Lenses and ray diagrams

Transcript

Lenses are a common piece of scientific equipment that are used in everyday life.

For example short and long sighted vision can be corrected by using the right type of lens
In this experiment you are going to use a common exam technique to help you find the focal length of a converging lens

The object is a triangle 1.5 centimetres tall and this will form a triangular shaped image on the screen

You will need a table like this.

Set up the equipment like this.

Switch on the lamp and ensure that the centre of the object, the centre of the lens and the centre of the screen are all at the same height and that the screen is vertical.

We will call the distance between the object and the screen D

We will call the distance between the object and the lens u

And we will call the distance between the lens and the screen v

Place the screen a distance of 70 centimetres from the illuminated object. We will call this distance D

Place the lens between the object and the screen so that the lens is very close to the screen

Slowly move the lens away from the screen until you can see a clearly focused image on the screen

To find the exact position that gives you the best image, it will help if you move the lens slowly backwards and forwards once you have a clearly focused image

We will now measure the distance u between the object and the lens. After measuring this carefully to the nearest millimetre we will write it in the table

We then repeat this but with the distance v between the lens and the screen

Repeat the procedure for distance D of 75 80 85 and 90 centimetres

Calculate the product of uv for each distance D by multiplying u and v

Plot a graph of uv on the Y axis against D on the X axis you do not need to start your axes at the origin, zero, zero

The gradient of the line is equal to the focal length. Calculate the gradient of your line.