

# Simple Thick Lens Made of a Bottle Filled with Liquid

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This study aimed to calculate and to determine experimentally a focal length of a simple thick lens. The thick lens made of a round-bottom bottle (flask) completely filled with transparent liquid (such as water or oil). Four different sizes of a round-bottom flask including 100, 250, 500 ml and 1000 ml were used to change the diameter of thick lens. The focal length of thick lens was calculated using ray transfer matrices and substituting values of bottle thickness, outer radius, inner radius and refractive index of the filled liquid. The calculated value of focal length was then compared with the measured value from setting up a simple experiment. This simple thick lens can be used to demonstrate basic to advanced concepts of geometrical optics.

## Summary

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