

Date: _____

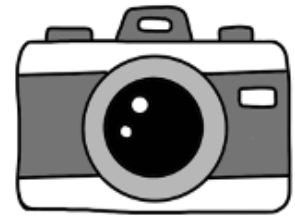
Name: _____

Eye / Camera

This activity was created by Alora.

Have you ever wondered how seeing works? Or how a camera works? Did you know that they're two very similar processes? In both cases there are multiple different processes that need to work to produce an image that is clear and can be understood.

Match the function of an eye structure to the corresponding part of the camera!



EYE STRUCTURE

FUNCTION

CAMERA STRUCTURE

Retina

Controls how much light enters the eye / camera

Aperture

Brain

Helps focus light

Camera Lens

Optic Lens

Light-sensitive surface, which captures the image of what we're looking at and receive an inverted vision of the image

Digital version: imaging sensor chip / *Non-digital version:* film

Iris

Flips the image received so it's right-side up

Digital version: programming to flip the image / *Non-digital version:* prism or mirror

Can you think of any **differences** between the functions and structures of the eye and the camera?

A FEW DIFFERENCES ←

Lens diversity: When staying focused on a moving object, the thickness of the optic lens can change to accommodate the image being viewed at different distances. Camera lenses cannot change shape. Instead, mechanical parts in the camera can adjust the positioning of the lens to stay focused on a moving object but only to a certain extent. Photographers need to change lenses depending on what they're shooting.

Photoreceptors: The retina of the eye contains two types of photoreceptors (specialized cells that receive light inputs) called rods and cones. Rods help us see in low-light and can't help us perceive colour. Cones are specialized in colour and there are 3 kinds: red cones detect long wavelength, green cones detect medium wavelengths, and blue cones detect short wavelengths. Different combinations of the cones receiving signals allow us to see the world in colour! Cameras only have one type of photoreceptors, which respond to the different wavelengths of light by using filters that are placed on top of the photoreceptors. The camera has an even distribution of photoreceptors, whereas the human eye has the cones concentrated at the centre of the retina, and rods toward the periphery.

Capturing the full image: Cameras always capture the full image, however, in our eyes we have a persisting blind spot! This is where the optic nerve connects to the eye to receive signals from the retina. These areas don't have any photoreceptors at all. You don't typically notice your blind spot because your brain uses signals from your other eye to fill the gap.



FIND YOUR BLIND SPOT



- 1 Look at the picture above. Place the paper about 50cm away from your face.
- 2 Close your right eye.
- 3 Look at the plus symbol with your left eye.
- 4 Move the picture forward until the circle disappears.
- 5 Congratulations! You've found your blind spot. Try the same process by closing your left eye and focus on the dot with your right eye. Move the paper until the plus sign disappears!