

# Build a Telescope

## Data Table

Telescope Design	Eyepiece focal length	Objective focal length	Observations	Telescope length (nearest mm)
Astronomical	50 mm (convex)	250 mm (convex)		
Terrestrial	50 mm (concave)	250 mm (convex)		

## Analysis, Calculations and Post-Lab Questions

1. What is the lens separation between the objective lens and the eyepiece lens for the sharply focused astronomical telescope? (Assume that the center of each lens is positioned 15 mm inside the tube at each end.)

Lens separation for the astronomical telescope:

2. Compare the lens separation of the astronomical telescope to the sum of the focal lengths of the two respective lenses. What does this tell you about where the focal point of the objective lens falls in comparison to the focal point of the eyepiece lens for the astronomical telescope?

3. Describe the image produced by the astronomical telescope. Is the image inverted? Is there distortion? Using Equation 3, determine the magnification of the astronomical telescope.

4. What is the lens separation between the objective lens and the eyepiece lens for the sharply focused terrestrial telescope? (Assume that the center of each lens is positioned 15 mm inside the tube at each end.)

Lens separation for the terrestrial telescope:

5. Compare the lens separation of the terrestrial telescope to the sum of the focal lengths of the two respective lenses. What does this tell you about where the focal point of the objective lens falls in comparison to the focal point of the eyepiece lens for the terrestrial telescope?
6. Describe the image produced by the terrestrial telescope. Is the image inverted? Is there distortion? Using Equation 3, determine the magnification of the terrestrial telescope.

7. What are the advantages and disadvantages of the two different telescope designs?

8. (Optional) Draw ray diagrams for the astronomical and terrestrial telescopes that are sharply focused on a distant object.

