

1. Which of the following is NOT a characteristic of cone cells?

- a. Allows us to detect colour
- b. They detect three different colours
- c. Allow us to detect white in the darkness*****
- d. Are located on the retina

2. A room is to be made so that will allow light to come without being able to see a clear image of the outdoors. What is this called?

Translucent

3. This part of the eye changes shape so that it can focus light onto the retina.

The lens changes shape to help focus light onto the retina.

4. This part of the eye changes the shape of the lens.

The ciliary muscles change the shape of the lens.

5. Why is a banana yellow?

A banana is yellow because it reflects yellow light and absorbs all of the other colors striking it.

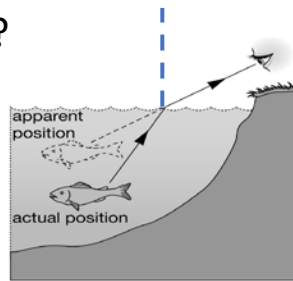
6. How can you make a red M&M appear black?

Do not provide it with red light. A red M&M only appears red when red light is provided. It will absorb all of the other colors. If you shine any other color that does not contain red, the M&M will absorb those colors and not reflect any. If no colors are reflected, it will appear black.

7. Why does light refract when it comes out of the water?

The change in density between 2 different substances causes light to change direction.

8. Does light bend toward the normal or away from the normal when it exits the water?

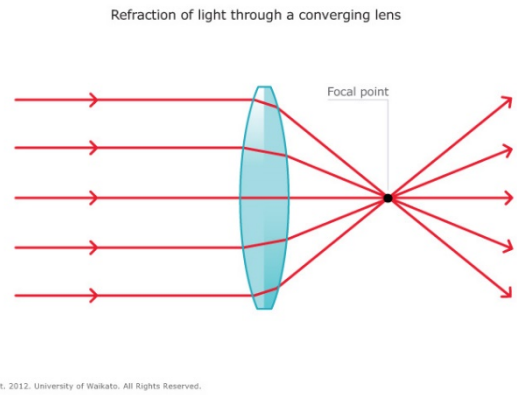
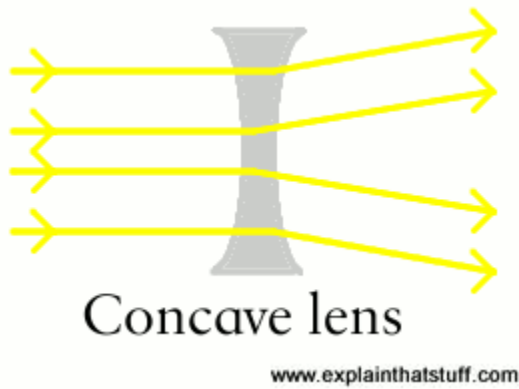


You can see the normal line draw. The light ray refracts “away” from it.

9. What is the difference between converging light rays and diverging light rays? Clue: One brings light together. The other separates light.

Converging light rays come together. Diverging light rays spread apart.

10. Draw a picture of light passing through a concave lens and light passing through a convex lens?

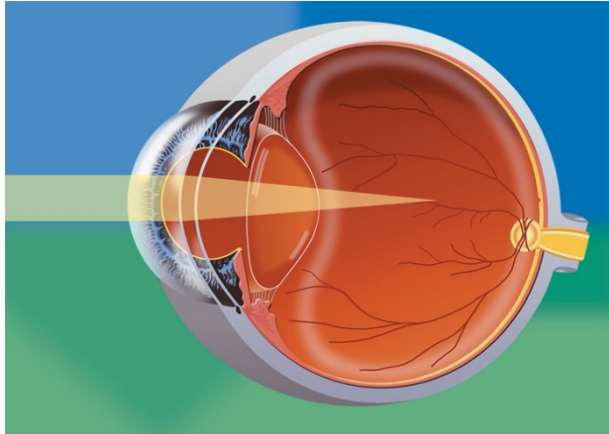


11. Match

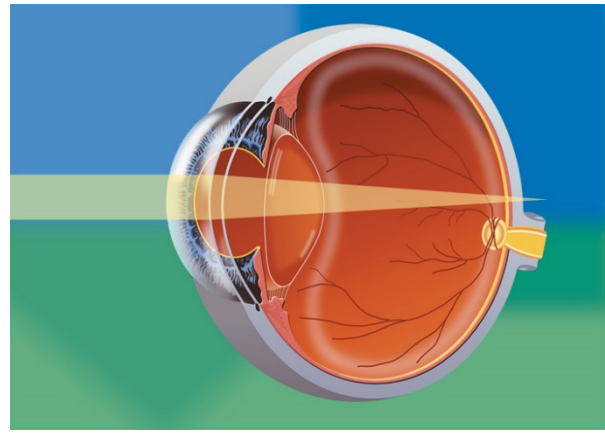
- | | | |
|-----------|--|--------------|
| 1. Retina | | A) Aperature |
| 2. Iris | | B) Diaphragm |
| 3. Pupil | | C) Film |

12.

Picture A



Picture B

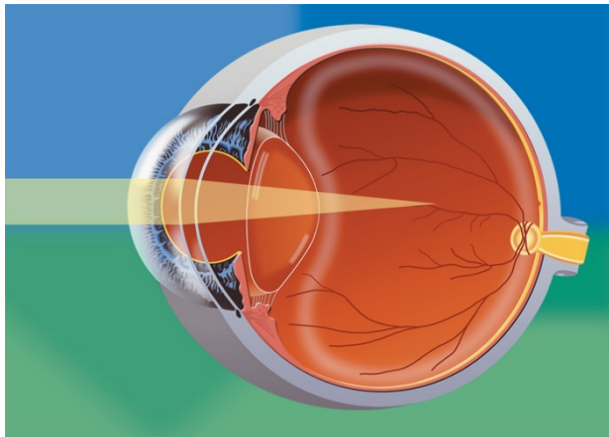


What would an optometrist call each of these vision problems above?

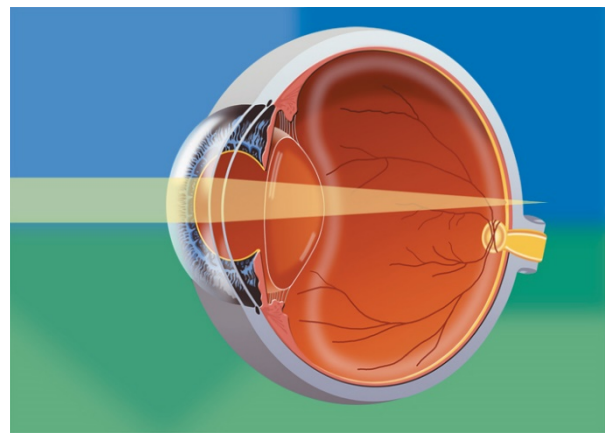
First Picture (Left) Near sighted (myopia) Second Pic: Far Sighted (Hyperopia)

13.

Picture A



Picture B



What type of lens would an optometrist recommend for each vision problem above?

To solve Near Sightedness Use: Concave Lens (tip: You see NEAR inside of a CAVE)

To solve Far Sightedness Use: Convex Lens (Tip: You see the big X FAR away on the wall)

14. What does a refracting telescope use to collect light from the environment?

Remember when you built a refracting telescope? It used 2 lenses from a couple of magnifying glasses. These are convex lenses.

15. What does a reflecting telescope use to collect light from the environment.

Reflecting involves mirrors. These telescopes use Mirrors....concave mirrors specifically. I have one on the side counter in my classroom.

16. What is chromatic aberration and what types of telescopes would you notice it in?

Chromatic aberration is when white light splits into a rainbow of colors. Convex mirrors (think magnifying glasses) tend to do this. This is a problem with Refracting telescopes....including the ones that you built. Often times, the objects that you look at will appear rainbow in color.

17. What is the functional eye unit called in a compound eye?

Ommatidia (found in the eyes of flies and other insects)

18. What is the difference between diffuse reflection and normal reflection.

Normal reflection occurs on smooth surfaces like a polished mirror. Light reflects perfectly and you can see your reflection in them.

Diffuse reflection happens on non polished surfaces. The microscopic bumps scatter light. You don't see your reflection in these objects.

19. A human will focus the light onto the retina by changing the shape of the lens. What is the name of the **muscle** that changes the shape of the lens?

Ciliary muscles change the shape of our lens.

20. A human will focus the light entering the eye by changing the shape of its lens. Fish do not change the shape of their lens. Their lens always stays the same shape. How then do they focus the light coming into the eye so that it hits the retina?

Fish do not change the shape of their lens. Instead, they move their lens forward and backward in order to focus the light properly. It is kind of like how you moved the lenses on your telescope to focus on image properly.

21. Camera eyes have a light sensitive retina to detect light. The equivalent to this in a digital camera is a **CCD (Charged-Couple Display)**
In an old fashion camera, the equivalent is the **Film**.

22. The **tapetum lucidum** is a shiny green tissue found behind the retina of animals that see in the dark.

23. List 3 major steps involved during laser eye surgery.

Numb the eye with special anesthetic eye drops.

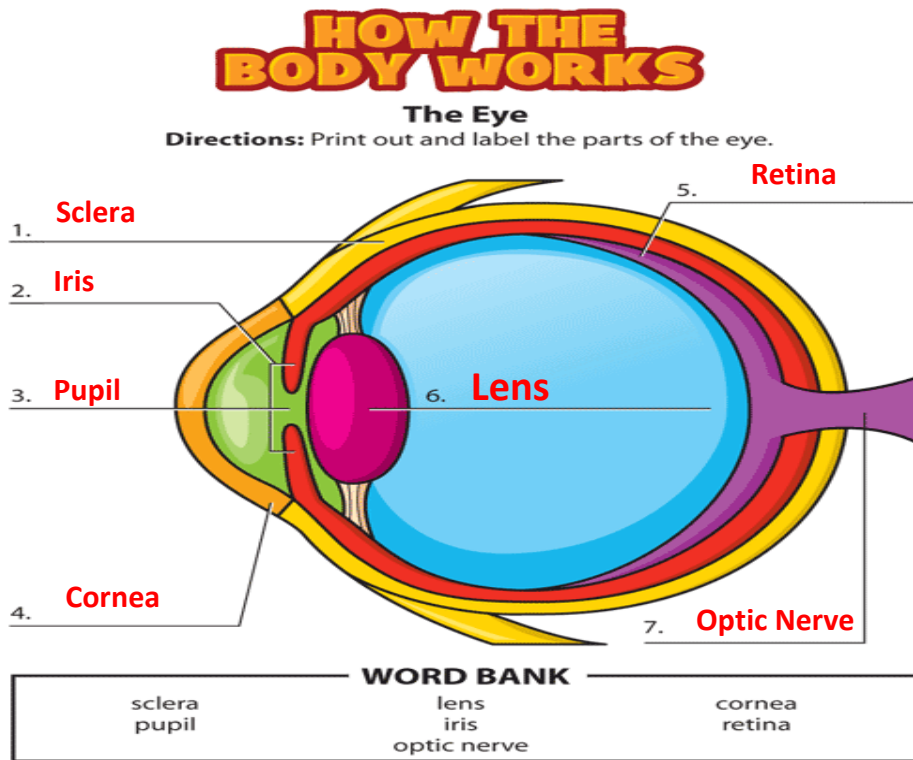
Slice the tissue that is on top of the cornea.

Use intense lasers to reshape the cornea (burning flesh smell)

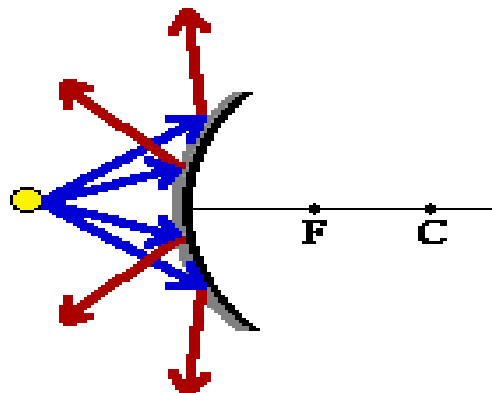
Place the tissue back on the cornea.

Use healing drops to moisturize the cornea.

24.

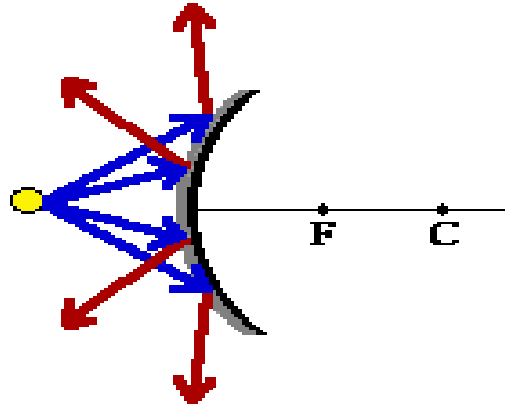


25. Is the following mirror a convex mirror or is it a concave mirror?



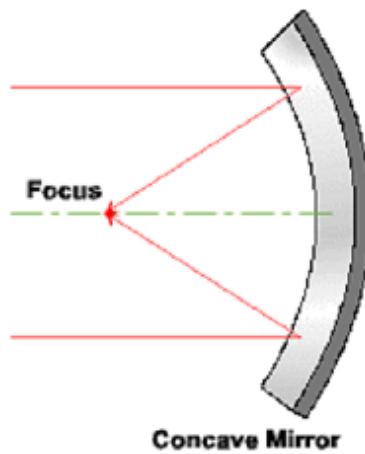
This is a convex mirror. It diverges light (spreads light apart)

26. Is this mirror a diverging mirror or is it a converging mirror?



This is a diverging mirror because the light spreads apart.

27. Is this mirror a converging mirror, or is it a diverging mirror?



This is a converging mirror because it brings light together.

28. What is the difference between a luminous object and a non-luminous object?

Luminous objects produce their own light (sun, lightbulb, glow stick). Non-luminous objects only reflect light (moon, your face, the table, the floor, the chair...all of these things reflect light...but never produce it.)

29. Name one eye adaptation that allows a fly to react quickly to an attack.

Hundreds of ommatidia create a mosaic image that resembles a puzzle-like screen. This pixelated vision is sensitive to even the slightest change in motion.

Their ommatidia are also designed to see the world in slow motion so that they can react in time. This provides them with a survival advantage.