

HOW WE SENSE OUR ENVIRONMENT: DIFFERENCES ACROSS SPECIES

Teacher Guide

Vision: We see the world around us by using our biology to convert photons of light into a signal our brains can understand. To do this, we have receptors in our eyes called **photoreceptors** that are activated by the light all around us. These photoreceptors then send a signal to an area of our brain called the visual cortex that allows us to consciously perceive what we are looking at.

We have 2 types of receptors in our retina (the part of our eye that allows us to see):

1. **Cones** allow us to see colors.
2. **Rods** allow us to see black and white and are used for night vision.

What 3 types of cones do humans have?

Blue, Green, Red

What cones do we have that dogs don't have?

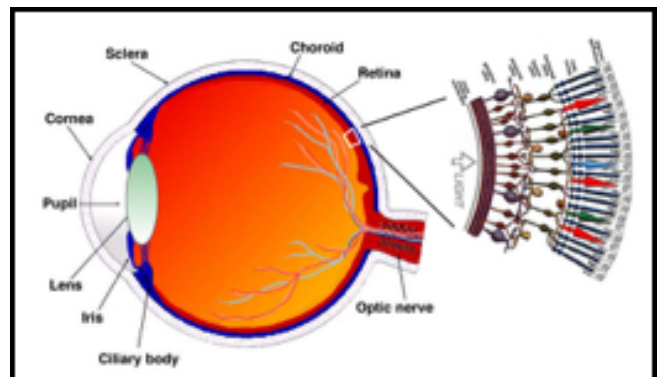
Red

What human condition causes some males to see the world similar to how a dog sees the world?

Being color blind (lacking functional red or green cones)

What cones do butterflies have that we don't have?

Cones for ultraviolet (UV) light



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Rank these species in order of the number of cone types that they have (Write 1-4 below the pictures - 1 is lowest, 4 is highest):

Humans



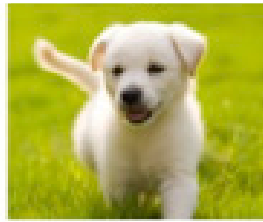
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Mantis shrimp



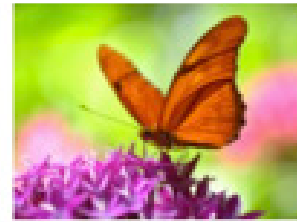
4

Dogs



1

Butterflies



3

What are the 5 basic senses in humans?

1. VISION
2. SMELL
3. HEARING
4. TASTE
5. TOUCH

Research online to find a species that experiences the world differently than humans. Try to figure out WHY!

Example:

1. Species: **Butterfly**
2. What sensory system is different in this species? **Vision**
3. How is it different than humans? Better or worse? **The butterfly has more cones for seeing color than humans do so it has better color vision than we have.**

Now it's your turn:

1. Species:
2. What sensory system is different in this species?
3. How is it different than humans? Better or worse?