

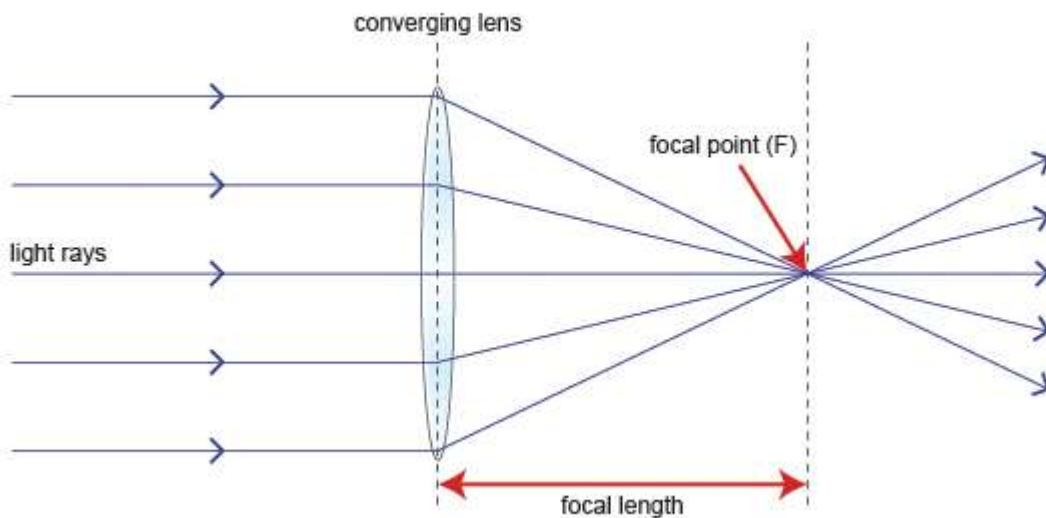
Lenses and telescopes



We use a variety of telescopes to help us observe the Universe. Telescopes have developed over the years. They use mirrors and lenses to bend, magnify and focus the light. One type of lens used is called a converging lens.

Converging lenses

A lens is a transparent block that causes light to **refract** (changes the direction the light travels in). A **converging** lens (or **convex** lens) is curved on both sides. This means the light rays coming out of it come together at a point – they converge.



Question 1: Which lens in the kit is a converging lens? (big or small).....

The point at which the light rays meet is called the focal **point**. The **focal length** is found by focusing a distant object on a piece of paper through the lens. The focal length is the distance between the centre of the lens and the image.

Question 2: What is the focal length of the large lens? (Hint: focus the light from the ceiling light onto a piece of paper)

.....

Converging lenses are often used to produce images that are **magnified**. The amount of magnification depends on:

- how curved the surface of the lens is
- how close the lenses are placed.

Question 3: Does the large lens make objects smaller or bigger?.....

A converging lens is used in a **refracting telescope** to focus the image. Galileo’s telescope would have been a refracting telescope.

Question 4: Where else might you see a converging lens?.....

Refracting telescopes

You have been provided with a kit to make your own refracting telescope.

Task 1: Make your telescope using the instructions provided in the kit.

Task 2: Read the secret messages with your telescope. Make a note in the table below of the message and the distance between the lenses when in focus ([use a ruler to measure the length of your telescope](#)). Fill in the table below.

Text	Message	Distance between lenses (cm)
1		
2		
3		

Task 3: Draw the path of light in the diagram of the telescope below.

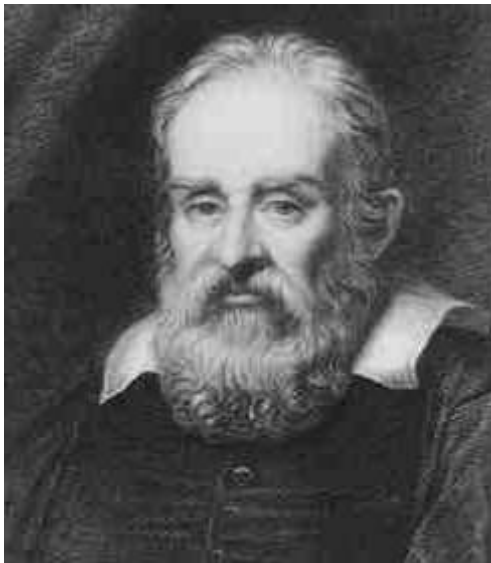


Question 5: How could you improve the telescope?.....

.....

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Telescopes in astronomy



Question 6: When did Galileo Galilei first hear about the Dutch invention of a magnifying tube with lenses?

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Question 7: What in space might you want to look at with a telescope and why?

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.....

Question 8: Can you name a famous telescope?.....

.....

Question 9: Why do you think telescopes are situated on mountains in countries like Hawaii, Chile and La Palma?

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