

The Human Ear : Instructions

You are given an outline of the ear showing outer, middle and inner sections, and a sheet with the various parts on it.

Follow the instructions below carefully and in the order given.

Note: when cutting out the parts, cut to the **outside** of the heavy *continuous* lines but cut **on** any *dashed* lines.

Do not cut the *dotted* lines.

1 Cut out the pinna (1). This is the part of the ear which sticks out from the side of the head and is designed to collect sound waves. It can also disperse very loud sounds which might damage the ear. Stick it down in its proper place.

2 Now cut out the ear canal (2). The proper name for this canal is the external auditory meatus. You should notice that it has hairs at its entrance - what do you think these are for? It also contains wax-producing cells in its walls - what do you think that the wax is for? Stick down the ear canal so that it lies neatly between the bones of the skull. Label the hairs and the wax.

3 Cut out the cochlea (3) carefully. This is the part of the ear that converts vibrations into nerve impulses. Move the part around until you find where it fits and then stick it down.

4 Next cut out the auditory nerve (4), which carries the nerve impulses produced in the cochlea to the brain. Stick it down.

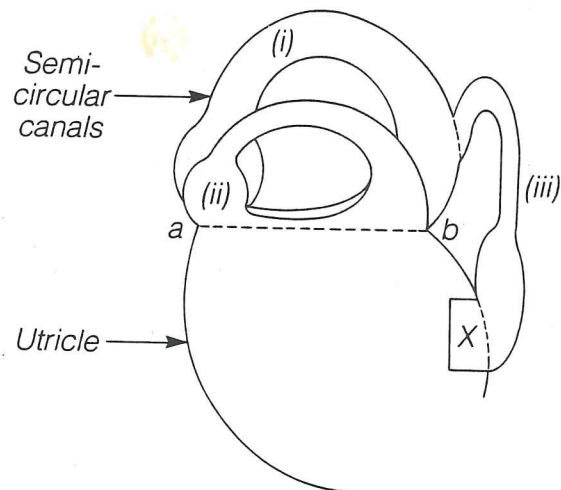
5 Cut out the utricle (5). Find where it goes and stick it down.

6 Find the round window (6). Cut it out carefully and stick it down on the utricle where shown.

7 Now find the oval window (7), cut it out and stick it down on the utricle where shown.

8 Very carefully cut out the three small bones (8, 9 and 10) found in the middle ear - these are known as the ossicles and consist of the stirrup (or stapes), the anvil (or incus) and the hammer (or malleus). Also cut out the ear-drum (or tympanum) (11).

Arrange the ossicles and the eardrum so that they are positioned properly before you stick them down; the stirrup should sit with its two ends on the oval window as shown; the narrow end of the anvil should touch the narrow end of the stirrup; the hammer should partly sit on top of the anvil as indicated and the ear-drum should fit snugly at the end of the ear canal and overlap part of the hammer. If you are still not sure how they are arranged look in a textbook. When all these parts are properly arranged, stick them down.



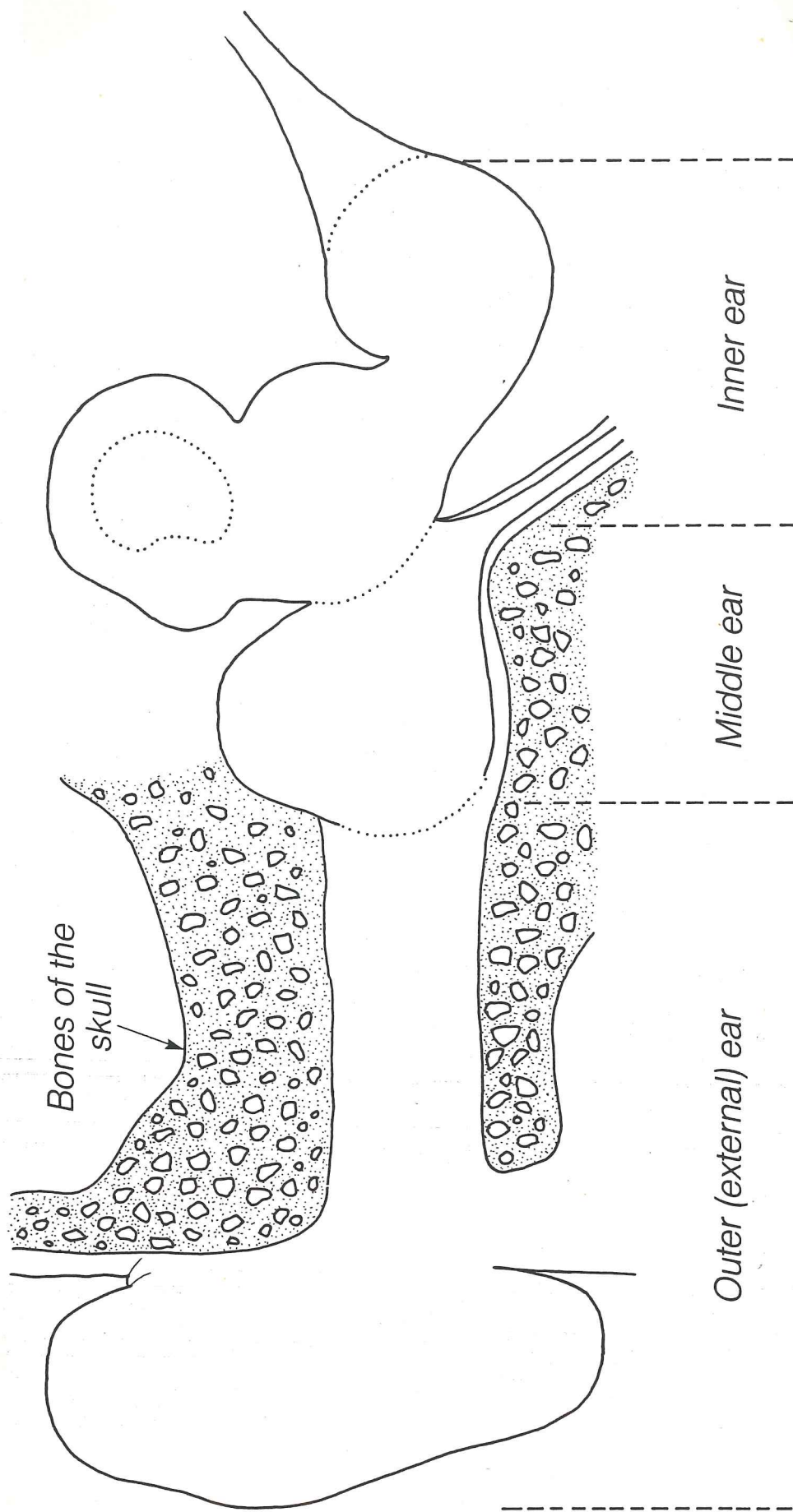
9 You are now only left with the semi-circular canals (12), which together with the utricle are involved in balance. Cut out this part carefully, including the parts labelled *cut out*. Fold **up** along the dotted line *a-b* and stick down only the first semi-circular canal (i) in the place shown in the diagram, with the line *a-b* directly on top of the line *A-B* on the utricle; the second canal (ii) should now be sitting up from the page at right angles. Now fold **up** the third canal (iii) along the dotted line so that it is sitting up at right angles to the page and also at right angles to each of the other two canals. Stick flap *x* down on to the utricle at *X*. This three-dimensional arrangement of the three semi-circular canals shows how they are actually arranged in your ears and you can see that they cover all three planes. (They can be folded flat for storing in a file.)

Now that you have all the structures in their proper places, label them and, using the information given above, together with any other information that you can find, write down their functions (what they do) after each label (in brackets).

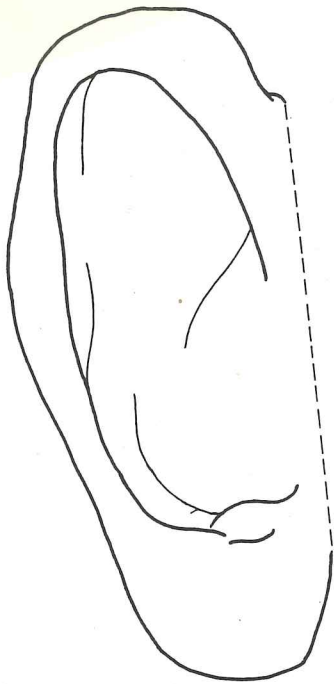
Finally label the Eustachian tube and write down its function.

Hand these instructions back in to
your teacher when finished.

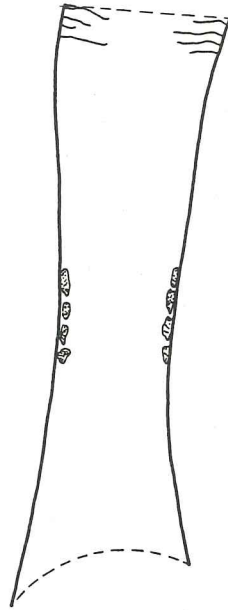
The Human Ear



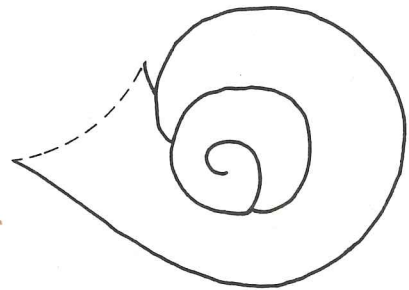
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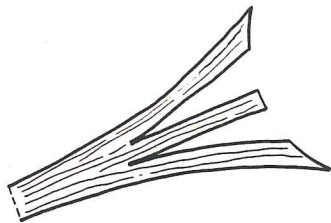
1 Pinna



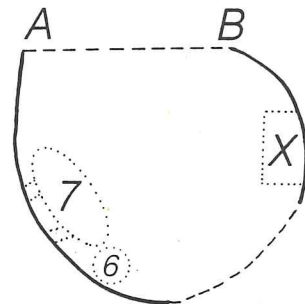
2 Ear Canal



3 Cochlea



4 Auditory Nerve



5 Utricle



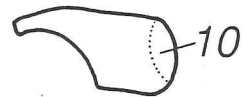
6 Round Window



7 Oval Window



8 Stirrup



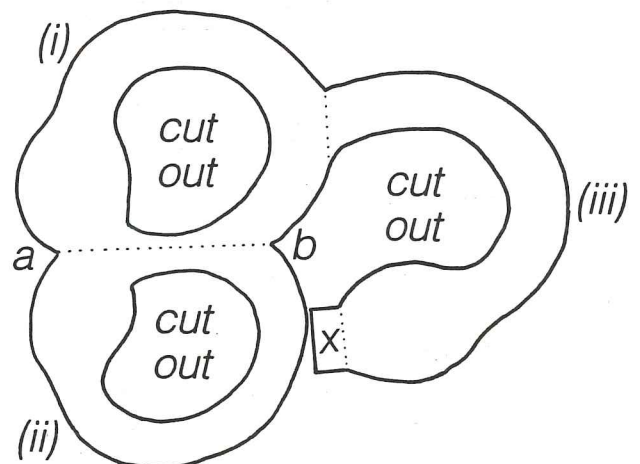
9 Anvil



10 Hammer



11 Ear-Drum



12 Semi-Circular Canals