From here nerve impulses travel along the axons of neurons in the optic nerve to the visual cortex at the back of the brain. Impulses pass to the thalamus of the brain. When the impulses reach the visual cortex, they must be interpreted to produce the images we see.

For example, because of the way light rays pass the retina of the eye, the image falling on the retina is both inverted and reversed from left to right. However, the images we see are not inverted or reversed. This is because the brain interprets the impulses it receives so that we can see the world the right way up. This is visual processing.

Contralateral Processing

The brain must also coordinate the information it receives from both eyes. As you view an object, each eye receives a slightly different view of the field, which is detected by different regions of the retina on each eye.

Axons from the regions of the retina closest to the nose in each eye cross over to go to the opposite side of the brain, this means that all of the information from the left visual field goes to the right visual cortex and all the information from the right visual field goes to the left visual cortex. This is called contralateral processing.

The visual cortex assembles all of the information it receives and gives us an understanding for what we're looking for.

The Human Ear

The human ear is divided into three regions:

(1) Outer ear
(2) Middle ear
(3) Inner ear

The outer and middle ear is separated by the eardrum, and the middle is inner ear is separated from ear by the oval and round windows. The pinna is a sound collecting device and in many animals it can be rotated by muscles to pick up sounds in all directions. Most humans have lost the ability to use these muscles.

How sound is perceived

Sound is created by differences in air pressure, which produce vibrations. Sound waves enter the outer ear canal and cause the eardrum to vibrate back and forth. These movements are transmitted to three tiny bones in the middle ear. The eardrum is in contact with the first bone and the third bone touches the oval

Learning can develop new skills or change existing ones, which the animals will retain in their memory. Longer-lived organisms with more developed nervous systems are likely to show a higher proportion of behaviour that is learned. Primates, big cats, wolves, and many other mammals spend a long time with their parents learning social ad hunting skills from them. A heard of elephants remembers where water supplies can be found during the dry season and the roots are learned by younger members of the heard. Similarly, many monkeys and apes can remember where a particular tree will be fruiting at a certain time of the year and pass on this knowledge to their young.

Learning and Survival

Many animals learn from their parents or from older members of their species. Primates in particular show the ability to acquire new skills that help them to survive. For example the wild chimpanzees in some parts of the world have learned behaviours such as fishing for ants and termites in logs using sticks, and cracking nuts open with a stone or hammer. The young chimps watch other members of the troop and then try to copy them. These behaviours provide a vital range of food sources for the animals that are able to develop the necessary skills.

Many animals learn from experience or by trial and error.

Pavlov's dogs and Classical Conditioning

Pavlov was a Russian physiologist and in the 1890s he studied the gastric function of dogs and tried to relate the quantity of saliva produced by the dog's salivary glands to the stimulus of food.

Salivation is a reflex response to the presence of food in the mouth, but Pavlov noticed that his experimental dogs began to release saliva before they started to eat and he decided to investigate this.

Just before giving the dogs food, and before they could see or smell it, he rang a bell. After repeating his experiment several times, he noticed that dogs salivated as soon as he rang the bell. They had come to associate the sound of the bell with the arrival of food. He called this modification of dog's behaviour conditioning. And he used the following terms to explain his results:

(1) Before training, the normal behaviour involved an unconditioned stimulus (the food) producing an unconditioned response (the release of saliva).

(2) After training, the dogs responded to the conditioned stimulus (the sound of bell) and produced the conditioned response (the release of saliva without the appearance of food).