

Tolerance and Acclimation

- 1) A species of fish, which is found at a depth of 200 meters in the temperate seas off the New Zealand coast, occurs at greater depths in the tropical seas around the Cook Islands but at far shallower levels in the Antarctic Ocean. Suggest the most probable reason for this observation.
- 2) Two experiments were conducted on the influence of temperature on the movement of flies. In each experiment 100 flies were placed in a container of air, which was gradually heated and then cooled. The number of flies moving at each temperature is shown below

Experiment 1 - Temperature range 0°C to 50°C

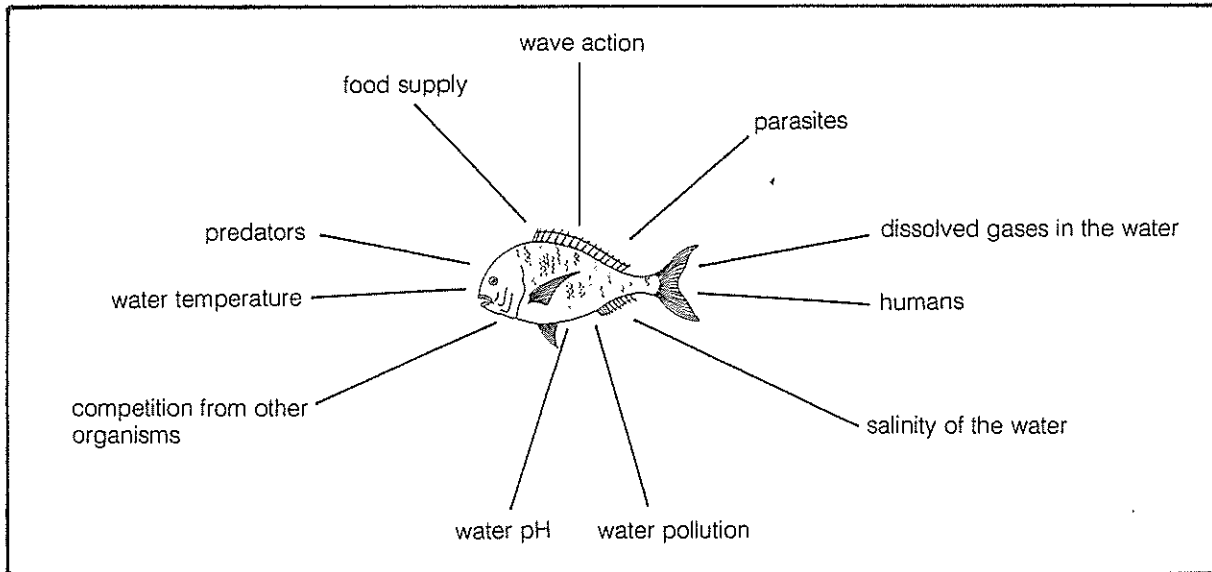
Temp. (°C)	0	10	20	30	35	40	45	50	45	40	35	30	20	10	0
Numbers Moving	0	8	41	64	97	84	8	0	0	0	0	0	0	0	0

Temperature (°C)	0	10	20	30	35	40	45	40	35	30	20	10	0
Numbers Moving	0	11	37	66	98	81	14	68	71	73	21	7	0

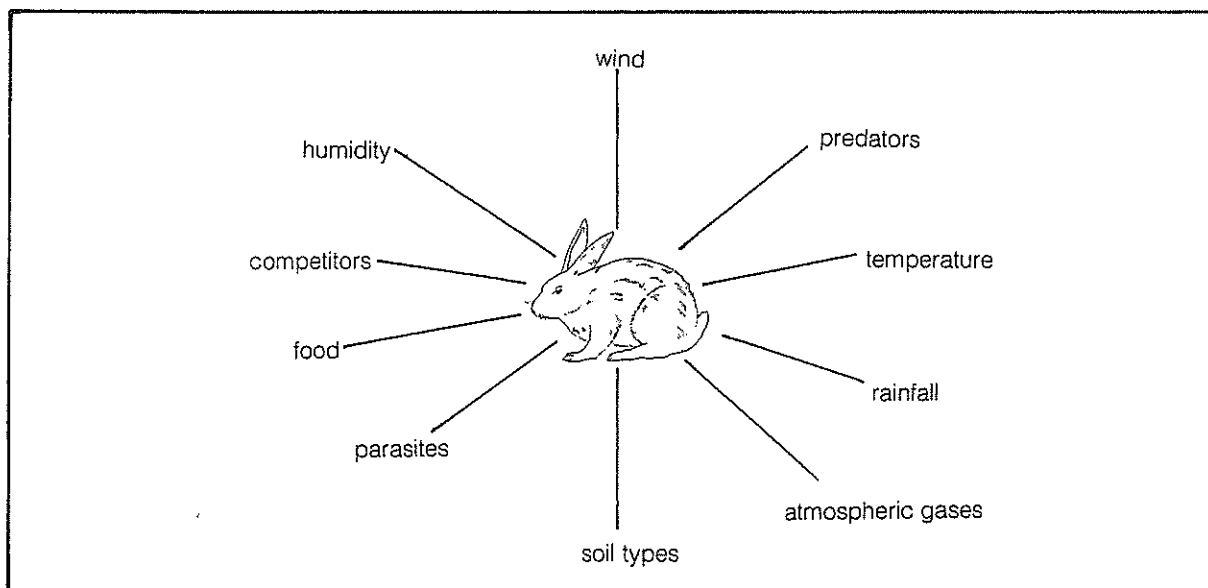
- a) Suggest an observation about the flies at the beginning of each experiment at 0°C.
- b) For Experiment II, between 40°C and 45°C, suggest a reasonable conclusion.

Environment

The habitat of an organism is affected by various conditions. These make a habitat suitable for some organisms but not others. These conditions, or factors, make up the **environment**.



3.3 Some of the environmental factors that could affect a fish.



3.4 An organism which lives in a different habitat would be affected by different environmental factors. For example, a rabbit living on grassland.

Environmental factors may be due to other living things (these are called **biotic factors**) or non-living things (**abiotic factors**).

The following table lists some of the biotic and abiotic factors that can make up an organism's environment. Not all these factors apply to every species.

Biotic factors	Abiotic factors	
<ul style="list-style-type: none"> • predators • parasites • food supply • human influence • competition 	<ul style="list-style-type: none"> • light intensity • temperature • humidity • oxygen and carbon dioxide levels • exposure • wave action 	<ul style="list-style-type: none"> • soil pH • salinity • water pH • rainfall • daylength • wind • soil type

Question

What environmental factors affect organisms living in a rock pool? Draw up a table to show the biotic and abiotic factors present in an intertidal rock pool.

ENVIRONMENT

The environment in which an organism lives is affected by biotic and abiotic factors.

TASK: sort the following factors into either biotic or abiotic factors and complete the table below:

- predators
- light intensity
- humidity
- parasites
- oxygen and carbon dioxide levels
- food supply
- temperature
- exposure
- wave action
- soil pH

- human influence
- salinity
- symbionts
- water pH
- rainfall
- day length
- competition
- wind
- soil type
- pathogens

ABIOTIC FACTORS	BIOTIC FACTORS

4.6.1 The use of dichotomous keys

The word dichotomous means 'separating into two parts'. It describes the kind of choices you make when using a key.

It is quite possible that you can identify an object in a broad sense, such as 'an insect'. The next step is to find a key that will identify *which* insect or member of the Arthropoda group you have.

There are two main kinds of key, but the way of using them is the same. You are presented with various options. You look at the organism you are identifying, answer the question posed, and follow the path to the end. There you will find the name of the unknown organism.

- Options may lead off with lines like the branches of a tree. In this case you follow the lines with the correct answers.
- or
- There may be a series of options (at least two), and a number at the end of each line. If this is, say, a 4 it means 'Now go to question number 4, you may jump several questions.'

Sometimes a key will have drawings instead of words.

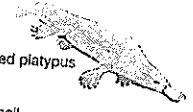
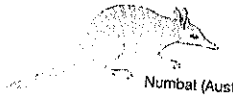
Ologists study...	
arachnologists	spiders
bacteriologists	bacteria
bryologists	mosses
entomologists	insects
herpetologists	reptiles
ichthyologists	fish
lichenologists	lichens
limnologists	lakes and freshwater
malacologists	snails
mycologists	fungi
myxomycetologists	slime moulds
ornithologists	birds
parasitologists	parasites
pteridologists	ferns

See Inv 1.1 - 1.3, *Investigations of Life*

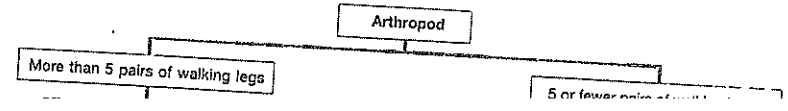
Classification key for vertebrates

1 Hair or feathers Controls body temperature	Go to 4
No hair or feathers Lacks temperature control	Go to 2
2 Scales on body No scales. Smooth skin	Go to 3
Undergoes metamorphosis	Amphibian
3 Lungs. Lays eggs on land	Reptile
Gills. Aquatic	Fish
4 Mammary glands	Mammal →
Fur, hair or whiskers	
Feathers	Bird

Classification key for mammals

1 Lays eggs with shell Mammary glands without nipples	Monotreme
	Duck-billed platypus
No egg with shell	Go to 2
2 Young born very undeveloped, finish development in pouch	Marsupial
	Numbat (Australia)
3 Long gestation period inside mother Presence of the placenta	Other orders

Classification key for arthropods



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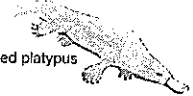
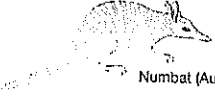
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