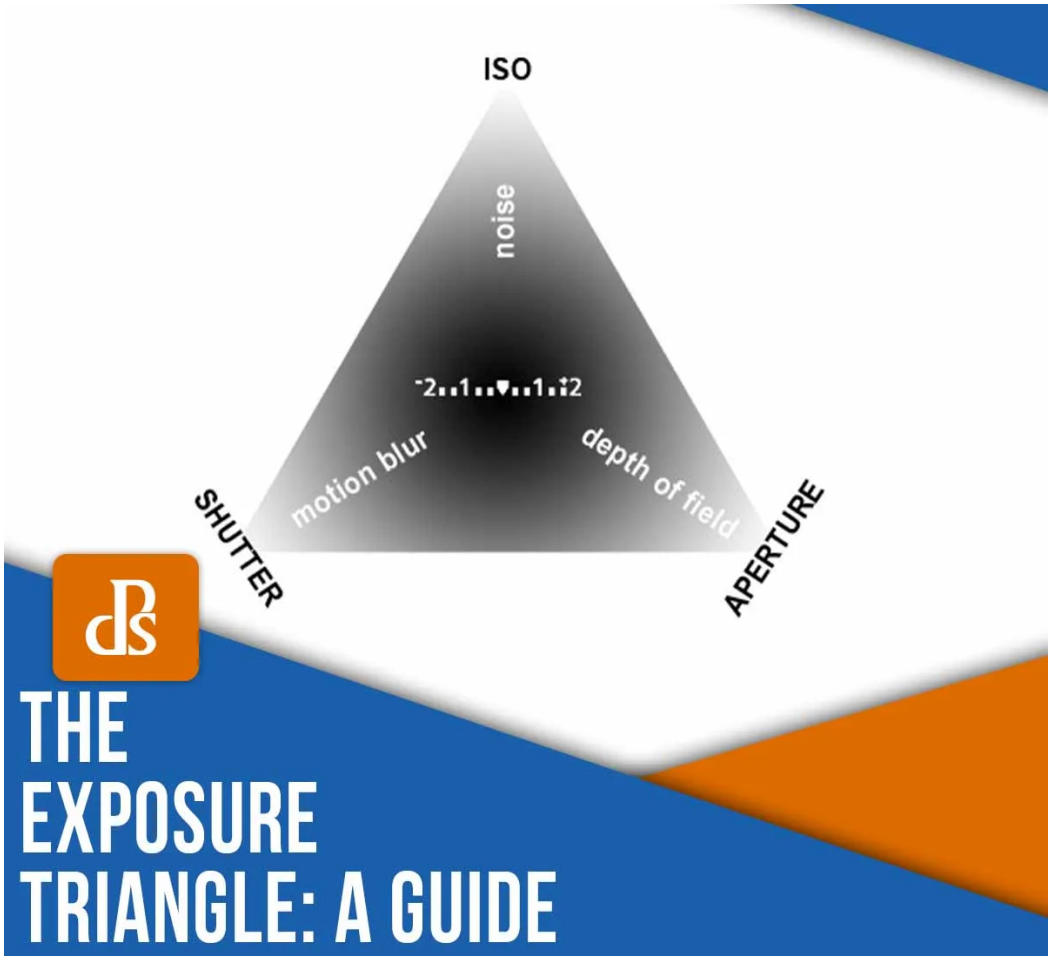
Exposure Triangle: Everything You Need to Know

A Post By: **Melinda Smith**



This article was updated in January 2024 with contributions from Melinda Smith, Elizabeth Halford, Darlene Hildebrandt, Jackie Lamas, and Jaymes Dempsey.

What is the exposure triangle? And how can you use it to capture beautifully detailed photos?

In this article, I'm going to share the ins and outs of the photographic triangle of exposure. I'll identify the three triangle corners, I'll discuss what they do, and I'll explain how you can use the triangle to instantly elevate your photos.

If you've never encountered the exposure triangle, or you're not sure how it works, then you're in for a treat. It genuinely is *the* most revolutionary concept in photography, and by the time you've finished reading, you'll feel like you've been struck by a bolt of lightning – I guarantee it.

Let's get started.

What is the exposure triangle in photography?

The exposure triangle refers to three camera variables, or settings, that *work together to determine image exposure*.

In other words, these three settings determine whether your image is too dark, too light, or spot on. The settings I'm talking about are:

1. Aperture
2. Shutter speed
3. ISO

By adjusting each setting, you can make your image lighter or darker. And by adjusting all three settings together, you can achieve a beautifully detailed photo – that is, a *well-exposed* photo.

Note that *perfect exposure* is a fundamental goal of photography. An image that is too dark looks muddy and

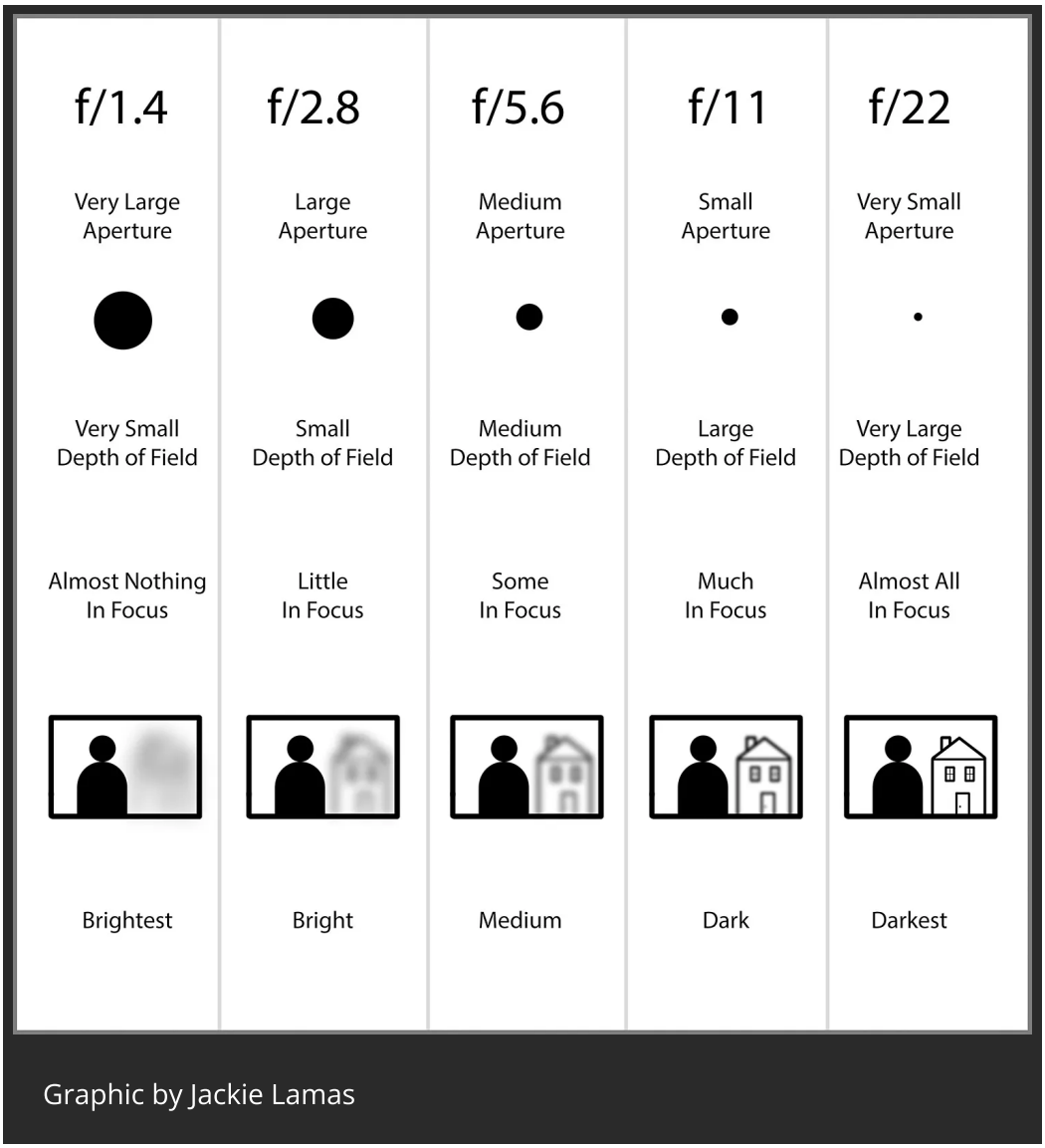
loses details in the shadows, while an image that is too bright looks blinding and loses details in the highlights.

But a well-exposed image looks, to borrow the Goldilocks phrase, *just right*. So if you can master the triangle of exposure, then you can start achieving just-right exposures, consistently.

The triangle of exposure variables

In this section, I'd like to take an in-depth look at the three key exposure variables, starting with:

Aperture



Graphic by Jackie Lamas

The aperture refers to a hole, or diaphragm, in your lens. The way it works is pretty intuitive: the wider the aperture, the more light that hits the camera sensor, and the brighter the resulting image.

Aperture is referenced in terms of *f-stops*, which look like this:

f/2.8, f/4, f/5.6, f/8, f/11, f/16, f/22.

This numbering system might seem confusing at first, but it's actually pretty easy to understand: the lower the number, the wider the aperture (and the brighter the image). So if you're shooting in ultra-dark conditions, you might use an f/2.8

aperture. But if you head out in direct sunlight, an f/11 aperture might make more sense.

The aperture doesn't just affect the image brightness, though. It also affects *depth of field*, which refers to *how much of your photo is in sharp focus*.

A wide aperture (small f-number) will render less of the image in focus, whereas a narrow aperture (large f-number) will render *more* of the image in focus. Here are a few photos demonstrating this concept:

F3.5, 1/640

F5, 1/320

With the aperture set to f/3.5 and f/5 (low numbers), the background is very blurry. But narrow the aperture to f/11, and you get less blur:

F8, 1/125

F11, 1/60

Narrow the aperture even farther, all the way to f/22, and the blur almost disappears entirely:

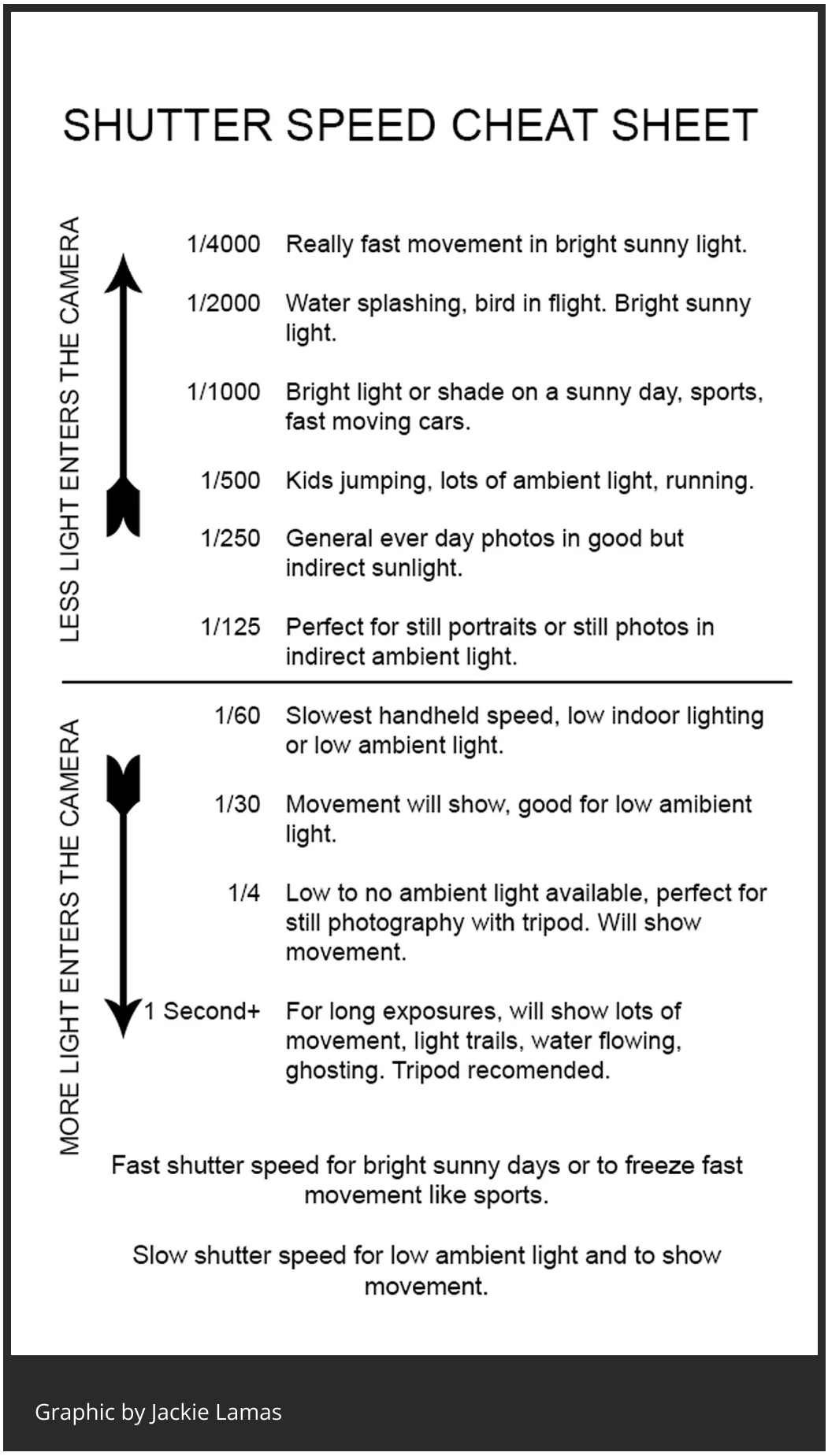
F18, 1/25 F22, 1/15

Do you see what I mean? As the aperture narrows, the depth of field deepens, and the background blur disappears. (This is handy if you want to shoot landscape images, where a narrow aperture lets you capture the entire scene – though a wide aperture, with a blurry background, is great for artistic portraits.)

By the way, in case you're wondering, you can generally change the aperture by setting your camera to Aperture Priority or Manual mode, then spinning a dial on your camera. If you're not sure how to do this, check your camera manual.

Now let's take a look at the *second* part of the exposure triangle:

Shutter speed



Graphic by Jackie Lamas

Shutter speed refers to the opening and closing of your camera's shutter. You press the shutter button, your camera

moves the shutter, and you've taken a photo.

If the shutter remains open for a *long* time, it lets in lots of light, which impacts the sensor and gives – you guessed it! – a brighter exposure.

If the shutter opens and closes in a fraction of a second, it lets in very little light, which gives a darker exposure.

Shutter speed is written in fractions of a second, just like this:

5s, 1s, 1/60s, 1/250s, 1/1000s, 1/4000s.

In the set of example shutter speeds above, 5s is the longest shutter speed, while 1/4000s is *ridiculously* short. The average shutter speed tends to hover in the 1/100s to 1/2000s range, though it depends on the specific type of photography.

Remember how I said that a longer shutter speed brightens the exposure? If you're shooting at night and you need a bright image, you could use a long shutter speed – whereas if you're shooting in bright sunlight and your images keep turning out bright, you could set a shorter shutter speed.

Now, shutter speed doesn't just affect exposure. It also affects image sharpness.

Specifically, the faster the shutter speed, the sharper the resulting image, especially if the scene contains moving subjects. So if you're photographing a basketball player slam-dunking the ball, you would need a fast shutter speed to freeze the player's movement. (If you're photographing a stationary basketball on the pavement, however, you could use a much lower shutter speed, because there's nothing you need to freeze).

Check out the two images below. On the left, I used a fast (1/2000s) shutter speed to freeze a moving car. On the right, I used a slow (1/10s) shutter speed, and the truck going across the street was completely blurred.

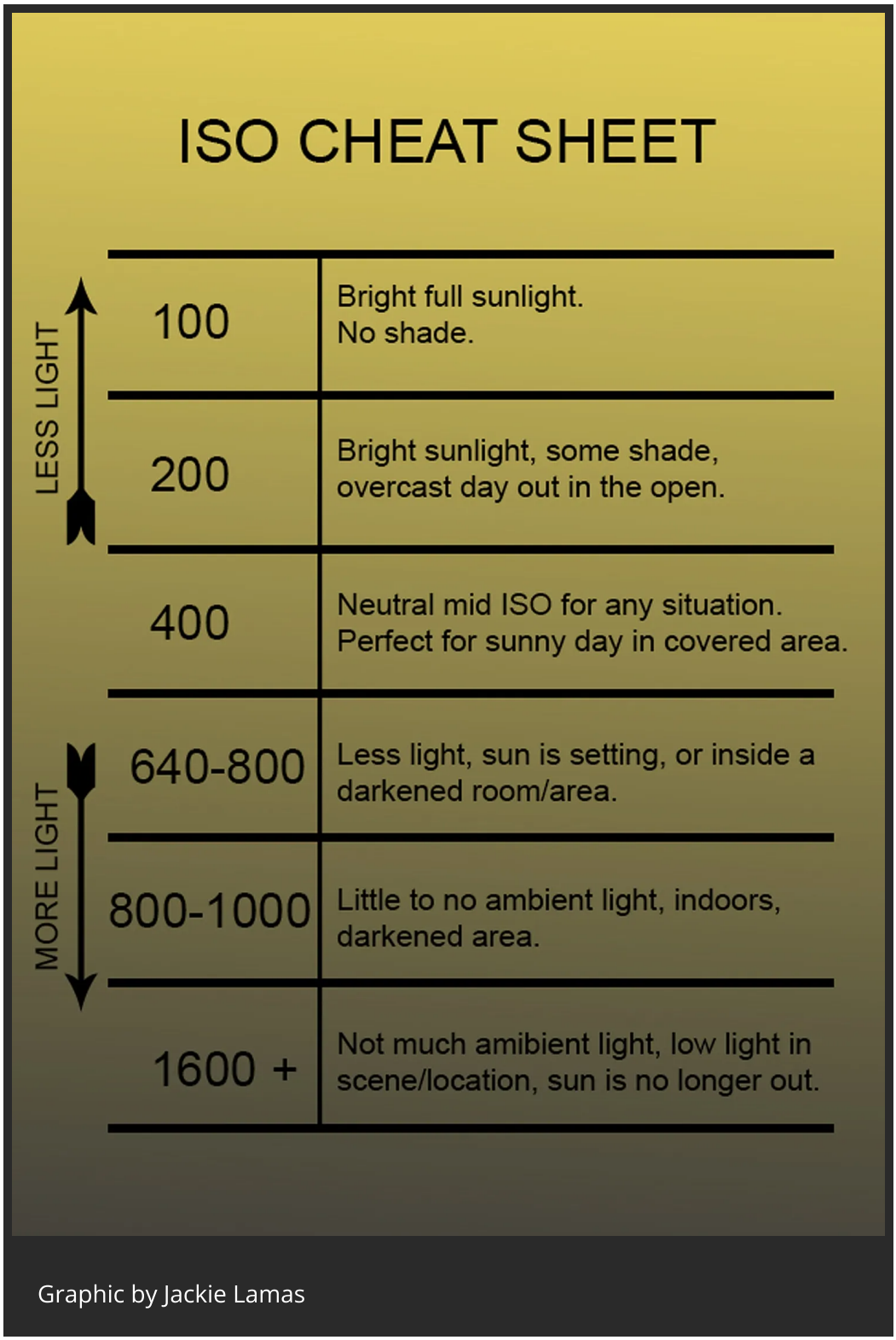
It's important to note that the shutter speed works *together* with the aperture and ISO to achieve the final exposure. That's what the exposure triangle is all about; variables together achieving a result.

So if you use a fast shutter speed (darker exposure) but use a wide aperture (brighter exposure), they'll balance out and you'll often get a nice, middle-of-the-road exposure. Whereas if you use a fast shutter speed (darker exposure) and a narrow aperture (darker exposure), the overall effect will be magnified and you'll get an ultra-dark image.

To adjust your shutter speed, simply set your camera to Shutter Priority mode or Manual mode, then rotate the corresponding camera dial.

Now let's take a look at the final exposure variable, ISO:

ISO



ISO refers to the sensitivity of your camera's sensor to light. (This is something of an oversimplification, but for our purposes, it works well.)

ISOs are written like this:

ISO 100, ISO 200, ISO 400, ISO 800.

And the higher the ISO, the brighter the exposure.

So if you're photographing in the evening and your shots keep coming out dark, you might bump up your ISO from 100 to 1600. And if you're photographing in the daytime and your shots keep coming out bright, you might drop your ISO from 400 to 100.

Make sense?

Of course, as you already know, ISO, aperture, and shutter speed *work together*, so you won't always use the ISO to increase or decrease brightness. Instead, you might increase the ISO so you can increase the shutter speed (to freeze action). Or you might increase the ISO so you can narrow the aperture (for increased depth of field).

By the way, ISO comes with an annoying side effect:

The higher the ISO, the noisier (or *grainier*) your images will become. Noise decreases sharpness, so it's often a good idea to keep the ISO as low as you can get away with, assuming you have the exposure you want (and a nice aperture and shutter speed).

Here's an image taken at a very low ISO (ISO 100). Look carefully at the background, which is delightfully smooth:

And here's another shot, but with a much higher (3200) ISO:

Can you see the noise? It's particularly noticeable in the background, but it's also present on the clock face.

Anyway, choosing the ISO is a balancing act. You want to keep your images sharp and well-lit, but you don't want to produce

too much grain, so it's generally a good idea to start low and boost the ISO as needed.

That said, certain photographers pretty much always shoot at low ISOs – landscape photographers, for instance – because they work with tripods and don't require a fast shutter speed in low light. And other photographers shoot exclusively at high ISOs, such as indoor sports photographers; they need fast shutter speeds, and even with a wide-open aperture, ISO 1600, 3200, and higher is absolutely, one-hundred percent necessary for a good exposure.

How do you adjust the ISO? You'll need to set your camera to Program mode, Aperture Priority mode, or Manual mode, then use the corresponding button, dial, or switch to make the necessary changes.

The triangle of exposure: putting it all together

Remember:

To brighten an image, you can widen the aperture, lower the shutter speed, or raise the ISO.

To darken an image, you can narrow the aperture, raise the shutter speed, or drop the ISO.

And if you adjust two variables in different directions – you lower the ISO plus you widen the aperture, for instance – the effects will (roughly) cancel each other out.

Therefore, the exposure triangle has two purposes in photography:

1. Adjusting the exposure so you get a detailed result
2. Allowing you to adjust the shutter speed, aperture, or ISO while keeping the exposure consistent

It's important to realize, by the way, that there is no perfect set of exposure variables for a particular situation. As the light changes, you'll need to adjust your aperture, shutter speed, and ISO accordingly. If you're photographing a portrait at midday, you might use a fast shutter speed to limit the bright light, but if you're photographing the same subject around sunset, you'll probably want to drop your shutter speed – otherwise, the image will end up far too dark.

How to use the exposure triangle when out shooting: a step-by-step approach

Say that you're out with your camera and you want to capture a nice exposure. How do you use the exposure triangle to get the result you want?

First, you should switch your camera to Manual mode. In Manual mode, you can adjust the shutter speed, aperture, and ISO independently, so you can carefully observe the effects of each variable.

Next, I recommend setting your ISO to your camera's base option (often ISO 100).

Then dial in your aperture, thinking *not* in terms of exposure, but in terms of depth of field.

At this point, you'll need to look at your camera's exposure bar, which sits across the bottom of the viewfinder. If your camera indicates a Plus (+) value, then the image is overexposed; if your camera indicates a Minus (-) value, then the image is underexposed. Set your shutter speed so that the exposure bar gives a middle value.

Finally, look at your shutter speed and ask yourself: Is it too slow for a sharp image? If the answer is "No," then you're golden, and you can proceed with your shot. If the answer is "Yes," then you should boost the shutter speed, then either increase the ISO or widen the aperture – whichever seems *less* harmful to the overall image. (Generally, increasing the ISO is the way to go, but if you don't mind a shallower depth of field, widening the aperture might be the better course of action.)

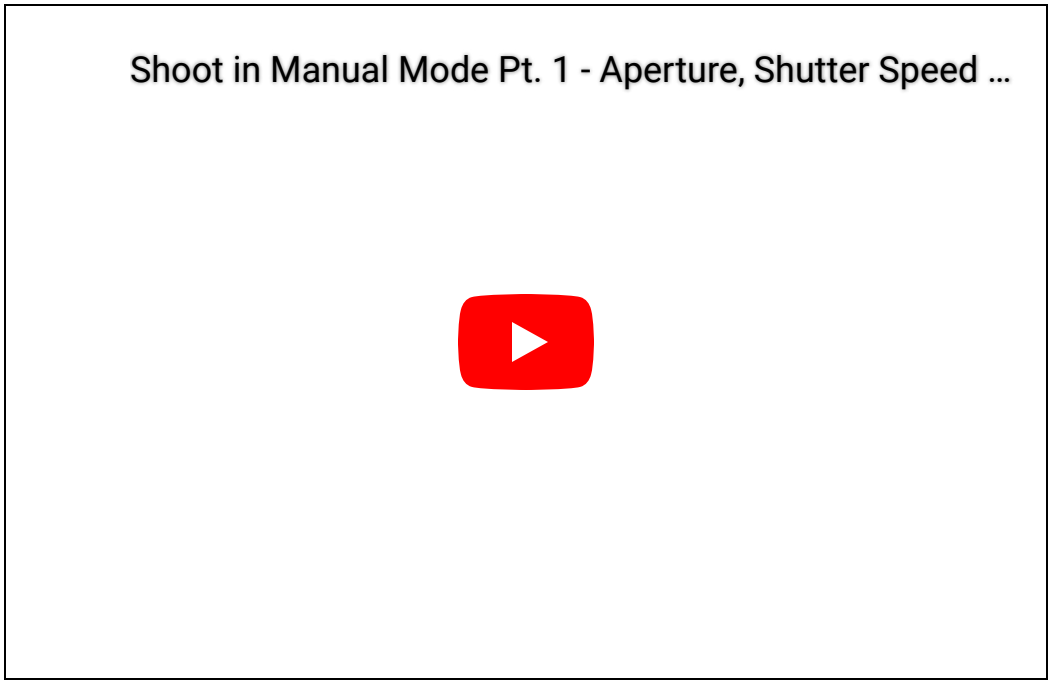
Finally, once your camera indicates a well-exposed scene and you're satisfied with the aperture, shutter speed, and ISO, take your shot!

Additional exposure triangle resources

Still struggling to understand how the exposure triangle works? No problem! Check out these two videos, which do a great job of explaining the triangle, how it works, and how to use it.

First, we have a video from Adorama TV; the host Mark Wallace goes through the three exposure triangle elements and explains how they work together:

Second, we have a handy video from photographer Sean von Tagen about shooting in Manual mode, which discusses – in depth! – the elements of the exposure triangle and why they matter. The video is long, but it's certainly worth your time if you're hoping to master the topic!



The exposure triangle: final words

Well, that's the exposure triangle in a nutshell! Now that you've finished, you're well-equipped to capture beautiful, well-exposed photos.

Now over to you:

How do you feel about the triangle of exposure? Do you think you can use it for great results? Will it help you with exposure? Share your thoughts in the comments below!

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Melinda Smith
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