National 3 Biology- Life on Earth Revision Guide

KEY TERM

Habitat- The place where an organism lives.

There are lots of different habitats and each has different organisms living in it.Examples

Habitat- River

Organisms present: pondweed, lily pads, algae, tadpoles, trout, water beetles and frogs.

Habitat- Forrest

Organisms present: Trees, grass, ferns, mushrooms, deer, birds, foxes, owls.

Habitat- Desert

Organisms present: Cacti, camels, desert rats.

KEY TERM

BIODIVERSITY is the differences that exist between living things.

Biodiversity differs habitat to habitat because organisms are adapted to live in particular areas e.g. polar bears would only be found in cold places not in the desert.

The importance of biodiversity

- A variety of different food sources are available
- Medicinal plants are maintained whilst new species with beneficial effects are discovered
- Raw materials: wood, cotton etc are maintained

Biotic Factors

A range of different biotic factors can affect the plants, animals and habitats found in a particular biome. They can increase or decrease the biodiversity. Biotic factors are factors which are related to living things e.g. predation, competition and disease.

Abiotic factors

Abiotic factors are non-living conditions which can influence where plants or animals live.

Examples of abiotic factors include:

- temperature
- light intensity
- moisture content of soil
- pH of the environment.

Sampling Techniques

Sampling plants:

It would be impossible to count all the plants in a habitat, so a sample is taken. A tool called a quadrat is often used in sampling plants. It marks off an exact area so that the plants in that area can be identified and counted.

About quadrats:

➢ quadrats should be placed randomly so that a representative sample is taken
➢ the results are more reliable when you look at the results from many quadrats
➢ quadrats may also be used for slow moving animals such as snails/slugs.

Sampling animals

It is impossible to find and count all the animals in an area. You can get an idea of the variety and number by taking a sample. Pitfall traps are often used to sample the small invertebrates living on the ground. You are likely to trap beetles and other insects, as well as spiders and slugs.
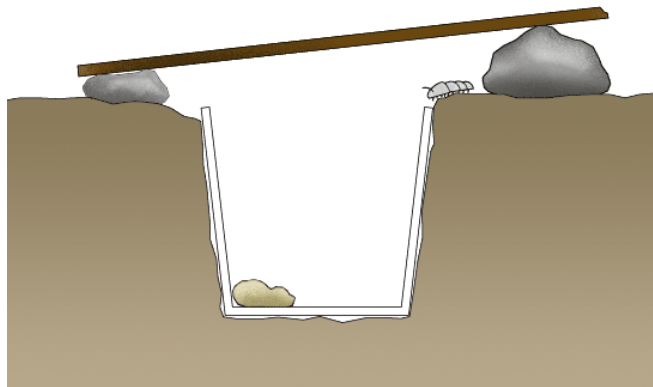
To set up and use a pitfall trap properly:

➢ the top of the yoghurt carton should be level with the soil surface
➢ cover the trap with a stone or piece of wood to keep out the rain, to make it dark and to stop birds eating your catch
➢ the traps must be checked often to avoid the animals escaping or being eaten before they are counted
➢ as with most methods a large number of traps makes results more reliable and minimises the effects of unusual results.

Measuring Light Intensity

Light meters can be used to measure light intensity. The meter is held at the soil surface and pointed in the direction of the maximum light intensity, then the meter is read. Errors can be made when measuring light intensity by

accidentally shading the light meter. Results can be made more reliable by taking many samples.

<u>Measuring Moisture Content of Soil</u>

Soil moisture and soil pH meters are also available - both are used by simply pushing the probe into the soil and reading the meter.

Errors can be made when measuring abiotic factors when the soil moisture or pH meter probes are not cleaned between readings. As always the results can be made more reliable by taking many samples.

Global Food Production

The increasing human population of the world has resulted in a greater need for food.

Fertilisers

Farmers and scientists use fertilisers in intensive farming to ensure the plants have the minerals they need for growth to again increase food yield. The can be artificial e.g. chemical fertilisers or natural e.g. manure.

When crops are harvested elements like Nitrogen are removed and this is why farmers use fertiliser- to replace the nutrients their next crop will need to grow.

Fertilisers can leach into fresh water, causing algal blooms. This leads to a reduction in oxygen levels and blocks out light. This causes death of organisms, decrease of oxygen and means less life can be supported.

Pesticides

Pesticides are used in intensive farming to control pests such as insects. They are sprayed onto crops and can accumulate in the bodies of organisms over time. As they are passed along food chains, toxicity increases and can reach fatal levels e.g. DDT. This is known as bioaccumulation.

Alternatives

Biological control and GM crops may be alternatives to mitigate the effects of intensive farming on the environment.

GM Crops-

Genetically modified crops are plants, the DNA of which has been modified using genetic engineering techniques, to resist pests and agents causing harm to plants and to improve the growth of these plants to assist in farmers efficiency.

Biological Control-

Biological control is a method of controlling pests (including insects, mites, weeds and plant diseases) using other living organisms e.g. using a virus (Myxomatosis) to kill rabbits and using ladybirds to kill aphids.

Questions to try

1.   Name 2 abiotic factors.

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2.   Name three biotic factors that could affect the number of rabbits living on the embankment.

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3.   2. Name a technique that could be used successfully to sample organisms living in an

(a)Soil ecosystem
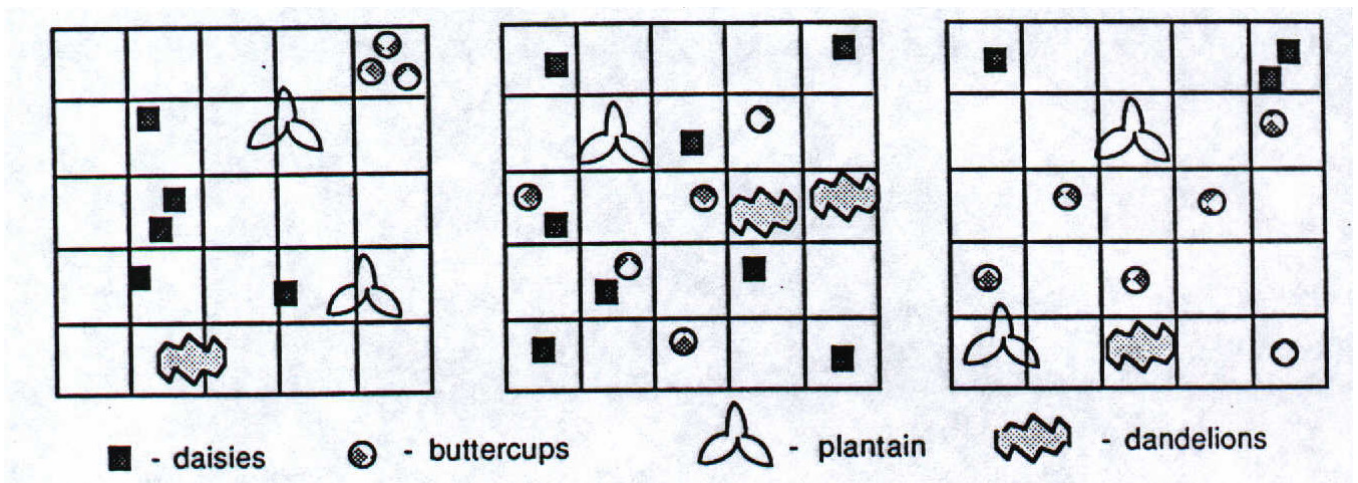
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(b) Lawn ecosystem

_____

4.   Give the definition of a habitat.

_____

5.   Explain what the term Biodiversity means.

_____

6.   Estimate the abundance of each plant type shown in the three quadrats shown below and complete the table.

■ - daisies   ◎ - buttercups   ⚘ - plantain   〰 - dandelions

Plant Type	Quadrat A abundance	Quadrat B abundance	Quadrat C abundance
Daisies			
Buttercups			
Plantain			
Dandelions			

Using Quadrats

Mr Twinkleberry has a problem, there are too many daisies on his lawn. He uses a 1 sq.m quadrat to estimate how many daises are on his lawn. He takes 10 samples with his quadrat and this was his result.

sample	number of daisies
1	6
2	8
3	9
4	1
5	5
6	8
7	4
8	3
9	7
10	9

7. Work out the total number of daisies counted and then the average in each quadrat.

_____

8. Mr Twinkleberry's garden is 100 sq.m. Estimate the number of daisies in his garden.

_____

9. Why have farmers had to increase the amount of food they are producing?

_____

10. Name 2 chemicals that farmers use to increase the amount of food they are producing **AND** explain what each does.

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_____

11. What does the word alternative mean (use a dictionary to help you)?

_____

12. What two alternatives can be used instead of pesticides and fertilisers?

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