

Lens Applications: The Human Eye

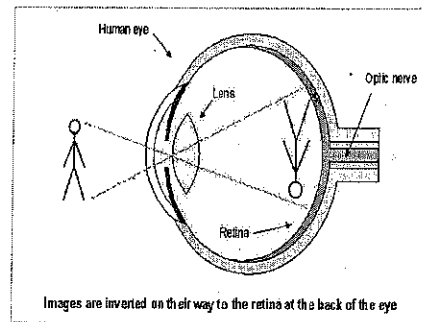
/40 marks Thinking/Inquiry

Learning Goals:

- I can explain common human eye conditions.
- I can explain the pros and cons of laser eye surgery.
- I can explain how corrective lenses improve human vision defects.

Introduction

- _____ (on outside) does most of the ray bending.
- _____ does fine tuning.
- The *image* is formed on your _____



The parts of the eye responsible for detecting colour are the _____.

The parts of the eye responsible for detecting light are the _____.

The human eye can detect the following three colours:

The photograph shown appeared to be _____ but was really _____.

This is an example of an _____ image. It is caused by overstimulation of photoreceptors in the eye.

Station #1: Myopia and Hyperopia Observations [3 marks]

Step 1: Position the ray box on the edge of the page provided. Plug in the ray box.

Step 2: Insert the 5 ray screen.

Step 3: Place the semi-circle lens approximately 10 cm away from the ray box.

Step 4: How far away from the back of the lens is the focal point? _____ cm.

[1 mark]

Step 5: Place the converging lens in between the semi-circle lens and the ray box. What do you notice about the focal point?

Is it **closer** to or **farther** away from the semi-circle lens than it was in step 4?

_____ [1 mark]

Step 6: Remove the converging lens and replace it with the diverging lens. What do you notice about the focal point?

Is it **closer** or **farther** away than it was in step 4? _____ [1 mark]

Flip over the page for the analysis questions!

Station #1 Analysis (This part may be finished at home, if you run out of time)

[6 marks]

Read the info sheet on myopia and hyperopia once you have your observations.

1. Given what you observed with the lenses and the ray box, which lens (converging or diverging) would be suitable for treating:

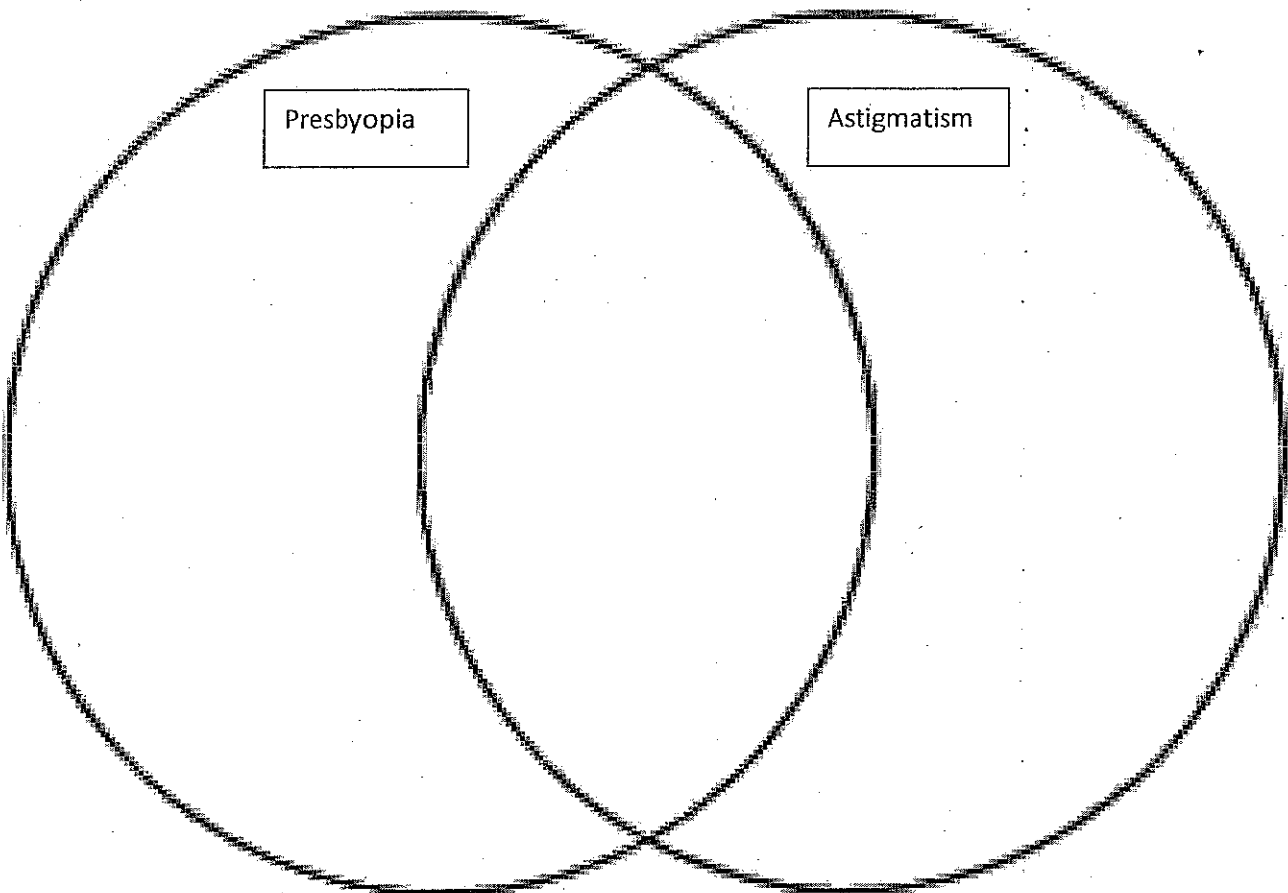
a) Myopia (give a reason and draw a diagram). [1 mark reason, 2 marks diagram]

b) Hyperopia (give a reason and draw a diagram). [1 mark reason, 2 marks diagram]

Station #2: Astigmatism and Presbyopia [6 marks]

1. Do the astigmatism test provided.
2. Read the info sheet on astigmatism.
3. Explain in your own words what astigmatism is. [2 marks]

4. Read about Presbyopia with your group members on p. 509 of your text.
5. Create a Venn Diagram for Presbyopia and Astigmatism. Please include at least 2 differences and 2 similarities. [4 marks]



Station #3: Laser Eye Surgery [7 marks]

Step 1: As a group read through the case study on pp. 508 - 509 in your text.

Step 2:

Summarize the steps involved in laser eye surgery below: [3 marks]

1. _____

2. _____

3. _____

Step 3: Create a Pro and Con T-chart for this type of corrective surgery. If you can think of more than are listed in the text, please include those as well. Be sure to discuss this within your group to include as many pros and cons as possible.

[4 marks]

Pro (benefit)

Con (risk)

Pro (benefit)	Con (risk)

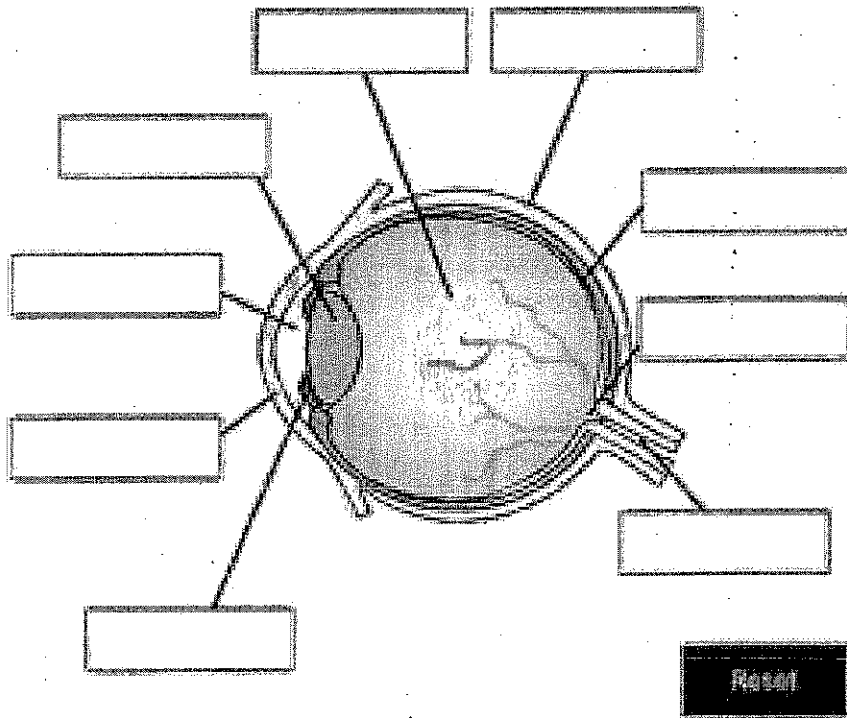
Station #4: Eye Anatomy [18 marks]

Step 1: Complete the blind spot eye test.

Blindspot distance: _____ cm [1 mark]

Step 2: Go to misshoughton.net → grade 10 academic → assignments → optics → human eye lesson

Step 3: Click on the link leading to the anatomy of the human eye. Match the part with the label by dragging the labels. Then label the diagram below. [9 marks]



Step 3: Click on the second link (back to misshoughton.net!), leading to the list of structures and functions for the parts of the eye. Fill in the table provided.

Parts of the Eye and Their Functions [8 marks]

Part	Function
Sclera	Protective covering. (the white of the eye)
Lens	
Retina	
Optic Nerve	
Iris	
Pupil	
Cornea	
Vitreous Gel (vitreous humor)	
Blind Spot (see the blind spot test info sheet)	

