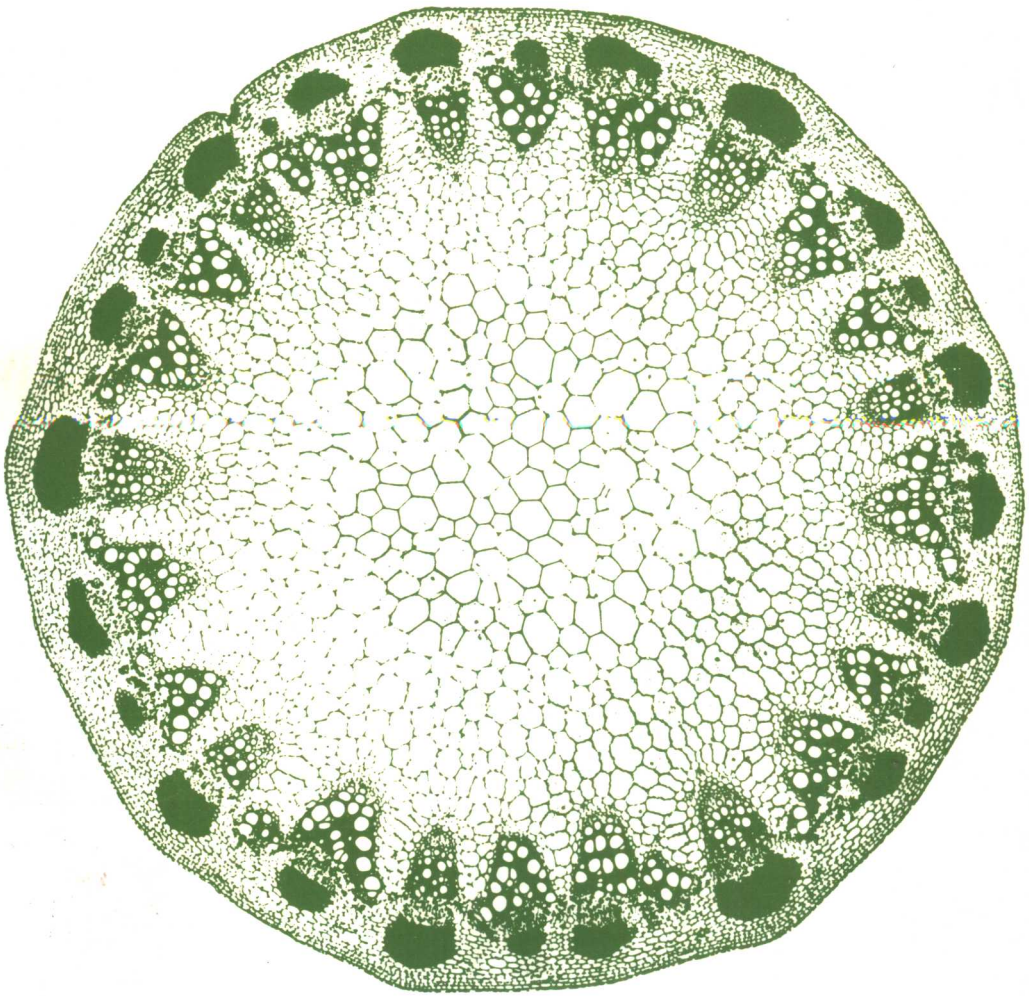
NUCLEUS

English for Science and Technology

BIOLOGY

Donald Adamson / Martin Bates



NUCLEUS

ENGLISH FOR SCIENCE AND TECHNOLOGY

BIOLOGY

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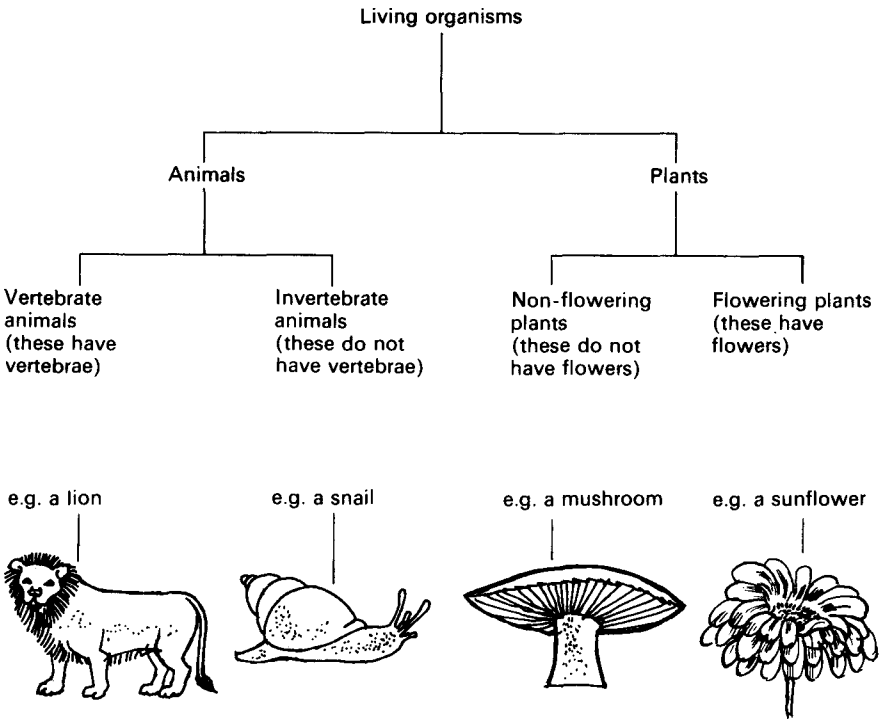
Unit 1 Properties and Shapes

Section 1 Presentation

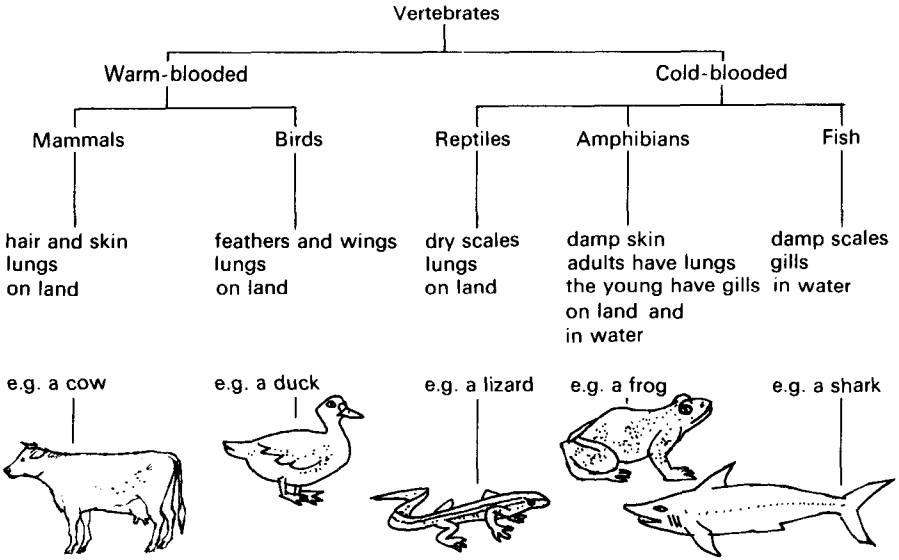
1. Look at this diagram:



Now complete these sentences with words from the diagram:

a) Biologists study . . . . Zoologists study . . . , whereas botanists study . . . .
b) Animals are divided into . . . and . . . .
c) There are two main groups of plants: . . . and . . . .
d) A lion is a . . . . It has . . . .
e) A snail is . . . . It . . . .
f) A mushroom . . . . It . . . .
g) A sunflower . . . .

2. Look at this diagram:



Read these examples:

> Mammals *are* warm-blooded vertebrates. They *have* hair and skin. They have lungs. They *live* on land.
>
> A cow *is* a mammal. It *has* hair and skin. It has lungs. It *lives* on land.

Now make similar statements about birds, reptiles, amphibians, fish; a duck, a lizard, a frog, a shark.

3. Look at this example:

> Birds *are* warm-blooded vertebrates *with* feathers, wings and lungs, *living* on land.

Now make similar statements about the following:

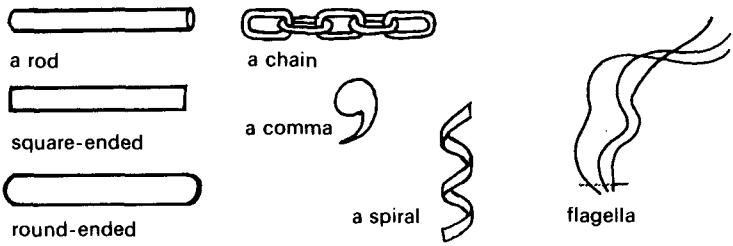
> Reptiles . . . .
> Mammals . . . .
> Fish . . . .

4. Answer these questions with information from the diagrams above:

a) Why can't fish breathe on land?
b) Why can birds fly?
c) Why can small mammals live in cold climates?
d) Why can young amphibians live in water?
e) Why is the body of a cat warm?
f) Why is the body of a snake cold?

Section 2 Development

5. Look and read:



The shapes of bacteria

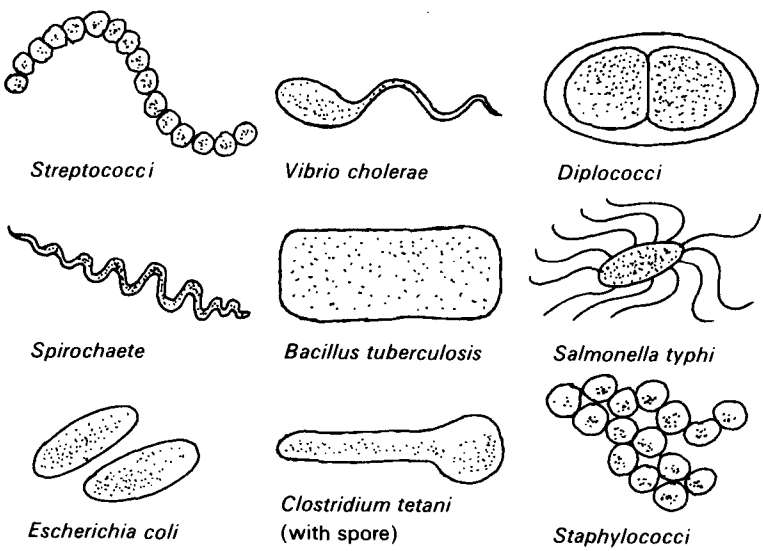
Bacteria (singular *bacterium*) are very small organisms with single cells. They can be divided into three groups according to shape.

Cocci (singular *coccus*): These are spherical in shape. Some species occur in groups; some occur in chains (*streptococci*); some have two cells joined together (*diplococci*).

Bacilliform bacteria: These are cylindrical or rod-shaped. Some are round-ended rods; others have square ends. Some bacilli have long flagella.

Spirilla (singular *spirillum*): These are spiral in shape. The bacterium which causes cholera (*Vibrio cholerae*) is comma-shaped with a single flagellum.

Look at these bacteria:



a) List each bacterium under these headings:

Cocci *Bacilli* *Spirilla*

b) Now describe the appearance of each of the bacteria in the above diagrams.

Section 3 Reading

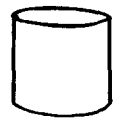
6. Look at these diagrams which illustrate words in the reading passage below:

curved

ribbon

flat

a cylindrical shape

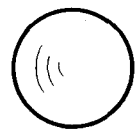


a rectangular shape

tapering

segments

a spherical shape



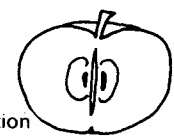
a swelling

a groove

a hook

a ring

a transverse section



a longitudinal section

the anterior end the posterior end

These circles are evenly spaced.

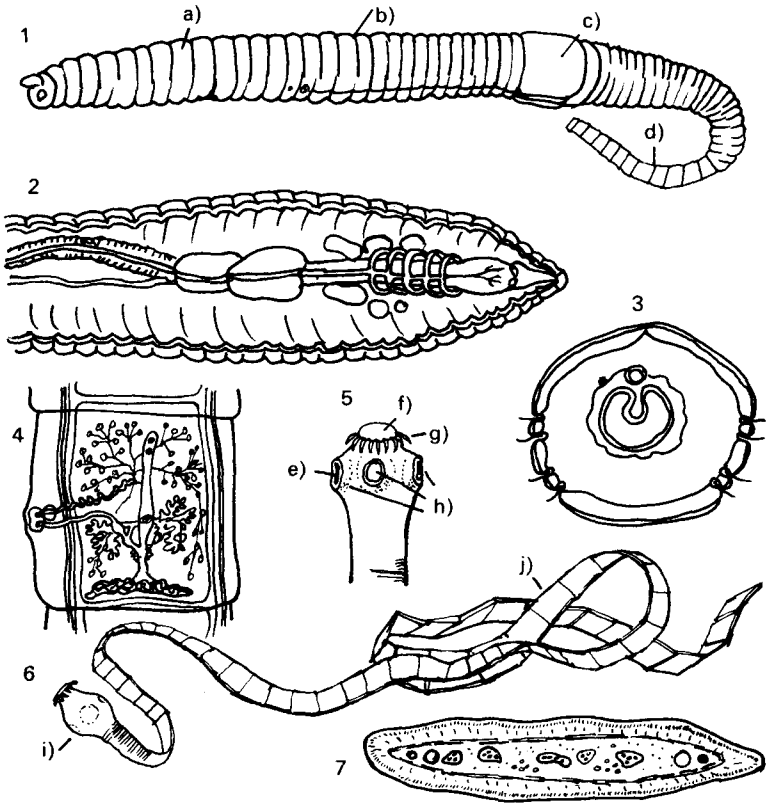
Now read these descriptions:

Two simple invertebrates

The tapeworm is a parasite which lives in the intestines of vertebrate animals. Its body is flat and ribbon-like. The body is divided into flat rectangular segments. These are smaller at the anterior end. The head is small and spherical. It has four evenly-spaced suckers, which are circular in shape. On top of the head there is a curved projection. Around this there is a ring of hooks.

The earthworm lives in the soil. Its body is roughly cylindrical in shape. The posterior end is tapering and slightly flattened. The anterior end is slightly tapering. The body is divided by transverse grooves into about 150 rings or segments. Near the middle of the body there is a swelling, called the clitellum.

Look at these diagrams:



Now say what these diagrams show, choosing from the captions below. Give reasons for your choice.

5 *Example:* Diagram (1) shows an earthworm. It is roughly cylindrical in shape and one part is swollen.

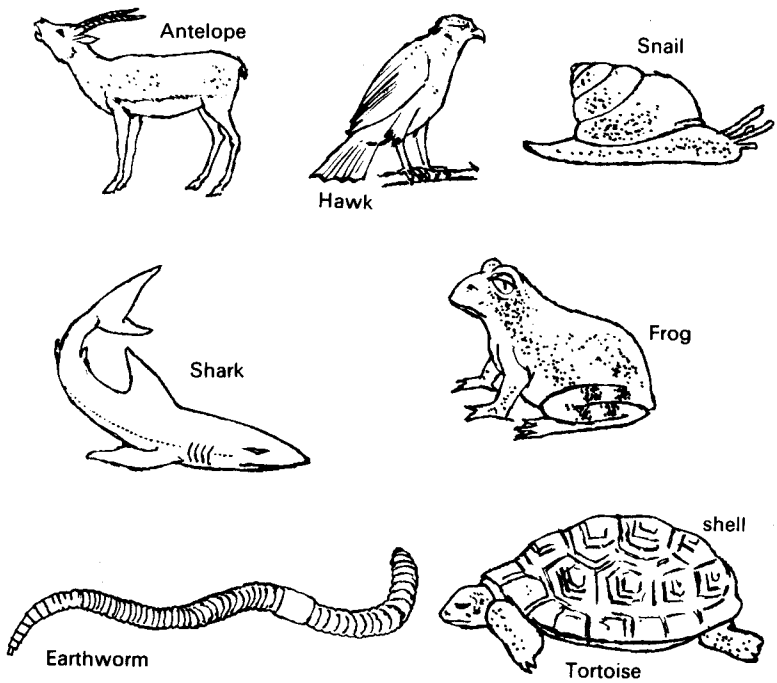
The head of a tapeworm
The transverse section of an earthworm
The longitudinal section of a tapeworm
An earthworm
The longitudinal section of an earthworm
A tapeworm
The transverse section of a tapeworm

7. Match the following with the letters in diagrams (1), (5) and (6) above.

a circular part	a swelling
a spherical part	a cylindrical segment
a ring of hooks	a flattened part
evenly spaced parts	a curved projection
a rectangular segment	a transverse groove

Section 4 Listening

8. Look at these diagrams. Then listen to the sentences. Write down whether each sentence is true or false.

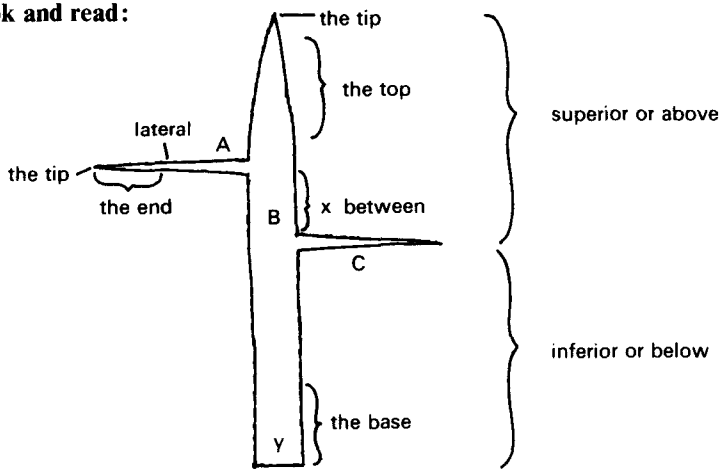


Now listen to each sentence again. Write them down, correcting the false statements.

Unit 2 Location

Section 1 Presentation

1. Look and read:

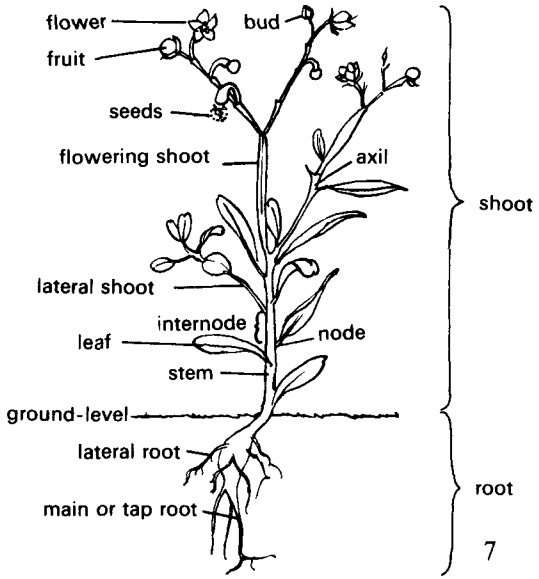


{ A is *lateral to* B. / A *projects laterally from* B. }

A is { *superior to* / *above* } C. C is { *inferior to* / *below* } A.

x is *between* A *and* C. y is { *situated* / *located* / *found* } at the base.

Now look at this diagram:

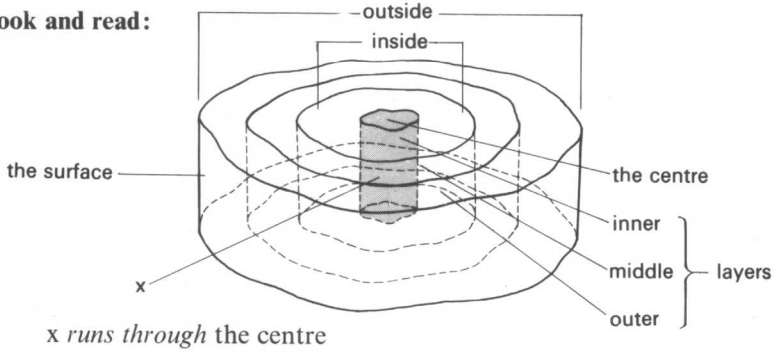


A flowering plant (*Talinum triangulare*)

Answer these questions:

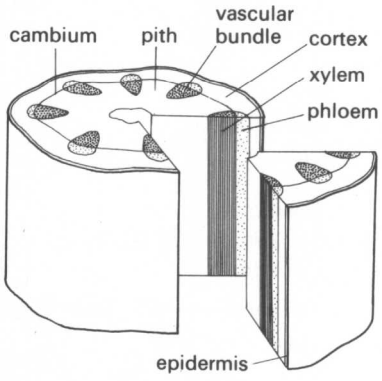
a) Where is the shoot usually found – above or below ground-level?
b) Where is the root usually found?
c) Which parts are lateral to the stem?
d) Which parts are located at the tip of the flowering shoot?
e) Which part of the plant is situated at the base?
f) What projects laterally from the root?
g) Where is the internode in relation to the nodes?
h) Are the buds inferior to the stem?

2. Look and read:

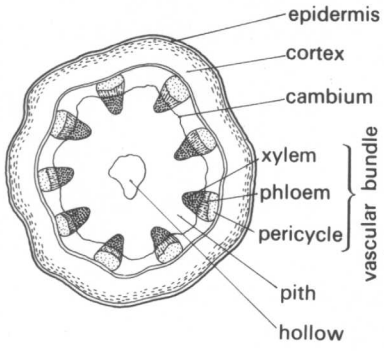


x *runs through* the centre

Now look at these diagrams:



Stereogram of a plant stem

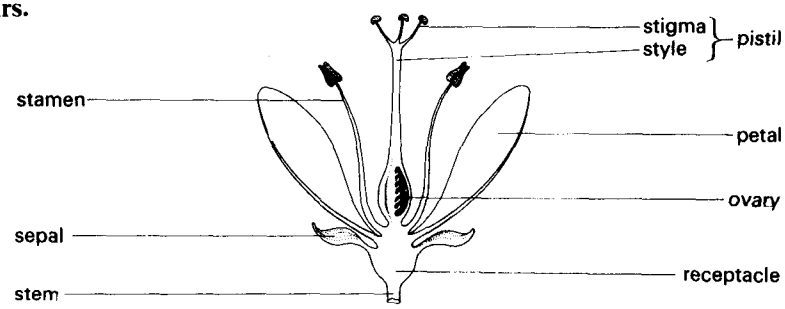


Transverse section of a young sunflower stem

Complete these sentences:

The . . . of a plant stem is a thin layer which is called the epidermis.
Inside the epidermis there are three . . . .
The . . . layer is called the cortex.
There is pith in the . . . .
. . . the pith and the cortex there is a . . . , which is called the cambium.
Some plants have a hollow in the . . . of the stem.
The vascular bundles are tubes which run . . . the stem.
The xylem, the phloem and the pericycle are situated . . . .
The . . . is on the outside of the vascular bundle, the . . . is on the inside and the . . . is between them.

3. Look at the diagram and read the text. Choose the correct words from the pairs.



Parts of a flower in longitudinal section

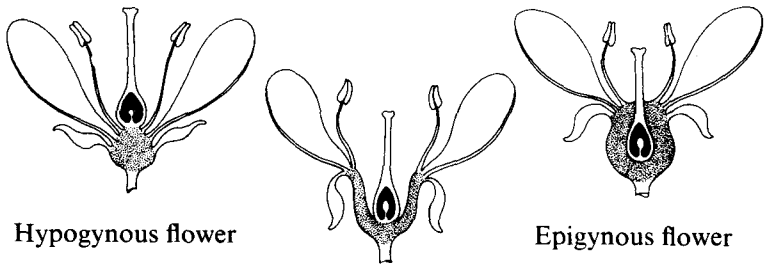
The flower is found at the end/base of the stem. It consists of a special part of the stem/root which is called the receptacle, and special leaves called floral leaves. These are arranged in rings or whorls.

The sepals form the calyx. This is the lowest/highest and innermost/outermost whorl.

The petals of the flower form the corolla. They lie inside/outside the sepals and are attached slightly higher/lower on the receptacle.

The stamens, or male reproductive organs lie outside/inside the petals. They are outside/inside the pistil, or female organ. This rises from the base/centre of the receptacle. It has an ovary at the tip/base. Below/above the ovary is the style. At the tip/base of the style are the stigmas.

4. Look at these diagrams:



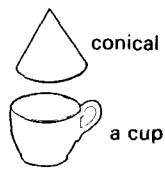
Hypogynous flower Epigynous flower

Perigynous flower

Variation in the shape of the receptacle in different kinds of flower

Now answer these questions:

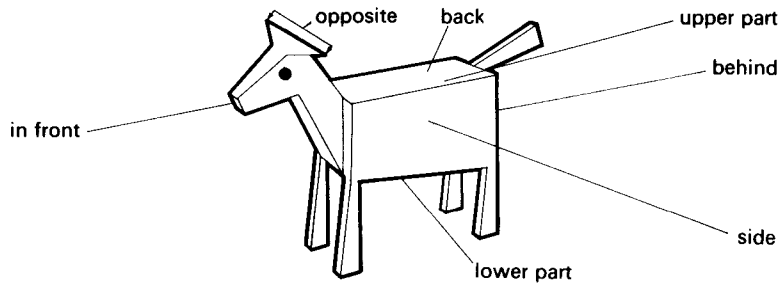
a) Which part of the flower varies in shape?
b) Which part varies in position?
c) Which kind of flower has a conical ovary?
d) Which kind has a cup-shaped ovary?



e) Which kind has the ovary at the top of the receptacle?
f) In one of these flowers, the ovary is said to be inferior. Which one?
g) Can you give an example of each kind of flower?

Section 2 Development

5. Look and read:

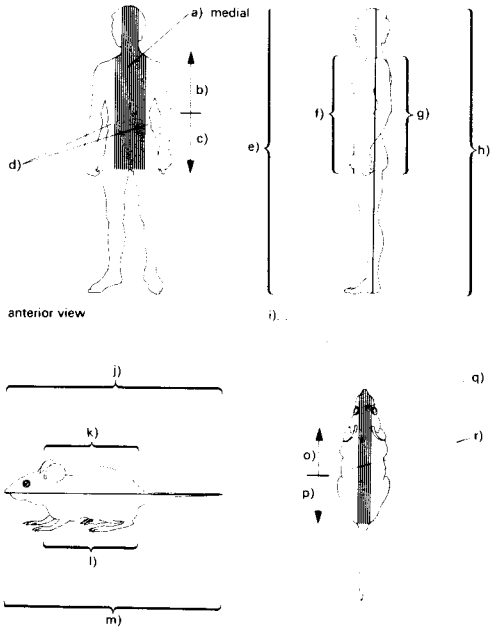


In biology, special words are used for the position of parts of animals. The upper parts of the body are *superior* to the lower parts, which are *inferior*.

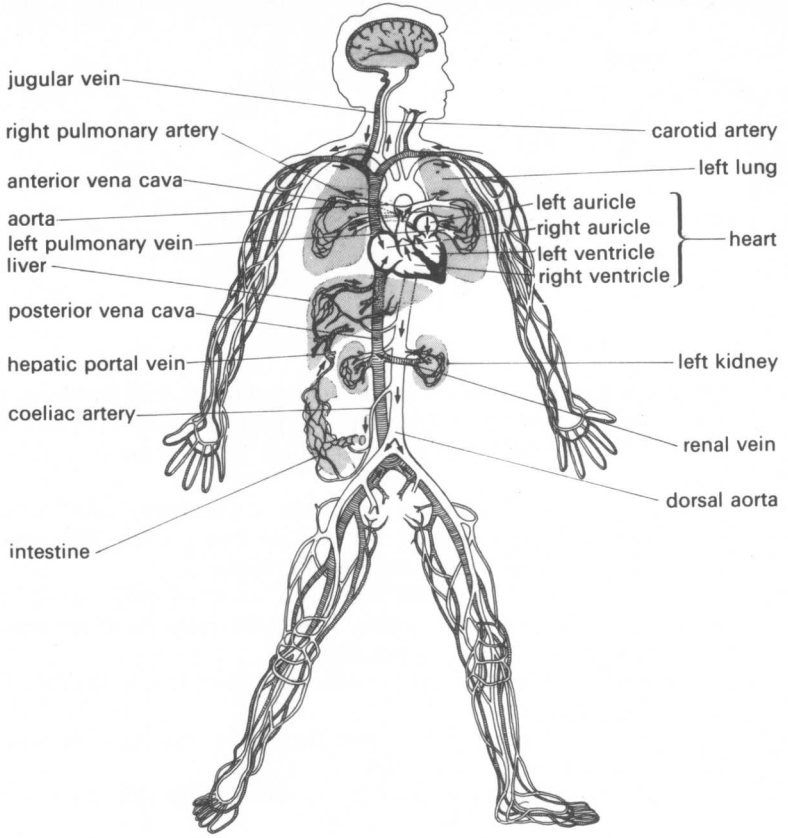
Posterior means behind and *anterior* means in front. Parts which are at or near the back of the body are *dorsal*. Parts which are opposite the back are *ventral* (i.e. near the stomach).

Thus in human beings, the ventral parts are anterior and the dorsal parts are posterior, whereas in other animals the ventral parts are inferior and the dorsal parts are superior. The central part of the body, running from head to tail, is called the *median*. Parts in this region are *medial*, whereas parts near the sides of the body are *lateral*.

Add labels and captions to these diagrams:



6. Look at this diagram:



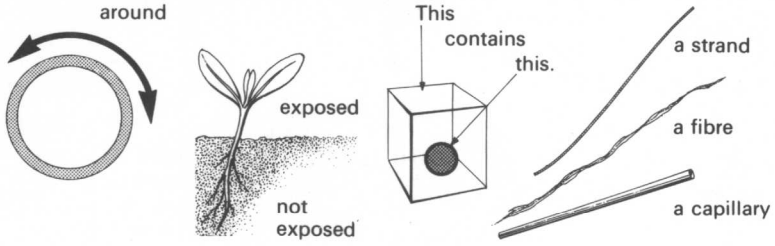
The human blood system

Now say whether these statements are true or false. Correct the false statements.

a) The auricles of the heart are superior to the ventricles.
b) The pulmonary vein enters the heart by the left auricle.
c) The pulmonary artery takes blood from the left ventricle to the liver.
d) The aorta is posterior to the heart.
e) The anterior vena cava enters the heart by the right ventricle
f) The kidneys are medial to the aorta and posterior vena cava.
g) In human beings, the anterior vena cava is inferior to the heart.
h) The blood from the intestine passes through the coeliac artery to the liver.
i) The jugular vein is in the region of the neck.
j) The renal veins lie between the kidneys and the vena cava.
k) In biological diagrams, organs on the left side of the body are shown on the right.

Section 3 Reading

7. Read this passage. The diagrams show the meaning of new words.



Teeth

The lower part of a tooth is inside the jaw-bone, while the upper part is exposed. The exterior of the exposed part consists of enamel. This is a very hard, non-living material which forms a good surface for biting.

Under the enamel there is a part made of a material called dentine. This is also hard but it is less brittle than enamel. It is like bone in structure. It contains living strands of cytoplasm.

In the centre of the tooth there is a material called pulp. This consists of soft connective tissue. Inside the pulp there are sensory nerve endings and blood capillaries.

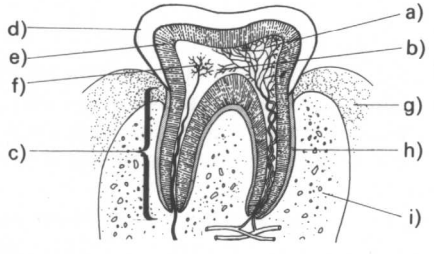
The lower part of the tooth is called the root. It is held to the jaw-bone by tough fibres.

Around the dentine at the root there is a thin layer of cement. This is also a bone-like material.

The flesh around the base of the enamel is called the gum.

Now add these labels to the diagram below:

jaw-bone	pulp	cement
enamel	sensory nerve ending	gum
dentine	blood capillaries	root



Molar tooth (nerve shown on the right, blood capillaries on the left)

8. Write short answers to these questions:

a) Which part of the tooth is outside the jaw-bone?
b) What is there on the surface of this part?
c) Which two materials are like bone?
d) What is on the surface of the lower part of the tooth?
e) Where is the soft part of the tooth?
f) Which material is not living?

9. Look at these examples:

Similarities: The leaves of a plant are found above the ground.
The flowers of a plant are found above the ground.

i.e. *Both* the leaves *and* the flowers of a plant are found above the ground.

Differences: The shoot is found above the ground.
The root is found below the ground.

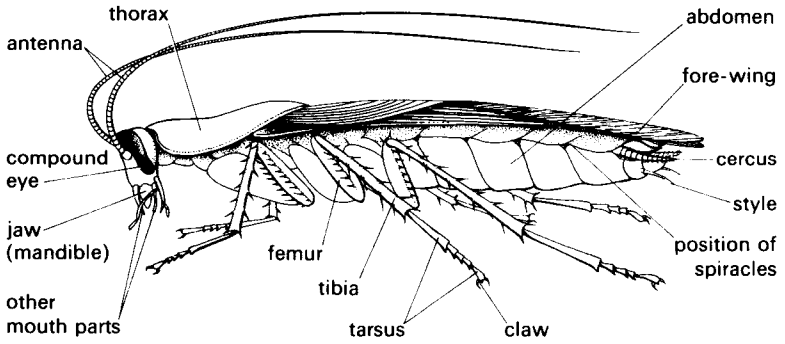
i.e. The shoot is found above the ground, {*while* / *whereas*} the root is found below the ground.

Now join these pairs of sentences with *both . . . and* or *while/whereas*:

a) The buds are found at the tip of the shoot.
The flowers are found at the tip of the shoot.
b) The outer layer is called the cortex.
The middle layer is called the cambium.
c) The calyx is outside the reproductive organs.
The corolla is outside the reproductive organs.
d) The stamen is a reproductive organ.
The pistil is a reproductive organ.
e) A hypogynous flower has a conical ovary.
A perigynous flower has a cup-shaped ovary.
f) The arteries take blood from the heart.
The veins take it back to the heart.

Section 4 Listening

10. Look at this diagram and then listen to the passage. Number the words below in the order in which you hear them.



The cockroach (*Periplaneta americana*: male)

tibia	femur	cockroach	tarsus
thorax	compound eye	claw	jaw
fore-wing	spiracles	cercus	
abdomen	antennae	style	

Now listen to the sentences describing the parts of the cockroach. Say whether they are true or false. Write them down, correcting the false statements.