



KNOWLEDGE ORGANISER

SCIENCE: CAN YOU SEE ME?

YEAR THREE

KEY KNOWLEDGE:

QUESTION 1: What do you need to be able to see?

ANSWER

Sight is one of the five senses that help us to get information about what is going on in the world around us. We see through our eyes, which are organs that take in light and images and turn them into electrical impulses that our brain can understand.

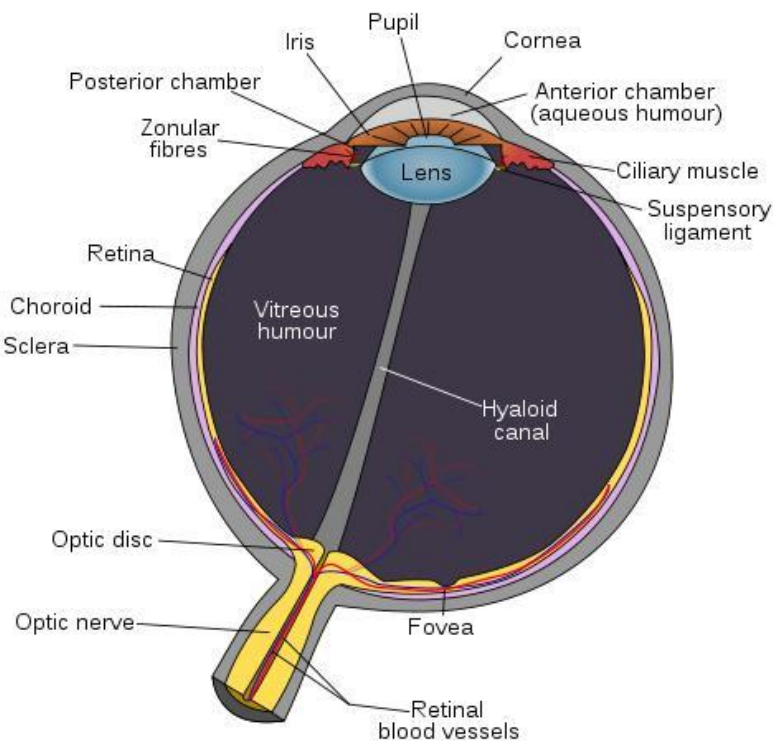
How do we see?

When we see something, what we are seeing is actually reflected light. Light rays bounce off of objects and into our eyes.

Our Amazing Eyeballs

Pupil and Iris:

Eyes are amazing and complex organs. In order for us to see, light enters our eyes through the black spot in the middle which is really a hole in the eye called the pupil. The pupil can change sizes with the help of the colored part around it, a muscle called the iris. By opening and closing the pupil, the iris can control the amount of light that enters the eye. If the light is too bright, the pupil will shrink to let in less light and protect the eye. If it's dark, the iris will open the pupil up so more light can get into the eye.



Retina:

Once the light is in our eye it passes through fluids and lands on the retina at the back of the eye. The retina turns the light rays into signals that our brain can understand. The retina uses light sensitive cells called rods and cones to see. The rods are extra sensitive to light and help us to see when it's dark. The cones help us to see color. There are three types of cones each helping us to see a different color of light: red, green, and blue.



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Focus:

In order for the light to be focused on the retina, our eyes have a lens. The brain sends feedback signals to the muscles around the lens to tell it how to focus the light. Just like the way a camera or microscope works, when we adjust the lens we can bring the image into focus. When the lens and muscles can't quite focus the light just right, we end up needing glasses or contacts to help our eyes out.

Off to the Brain:

The rods and cones of the retina change light into electrical signals for our brain. The optic nerve takes these signals to the brain. The brain also helps to control the eye to help it focus and to control where you are looking. Both eyes move together with speed and precision to allow us to see with the help of the brain.

Why two eyeballs?

With two eyeballs our brain gets two slightly different pictures from different angles. Although we only "see" one image, the brain uses these two images to give us information on how far away something is. This is called depth perception.

QUESTION 2: How do mirrors work?

ANSWER

Basically, anything with a smooth surface that reflects almost all of the light that hits it — with only very little light absorbed or scattered — can be a mirror. The key factor is a smooth surface, because rough surfaces scatter light instead of reflecting it.

When rays of light coming from an object strike the smooth surface of a mirror, they bounce back at the same angle. Your eyes see these reflected photons as a mirror image. The mirror image is reversed, which you can easily see if you stand in front of a mirror with a shirt with words on it. The words on the shirt appear backwards in the mirror. In addition to helping you make sure your hair looks nice before you head out to school or off to work, mirrors serve many important functions. For example, rear-view mirrors on a car allow you to see what's behind you before you back up. Mirrors are also important parts of telescopes and microscopes. Mirrors can even help you watch television. Today's high-definition televisions often rely upon millions of microscopic mirrors to display those beautiful, crisp images you enjoy watching so much!

QUESTION 3: How are shadows formed?

A shadow is made when an object blocks light. The shadow appears on the side of the object furthest from the light source.

The object must be opaque or translucent to make a shadow. A transparent object will not make any shadow, as light will pass straight through it.

Opaque objects make dark shadows. Translucent objects make faint shadows.

- If an object is moved **closer** to the light source, the shadow gets bigger.
- If an object is moved **further** away from the light source, the shadow gets smaller.





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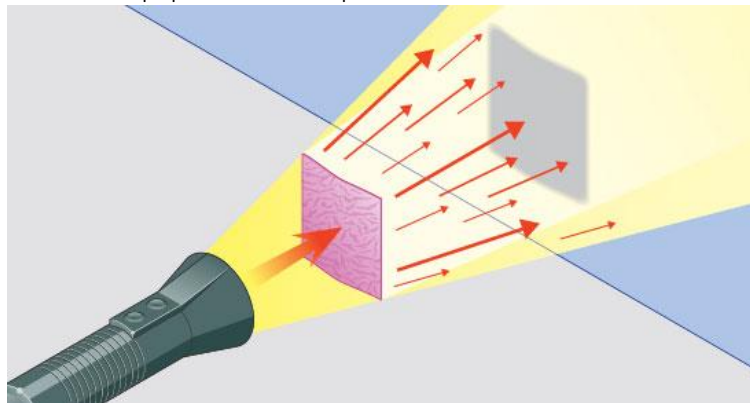
Transparent

Transparent materials let light pass through them in straight lines, so that you can see clearly through them. Glass is an example of a transparent material.



Translucent

Translucent materials let some light through, but they scatter the light in all directions, so that you cannot see clearly through them. Tissue paper is an example of a translucent material.



Opaque

Opaque materials do not let any light pass through them. They block the light. Wood is an example of an opaque material.

