Day 2: Take Control of the Exposure Process

Why is exposure so important?

1. To achieve the proper *brightness level* – because your camera won't always get it right.

2. The exposure controls the *mood* of the photo.

   - Create bright scenes for a cheerful or happy mood to your photos.
   - Create a dark scene to add mystery or drama.

3. You can create all sorts of *effects* with exposure, which we will cover later, such as:

   - Capturing peak action with fast shutter speeds.
   - Slowing down the shutter speed to catch trails of light or water
   - Slowing down the shutter to create blur.
   - Closing down the aperture to capture everything front to back.
   - Opening up the aperture to blur the background.
   - Using shutter speed to create streaking lights.
   - Using the aperture to create a starburst effect.

How exposure works

1. Start with the concept of a light proof box with something sensitive to light inside of it.

   - Sensitivity: You change the sensitivity to light of the camera - that your ISO control.
   - Time: You decide how long to allow light into the camera - that is shutter speed.
   - Size: You control the size of the opening that allows light in - that is your aperture.

2. That results in the Exposure Triangle, which just shows you that these controls all work together. A change to any one of them changes everything. If you change one without an offsetting move to another, you are changing the exposure of the picture.

Stops: the "common currency" of exposure

- Long ago, cameras were mechanical devices. A "stop" was a groove that indicated every time you doubled (or halved) the amount of light you were allowing into the camera.
- If you double the time (shutter speed), that is adding a stop of light. If you double the size of the opening (Aperture), that is also adding a stop of light. If you double the sensitivity of the digital sensor (ISO), that is also adding a stop of light.
- Therefore, stops act as a sort of *common currency* to allow you to compare changes in shutter speed (time), aperture (size), and ISO (sensitivity).

Additional Commentary

In today's lesson, we are going to cover exposure. Exposure is super-important, so we'll use additional days in this course to cover specific parts of it. For now, we're going to cover it from a high level, so you understand everything that is going on when we get to the specifics.

First, we'll talk about why it is so important that you learn how to control the exposure process. It is much more than just controlling the light levels and brightness. Next, we'll talk about how it works. You'll learn how to get started manually exposing your pictures. Finally, we'll get into today's assignment.

Before we get started, let me emphasize that I don't expect you to have exposure mastered at the end of today's lesson. I don't even expect you to understand everything about the exposure controls. I just want you to understand the process *in general*. The next three days of the course will go through specifics.

Why Exposure Is So Important

You might wonder why we are going to spend so much time on exposure. How hard could it be to get the correct exposure? And doesn't your camera automatically do it for you anyway?

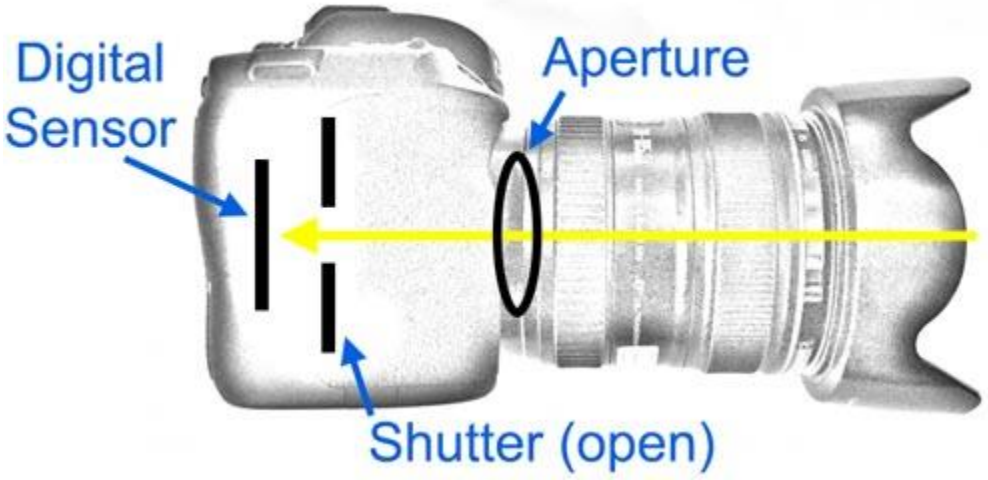
Here's the deal: yes, you can get a correct exposure very easily. In fact, you are probably already capable of getting correctly exposed pictures. Your camera has a variety of automatic modes that will essentially do it for you.

But simply getting a *correct* exposure is not what high-quality photography is all about. You need an *appropriate* exposure. What do I mean by that? As you'll see throughout this course, the three exposure controls we are going to work with control a lot more than simply achieving the correct brightness value for your picture. They also control things like the depth of field for your picture. They control the amount of digital noise. They control how crisp or sharp your picture is. They let you achieve certain effects in your photos like light trails and motion blur. You'll use these techniques all the time. Because of all that, we need to give you a good foundation for this topic.

How Exposure Works

Now let's talk about how exposure works in photography. The best way I have found to explain exposure is to show you how it worked in cameras of old and then show how it still works that way in modern digital cameras.

The good news is that everything in exposure comes down to three controls. Those controls are shutter speed, aperture, and ISO (the sensitivity of your camera's digital sensor).



Despite the dizzying number of controls, your camera is actually a pretty simple device. It is just a lightproof box. In fact, the earliest cameras were just simple wooden boxes with a hole in one side of it. In those days, you would insert a light-sensitive glass plate (and later, a piece of film) inside the box and close it. When you wanted to create a picture, you uncovered the hole so that light entered the box and created an image.

Cameras today actually work the same way except that there is a digital sensor inside the box instead of a glass plate or a piece of film. More about the film/sensor in a second, and for now let's stick with the camera. Just as in the old days, the job of the camera is simply to restrict the light that can get inside.

Nowadays, instead of just a hole in the camera to let light in, we use lenses to channel light into the camera. Light comes through the glass in the lens and then through a hole in the back of the lens called the *aperture* to enter the camera. Importantly, the size of the aperture is adjustable so that it can be made larger to let more light into the camera or smaller to let less light in.

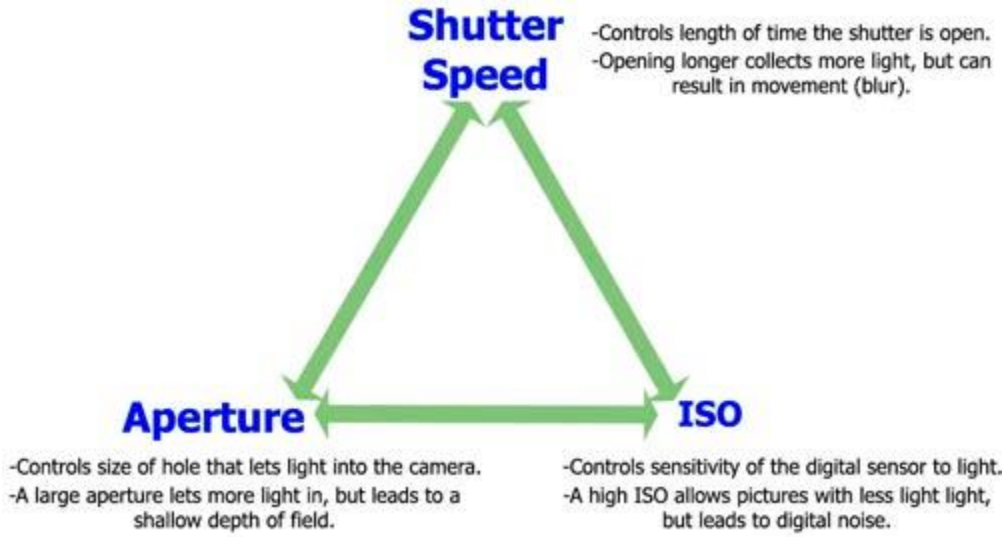
In the old days, you would keep the hole in the side of the camera covered up most of the time so as not to allow light to touch your film and ruin it. The same is true now. You cannot allow light into your camera or the digital sensor would be taking pictures when you don't want it to. Therefore, your camera has a device called a *shutter* that keeps light out of the camera. Think of it just like shutters on windows. When they are closed, no light can get in. But you occasionally open them to let light in.

Most of the time, the shutter of your camera is in the closed position, which keeps light from the lens from entering your camera. When you press the shutter button, however, the shutter opens up and briefly allows light into the camera.

With that description, you actually now know everything you need to know about how a camera exposes pictures. Light comes through the aperture of the lens, is allowed to enter the camera by opening the shutter, and it reflects onto the digital sensor to take a picture. That description shows us that there are three parts of your camera that control exposure: (1) the aperture, (2) the shutter, and (3) the digital sensor. We'll talk more about each of them in detail in the coming lessons.

The Exposure Triangle

Now we have covered all three elements of exposure: shutter speed, aperture, and ISO. Putting these three exposure controls together is what determines the overall exposure of your picture.



Your camera's meter (which we will talk more about in tomorrow's lesson) tells you how much light you need. You then use these three controls to allow the proper amount of light into the camera. Here is how they work together when you are setting your exposure:

- If you set a low ISO to avoid digital noise, you will need to allow a lot of light into the camera through some combination of a longer shutter speed and larger aperture.
- If you use a small aperture to create a large or wide depth of field in your picture, then you will have to use a longer shutter speed to let more light into the camera, or else use a higher ISO to turn the reduced amount of light into a useable picture.
- If you use a fast shutter speed to maximize clarity and avoid any camera shake, then you will have to use a combination of larger aperture (to allow more light into the camera) and higher ISO (to reduce the amount of light needed) to create a proper exposure.

As you can see, they all tie together.

Measuring Light in Stops

Changes to exposure values in photography are measured in *stops* or *f-stops*. A stop is nothing more than a doubling of the exposure value.

In some contexts, the concept of a stop is pretty simple. To double the exposure value by changing the ISO value, you just double the number. For example, increasing your ISO by one stop just increases it from 100 to 200 (or 200 to 400, and so on). It is also not too confusing in connection with shutter speed. You just double the length of time of the exposure. For example, if you shutter speed is at 1/60 of a second and you want to add a stop of light, you just increase it to 1/30 of the second.

If you want to reduce the exposure, it works the same way in reverse. Reducing your ISO of 800 by one stop would result in ISO 400; and reducing the shutter speed of 1/2 second by one stop would result in a shutter speed of 1/4 second. In both of these cases, without some offsetting change, the picture would be underexposed by one stop. When you look through your camera's viewfinder, the exposure will say -1.

In the context of aperture changes, measuring stops works the exact same way, but takes longer to understand because the numbers are not intuitive. Here is a chart on aperture values that may be available to you (the minimum and maximum vary from lens to lens):

f/2.8	f/4.0	f/5.6	f/8.0	f/11	f/16	f/22

If your aperture value is at f/8 and you want to reduce your exposure by one stop, you just reduce the aperture setting to f/11. Or if you wanted to increase the exposure by one stop using the aperture setting, change it to f/5.6.

The real benefit of stops is in how it works to tie together shutter speed, aperture, and ISO. Think of a stop as the common currency between the measurements of the different exposure controls. Stops are the same no matter which exposure control you are using. This means that if you reduce the aperture by one stop, you can increase the shutter speed by one stop to maintain the exact same exposure. This has real-world applications that you will use all the time.

Day 2 Assignment
Shoot in Manual Mode

Description:

Put your camera in Manual (M) mode and use the camera's meter to take properly exposed pictures.

Do not try to do too much here! Don't worry about depth of field or digital noise or anything like that. Just make correct exposures – meaning pictures with the proper brightness level using Manual mode. At this point, I just want you getting a feel for using that mode and how to change the controls.

Keys to Success:

- Take shots in different contexts, including:
  - Outdoors
  - Indoors in bright light
  - Indoors in dim light
- Pay attention to how the exposure controls work together.
- Don't worry about specifics of exposure controls or composition yet.

If You Are Already Comfortable Shooting in Manual Mode:

- Continue getting more comfortable with your camera's controls.
- Hang on - we'll get into the specifics of exposure starting tomorrow.

Upon Completion of this Assignment:

This is a small but meaningful step. You can now operate your camera without assistance. The training wheels are off and you are ready to take control of the exposure process!