



Notes

# 26

## THE CAMERA

You have learnt in the previous lesson that a camera is necessary for photography. No pictures can be taken without a camera. The camera itself is going through a change as digital photography is slowly replacing film photography. Even though technology is changing what we need to understand is that both film and digital cameras work on the same principles. Have you ever wondered how this happens? You will learn about it in this lesson.



### OBJECTIVES

After studying this lesson, you will be able to do the following :

- illustrate the working of a camera;
- describe the parts of a camera ;
- enumerate the function of a lens in making a photograph;
- identify the different types of lenses;
- explain about other important equipment in photography.

### 26.1 WORKING OF A CAMERA

Let us peep inside a camera and try to understand how it works and what its essential components are. A camera is a box which is black inside and allows the right amount of light to fall on the surface that is to record the photograph. This surface varies in the two types of cameras. If it is a film camera then the light falls on the surface of a film and if it is a digital camera then it is an image sensor that registers the light. If the amount of light is more than required then the picture will appear white and details will be missing due to over exposure and if the light is less than required then the photo will appear dark, again taking away the details from the picture. So the main parts of a camera are supposed to control the entry of light.



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This is done by two components:

- The shutter
- The aperture

Both these act as controllers of light.

The **shutter** is like a door that opens and closes for a given period of time. This time ranges from a small fraction of a second to a few seconds. This is the time when light enters the camera. If the light in the area where we are taking the photograph is weak then we shall open the shutter for a longer period of time. If the light is very bright then we shall open the shutter for a fraction of a second.

Similarly the **aperture** is of great significance. The aperture is another opening to control the amount of light coming into the camera. You can compare this to a tap. When you open the tap fully, a lot of water rushes out but if you open it a little then only a little amount of water comes out. Likewise you can open the aperture for more light and close the aperture to reduce the amount of light entering the camera.

So while taking a photo you have to set the shutter speed and control the aperture on the camera. When you press the release button, the shutter is opened and closed instantly. It is in the intervening period that the exposure takes place on the film/ sensor. This is indicated by a CLICK noise which can be heard.

## 26.2 PARTS OF A CAMERA

Apart from the shutter and the aperture there are others parts of a camera which are important for its functioning. Let us list them.

- **View finder:** This is the point from where we look and aim the camera in the direction of the scene that is to be photographed.
- **Shutter release:** As mentioned earlier this is the button on the top of a camera which when pressed takes the photograph.
- **Lens:** The lens is the most important part of a camera, because it is the device through which we focus the subject or the picture onto the surface that is going to record the photograph. A lens which is made of glass has a unique property to bend the light rays and focus them on a sharp point. So when we look at the image that is to be photographed through a lens it may appear soft or blurred, but then by focussing it we can make it sharp. Now it is ready to be photographed. Usually the aperture is also built inside the lens.
- **Focussing ring:** This is the adjustment that we use to bring the subject into sharp focus. It is usually on the lens and has a scale that shows the distance of the subject from the lens. By moving the ring clockwise or anti-clockwise we adjust the focus. Most new cameras also have an automatic focussing mechanism and such cameras are also referred to as *autofocus cameras*.



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- **Light meter:** You have studied that the shutter and the aperture control light and send in just the right amount for the picture to be taken. But how do we decide about the right amount of light at the given moment when we are taking the photo. This is measured and indicated by a light meter. The light meter is either inside the view finder or on the screen that shows the picture. The easy to use cameras have an automatic setting that reads the light and accordingly sets the aperture and shutter speed.

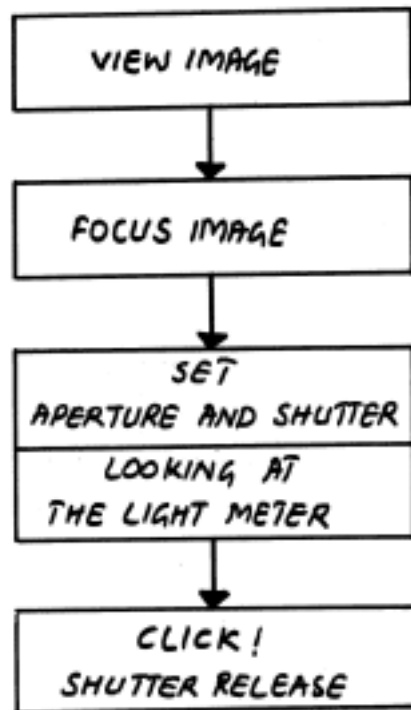


Fig 26.1

**INTEXT QUESTIONS 26.1**

- 1) What are the parts in a camera that control light?
- 2) What will happen to the picture if more than the required amount of light enters the camera ?
- 3) What is the purpose of a lens in a camera?
- 4) What is the function of a light meter ?
- 5) What happens when we hear a click sound on the camera?



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### 26.3 PROPERTIES OF A LENS

As you have learnt earlier, the lens is of great importance while taking a photograph. It decides how the picture will look. Good cameras allow us to change the lens according to our needs. Such cameras are generally *Single Lens Reflex (SLR) cameras*. You may have noticed photographers carrying cameras which have long lenses. If you recall watching a cricket match on television you may remember photographers sitting with cameras that have very long lens. These cameras with long lenses have a special purpose and they bring the far away subject closer to the camera. Such lenses are called *telephoto lens*. These lenses are useful when you cannot move the camera close to the subject, like you cannot step onto a cricket field to get a close picture of the batsman in action or you cannot get close to a place where there is danger of getting hurt.

Similarly you may need to take the picture of a scene where it is crowded and you want to see everyone in the scene. For this you will need a wide angle lens. Such a lens would make the objects small but it will accommodate a larger area on the picture frame. Such a lens will be called a *wide angle lens*. You can use such a lens in photographing places which are crowded and don't give space to the photographer to move back. For example a birthday party with lots of guests in a room can be photographed well by a wide angle lens and everybody in the crowd would be in the picture.

We can explain this by saying that different lenses have different angles of view.

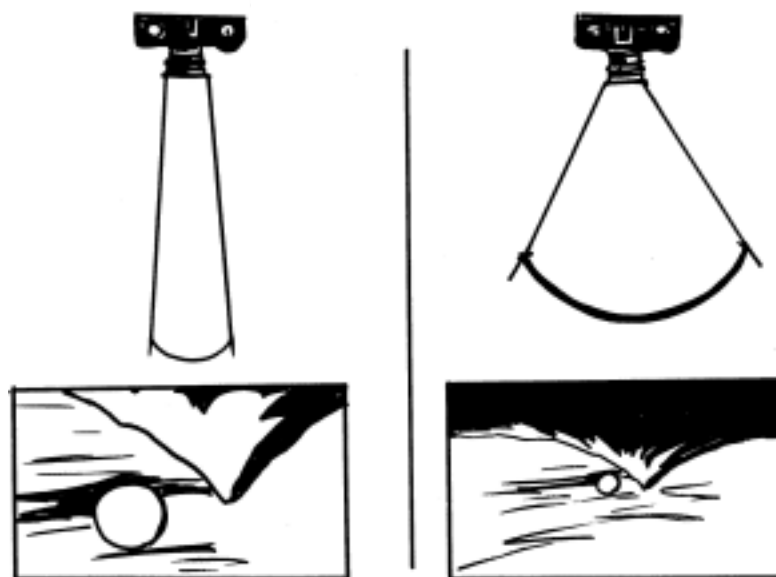


Fig 26.2: (a) Narrow angle of view (b) Wide angle of view

The narrower the angle of view, the closer a distant object comes. The wider the angle of view, more of the scene is included in the frame thus also making the subjects look small.

We can also explain this property of a lens in terms of its focal length.

But what is this focal length?

Focal Length is the distance between the lens and the film or image sensor (in a digital camera) when the lens is focused at infinity (the farthest distance).

It means that when the light rays coming from the farthest distance converge at a point, the distance between the lens and that point is the focal length of the lens.

The focal length is mentioned on a lens in millimetres.

The wide angle lens has a shorter focal length. When the focal length increases, the lens starts becoming telephoto and the lens itself is longer.

You may have come across a camera that has one fixed lens but with the help of a switch you can change the scene from wide angle to telephoto i.e. you can get the subject that you are photographing closer to you or make it move further from you. Such lenses that can change the angle of view and become telephoto as well as wide angle are called *zoom lenses*.

A zoom lens is a lens with a variable focal length. So when the focal length of a lens varies from say 35mm to 100mm its angle of view becomes narrower and therefore the scene changes from wide angle to telephoto.

### 26.4 OTHER IMPORTANT EQUIPMENTS IN PHOTOGRAPHY

Though the camera is an essential part of a photographer's equipment there are a few other equipments which are added to a camera to make its functioning better.

- One is the **flash**. This is a high intensity light which bursts out for that fraction of a second when the shutter is released. This is useful when you are in situations where light is not enough for the picture to be taken. A flash makes it possible to take a photograph in complete darkness. Again in some cameras you may have seen the flash to be a part of the camera, but in more advanced cameras the flash is put separately and a separate flash is more powerful than the one that is a part of the camera.
- The other important part of a photographer's equipment is called a *tripod* which as the name implies is a three legged support for the camera. Sometimes one needs to fix the camera onto a stand because the lens that is being used is heavy. When a slow shutter speed is used, the camera must be mounted on a stand to avoid a hazy picture which may happen if the camera is hand held.





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Fig 26.3: (a) Flash



(b) tripod



**Activity 26.1**

1. Visit a neighbourhood photo studio and familiarise yourself with the different types of lenses used in photography.



**INTEXT QUESTIONS 26.2**

- 1) Name the three types of lenses that are commonly used in cameras.
  - i)
  - ii)
  - iii)
- 2) Fill in the blanks with the appropriate word:
  - i) \_\_\_\_\_ lens is used to photograph a football match in the playground?
  - ii) Zoom lens has a ..... focal length.
  - iii) \_\_\_\_\_ camera allows us to change the lens according to our needs
- 3) Give at least two situations in which it is useful to use a tripod while taking a picture.



**26.5 WHAT YOU HAVE LEARNT**

- working of a camera
    - shutter
    - aperture
- (controllers of light)



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- Parts of a camera
  - view finder
  - shutter release
  - lens
  - focussing ring
  - light meter
- types of lenses
  - telephoto lens
  - wide angle lens
  - zoom lens
- other important equipment in photography
  - flash
  - tripod



### 26.6 TERMINAL EXERCISES

1. Which are the most important components of a camera? Explain the use of each component.
2. Name three circumstances when you will use flash and give reason for its use.
3. Which are the important lenses used in photography? Explain their use.
4. What is the function of a lens in a camera.



### 26.7 ANSWERS TO INTEXT QUESTIONS

- 26.1**
1. Shutter and aperture.
  2. The picture will appear white and details will be missing.
  3. Lens is the device through which we focus the light or the picture onto the surface that is going to record the photograph
  4. A light meter lets us know the right amount of light that is necessary to take the picture.
  5. The shutter opens and the photograph is taken.
- 26.2**
1. i) wide lens,  
ii) telephoto lens  
iii) zoom lens.
  2. i) wide lens  
ii) variable.  
iii) SLR
  3. i) when the lens used is heavy.  
ii) when the shutter speed of the camera is slow.