

COM1215 – Photography - Exposure

After completing COM1205, you should now have a basic understanding of the basic components and functions of a camera. In this module, we will be going into further detail on the topic of exposure.

Most people are familiar with taking photos. As cameras become more advanced, it becomes easier and easier to snap a picture. To create truly memorable images, though, a person needs to understand the principles of photography and the functions of the camera. A good image is well focused, properly exposed and thoughtfully composed. There is more to taking a photo than 'pointing and shooting'!

In order for the viewer to see what the photographer intended the shot must be carefully planned. Composition, exposure, and focus all interact with each other to create the final capture. If any of these components is incorrect then the entire image suffers.

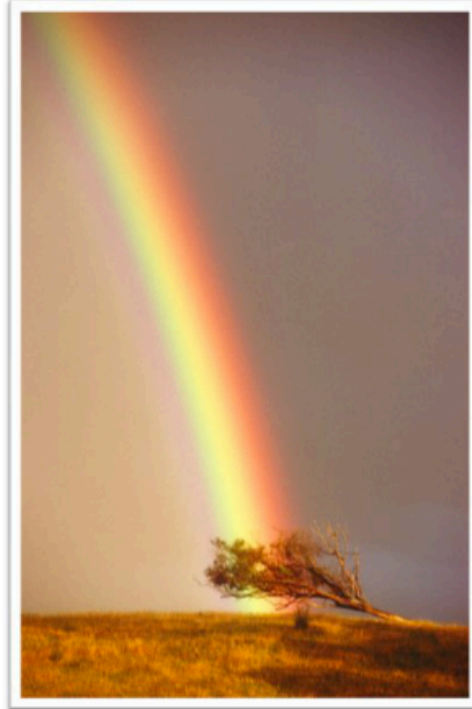


Image: John Foxx/Stockbyte/Getty Images

Exposure



Image: Stockbyte/Getty Images

In this course we will focus on correct exposure. The amount of light hitting the film or sensor will determine the overall brightness of the image. This brightness is controlled with the aperture, the shutter and the ISO. It is important to understand which of these controls should be used to create the desired result.

With a solid understanding of the basic principles and elements of the photographic process, you, the photographer, will have more control and success in presenting your vision to the viewer.

The Aperture

Introduction

The aperture is an opening in the lens through which light travels. As the size of the aperture changes, the amount of light passing through the lens to the film or sensor is affected. The aperture settings of your lens affect two things: depth of field and exposure.

1 How the aperture controls light

Changing the lens aperture setting affects your exposure. Changing the size of the aperture changes the amount of light that is allowed to pass through the opening and therefore affects the exposure or brightness of the image. Photographers use the aperture and the shutter settings together to determine the correct exposure or brightness of the image.

Your camera lens apertures will look similar to these:

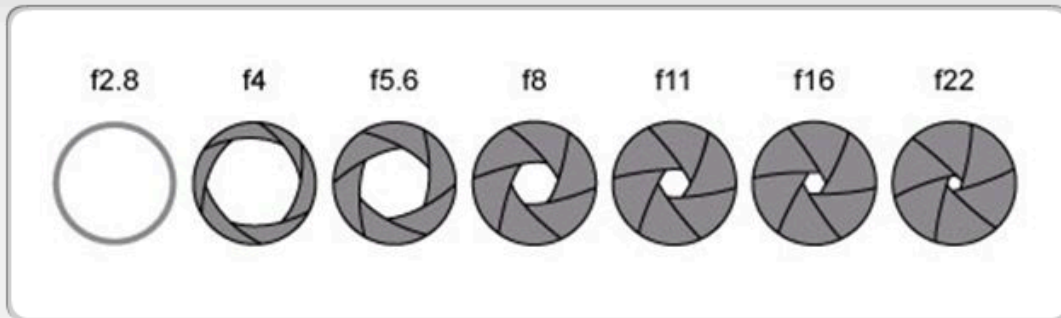


2 f-stops



Each aperture size is called an f-stop in photography. Apertures of f1.4 f2 f2.8 f4 f5.6 f8 f11 f16 f22 f32 are the main f-stop numbers that photographers commonly use.

3 f-stops



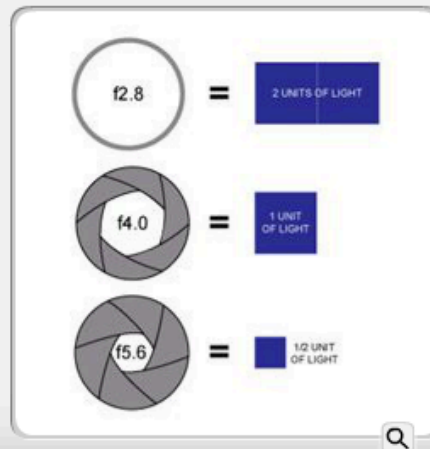
At smaller f-stops i.e. f2 or f2.8, the opening is bigger (a larger aperture) which allows more light to pass through the lens to strike the film or sensor. At higher f-stops i.e. f16 or f22, the opening is smaller (a smaller aperture) which allows less light to pass through the lens to strike the film or sensor.

The photographer may choose a specific f-stop. Moving one full f-stop up from the current setting will reduce the light passing through the lens by half. Moving one full f-stop down from the current setting will double the amount of light passing through the lens.

4 Example



In this example, starting with an original f-stop of f2.8 and then changing to f4 allows half the amount of light to pass through. Changing to f5.6 reduces the light by half again.



Review the following series of images. Each was taken with a 1 f-stop increase in exposure value. An increase in exposure means a brighter image. To increase the exposure, you must select a lower f-stop number. The only change in the image settings was the new lens aperture (f-stop) setting. Nothing else was changed.

The first image was taken at f8 @ 1/125th sec.

The next image was taken at f5.6 @ 1/125th sec and is twice as bright as the f8 image.

The final image of the series was taken at f4 @ 1/125th sec and is twice as bright as the f5.6 image.

You could also think of it the opposite way. The f5.6 exposure is twice as dark as the f4 exposure and the f8 exposure is twice as dark as the f5.6 exposure.



Image: Andy Sotiriou/Photodisc/Getty Images
f8 @ 1/125th sec



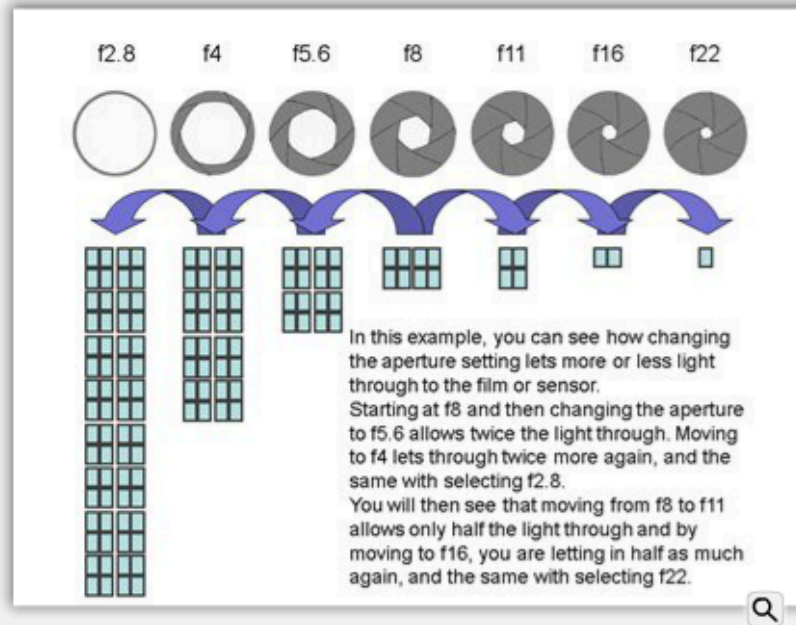
Image: Andy Sotiriou/Photodisc/Getty Images
f5.6 @ 1/125th sec



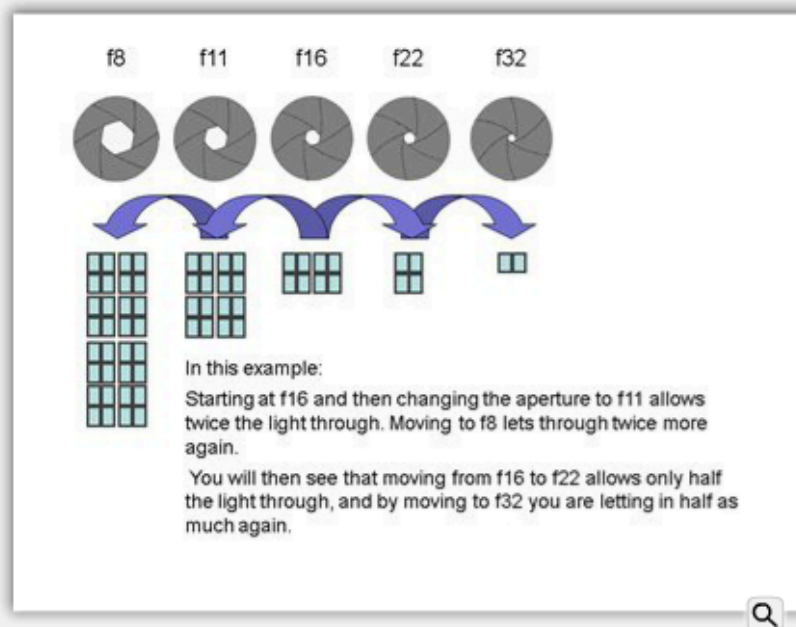
Image: Andy Sotiriou/Photodisc/Getty Images
f4 @ 1/125th sec

How the Aperture Controls Light

Example 1



Example 2



Example 3

f1.4 f2.0 f2.8 f4 f5.6

In this example:
Starting at f2.8 and then changing the aperture to f2 allows twice the light through. Moving to f1.4 lets through twice more again.
You will then see that moving from f2.8 to f4 allows only half the light through, and by moving to f5.6 you are letting in half as much again.

Now that you are starting to understand how the aperture controls the light hitting the film or sensor, you can start to predict how the image will be affected when you change the aperture setting. Images: Stockbyte/Getty Images

f4 f5.6 f8 f11 f16

Depth of Field

The size of the lens aperture affects the depth of field. The depth of field is the portion or amount of the image that appears sharp or in focus.

Photographers change aperture settings to create different amounts of sharpness within the image. The aperture therefore is used to control the amount of depth of field recorded to the film or sensor. By choosing the correct aperture, the photographer has the choice of showing a large depth of field or a shallow depth of field within the image.



Depth of Field and f-stops

The common aperture or f-stop numbers that photographers use are listed below:

f1.4 f2 f2.8 f4 f5.6 f8 f11 f16 f22 f32

Your camera may not go all the way down to f1.4 or all the way up to f32 but it will likely have the majority of f-stops in the list above.

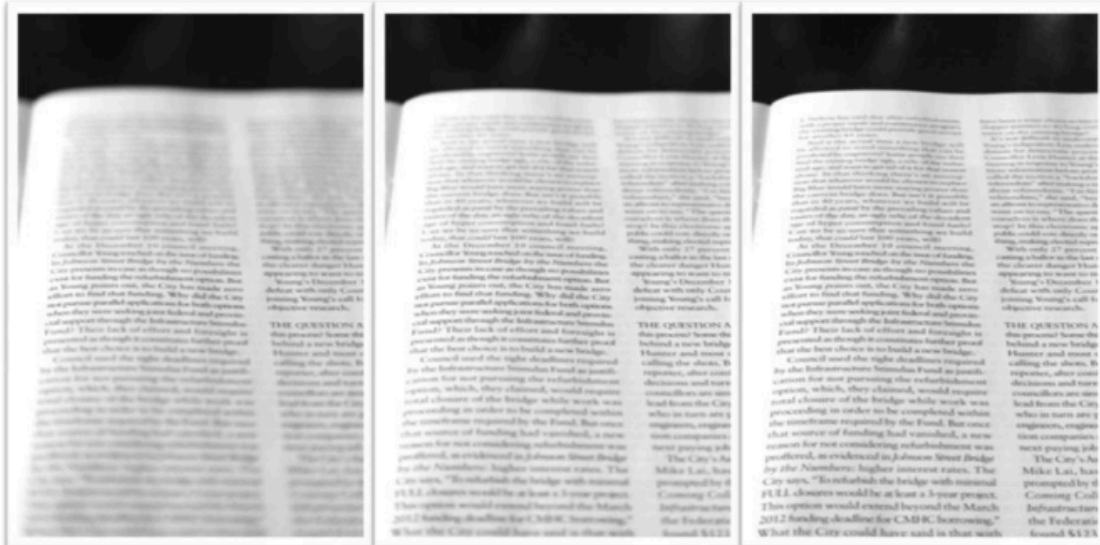
The smaller f-stops (e.g. f2.8 or f4) offer the photographer the ability to show less depth of field or a smaller amount of focus before and after the subject. The larger f-stops (e.g. f11 or f16) offer the photographer the ability to show a greater depth of field or larger amount of focus before and after the subject.



Image: Photodisc/Thinkstock

Depth of Field Examples

The images below were taken with a small f-stop (f4), a medium f-stop (f8) and a large f-stop (f22). The f22 image has a greater depth of field, which means there is more sharpness throughout the image. The image shot at f4 shows a smaller area of sharpness.



Aperture = f4

Aperture = f8

Aperture = f22

The Relationship Between Aperture and Shutter

You now understand how the aperture controls the amount of light that will strike your film or sensor. In this section you will explore the ways in which the shutter speed also affects the overall exposure. You will begin to understand the relationship between the aperture and the shutter.

The shutter opens and closes to control how long light will be able to pass through the aperture. For every aperture choice you make there will need to be a corresponding shutter speed. These combinations are always changing due to a variety of reasons. Some of those reasons are:

- the amount of light available
- the type, size and motion of your subject
- the equipment you are using

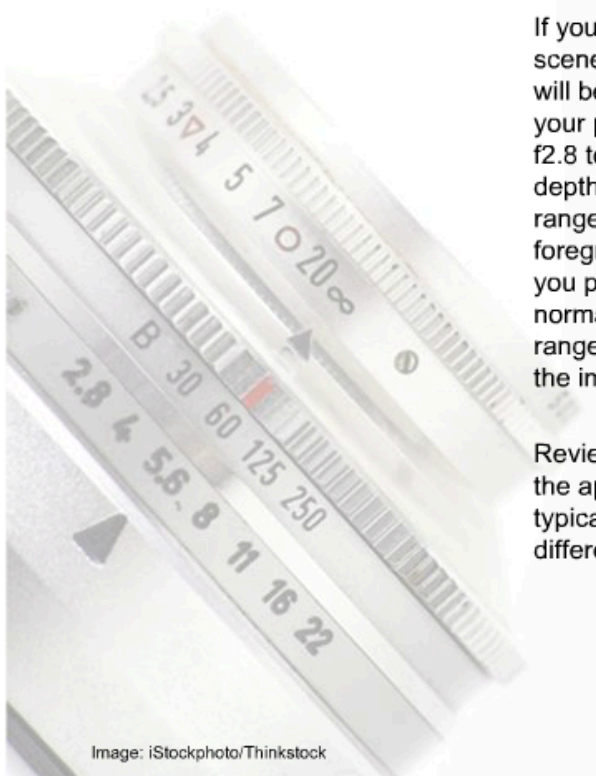
You might find that you took a photograph at noon one day using f4 @ 1/125th sec. The next day, at a later time in the day, you might need to use a combined setting of f4 @ 1/30th sec for the exact same subject in the exact same location in order to achieve the same exposure. The reason the shutter needs to stay open longer is that there is less light later in the day.

What to set first?

While you are taking photos, it is very important to remember that you will have to change the shutter speed when you select a new aperture. These components work together to determine the exposure in the image. If you increase the f-stop, you must also adjust the shutter speed in order to capture the same amount of light. For example, if you start with a combination of f8 and 1/500th sec and you increase the f-stop to f11, you may need to adjust the shutter speed to 1/250th sec. If the aperture is smaller, the shutter needs to remain open longer in order to capture the same amount of light.

Knowing that both aperture and shutter speed affect the brightness of the image, how do you decide whether to set the aperture first and then find the corresponding shutter speed, or to set the shutter speed first and then find the corresponding aperture? The answer depends on your subject matter and the circumstances of the shot. If you are capturing a stationary object and you want to control the depth of field to ensure that the subject really stands out in the shot, you would pick an aperture that will give you a shallow depth of field and then find the shutter speed that will ensure a good exposure. If your subject is moving, you will need to choose a fast shutter speed to freeze that motion and then find the aperture that will ensure a good exposure. You will learn more about controlling shutter speed in Project 2.

Common Aperture Settings



If you are photographing stationary objects or scenery, you must consider which f-stop (aperture) will best emphasize your subject as you compose your photograph. Aperture settings in the range of f2.8 to f5.6 will generally result in a shallow (small) depth of field. You would choose something in this range if you want the subject in focus and the foreground and background to be out of focus. If you prefer a medium depth of field, you would normally choose an aperture in the f5.6 to f11 range. To obtain maximum sharpness throughout the image, choose apertures of f11 and higher.

Review the images on the following slides and note the aperture used for each subject. These are typical results to be expected when selecting different f-stops.

Image: iStockphoto/Thinkstock

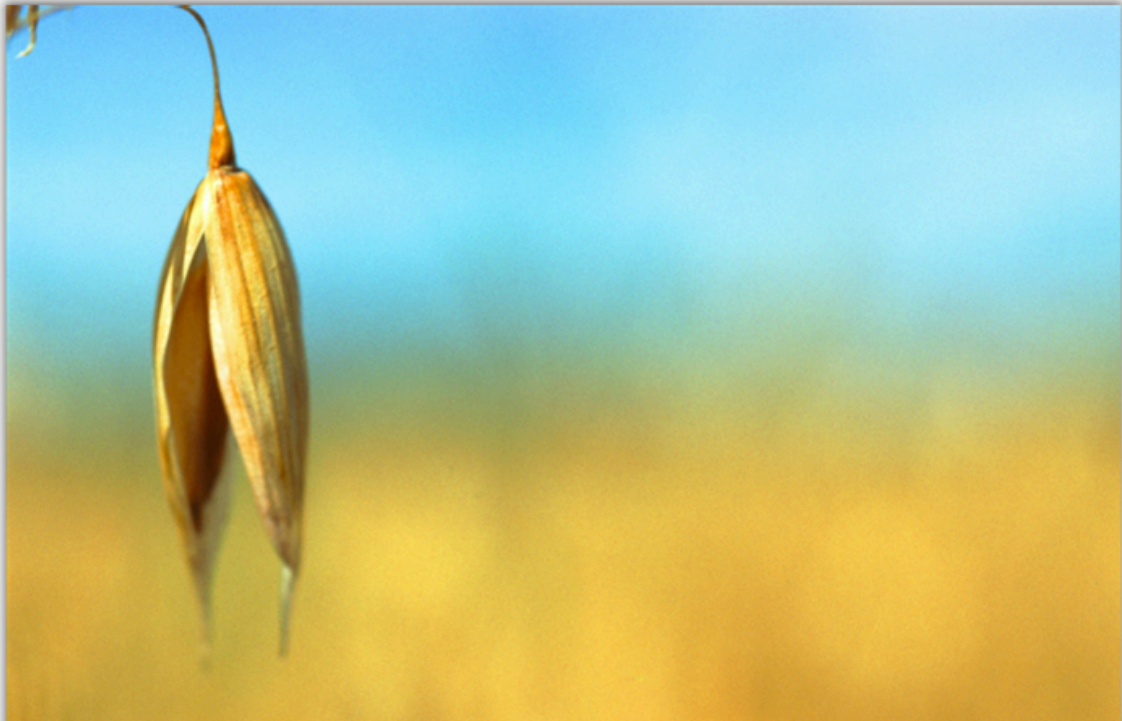
Photographing using a small f-stop (f2.8/f4/f5.6)



f2.8 @ 1/500th sec
Image: Stockbyte/Getty Images

Photographing using a small f-stop (f2.8/f4/f5.6)

Next Slide



f5.6 @ 1/60th sec
Image: John Foxx/Stockbyte/Getty Images

Photographing using a medium f-stop (f5.6/f8/f11)



f5.6 @ 1/1000th sec

Image: Tom Brakefield/Stockbyte/Getty Images

Photographing using a medium f-stop (f5.6/f8/f11)



f8 @ 1/250th sec

Image: Tom Brakefield/Stockbyte/Getty Images

Photographing using a large f-stop (f11/f16/f22)



f16 @ 1/2000th sec

Image: David de Lossy/Photodisc/Getty Images

Photographing using a large f-stop (f11/f16/f22)

Next Slide



f22 @ 1/250th sec

Image: Stockbyte/Getty Images

The images you just looked at represent the “normal” results of aperture selection. These would be f4 for a shallow depth of field, f8 for medium, and f16 for large.

The following set of photographs will show you that different f-stops do not always result in increased or decreased depth of field. The sharpness throughout each of the next three images is approximately the same.

f16 @ 1/125th sec

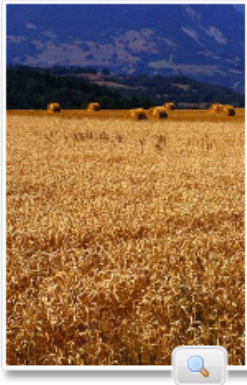


Image: John Foxx/Stockbyte/Getty Images

f4 @ 1/1000th sec



Image: Stockbyte/Getty Images

f5.6 @ 1/15th sec



Image: Andy Sotiriou/Photodisc/Getty Images

Next, we will look at 3 images of the same subject taken with different aperture/shutter combinations. Again, the overall sharpness in each image is the same.

f4 @ 1/2000th sec



f11 @ 1/250th sec



f32 @ 1/30th sec



Images: John Foxx/Stockbyte/Getty Images

The images you just looked at demonstrate that the distance from the subject also contributes to the apparent sharpness of the image. If the subject is very far away then you will generally be able to select any aperture or f-stop setting and see no apparent change in the sharpness of the image.

With practice you will learn how to select the best aperture for your given scene. You will soon start to understand the relationship between the f-stop, the subject, and the distance from the subject as you try to achieve the desired of depth of field.

Choosing an Aperture

Introduction

When photographing a portrait or single subject, most photographers would choose an aperture in the $f4$ to $f5.6$ range (larger apertures). This would typically create a shallow depth of field which in turn should help to emphasize the subject by making the foreground and the background less sharp (more blurry).

If you are photographing a scenic, then usually the image will be taken at the higher f-stops (smaller apertures) of $f16$ through $f22$ so that all of the subject matter appears sharp (in focus).

Consider the following:

1. Portraits - $f4/f5.6$ for shallow depth of field
Sports - $f4/f5.6$ for shallow depth of field
Individual subjects - $f4/f5.6$ for shallow depth of field
2. Scenic - $f16/f22$ for a large depth of field
Larger group shots - $f11/f16$ for a large depth of field

1



Image: Tom Brakefield/Stockbyte/Getty Images

1

Shallow Depth of Field

Large Depth of Field

2

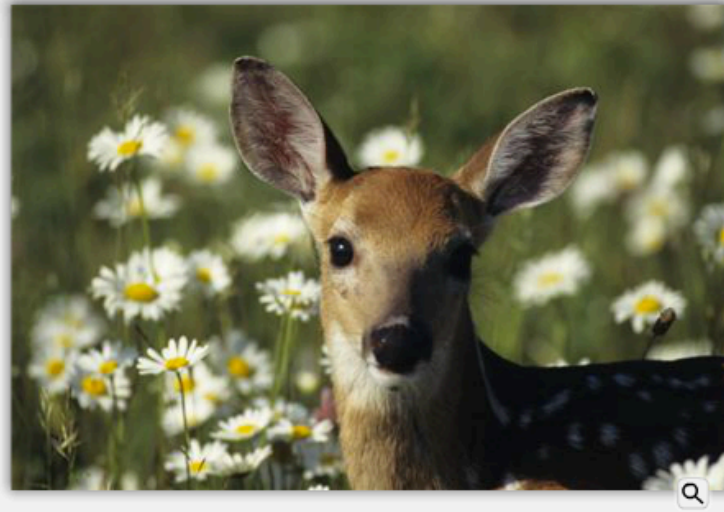


Image: Tom Brakefield/Stockbyte/Getty Images

2



6



Image: John Fox/Stockbyte/Getty Images

6



1

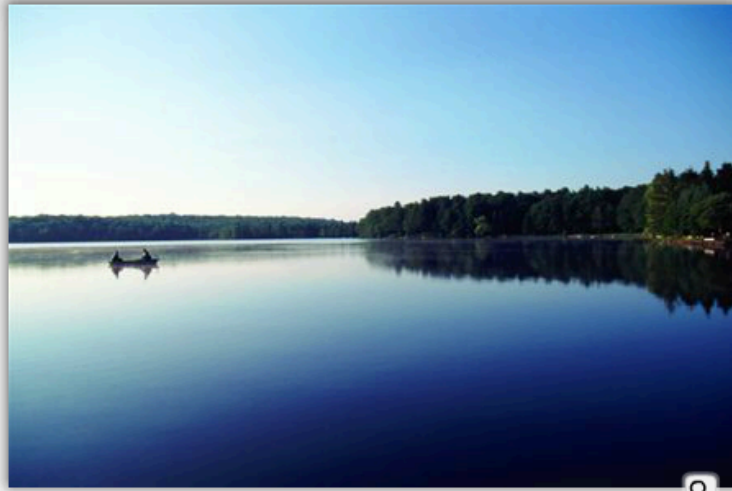


Image: John Foxx/Stockbyte/Getty Images

1



Shallow Depth of Field

Large Depth of Field

2



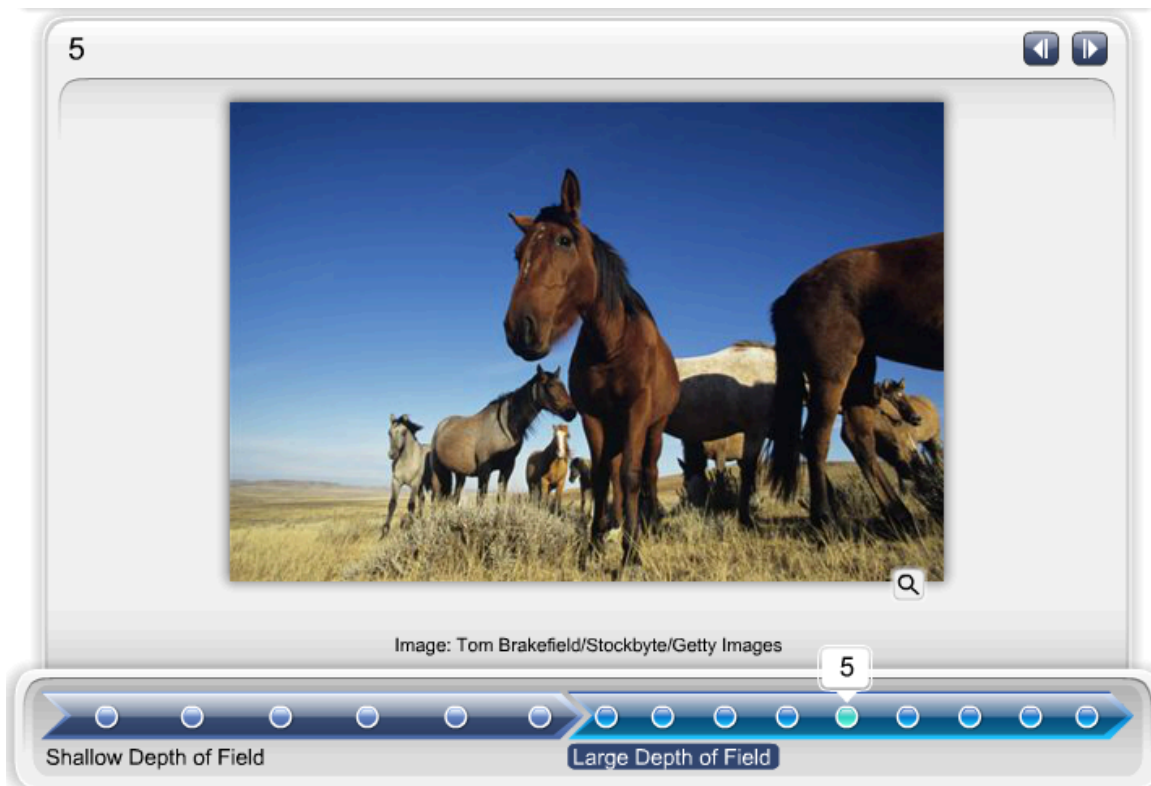
Image: Digital Vision/Getty Images

2



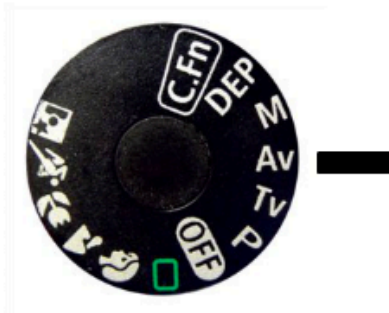
Shallow Depth of Field

Large Depth of Field



Aperture Priority Mode

To practise what you have learned so far, place your camera in the aperture priority mode by selecting A or Av on the mode dial. This function will allow you to experiment with f-stop selections and without the worry of exposure problems (for the most part – more on that later!). But for now this is a great way for you to practise your depth of field control when photographing subjects.



APERTURE PRIORITY (A/AV): the aperture priority setting allows you to select the appropriate aperture and the camera will automatically choose a corresponding shutter speed to give you a correct exposure for the given situation.

Set your camera to this setting and then practise photographing a variety of subjects at a variety of apertures (f-stop settings).

The Shutter

The shutter, like the aperture, is a part of the camera that controls the amount of light passing through the lens. The shutter controls how long light will be allowed to pass through the aperture.

As the shutter speed varies, the amount of light allowed to pass through the aperture to the film or sensor changes. The shutter settings of your camera affect two things: motion and exposure.

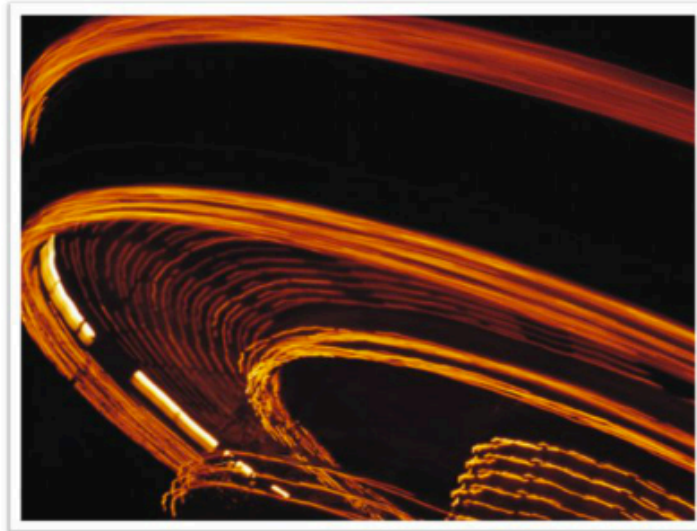


Image: John Foxx/Stockbyte/Getty Images

How the shutter controls light

Introduction

The shutter in your camera is a physical part that acts like a curtain - opening and closing to control when and for how long light is allowed to pass through the lens. This, combined with the size of the aperture opening in your lens, determines the exposure of your image.

Your camera will typically have shutter settings similar to these:

30" 15" 8" 4" 2" 1" 1/2 1/4 1/8 1/15 1/30 1/60 1/125 1/250 1/500
1/1000 1/2000 1/4000 1/8000

When you see a number followed by " (a double quotation mark), this indicates seconds (30" = 30 seconds, 4" = 4 seconds and so on). The numbers listed above are standard shutter speeds found on most cameras. Your camera may not go all the way down to 30 seconds or all the way up to 1/8000 of a second, but you will most likely have a minimum selection of 1 sec to 1/1000 sec.

1 Shutter speed and light

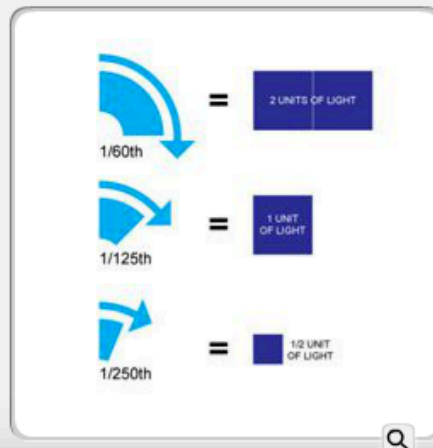
Shutter speeds of $1/500$ th or $1/2000$ th sec would be considered as faster shutter speeds. Shutter speeds of $1/4$ or $1/30$ th sec would be considered to be slower shutter speeds.

Slower shutter speeds (i.e. 1 sec or $1/8$ th sec or $1/30$ th sec) mean that the shutter will stay open longer which allows more light to pass through the aperture to strike the film or sensor. Faster shutter speeds (i.e. $1/250$ th sec or $1/1000$ th sec or $1/4000$ th sec) mean that the shutter will stay open for a shorter time which allows less light to pass through the aperture to strike the film or sensor.

These shutter speeds can be changed, and moving from one full shutter speed number to another allows either double or half the amount of light through to the film or sensor, depending on which new shutter speed you select.

2 Example

Having an original shutter speed of $1/125$ th sec and then moving to $1/250$ th sec allows half the amount of light to pass through the aperture.



Setting Shutter Speed

Review the following series of images. Each was taken with a 1 stop increase in exposure value. An increase in exposure means a brighter image. The only change in the image settings was the new shutter speed setting. Nothing else was changed. The first image was taken at 1/250th sec @ f8. The next image was taken at 1/125th sec @ f8 and is twice as bright as the 1/250th sec. image. The final image of the series was taken at 1/60th sec @ f8 and is twice as bright as the 1/125th sec image. You could also think of it the opposite way. The 1/125th exposure is twice as dark as the 1/60th exposure and the 1/250th exposure is twice as dark as the 1/125th exposure.

1/250th sec @ f8

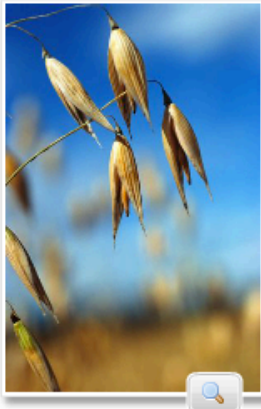


Image: John Foxx/Stockbyte/Getty Images

1/125th sec @ f8

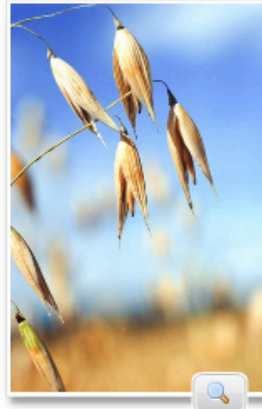


Image: John Foxx/Stockbyte/Getty Images

1/60th sec @ f8

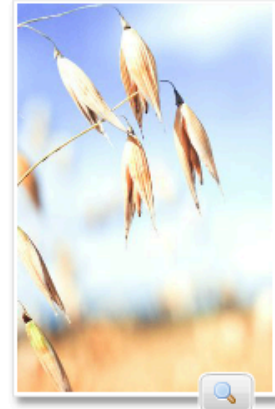
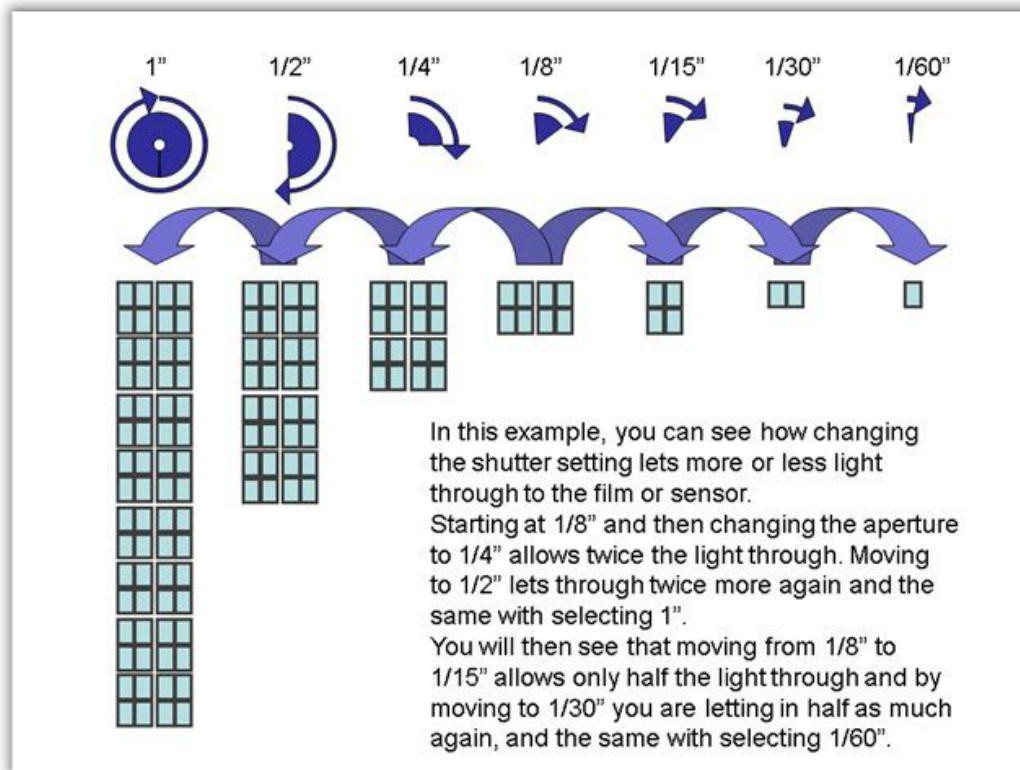
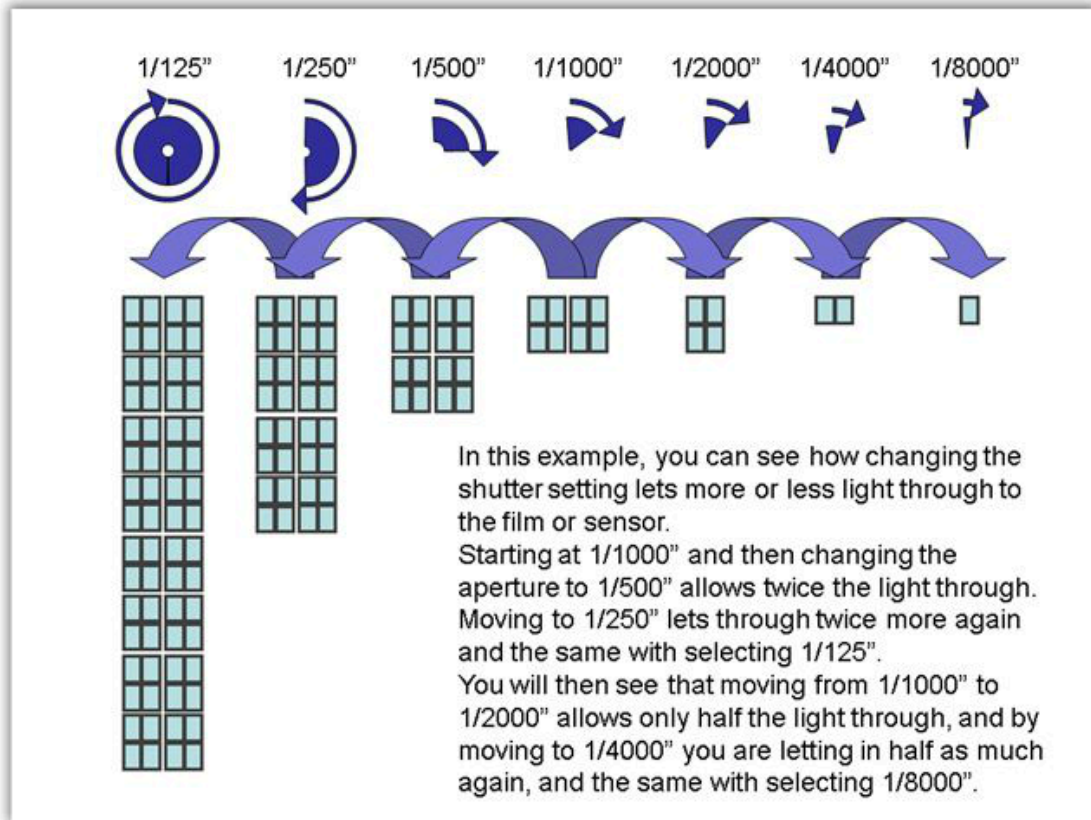


Image: John Foxx/Stockbyte/Getty Images

Examples

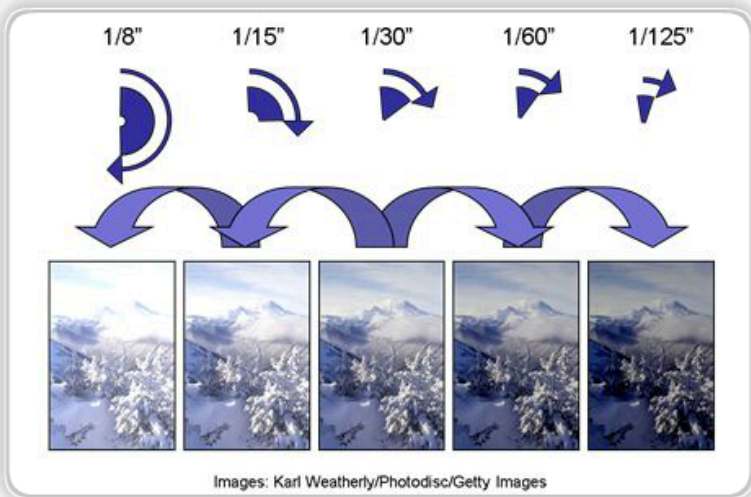




Review: How the Shutter Controls Light

Introduction

Now that you are starting to understand how the shutter controls the light striking the film or sensor, you can start to predict how the image will be affected when you adjust the shutter speed.



How the Shutter Controls Motion

Motion is the suggestion of movement in a photograph either by the appearance of the subject as stationary in the middle of a complex action or the appearance of the subject as blurry with the background being in focus.

Adjusting the shutter settings will affect the appearance of motion within your image.

Photographers use shutter speed to control the amount of movement captured in an image. The common shutter speed numbers that photographers use are:

**30" 15" 8" 4" 2" 1" 1/2 1/4 1/8 1/15 1/30 1/60 1/125 1/250 1/500
1/1000 1/2000 1/4000 1/8000**

Remember, your camera may not go all the way down to 30 seconds or all the way up to 1/8000 of the second, but you will most likely have a minimum selection of 1 sec to 1/1000 sec.

The faster shutter speeds (i.e. 1/500th or 1/1000th) offer the photographer the ability to stop more subject motion/movement. The longer shutter speeds (i.e. 1/30th or 1/2) offer the photographer the ability to show more subject motion/movement.

Stopping Motion

Introduction

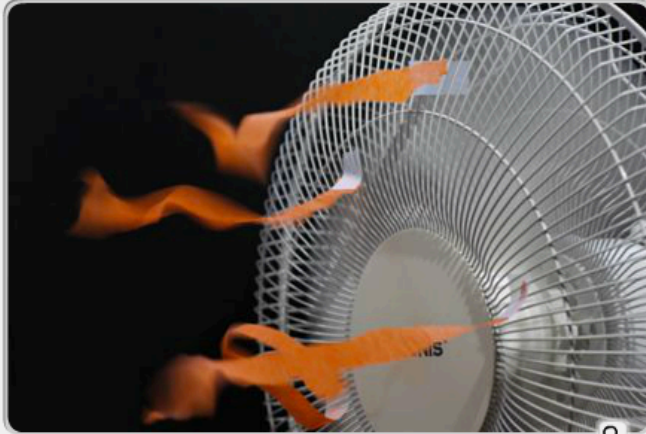
The following images of the fan were taken with a fast shutter speed (1/1000th sec), a medium shutter speed (1/250th sec) and a slow shutter speed (1/60th sec). The 1/1000th sec image has stopped more motion, which means there is typically more sharpness in the recorded image. The image shot at 1/60th sec shows more motion and therefore less sharpness of the subject.

The slower the shutter speed, the less ability you will have to freeze motion in your image. The faster the shutter speed, the more likely you will be able to freeze motion in your image.

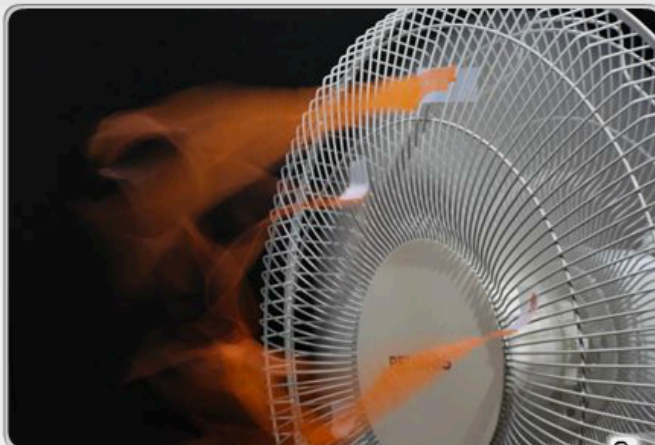
1/1000th sec



1/250th sec



1/60th sec



The Relationship Between Aperture and Shutter

You now understand the role of the shutter in determining how much light is allowed to pass through the lens to the film or sensor. In Project 1 you learned how the aperture setting affects the overall exposure. While you are taking photos, it is very important to remember that you will have to change the aperture setting when you select a new shutter speed. These combinations are always changing due to a variety of reasons.

Some of those reasons are:

- the amount of light available
- the type, size and motion of your subject
- the equipment you are using

You might find that you took a photograph at noon on a nice sunny day using 1/500th sec @ f11 and then the next day, later in the afternoon, you might photograph the exact same subject in the exact same location and end up with a new combined setting of 1/500th sec @ f5.6. The reason for the different aperture setting is that the amount of light was lower on the second day because it was later in the day.

Working Together

While you are taking photographs, it is very important that you are aware of the changes to the aperture (f-stop) setting that are required when you select a new shutter speed. These two individual components are always working together to create a unified exposure. You will soon understand that you cannot change the shutter speed without also choosing the corresponding aperture setting to ensure the same exposure level.

What you should start to observe is that the combinations of shutter and aperture are always changing and that the faster the shutter speed (going up from 1/250th to 1/500th to 1/1000th), the larger the aperture (smaller f-stop) you will need (an example being f4 to f2.8. to f2.0).



Image: Hemera/Thinkstock

Shutter Speed as a Priority

When considering a subject of a photograph, you, the photographer, may first think of what shutter speed will be needed to achieve the desired result. If you are taking pictures at a sporting event, then usually the first priority is to stop as much movement or motion as possible. Therefore you will automatically try to select the faster (higher) shutter speeds (1/500th, 1/1000th, 1/2000th). There will be times during sporting events when photographing at slower shutter speeds will allow you to capture more subject movement, which in turn might emphasize that movement.



Image: Medioimages/Photodisc/Getty Images

Using shutter speed as your starting point is not limited to sporting events. You will be able to use different shutter speed selections to control the freezing of or capture of movement on a variety of subjects.

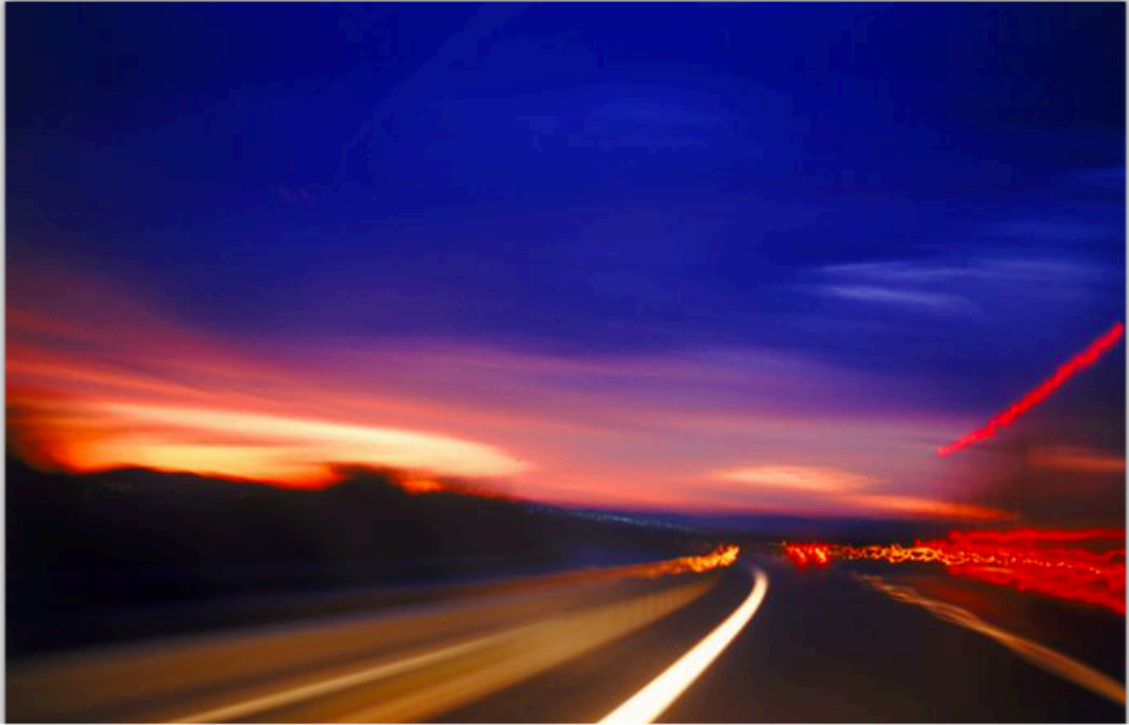
Low Light Situations

There is another photographic situation where you, as the photographer, would consider the shutter speed first instead of the f-stop: in low light situations. When the light is low (at least in photographic terms) there is a very good likelihood that you will need to photograph a subject at longer shutter speeds to allow enough light through to the film or sensor to produce a proper exposure. The exact length of the shutter speed will be dependant on the subject matter.

If you are photographing the local basketball team in a gymnasium, you might find that the amount of light available is very low (photographically speaking) and that the fastest shutter speeds available to you might only be 1/250th or 1/500th sec (which from experience might not be fast enough to stop enough movement on the court).

If you are photographing a sunset scene 10 minutes after the sun has set, you might need shutter speeds of 15", 30" or more (remember that " means seconds).

The shutter speed choices available to the photographer will usually become the photographer's first technical priority when shooting fast moving subjects and/or in low light situations.



2" @ f5.6

Image: John Foxx/Stockbyte/Getty Images



15" @ f4

Image: Kim Steele/Photodisc/Getty Images

Common Shutter Speeds



Image: iStockphoto/Thinkstock

When setting up a shot, if the amount of movement captured in the image is an important factor, you will think about what shutter speed will give you the desired result. Typically you will expect to obtain a sharper image with little or no subject movement when shooting using a 1/500th, 1/1000th or 1/2000th sec setting. Expect to have some motion or movement shooting at shutter speeds of 1/60th, 1/125th or 1/250th sec. You would consider using 1/8th, 1/15th, or 1/30th sec

or slower to allow for a lot of movement or subject blur to be captured to your film or sensor.

Review the images on the next slide and note the shutter speed used for each subject. These are typical results to be expected when selecting these shutter speeds for these types of subjects.

Common Shutter Speeds Examples



1/2000th @ f5.6

Image: Digital Vision/Getty Images



1/1000th @ f5.6

Image: Tom Brakefield/Stockbyte/Getty Images



1/30th @ f8

Image: George Doyle/Stockbyte/Getty Images

Introduction

To practise what you have learned, place your camera in the shutter priority mode by selecting **S** or **Tv** on the mode dial. This function will allow you to experiment with shutter speed selections and motion without the worry of exposure problems (more on correct exposure to follow). For now, this is a great way for you to practise your motion/movement control when photographing subjects.

Shutter Priority (S/TV)



The shutter priority setting allows you to select the appropriate shutter and the camera will automatically choose a corresponding aperture to give you a correct exposure for the given situation.

Please keep in mind that the ability to show or to stop motion is dependent on the shutter speed as well as the motion of the subject as well as your film/sensor ISO choice (more on ISO to follow in Project 3).

Faster Shutter Speeds

The faster shutter speeds are a good choice when trying to stop motion.

1/2000th @ f5.6

Image: Ryan McVay/Photodisc/Getty Images



Slower Shutter Speeds

The slower shutter speeds are a good choice when trying to convey or show motion.

1/8th @ f2.8

Image: Gary Faber/Photodisc/Getty Images



The Role of ISO

ISO stands for "international standards organization". The ISO setting indicates the film or digital sensor's sensitivity to light. Smaller ISO settings (example 50 ISO, 100 ISO, 200 ISO), require a greater amount of light to strike the film/sensor for correct exposure. Higher ISO settings (example 400 ISO, 1000 ISO, 1600 ISO) require less light to strike the film/sensor to obtain a correct exposure.



Image: Flickr/Getty Images

Grain and Noise

Since higher ISO film/sensor settings (400, 1000 or 1600 ISO) require less light to obtain the same exposure, why wouldn't the photographer always use the higher ISO numbers? The answer lies in the makeup of the film/sensor.

In order to make film more sensitive to light, the light sensitive granules on the film must be larger. These larger granules can be visible in your photograph and are called grain.

In order to make a digital sensor more sensitive to light, the signal received by the sensor needs to be magnified. When the magnification becomes visible in your photograph, this is called noise.

Grain and noise reduce the amount of detail and contrast visible in the image. What this means to the photographer is that while you have the ability to shoot in lower light with high ISO settings, the detail of the subject may unfortunately not be as refined due to the grain or noise structure of the recording medium. If the photographer switches to the lower ISO settings to allow for better detail to be recorded, more light will be required to obtain the correct exposure.

ISO Settings

There is always a tradeoff between an ISO that will minimize the grain or noise visible, allowing for better detail in the image, and optimizing the amount of light available for correct exposure. The choice of ISO setting that allows you both exposure control and good image detail (less grain or noise) is what you strive for when shooting in low light conditions. 100 ISO is the “normal” film of choice. 100 ISO film speed offers very good grain/noise structure and moderate light capturing capabilities for general shooting situations.

The common ISO settings that photographers use are:

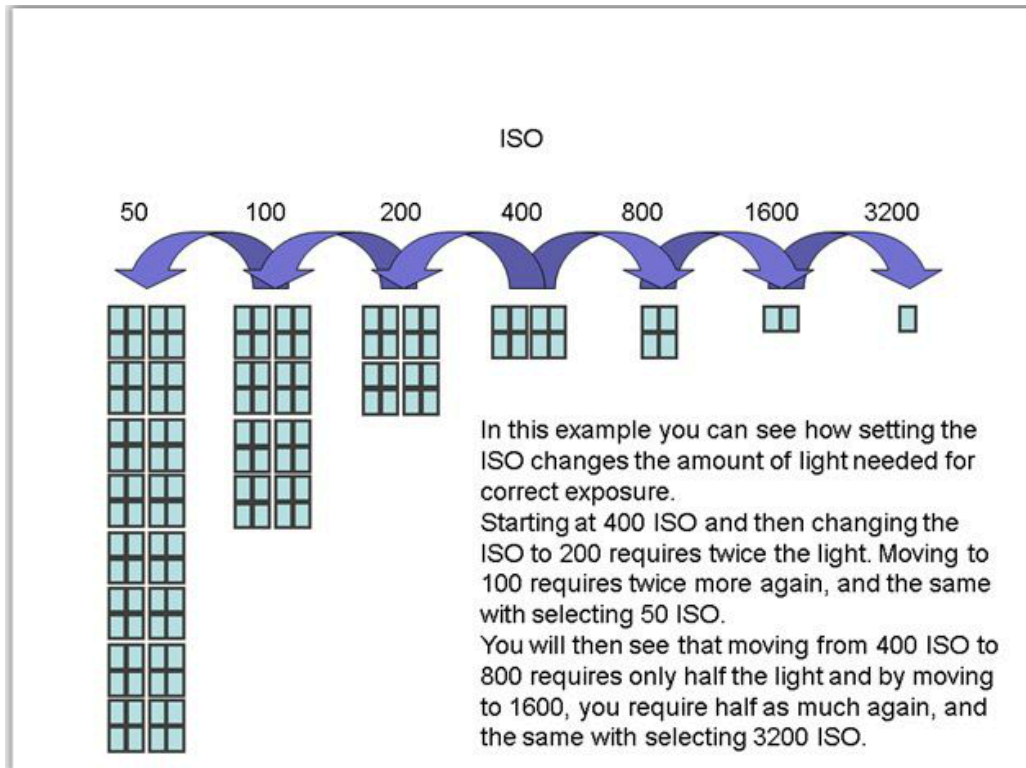
50 100 200 400 800 1600 3200

The ISO numbers listed above are your standard traditional film speeds. Anyone photographing with film can purchase these ISO film speeds. If you are photographing digitally, depending on the camera, you might have access to some of, all of, or more than the ISOs listed above.

How the ISO Controls Light

You have learned in previous lessons that the shutter and aperture control the amount of light striking the film/sensor by allowing either 2 times (double) or 1/2 (half) the amount depending on which shutter or aperture setting you choose. Your traditional ISO settings work in a similar way.

A sensor or film ISO of 200 requires only half the amount of light that would be required if you were using 100 ISO to achieve the same exposure. Changing from 100 ISO to 400 ISO means that you will now be able to take exactly the same image in one quarter the amount of light. Conversely, shooting 100 ISO and then changing to 50 ISO means that now two times the amount of light is necessary for the same exposure.



Aperture, Shutter & ISO

You are now starting to understand the relationship between the aperture, the shutter and the choice of ISO. A one step change in any one of these individual components will either double or half the light requirements to achieve an acceptable exposure.

Each of the three controls a different compositional component:

- the aperture = depth of field
- the shutter = motion
- ISO = detail

All three control the outcome of the exposure.



Image: Hemera/Thinkstock

Compensating for Changes in ISO

If you change the ISO from 100 to 400 without changing either the aperture or the shutter speed, your new exposure is going to be only 1/4 of the previous setting.

To compensate for the change in ISO and maintain your previous exposure you could:

- change your aperture 2 full f-stops higher (smaller aperture ex. f4 to f5.6 to f8)
- change the shutter speed 2 full stops faster (ex. 1/125th to 1/250th to 1/500th)
- change the shutter and the aperture 1 full stop each for the combined total of 2 full stops (ex. f4 to f5.6 and 1/125th to 1/250th)

Any of these three scenarios will create the desired result.

ISO Film Grain or Digital Noise

Selecting an ISO

In addition to affecting the exposure, selecting different ISOs also causes changes in the detail of the image.

As already discussed, a lower ISO setting will result in a greater amount of detail and contrast recorded to the film or sensor. A higher ISO setting will result in a lower amount of detail and contrast recorded to the film or sensor.

The following image of a leaf was taken with different ISO settings.

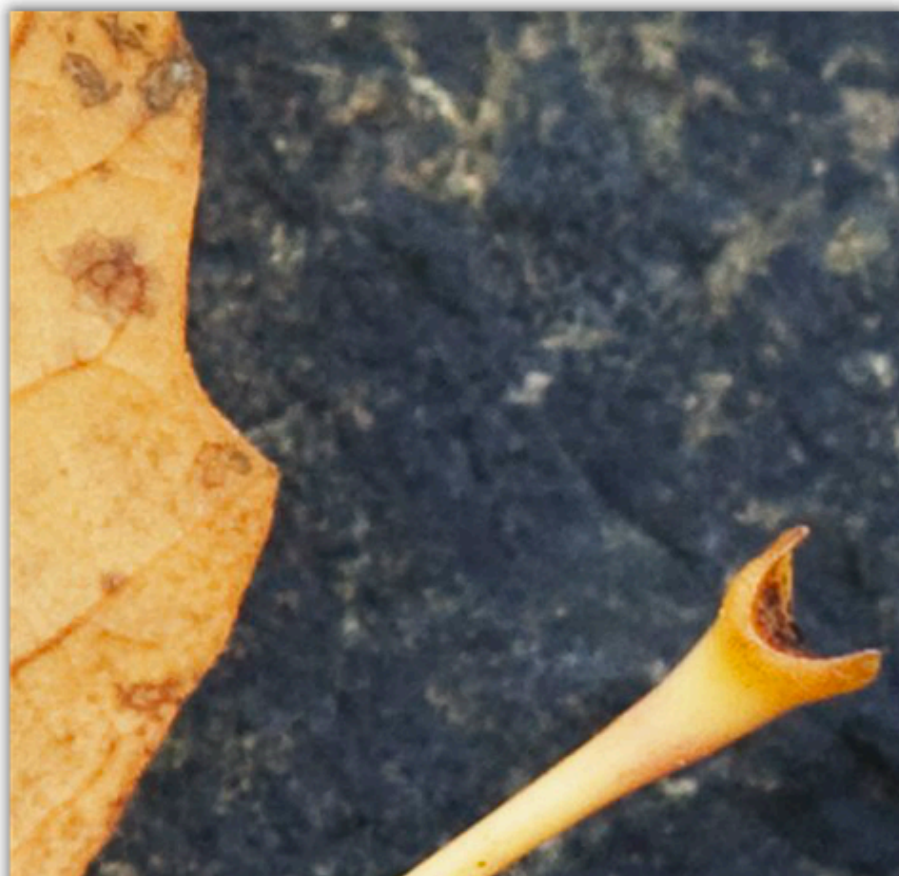
Each image taken at a different ISO has been cropped and enlarged to show you the difference in detail and contrast with each new ISO setting.

Whenever a photographer is considering a subject to photograph, he or she always needs to consider the correct choice of ISO that will allow the proper amount of detail, contrast and exposure for that subject. Since each subject may be different, each new photo shoot needs to be evaluated independently for the correct choice of ISO.

Review the images and note the ISO used on each shot. These are typical results to be expected when selecting these ISO settings.



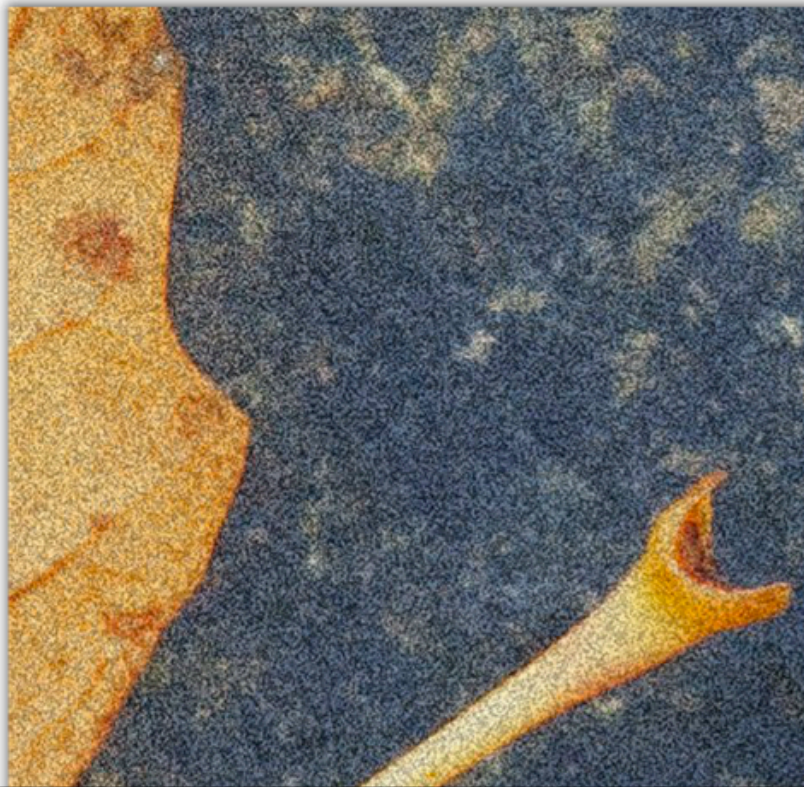
100 ISO



Cropped and enlarged 100 ISO image



Cropped and enlarged 400 ISO image

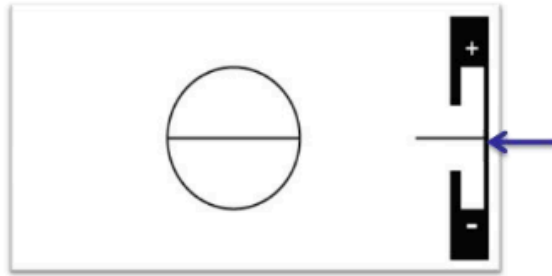


Cropped and enlarged 1600 ISO image

Understanding the Camera's Light Meter

On the outside edge, left/right or bottom of the viewfinder, you will see a meter indicator. By ensuring that the needle or indicator is halfway between the + and – signs you will achieve correct exposure of your images.

When taking an image with a semi-automatic exposure mode (aperture priority (A/Av) or shutter priority (S/Tv)), the camera will make the necessary adjustments to try to ensure the correct exposure.



Photographing Using Full Manual Settings



Manual Exposure:

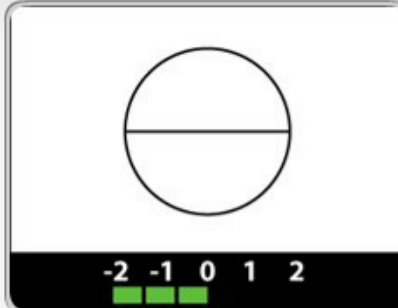
Depending on the make or model of your camera you may or may not have manual exposure control.

MANUAL (M): the manual setting allows you to select the shutter and the aperture for compositional/exposure control appropriate to the situation. When using manual exposure controls, no automatic functions are accessible. You are responsible for all of the decisions necessary to obtain a proper image. You must decide on a shutter speed and an f-stop selection.

You must first make the decision as to whether the shutter or the aperture is to be your main compositional tool. Remember, the shutter is your first choice if you wish to record or freeze motion and the aperture is your first choice if depth of field or amount of sharpness is the priority.

If you decide that you want to set the shutter to 1/60th sec, for example, then you will have to adjust the aperture setting until the needle or indicator is halfway between the + and – signs. This will ensure correct exposure.

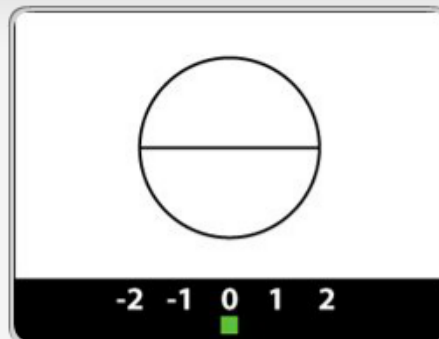
In-camera Light Meter Indicators



This digital indicator, instead of being an analog needle moving up and down, is a digital light moving left or right and in this case is indicating that the exposure is obviously pointing to the '-'. The meter is indicating that the image will be darker than "normal" and therefore, unless it is your intent to have the image recorded dark, you need to adjust the shutter/aperture combination until the single light bar is in the centre position.

An advantage to the digital readout is that you can see whether you are over or under-exposing in half-stop or full-stop increments. On most of the newer cameras you can go into the menu and change the meter readout indicator from 1/2 stop increments to 1/3rd stop increments. This means you have a more accurate meter evaluation and a better indication of how much adjustment is needed to achieve "normal" exposure.

In this case the single light bar is under the zero position, neither illuminating a succession of lights towards the '-' nor '+' end of the scale. The meter is indicating that the exposure is correct.



Example 1: Correctly Exposed Image

Navigation ▾



In this image there is good detail and colour in the leaves, tree trunks and sky. There are nice shadows and there is good brightness range and detail in the highlights.

A strong visual range of colour, brightness and detail makes this image interesting to look at.

Image: Digital Vision/Getty Images

Example 1: Underexposed Image

Navigation ▾



In this image there is possibly better colour in the sky and a little more detail in the tree trunks, but the shadow areas are too dark.

The image lacks enough bright detail to make it interesting to look at.

Image: Digital Vision/Getty Images

Example 1: Overexposed Image

Navigation ▾



In this image there is possibly a little better detail in the shadow parts of the leaves, but at the expense of the highlights being “blown out” or overexposed.

There is not enough detail or colour saturation to make this image interesting to look at.

Image: Digital Vision/Getty Images

The image of the pheasant on the left is a better exposure as it shows more detail and colour. The image on the right was overexposed. The right image does show more detail in the neck area but the overall image is too washed out to be of any value. The better shot is the left hand image.

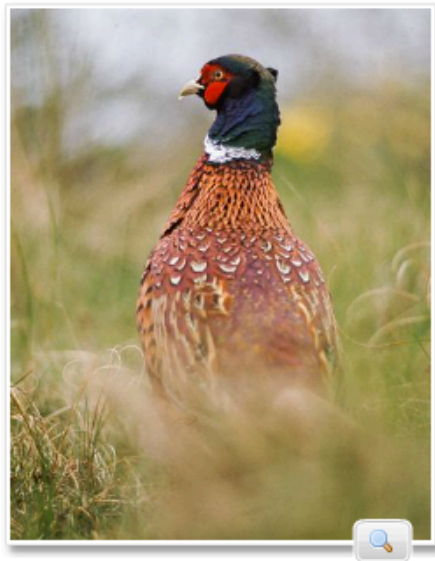
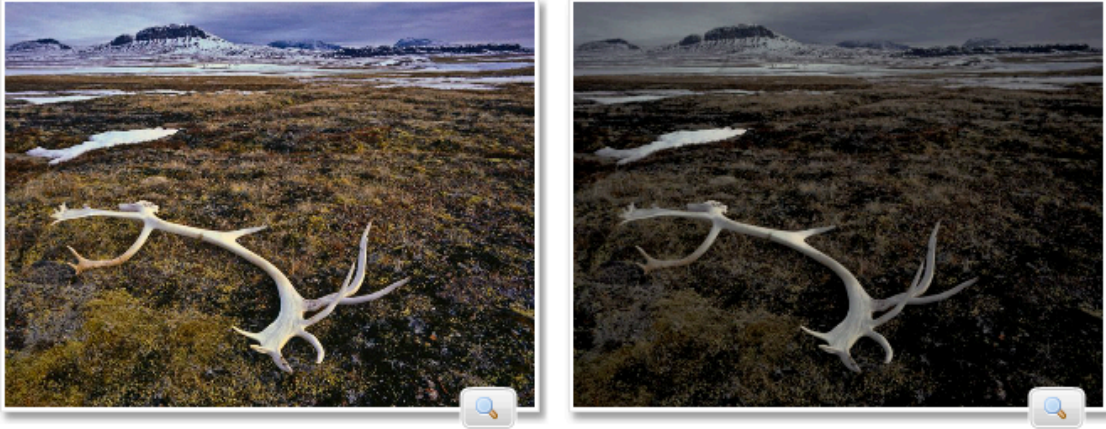


Image: David de Lossy/Photodisc/Getty Images



The image of the antlers on the left is a better exposure as it shows more overall detail. The image on the right was underexposed. The right image might show a little more detail in the antlers but the overall image is too dark and lacks sufficient detail in the surrounding grass areas to be of any value. The better shot is the left hand image.

Image: DC Productions/Photodisc/Getty Images

Now that you are aware of how the camera light meter indicates exposure settings, you should be ready to try taking photographs in the full manual exposure mode.

You now understand the relationship between the aperture (f-stop), the shutter and the ISO with respect to exposure. You are aware of how the f-stop (aperture) controls depth of field, how the shutter controls motion and how the ISO affects the detail and contrast in the image. It will be up to you as the photographer to decide on which ISO to select. Once you have made that decision you will then have to decide on which photographic effect is more important: depth of field or motion.

If you decide to photograph a scenic then you will most likely want to start by selecting an f-stop of f11 or f16 (for strong image sharpness). Once you have decided on the appropriate aperture you must then adjust the shutter until the light meter indicates a neutral setting. Once you have achieved this neutral setting you will have succeeded at establishing a "normal" exposure, which in most cases should give you a correct exposure.

In this image an ISO setting of 100 and an aperture setting of f32 was selected. The shutter speed was adjusted until the light meter indicated "normal". In this shot the shutter was 4" (seconds).

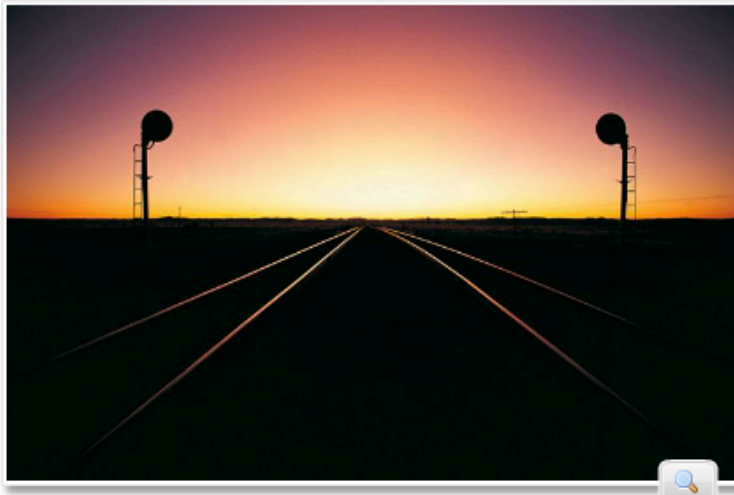
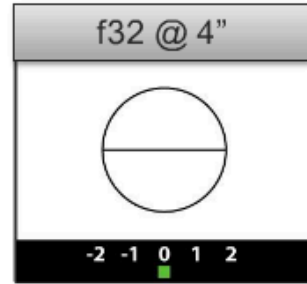


Image: Digital Vision/Getty Images



In this image an ISO setting of 100 and an aperture setting of f22 was selected. The shutter speed was adjusted until the light meter indicated "normal". In this shot the shutter was 1/8th sec.

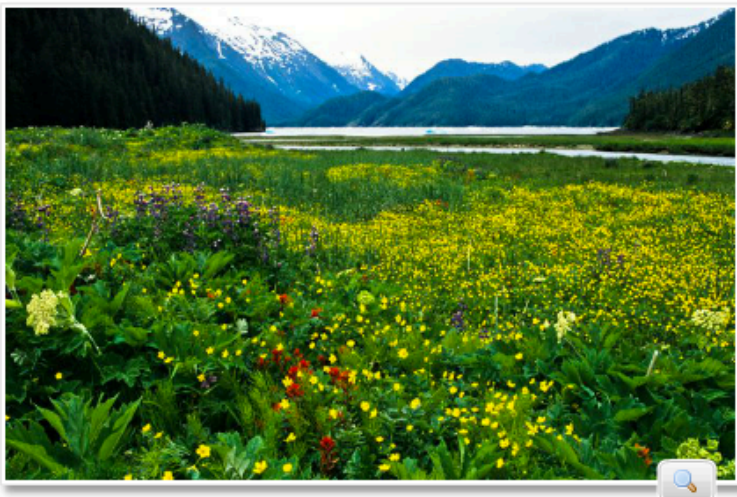
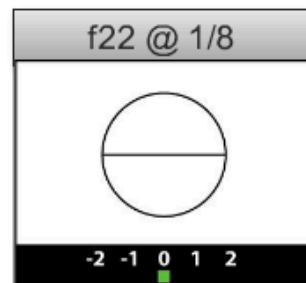


Image: Karl Weatherly/Photodisc/Getty Images



In this image an ISO setting of 200 and an aperture setting of f16 was selected. The shutter speed was adjusted until the light meter indicated "normal". In this shot the shutter was 1/125th sec.

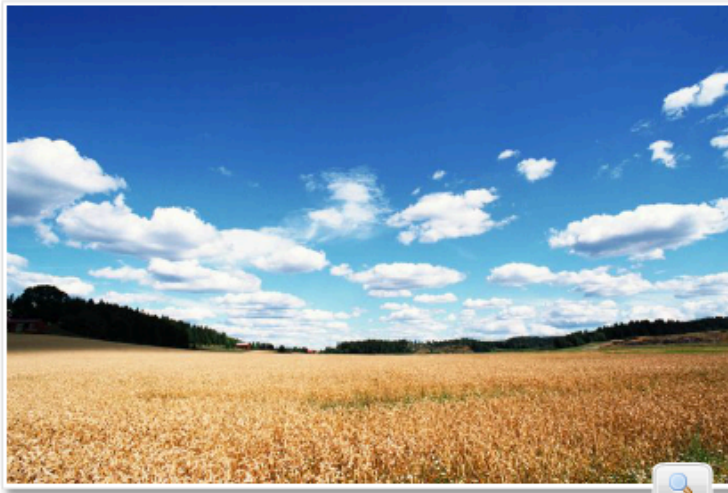
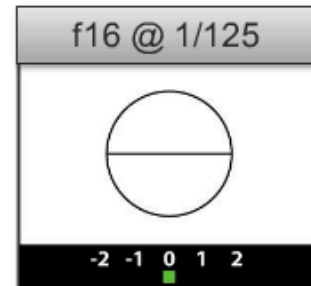


Image: John Foxx/Stockbyte/Getty Images

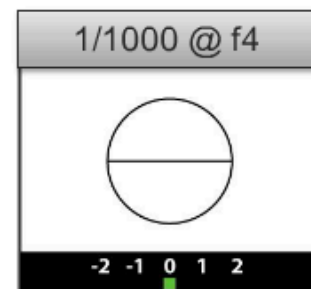


If you decide to photograph a sporting event, you will most likely want to start by selecting a fast shutter speed of 1/500th to 1/2000th sec for strong motion stopping. Once you have decided on the appropriate shutter, you must then adjust the aperture until the light meter indicates a neutral setting. Once you have achieved this neutral setting you will have succeeded at establishing a "normal" exposure, which in most cases should give you a correct exposure.

In this image an ISO setting of 400 and a shutter speed of 1/1000th second was selected. The f-stop was adjusted until the light meter indicated "normal". In this shot the aperture was f4.



Image: Stockbyte/Getty Images



Exposure Compensation

Introduction

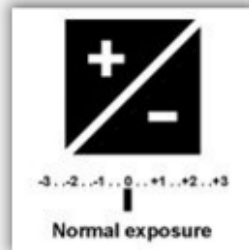
When photographing in a semi-automatic mode (Aperture priority (A/Av) or Shutter priority (S/Tv)) the camera will try to obtain correct exposures for you all the time. However, there will be times when the camera will not record the scene the way you want or the camera will record the exposure incorrectly. If this occurs, most cameras offer an exposure compensation setting. This will allow the photographer to override the meter's suggestion and either increase or decrease the suggested exposure in order to get the desired result. There will be an icon that looks like the image below.

This button allows you to set the camera to increase (overexpose) or decrease (underexpose) the suggested exposure.



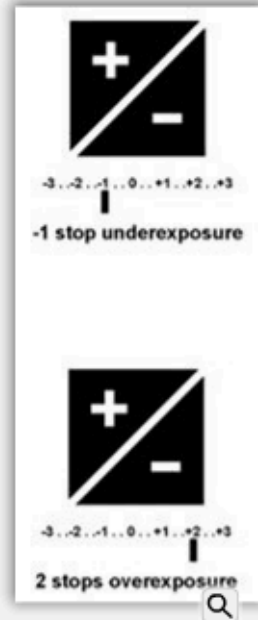
Normal Exposure

The original light meter setting from the camera on aperture or shutter priority will look like this one when you initially click the exposure compensation button. This setting indicates a "normal" exposure which is usually not overly bright or dark.



Underexposure and Overexposure

You can have the image set to underexpose:



Or you can have the image set to overexpose if you wish:

Example 1

The image on the left was shot using the shutter priority mode (S/Tv). This is how the image was recorded when the suggested meter settings were used. As you can see, the overall image is too dark. The photographer then purposely set the exposure compensation to +2 for the second shot.



Portfolio

You will present your images in either digital or print format.

With each image you will discuss:

- which component (aperture, shutter or ISO) was your main tool and why
- the equipment used to create the image
- the challenges or difficulties you encountered, if applicable

You will be participating in critiques and will receive or give feedback on both your own or other photographers' images, either in the classroom or online. Your understanding of both the technical and the aesthetic qualities that make up a strong photograph will have improved as you proceeded through this course. Now that you are a better photographer with a whole new skill set, you are ready to complete the final assignment for this course.



Image: Michael Blann/Digital Vision/Getty Images

Image Critiquing

Please consider the following as you critique your own images or the work of others:

Analyzing and critiquing yours and other photographers' images is a great way to expand your photographic skill and vision. Look at your work and that of others and consider the use of light, focus and depth of field. This will help in your understanding of the ways in which these components can be combined to create strong images. Discussing the positioning of subjects within the frame, the placement of colours or tones and how they affect the mood or spirit of the photograph is an excellent way to enhance your own level of photographic awareness.

Placing your images "out there" for everyone to look at and make comments on is not an easy thing to do. Being part of a group that shares in the joy of photographic excellence and that openly invites participants to join in on thoughtful, informative discussions is an excellent opportunity for you to grow as a photographer.

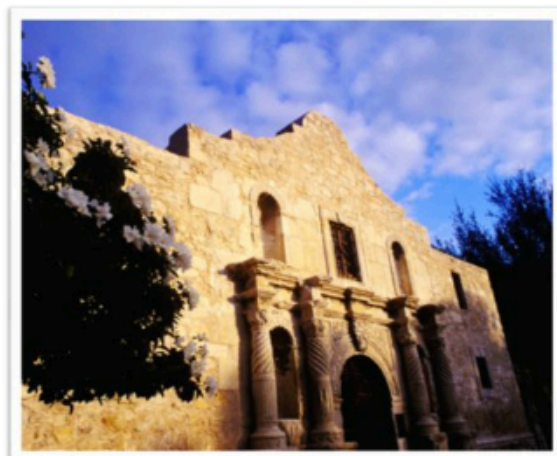


Image: Jack Hollingsworth/Photodisc/Getty Images

What To Look For

You will be able to post your images on web sites like the ones listed on the following slide (Links), as well as print your images for display in the classroom. These are just two ways to make these images available for an open discussion.

Please consider these common points when critiquing images:

- How is the exposure?
- Is the image or subject in focus?
- Is there proper placement of the subject in the frame?
- Are the other elements in the composition a good balance and an effective addition to the subject?
- Is there considerable thought behind the making of this picture or is it simply a "snapshot"?
- What about the use of colour, or its absence if the shot was taken in B&W? Was this the right choice for the image as it was presented?
- Was your eye directed to the proper point in the image or do you find that there does not seem to be any centre or focal point?

These are but a few points to consider as you look at a photograph. Since each new image is different, the same critique will never happen twice and there will always be something new to learn.