals

Capture/Recapture Method

We capture some animals and mark them all.

We release the animals and collect again at some stage later.

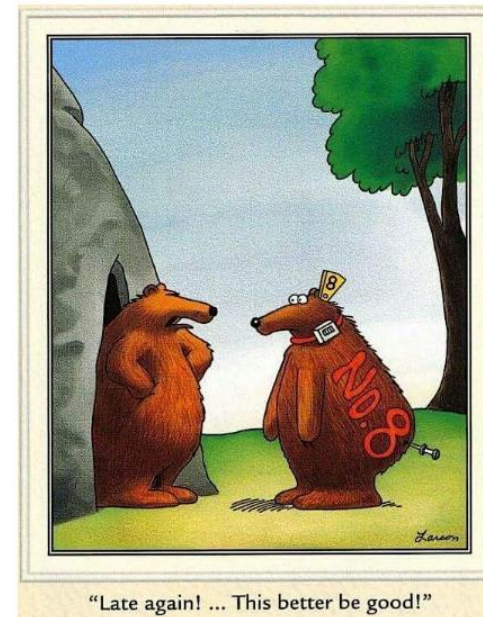
We see how many we capture the second time were previously marked from the first capture.

This method is not exact and is only an approximate guide to actual number of animals in a habitat. Marking or tagging should not interfere with the animal and should not make it more obvious to predators.

1st Capture 2nd Capture

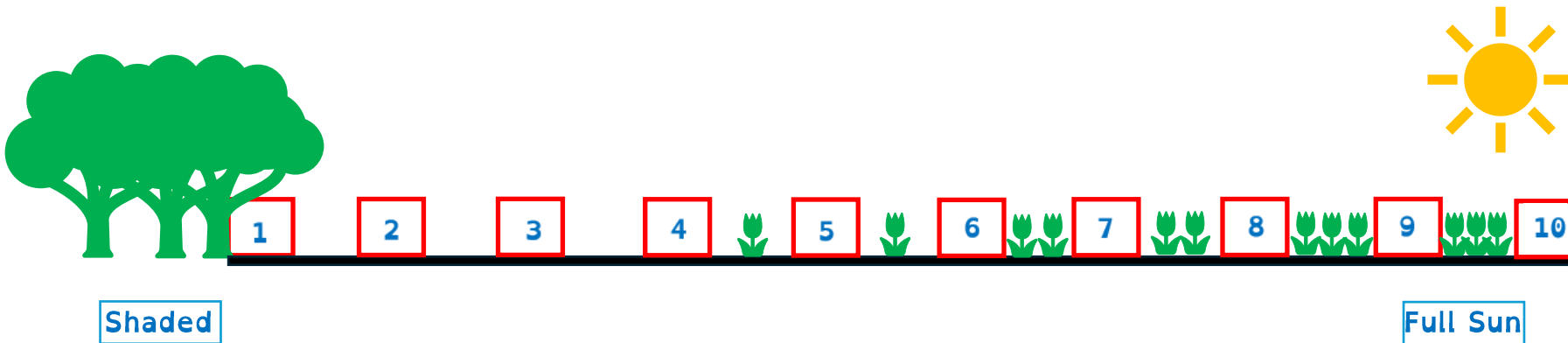
$$\frac{15}{3} \times \frac{15}{3} = \frac{225}{3} = 75$$

Marked from first capture





Belt or Line Transect



- 🌱 A belt or **line transect** measures changes in **Abiotic factors** across a certain line.
 - 🌱 Each quadrat is measured at every metre along this line from shade to full sun.
 - 🌱 For example, the **air temperature, soil temperature**, soil humidity, **light** and wind can be measured. That should give us the change or gradient along the line.
 - 🌱 We also look at the % frequency (**qualitative**) measurement along the line to see how the changes can affect different species of **plants** and animals.
 - 🌱 We would expect the air and soil temperature to be lower in the shade and higher in the open. We would also expect more light in the open area.
- This would mean some species of plants would grow better in the open area than others.**

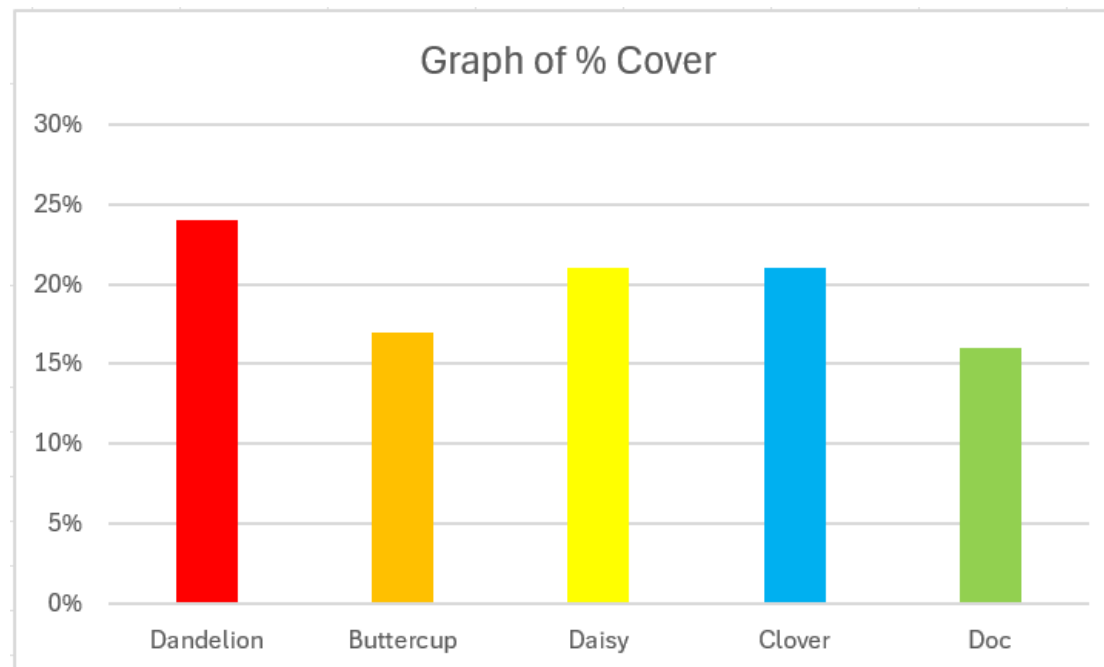




Presentation of Results

Percentage Cover – Quantitative Examples

Results can be in table form or drawn as a graph. Bar charts can be useful for this.





Subjective Estimates

The **DAFOR** scale is based on your opinion of frequency. It's not as accurate as taking quadrat measurements.

Dominant **A**bundant **F**requent **O**ccasional **R**are

Sources of Possible Errors

Errors may arise in the study of an ecosystem in the following ways:

- Mistakes may be made in judgement and recording.
- Conditions change in the ecosystem over time.
- Accidental discoveries may be made.
- Organisms can be wrongly identified.
- The habitats studied may not accurately reflect the overall ecosystem.





Questions on this topic

Q.1 Name 2 pieces of equipment used to carry out a plant survey?

Q.2 Give examples of 2 pieces of equipment used to capture animals?

Q.3 What is the difference between qualitative and quantitative?

Q.4 Briefly describe how Capture/Recapture works?

