**How the Eyes Work**

All the different parts of your eyes work together to help you see.

First, light passes through the **cornea** (the clear front layer of the eye). The cornea is shaped like a dome and bends light to help the eye focus.

Some of this light enters the eye through an opening called the**pupil**(PYOO-pul).

The **iris** (the colored part of the eye) controls how much light the pupil lets in.

Next, light passes through the **lens** (a clear inner part of the eye). The lens works together with the cornea to focus light correctly on the retina.

When light hits the **retina** (a light-sensitive layer of tissue at the back of the eye), special cells called photoreceptors turn the light into electrical signals.

These electrical signals travel from the retina through the **optic** **nerve** to the brain. Then the brain turns the signals into the images you see.

**How the Ear Work**

The ear picks up sound waves and transforms them into electrical signals which travel along nerves to the brain. The signals are interpreted by the brain and connected to other impressions and experiences – the sound is then perceived as loud or quiet, speech, music or a message such as “the phone is ringing.”

The ear has three parts:

* the outer ear (visible part, called the "auricle" or "pinna," and the external auditory canal)
* the middle ear (the eardrum or "tympanic membrane" and the tympanic cavity containing tiny ear bones. These are called the hammer, anvil and stirrup, or "ossicles")
* the inner ear (cochlea and the organ of balance, called the "vestibular system")

## What happens in each of the three sections of the ear?

The outer ear is made up of skin and cartilage. Like a satellite dish, it captures sound waves and passes them on to the outer ear canal. First cartilage and then further on bone help to keep this passageway open so that the sound waves can reach the eardrum without being affected.

The middle ear is an air-filled cavity also referred to as the tympanic cavity. It is connected to the upper throat by the Eustachian tube. Air moves in and out to accommodate different pressures in the outside environment. But germs can also enter the middle ear through the Eustachian tube from the upper throat.

It is the ear bones that are important for hearing: the malleus, the incus and the stapes. The malleus is attached to the eardrum, picking up its vibrations and passing them on to the inner ear via the incus and the stapes.

The sound waves are amplified by this transfer and then enter the cochlea. It is filled with fluid and lined with very fine hairs (hair cells). These cells convert the vibrations to nerve signals, which are then transported to the brain.

**How does the taste work?**

Taste buds are sensory organs that are found on your tongue and allow you to experience tastes that are sweet, salty, sour, and bitter. How exactly do your taste buds work? Well, stick out your tongue and look in the mirror.

See all those bumps? Those are called papillae (say: puh-PILL-ee), and most of them contain taste buds. Taste buds have very sensitive microscopic hairs called microvilli (say: mye-kro-VILL-eye). Those tiny hairs send messages to the brain about how something tastes, so you know if it's sweet, sour, bitter, or salty.

The average person has about 10,000 taste buds and they're replaced every 2 weeks or so. But as a person ages, some of those taste cells don't get replaced. An older person may only have 5,000 working taste buds. That's why certain foods may taste stronger to you than they do to adults.

**How does our smell sense work?**

Whenever we smell something, our nose and brain work together to make sense of hundreds of very tiny invisible particles, known as molecules or chemicals, that are floating in the air. If we sniff, more of these molecules can reach the roof of our nostrils and it is easier to smell a smell.

The fact that we have two nostrils allows our brain to detect small differences in the number of molecules that reach each one, so we can follow a smell trail just like tracker dogs. Have you ever tried finding where a smell is coming from? See how hard it gets with one nostril blocked.

Inside your nostrils, there are tiny things called [neurons](https://qbi.uq.edu.au/brain/brain-anatomy/what-neuron) that "talk” to each other using electrical messages (our brains are mostly made of neurons too, by the way).

## Smell memories

These type of tiny cells, called olfactory neurons (olfaction means smell), have long [cable-like connections](https://qbi.uq.edu.au/brain/brain-anatomy/axons-cable-transmission-neurons) that send electrical messages to a spot at the front of the brain, known as the olfactory bulb. Each olfactory neuron connects with a different neuron in the olfactory bulb, which then sends this information to other areas of the brain.

The parts of the brain that get these signals also do other things, such as [storing memories](https://qbi.uq.edu.au/brain-basics/memory/where-are-memories-stored) or provoking emotions. That is why some smells can bring back old memories.

**How does the touch sense work?**

The sensation of touch is mediated by mechanosensory neurons that are embedded in skin and relay signals from the periphery to the central nervous system. During embryogenesis, axons elongate from these neurons to make contact with the developing skin. Concurrently, the epithelium of skin transforms from a homogeneous tissue into a heterogeneous organ that is made up of distinct layers and microdomains. Throughout this process, each neuronal terminal must form connections with an appropriate skin region to serve its function. This Review presents current knowledge of the development of the sensory microdomains in mammalian skin and the mechanosensory neurons that innervate them.

Like all senses, the sense of touch allows us to gather information about the people and things in the world around us. What sets touch apart is its intimacy, as it requires direct contact with skin, the sensory organ of tactile sensation. Humans constantly rely on tactile feedback for mundane tasks such as fishing keys out of a cluttered pocket as well as essential behaviors such as manipulating food to feed ourselves and our offspring.