

| Structure                          |                                                                         | Outer ear        |                                                                 | Middle ear (cont)                                               | Inner ear (cont)                                                         |                                                   |
|------------------------------------|-------------------------------------------------------------------------|------------------|-----------------------------------------------------------------|-----------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------|
| 3 regions                          | outer                                                                   | Pinna (ear flap) | flap of cartilage covered by skin                               | swallowing to open it to allow air to enter or leave middle ear | sensory hair cells                                                       | detection of head movements                       |
|                                    | middle                                                                  |                  |                                                                 | equalised the pressure on either side of eardrum                |                                                                          | stimulated, send nerve impulse to brain           |
|                                    | inner                                                                   |                  | collects sound waves in surrounding                             |                                                                 |                                                                          | brain coordinate muscled to maintain body balance |
| How we hear                        |                                                                         |                  | directs them along auditory canal to eardrum                    | Unequal pressure                                                |                                                                          |                                                   |
| Sound waves                        | collected by pinna are directed to eardrum                              |                  |                                                                 |                                                                 |                                                                          |                                                   |
|                                    | causes eardrum to vibrate                                               | Auditory canal   | produces wax                                                    |                                                                 |                                                                          |                                                   |
| Earbones                           | amplify and transmit vibration to oval window                           | wax              | lubricates canal                                                |                                                                 |                                                                          |                                                   |
|                                    |                                                                         |                  | traps dirt and bacteria to prevent them entering the middle ear |                                                                 |                                                                          |                                                   |
| Oval window                        | vibrates                                                                |                  |                                                                 |                                                                 |                                                                          |                                                   |
|                                    | cause perilymph in cochlea to vibrate                                   | Eardrum          | thin, elastic membrane at the end of auditory canal             |                                                                 |                                                                          |                                                   |
|                                    | vibrations in perilymph is transmitted to endolymph of cochlea          |                  | convert sound waves to vibrations                               |                                                                 |                                                                          |                                                   |
| Sensory hair cells (central canal) | stimulated                                                              | Middle ear       |                                                                 |                                                                 |                                                                          |                                                   |
|                                    | generate nerve impulses                                                 | Ear bones        | 3 tiny ear bones                                                |                                                                 |                                                                          |                                                   |
|                                    |                                                                         |                  | smallest bones in body                                          |                                                                 |                                                                          |                                                   |
| produce sensation of hearing       | nerve impulses travel along auditory nerves to auditory centre in brain |                  | amplify and transmits vibration from eardrum to oval window     |                                                                 |                                                                          |                                                   |
|                                    | vibration in perilymph transmitted to round window                      | Oval window      | flexible membrane                                               |                                                                 |                                                                          |                                                   |
| Round window                       | releases fluid pressure in the cochlea to the air in middle ear         |                  | transmits vibration from ear bones to inner ear                 |                                                                 |                                                                          |                                                   |
|                                    |                                                                         | Round window     | releases fluid pressure in cochlea into the air                 |                                                                 |                                                                          |                                                   |
|                                    |                                                                         | Eustachian tube  | tube connecting middle ear to pharynx                           |                                                                 |                                                                          |                                                   |
|                                    |                                                                         |                  | normally closed                                                 |                                                                 |                                                                          |                                                   |
|                                    |                                                                         |                  |                                                                 | Inner ear                                                       |                                                                          |                                                   |
|                                    |                                                                         |                  |                                                                 | Cochlea                                                         | for hearing                                                              |                                                   |
|                                    |                                                                         |                  |                                                                 |                                                                 | coiled tube with three parallel canals separated by membranes            |                                                   |
|                                    |                                                                         |                  |                                                                 | perilymph                                                       | fluid in upper and lower canal                                           |                                                   |
|                                    |                                                                         |                  |                                                                 | endolymph                                                       | fluid in central canal                                                   |                                                   |
|                                    |                                                                         |                  |                                                                 | sensory hair cells                                              | in central canal                                                         |                                                   |
|                                    |                                                                         |                  |                                                                 |                                                                 | detects vibrations of endolymph                                          |                                                   |
|                                    |                                                                         |                  |                                                                 | endolymph vibrates                                              | sensory hair cell hairs are bent                                         |                                                   |
|                                    |                                                                         |                  |                                                                 |                                                                 | sensory hair cells generate nerve impulses                               |                                                   |
|                                    |                                                                         |                  |                                                                 |                                                                 | nerve impulses travels along auditory nerves to auditory centre in brain |                                                   |
|                                    |                                                                         |                  |                                                                 | Semircular canals                                               | not involved in hearing                                                  |                                                   |