



## Determination of focal length and optical power of the collecting lens.

### Purpose of work:

Learn to determine the optical power and focal length of a collecting lens

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### Equipment:

015 - Optical bench  
004 - Light source  
009 - Slide with a picture  
006 - Long focus lens converging  
014 - Screen

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### Theoretical part:

The simplest way to measure the optical power and focal length of a lens is based on using lens formula

$$D = \frac{1}{d} + \frac{1}{f} \text{ or } \frac{1}{F} = \frac{1}{d} + \frac{1}{f}$$

Where D is the optical power of the lens, F is the focal length of the lens, d is the distance from the object to the lens, f is the distance from the lens to the image.

The illuminated slide is used as the object. The actual image of the picture from the slide is obtained on the screen.

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## Workflow

1. Assemble the objects on the optical bench in the following order: screen, collecting long-focus lens, slide with a picture, light source.
2. Start the simulation. The light source will turn on and an image will appear on the screen.
3. Move the lens along the optical bench until a clear image of the luminous picture is obtained on the screen.
4. Measure the distance between the picture slide and the lens ( $d$ ) and between the lens and screen ( $f$ ). Enter the data into the table.

5. Make a formula to calculate the optical power of the lens:

$$D = \frac{1}{d} + \frac{1}{f}$$

6. Make a formula for calculating the focal length of the lens:

$$F = \frac{1}{D}$$

7. Repeat the experiment several times.

### 8. Table

number	f, m	favg, m	d, m	Experimentdav	Dav, diopters	Fav, m
1						
2						
3						

9. Make a conclusion:

**A.** As a result of this laboratory work, we were convinced of the validity of the formula  $D = \frac{1}{d} + \frac{1}{f}$  and learned to experimentally measure the optical power of the lens. The power of a lens is determined by the reciprocal of its main focal length.

**IN.** As a result of this laboratory work, we were convinced of the validity of the formula  $D = \frac{1}{d} + \frac{1}{f}$  and learned to experimentally measure the optical power of the lens. The optical power of a lens is equal to its main focal length.

**C.** As a result of this laboratory work, we were convinced of the validity of the formula

$D = \frac{1}{d} + \frac{1}{f}$  and learned to experimentally measure the optical power of the lens. The optical power of a lens does not depend on its main focal length.