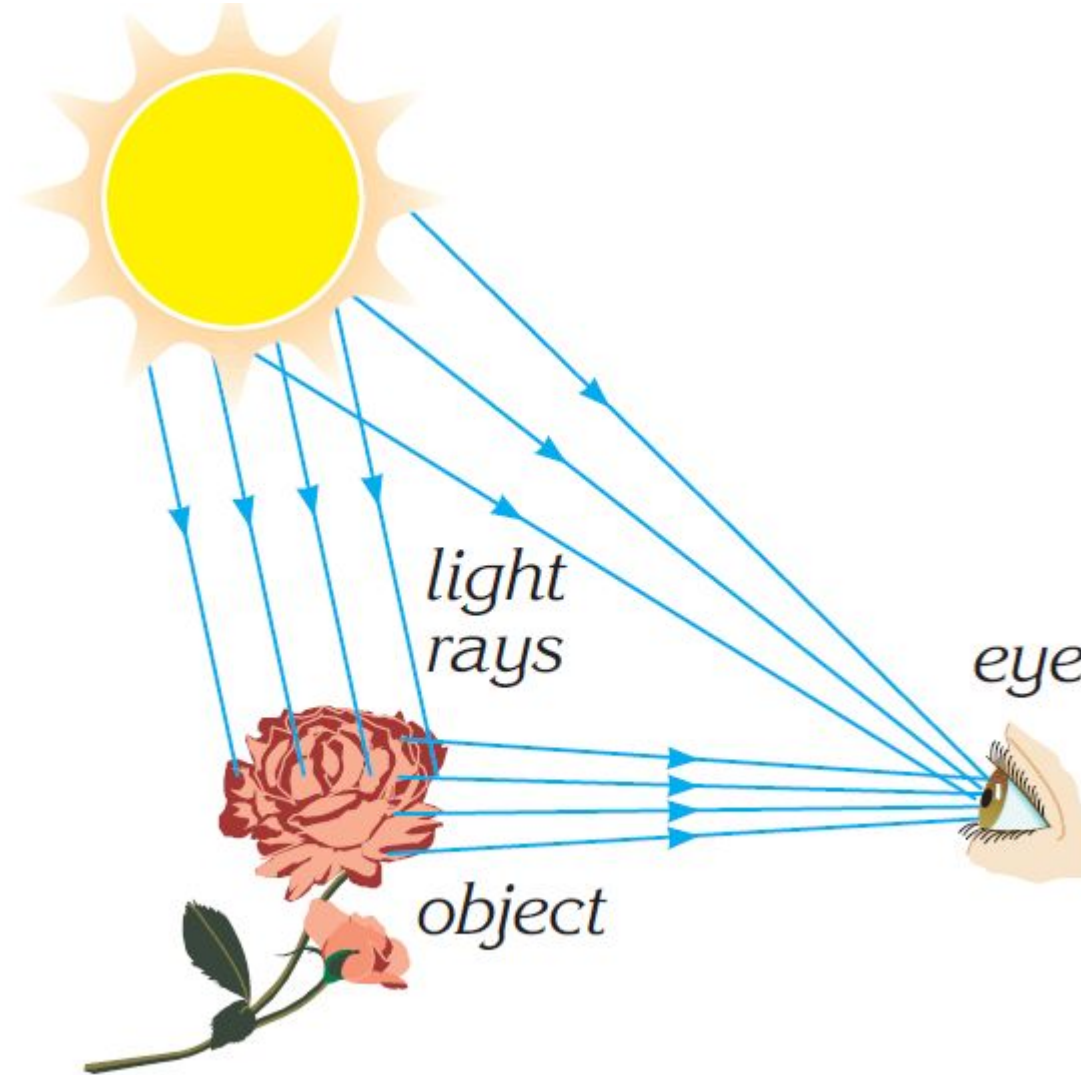


Why can we see the full moon only once a month? Why do you see only part of the moon at other time?



How do we see?



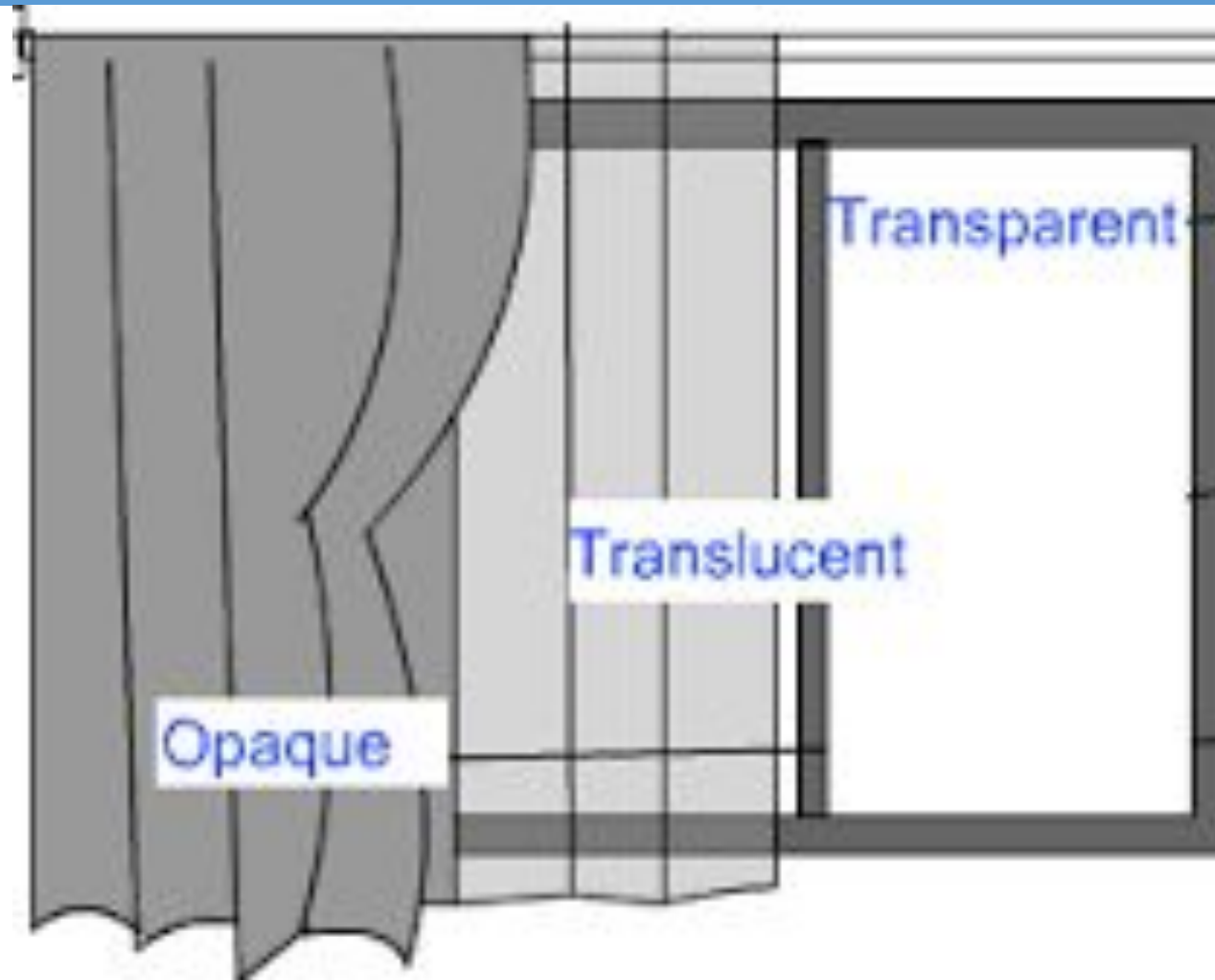
We do not see the objects, we see the reflection (отражение) of light from them
<https://www.youtube.com/watch?v=pvC9MQvqHMQ> <https://www.youtube.com/watch?v=VwNKPgo3oxA>

Luminous or Illuminous objects



Are the objects that emit their own light. Is moon a luminous object?

Does light pass through all matter?

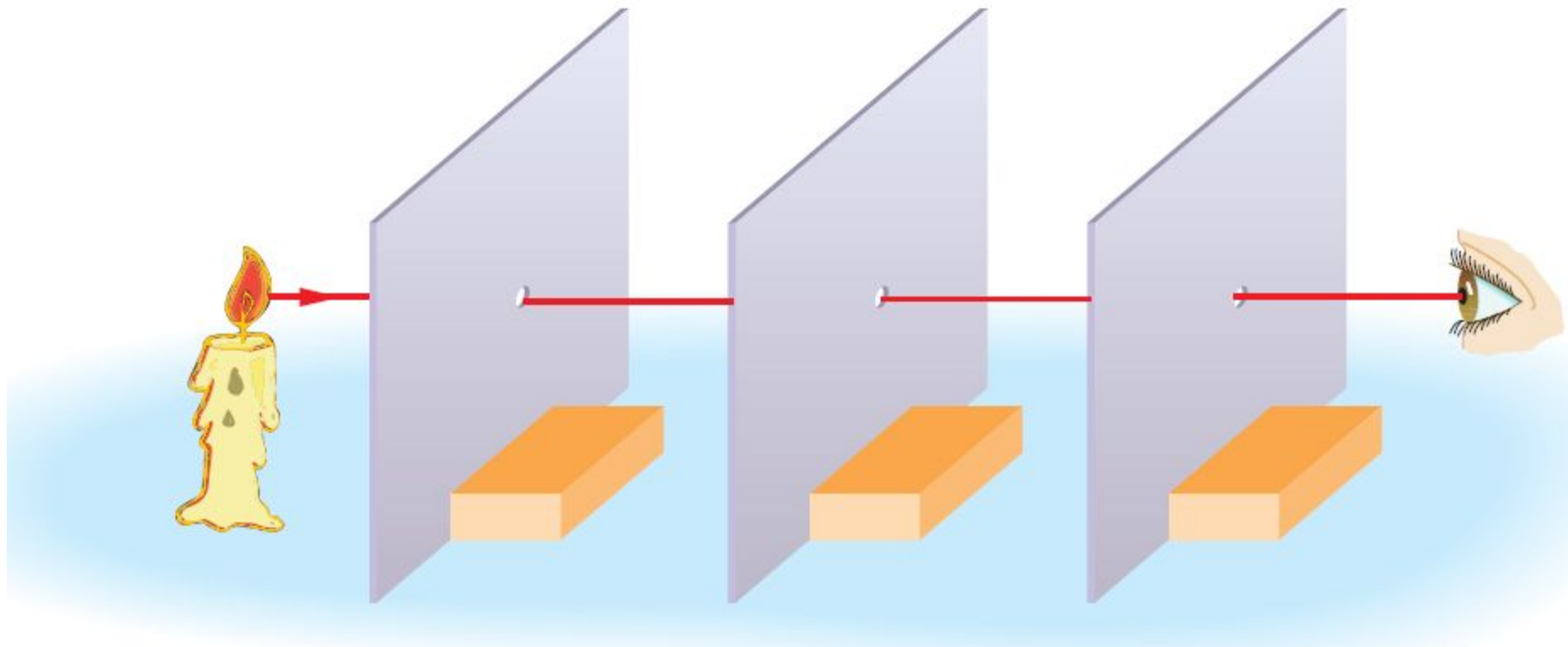


Transparent - allow light to pass through them(прозрачный)

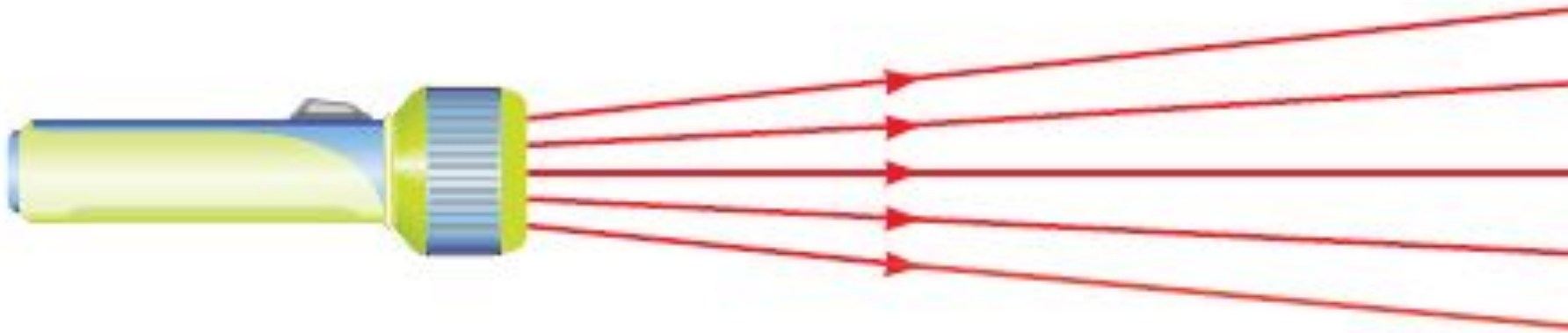
Translucent - allow some light to pass through them(полупрозрачный)

Opaque - do not allow light to pass through them(непрозрачный)

Light travels in a straight line

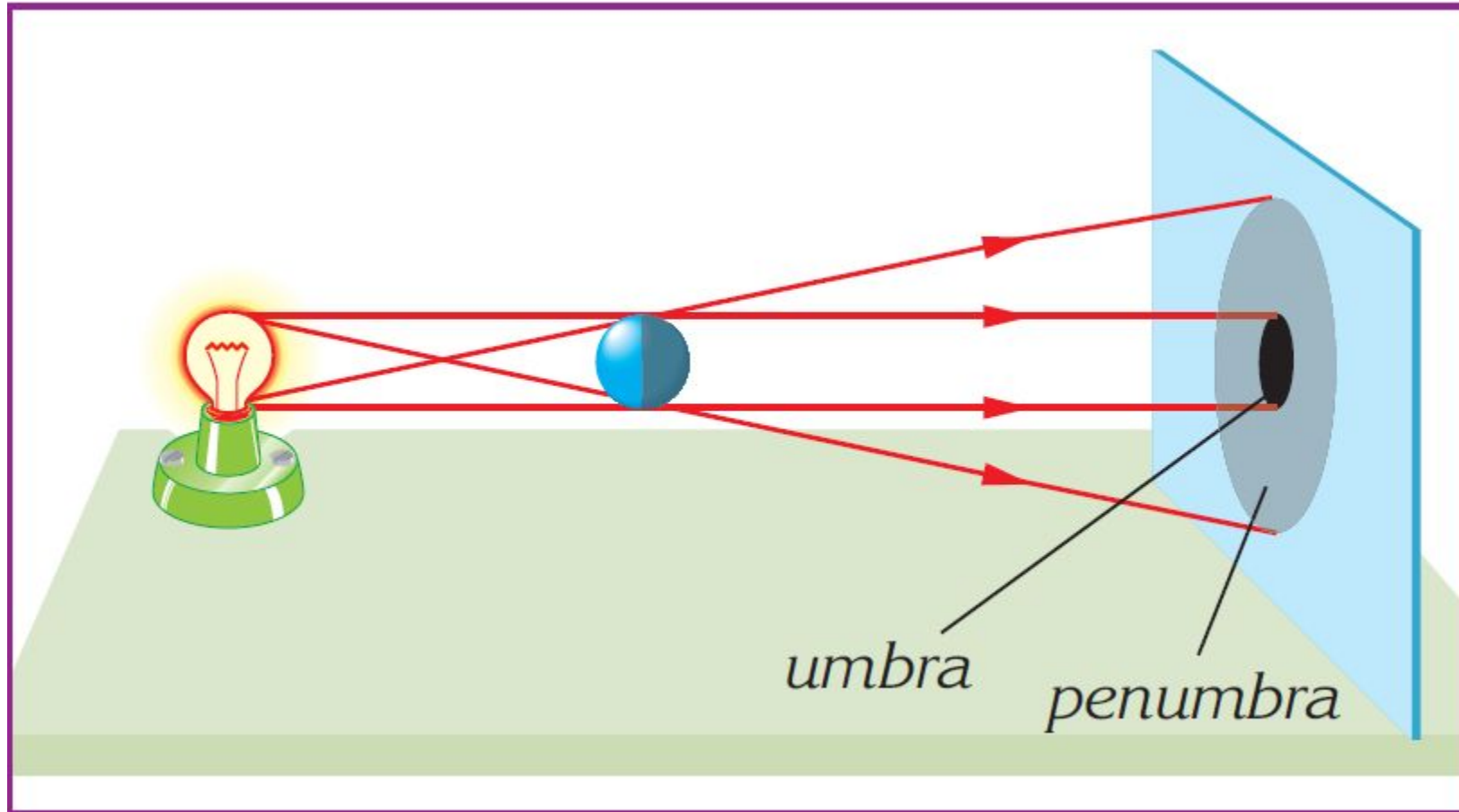


Light travels in straight lines



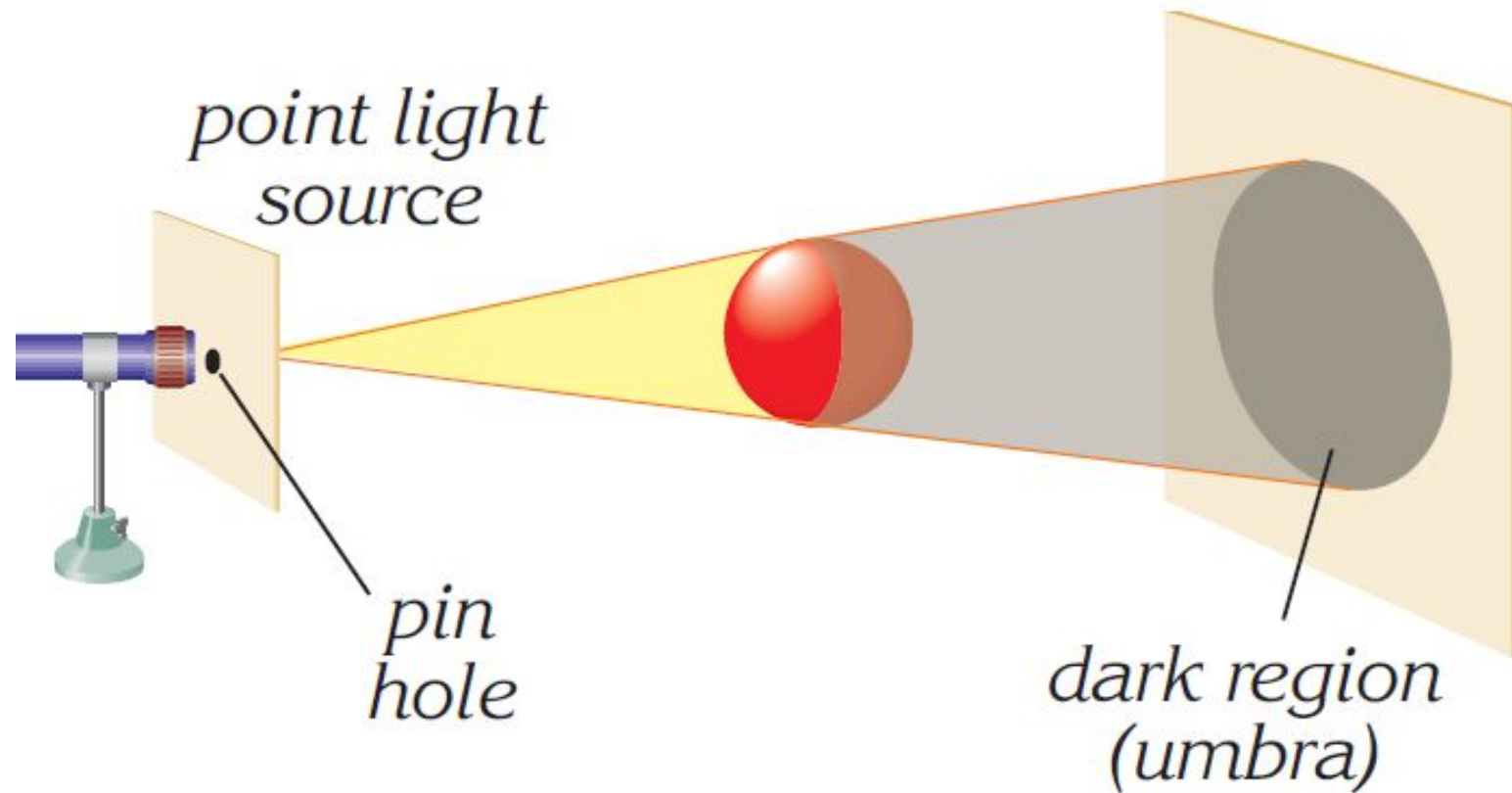
We use arrows to indicate the direction of light. We call these lines rays of light

What is a shadow?



Some light rays are blocked by the object, while others continue to travel. This dark region is called a shadow. Completely dark region in the centre is called umbra. Partial shadow around it is called penumbra.

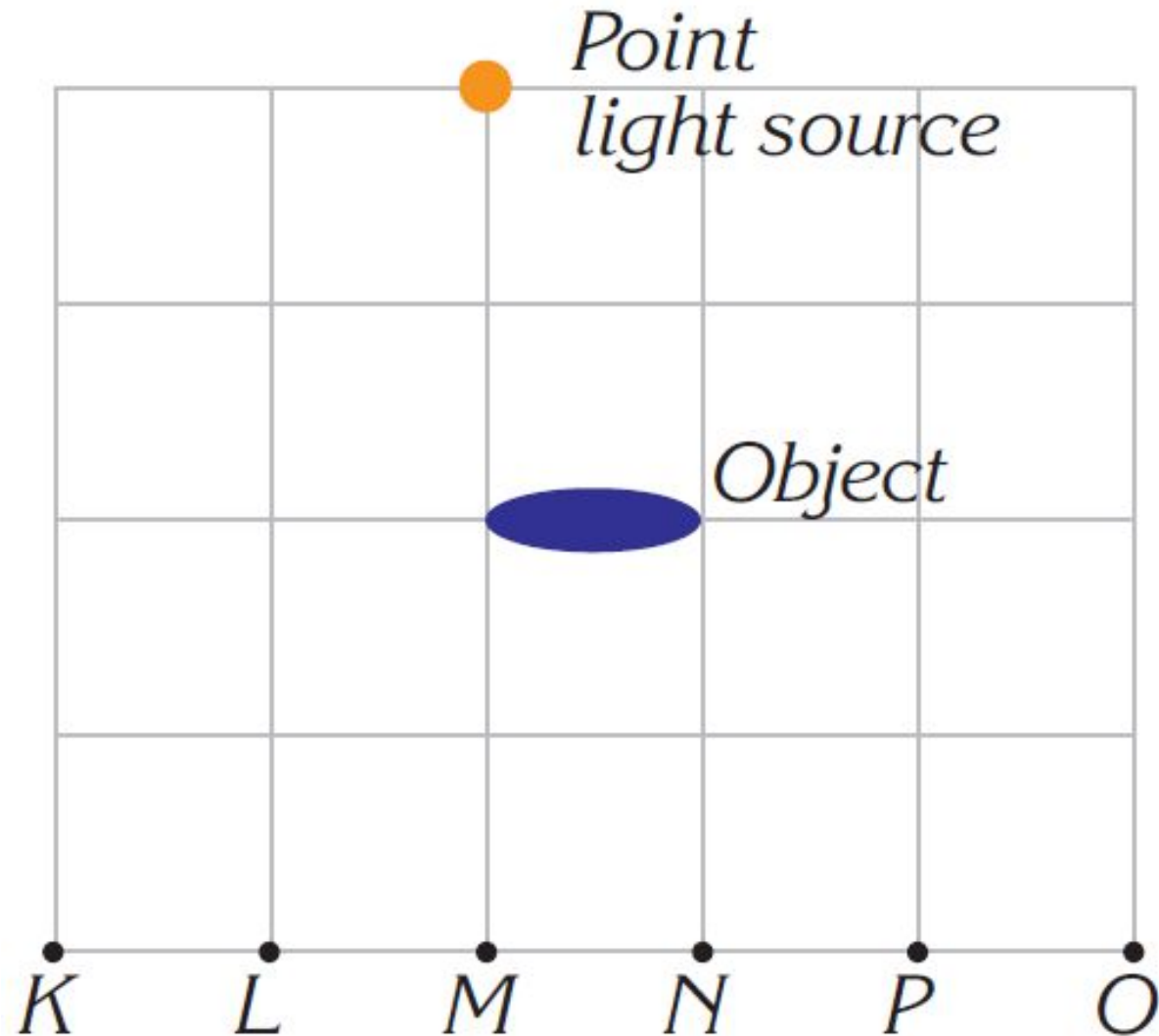
Point like source of light



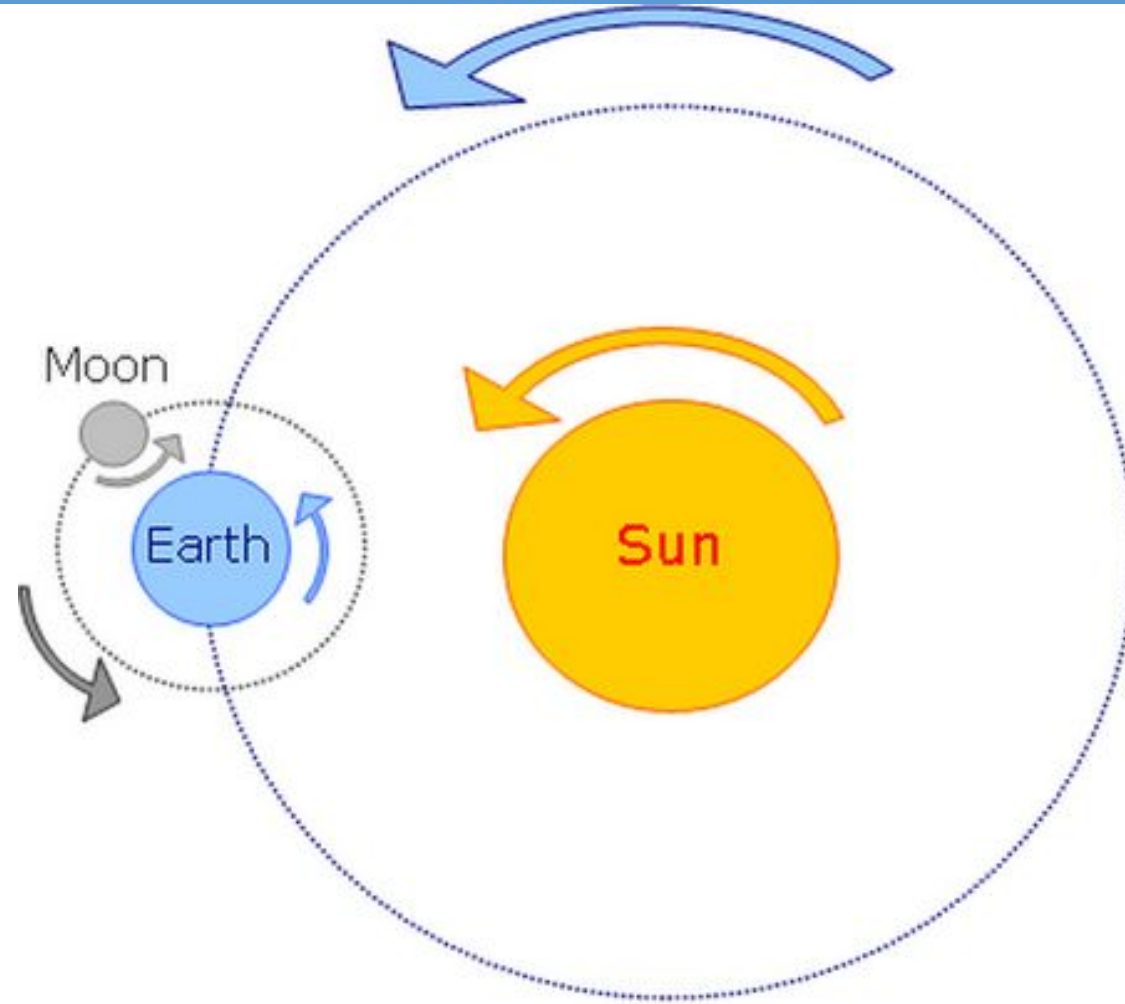
The light bulb is a large light source. It cannot form shadows with sharp edges. A dark shadow with sharp edges can be formed with a point light source.

Example

An opaque object is placed in front of a point light source as shown in the figure. Locate the region where a shadow forms when the source is on.



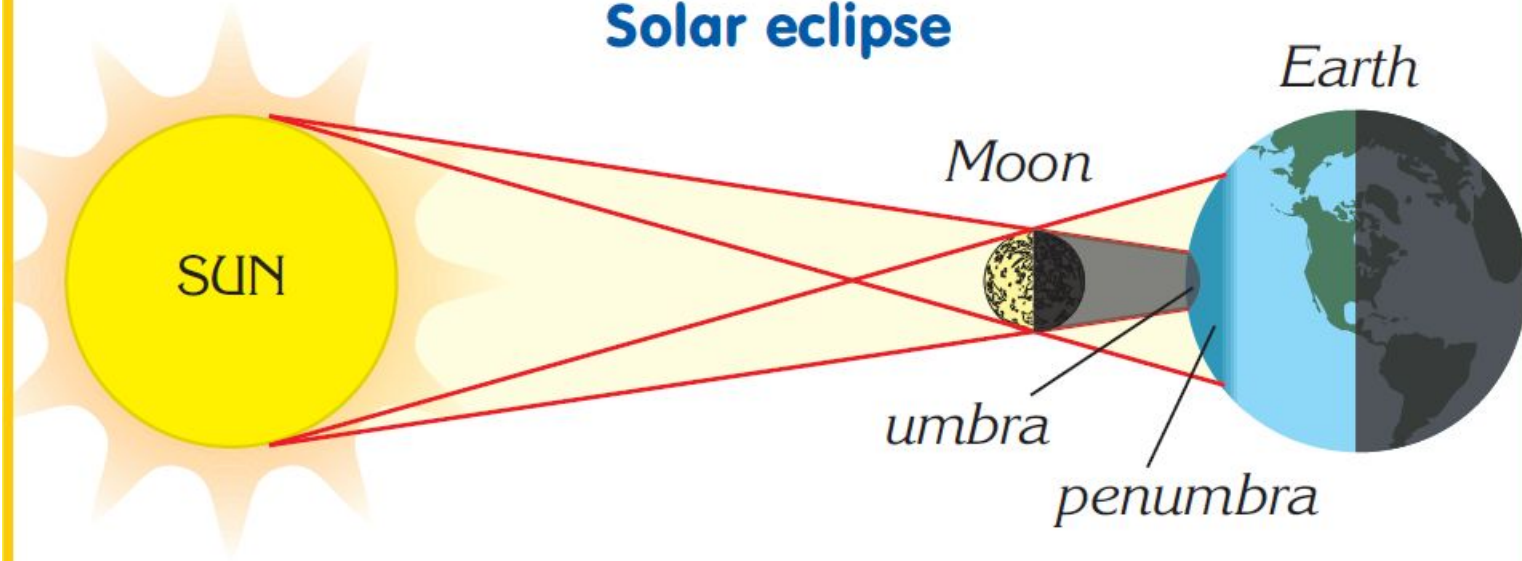
Reason of eclipse (затмение)



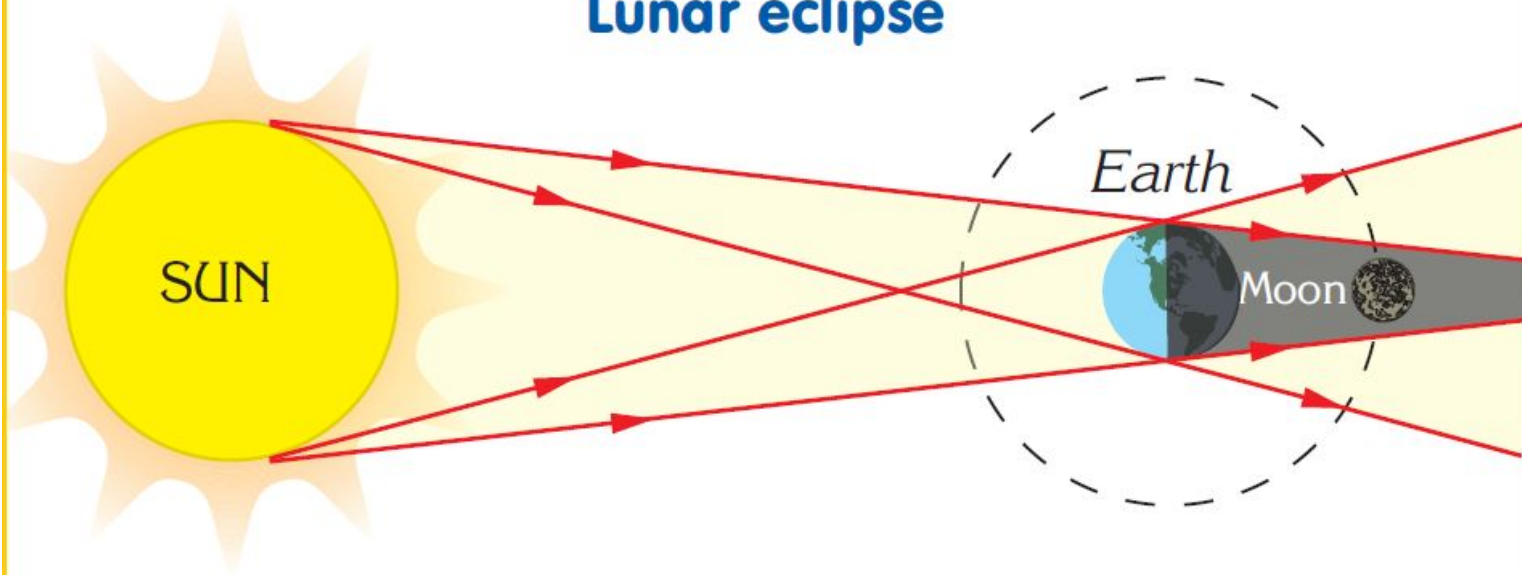
The Moon revolves around the Earth, and similarly the Earth revolves around the Sun. Occasionally the Earth and the moon enter each others dark regions.
<https://www.youtube.com/watch?v=kgbK2FZFFdw>

Lunar and Solar eclipse

Solar eclipse



Lunar eclipse



Speed of light

It travels with a speed of 300 000 km/s or 300 000 000 m/s



The distance between the Earth and the Sun is 150 000 000 km. Calculate the time it takes sunlight to reach the Earth.

Exercise

The distance between the Earth and the Moon is about 384 000 km. Calculate the time it takes for light to travel from Moon to Earth.

What is light year?

The distance between stars is so great that it is not practical to express it in metres. Instead we use the light year as a unit of distance. [calculations]

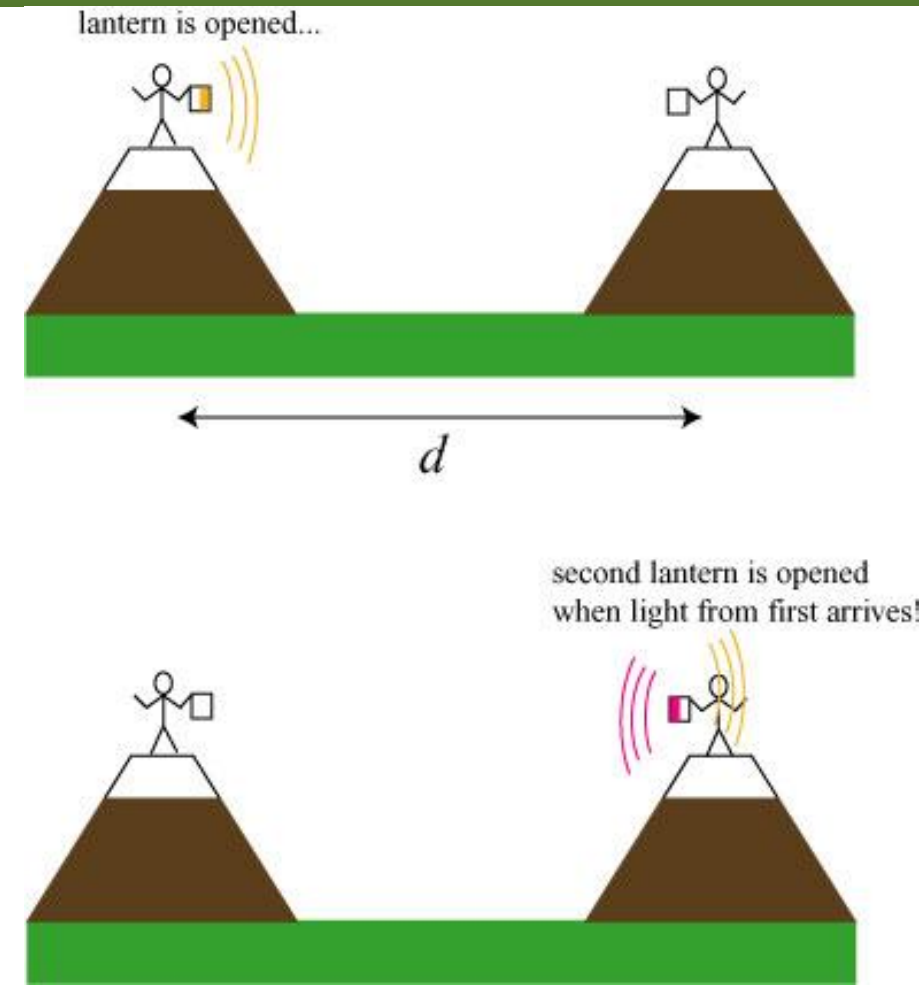
Exercise

Your friend is going to take a picture of you with a flash light. The distance between you and your friend is 5 m. Calculate the time that light takes to go from the camera to your face?

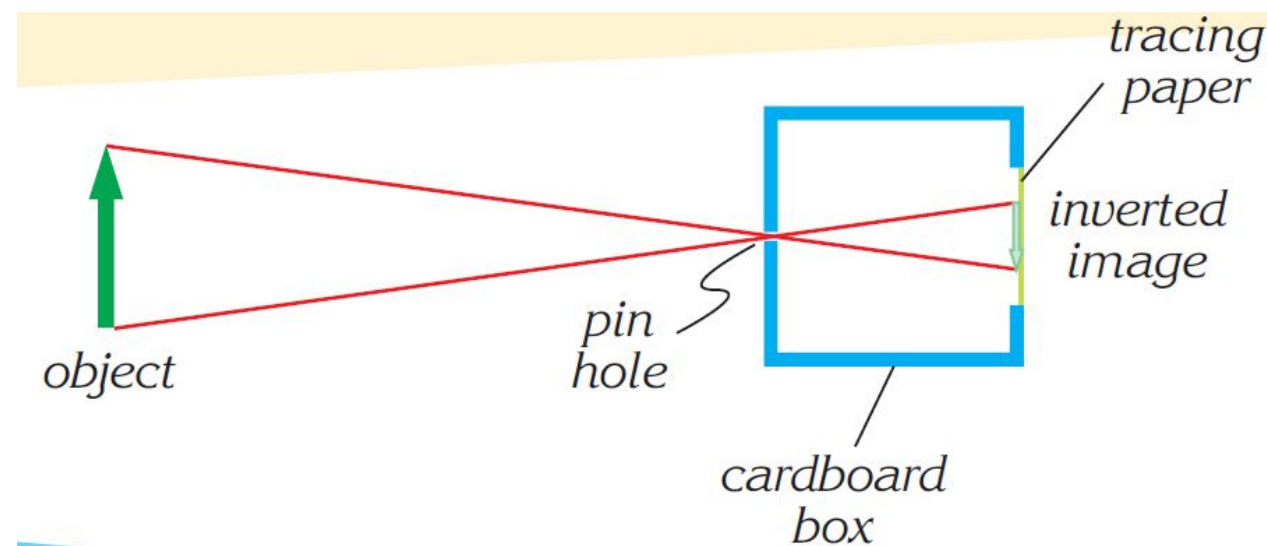
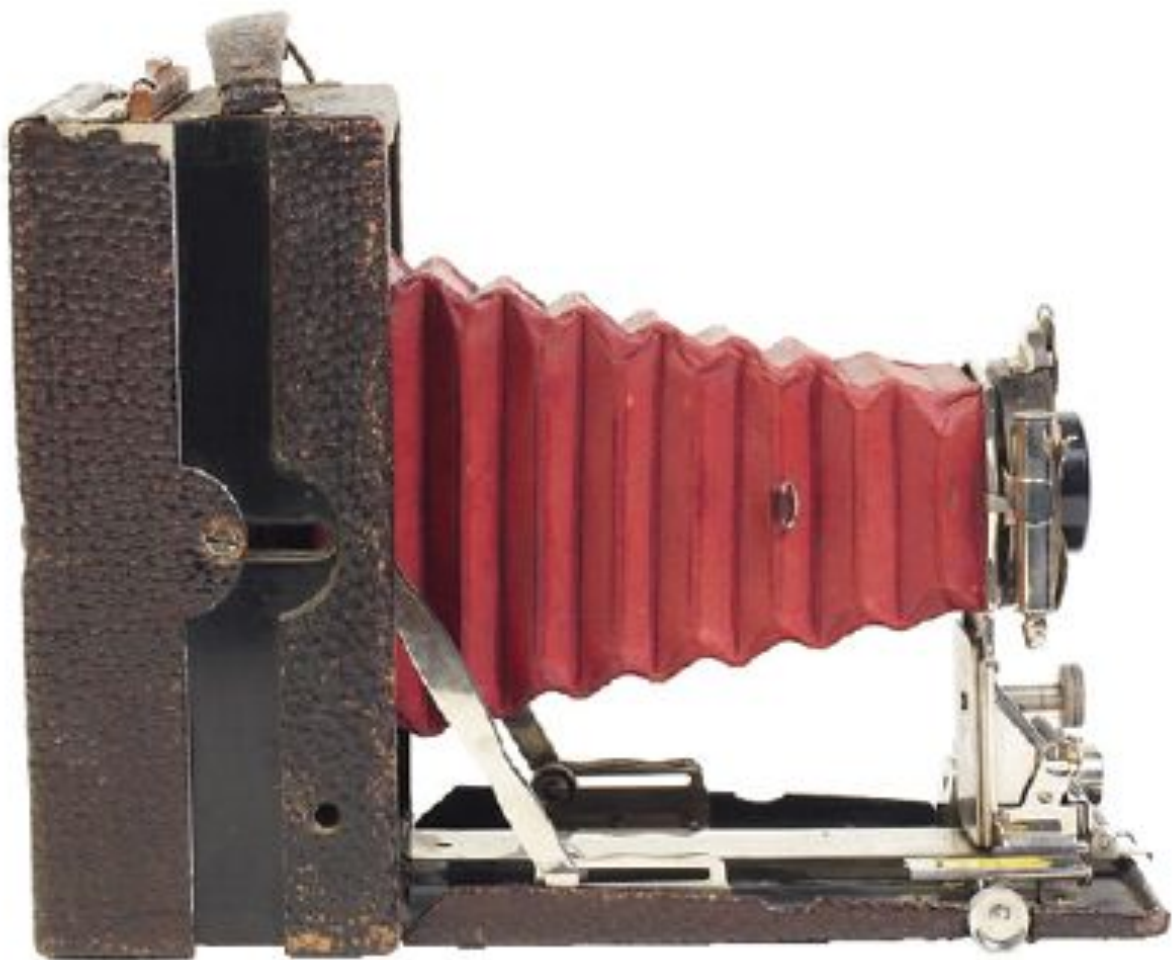
Exercise

Galileo was the first to calculate the speed of light. Two people standing on two hills with lanterns sending signals like illustrated. The time difference measured by first person is 0.5 s. The distance between them was 10 km. What was the calculated speed of light?

<https://www.youtube.com/watch?v=HwREvdUWSKE>



Pinhole camera



The picture formed on the screen is called the real image since it is formed by rays travelling from the object. The image is **inverted (перевернутый)**. That is, it is turned upside-down and left-to-right.

What we have learned?

- **Light is a type of energy**
- **We see only reflection of light from the objects**
- **Luminous or illuminous objects emit light**
- **Opaque, translucent and transparent materials**
- **Light travels in straight lines**
- **What is umbra and penumbra**
- **How solar eclipses occur**
- **Speed of light is 300 000 km/s or 300 000 000 m/s**
- **Light year is a distance travelled by light in 1 year**