



instructables classes



PHOTOGRAPHY CLASS

9 Lessons Beginner Level

Welcome to the world of photography. Photographs can be a powerful tool for sharing stories and experiences through images. They can express emotion, carry a narrative, demonstrate principles; cameras are potent instruments for documenting the human condition and sharing moments from life. A single image can transform the way a story is contextualized and perceived.

In this class, we will begin to explore basic camera functions and how we can get amazing images just by *slightly* adjusting the way we see the world, then apply this new found awareness to *making* (not taking) pictures.

Enter an Instructables Contest!

If you've used the skills you've learned in this class to write a great instructable, try entering it in one of our Contests for a chance to win some amazing prizes!



Class Author:
audreyobscura

Hi! I'm Audrey, I am an artist, photographer, videographer, and performer who is completely obsessed with DIY. I have worked as a photojournalist, film producer & director, and art conservator before joining the Instructables Design Studio in 2012. I love developing stories through my camera, and can't wait to see what experiences you share with your camera after you take this beginning photography class.

When I'm not working on super sweet DIY projects for Instructables, I'm expanding my conceptual art portfolio, building custom electronics for musical performance, and photographing interesting litter I find in urban areas.

// follow me to see what I'm up to:

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Lessons



Lesson 1: Choosing a Camera, Tools and Supplies

Choosing which camera is best for you can be daunting when you are starting out, this lesson guides your purchase choices so that you can make the best images for your shooting needs.



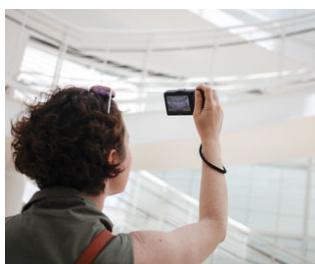
Lesson 2: Getting to Know Your Camera

This lesson dives into the anatomy of your digital camera, and how the parts work together to create images.



Lesson 3: Important Camera Settings

Digital cameras are tiny computers with lots of options and settings. This lesson outlines best practices for setting up your camera, and common menu features.



Lesson 4: Holding the Camera

How you hold the camera is important to your image quality and your composition. This lesson demonstrates how simple adjustments to holding your camera can greatly improve your image quality.



Lesson 5: Tripods and Supports

Hold still! This lesson goes over how to select a tripod and provides some insight on which tripods work best for your image making needs.



Lesson 6: Natural Lighting

This lesson explains how photographers utilize the sun to light their images, and a fun project to get help you harness the sun creatively in your images.



Lesson 7: Artificial Lighting

Who needs the sun when you have light bulbs?! This lesson goes over the use of on-camera flash as well as affordable lighting solutions. We'll wrap this lesson by building a simple portable light kit.



Lesson 8: Composition

See how to construct images in this lesson about composition. Important principles covered: Rule-of-Thirds, Elements of Design, and a fun homework assignment to practice tuning your eye.



Lesson 9: Next Steps for Photography

We've covered the basics, now it's time to develop your style and start shooting in manual mode.

LESSON 1: CHOOSING A CAMERA, TOOLS AND SUPPLIES



A lot of folks get scared away from a photography practice because they think that being a good photographer is very gear-intensive, and thus quite expensive. While that is the case for super-pros, getting started with photography doesn't mean you have to take out a second mortgage.

Understanding the basics of digital camera features available to consumers can guide you through your purchases, and help you realize the best solutions for each shooting situation. While there may not be a 'magic bullet' of a camera that is perfect for every situation, it is up to the photographer wielding the camera to use their tool to the best of their ability.



Who Is This Class For?

This class is geared for the absolute beginner.

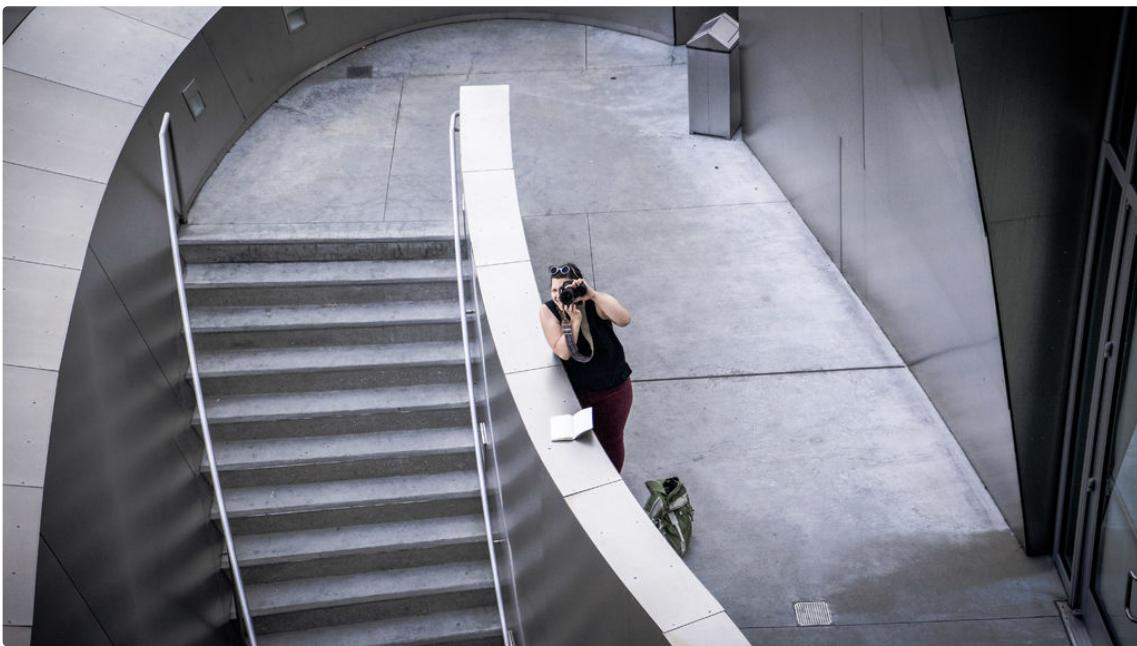
Whether you are just getting started with a point and shoot, a DSLR, or even a smartphone, this class is for you. Follow along in this course to learn new skills, or to just brush up on photography tips and tricks.



This class will go over basic camera functions and principles, highlighting techniques to make fantastic images with any camera in any lighting situation. The most valuable skill learned in this class will be that you will learn *to see light and form differently*, and to make the best pictures in any scenario.

About Your Instructor

My name is Audrey Love, and I am a photography professional turned DIY-Mad-Scientist.



I have been tinkering and crafting my whole life, and I was lucky enough to turn this curious passion for making into a career. I started visiting Instructables.com when I was working on my Photography/Digital Media BFA at the University of Nevada, Reno - thanks to articles authored by Instructables community members, I learned how to read circuit diagrams, solder, and cast resin for the first time ever! I'm still endlessly learning from the I'bles community, and part of my motivation for teaching this class is to give so that future Instructables authors have the know-how to use a camera to tell their own DIY story.

I have extensive education and experience as a photographer and digital image retoucher. STILL! I am constantly amazed that I can *keep learning new things* about the camera as a tool. As digital photography keeps benefiting from technological innovation, and robust features become more accessible, the creativity of camera users is really astounding. (But perhaps secretly, I long for the days I could get back into the dark room to wet analog process photos again.)

The Stuff

This list provides insight as to best choices for cameras and tools for the beginning photographer. Other items will be suggested throughout this course, but these are the essentials.

Recommended Digital Cameras

- [Beginners DSLR](#)
- [Beginners mirrorless camera](#)
- [Point-and-shoot](#)

Everyday Camera Accessories

- [Additional camera batteries](#)
- [Flash memory](#)
- [Memory card reader](#)

Great Supports and Tripods

- [Tripod](#)
- [Monopod](#)
- [Clamp mount](#)
- [Articulated leg tripod](#)
- [Selfie sticks](#)



In our [Natural Lighting](#) and [Artificial Lighting](#) classes, we take on crafting some DIY photography tools made from mostly things that are lying around the house or easily and affordably purchased nearby.

Supplies for Projects in the Lessons

- [Foam core posterboard](#)
- [Aluminum foil](#)
- [Spring clamps](#)
- [Spray adhesive](#)
- [Razor blade or scissors](#)
- [Two clamp lights](#)
- [Two dimmable LED light bulbs](#)
- [Two white shower caps](#)
- [Extension cord with splitter](#)
- [AC light dimmer](#)

Kinds of Digital Cameras

When buying just about anything, you'll usually have some options in quality, convenience, and affordability. When it comes to buying a camera, pick two, because you don't get all three.

Let's take a look at some common kinds of digital cameras available on the market. Understanding the tiers of cameras that are commonly sold can help you decide which one is the most well-suited to your needs.

Point-and-Shoot



Point-and-shoot cameras are awesome. Cheap and Convenient, but...they lack in the quality department. They have a slim profile, are very light weight, and are virtually silent when actuating the shutter. Most commercially available point-and-shoot cameras are smaller than your average smartphone, have an ease-of-use that makes taking lots of photos feel effortless. You can find a reliable point-and-shoot camera for a good cost, but in this price-tier of cameras, make sure you pay attention to reviews so that you are getting a camera with the features you want.

The compact size of the point-and-shoot camera does not allow them to have many manipulatable settings. They are limited by few creative options and often render poor image quality in low-light settings. One big feature missing from P&S; cameras is focus control. Often these little guys have no means of indicating where you are trying to focus your camera, and you end up with a foreground that is blurred with a crisp landscape behind it. Furthermore, because of the small display, you often won't notice this error until you are reviewing an enlarged image on your computer.

Mirrorless



Mirrorless cameras have quickly become a personal favorite. They produce high-quality images and boast a small stature, but....they can have a slightly higher price tag.

Mirrorless cameras haven't been on the market for too long and are still seeing a lot of innovation between model iterations, trying to compete with the quality of DSLRs while maintaining a small size like a point-and-shoot. My first mirrorless camera didn't have a means of modifying focal ranges, but these days, their competitive advantage in the camera market is that they have focal detection comparable to DSLRs. This means you are able to select features to focus on, as well as auto-detect the exposure needs of your desired subject. As these cameras have been developed, their list of cons has diminished.

These little powerhouses just chug batteries. Every mirrorless camera I have researched has had at least one frustrated reviewer talking about the bad battery life. Besides the screen, batteries take up the most space within your camera. These cameras have a lot of robust features that require more power consumption than a point and shoot, but because mirrorless cameras are small, and have a small battery, you have to swap the rapidly drained power source often.

DSLRs



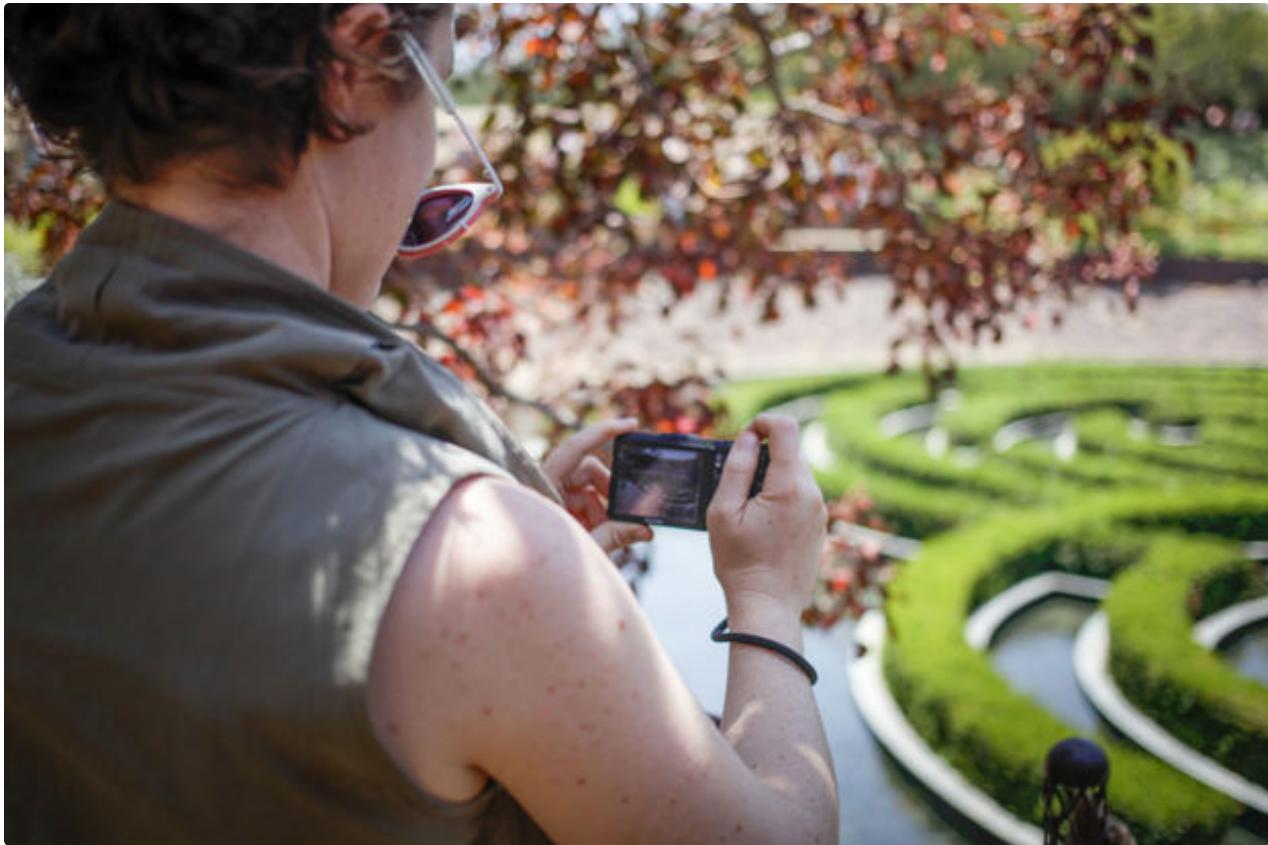
DSLR stands for **Digital Single Lens Reflex**. This refers to any camera that has a removable lens and a reflex-mirror reflecting light into a viewfinder, *not* a screen. The mirror flips up when you depress the shutter button to allow light to hit the sensor and create your image.

You can get a very high-quality DSLR camera for a great price, but this kind of camera does come with a steep learning curve and needs to be well cared for.

There are some '[prosumer](#)' [DSLR cameras](#) that are available for around \$600. These are accessible at a lower cost than pro cameras because the sensor, which is likely the most expensive part of your camera, is cropped and physically smaller. These low-cost DSLR cameras often have fewer features than [full-frame sensor DSLRs](#), but are AWESOME for learning how to use the camera as a tool. Keep in mind that the price-tag for a DSLR doesn't include additional lenses, and if you want that super-zoomed-in image of a bird in a tree, you'll have to buy an additional zoom lens to mount to your camera - be warned, some lenses may even cost more than the price of the camera body.

The benefit to working with DSLRs is that you have ultimate control over images, and as you develop your photography practice, you have a tool that you can grow with and use at various levels of proficiency.

If you don't want a camera that is too heavy or clunky to carry around, then a DSLR is not for you. These cameras are like tiny advanced computers that turn rays of light into well-toned images and have some substantial weight. When you start adding the weight of heavy optical glass, they can get unwieldy quickly.



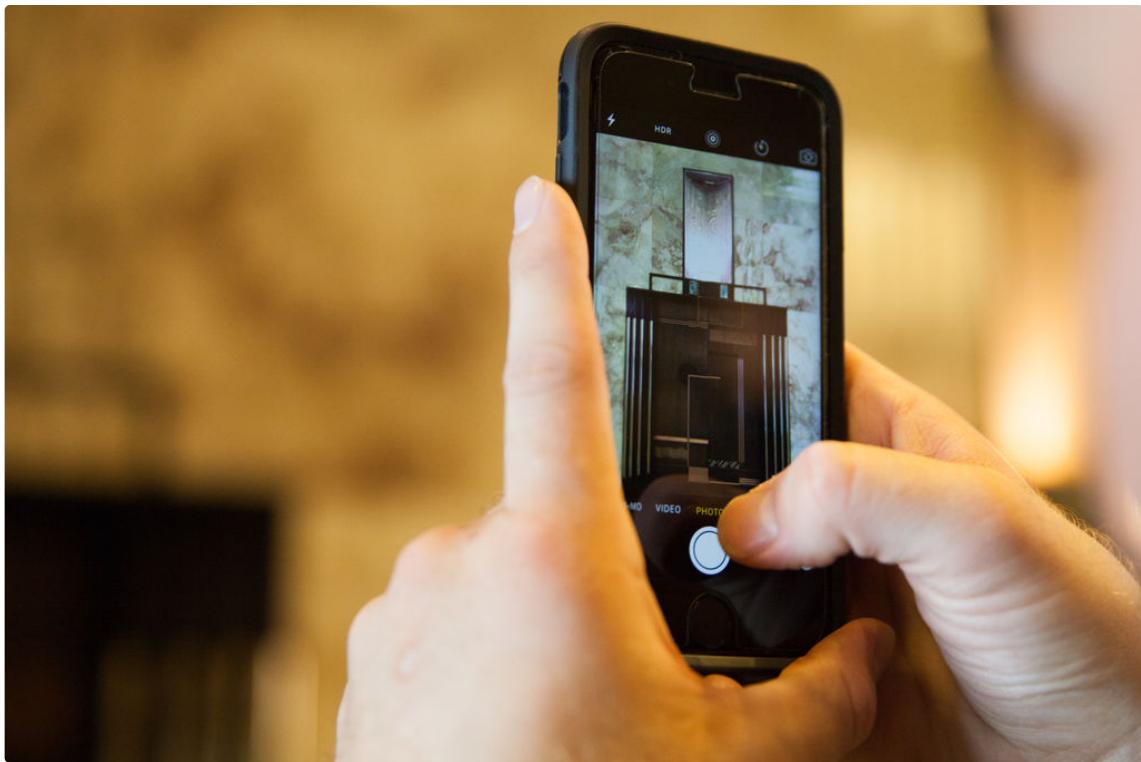
Things to Consider

When you're in the market for a camera there are oodles of things to consider and questions to ask yourself before investing in such an expensive tool. Ask yourself *why* you want a camera, what kind of moments are you trying to capture. Are you a world traveller? A live music enthusiast? A DIY blogger? ;)

I encourage you to do lots of research about the cameras you are interested in. Read reviews, even watch some unboxing videos. One of my favorite resources for gear reviews is DPRReview - I'm pretty sure there isn't a camera, lens, flash, or battery under the sun that they haven't reviewed. There can be a lot of variation in user experience depending on how the camera is trying to be used, so pay attention to how others have used the camera you are researching, and what kind of images reviewers have made with that camera.

Here is a guided list to help you decide what kind of camera is best for you.

Level of commitment



Are you new to photography? Unsure what kind of photographs you want to make? If you're just getting started, breaking the bank for a camera probably isn't worth it. I didn't buy a DSLR until my third year of art school, it wasn't until then that *I KNEW* that I was going to make photographs forever, thus was ready to embark upon that level of investment for storytelling and image making. Albeit, DSLRs are a lot less expensive than they were 12 years ago, but a DSLR is a commitment to learning how to use the camera as a tool. Not ready to take that kind of plunge? There are some amazing point and shoot cameras available, with loads of settings to explore to get you started with digital photography.

In recent years, I have become a bigger and bigger fan of mirrorless camera systems. Mirrorless cameras are a good middle of the road camera that can be very capable. You get the compactness of a point and shoot camera, but with some of the custom functionality of a larger DSLR. Most of these cameras even have an interchangeable lens system that doesn't break the bank!

Where are you making your photographs?

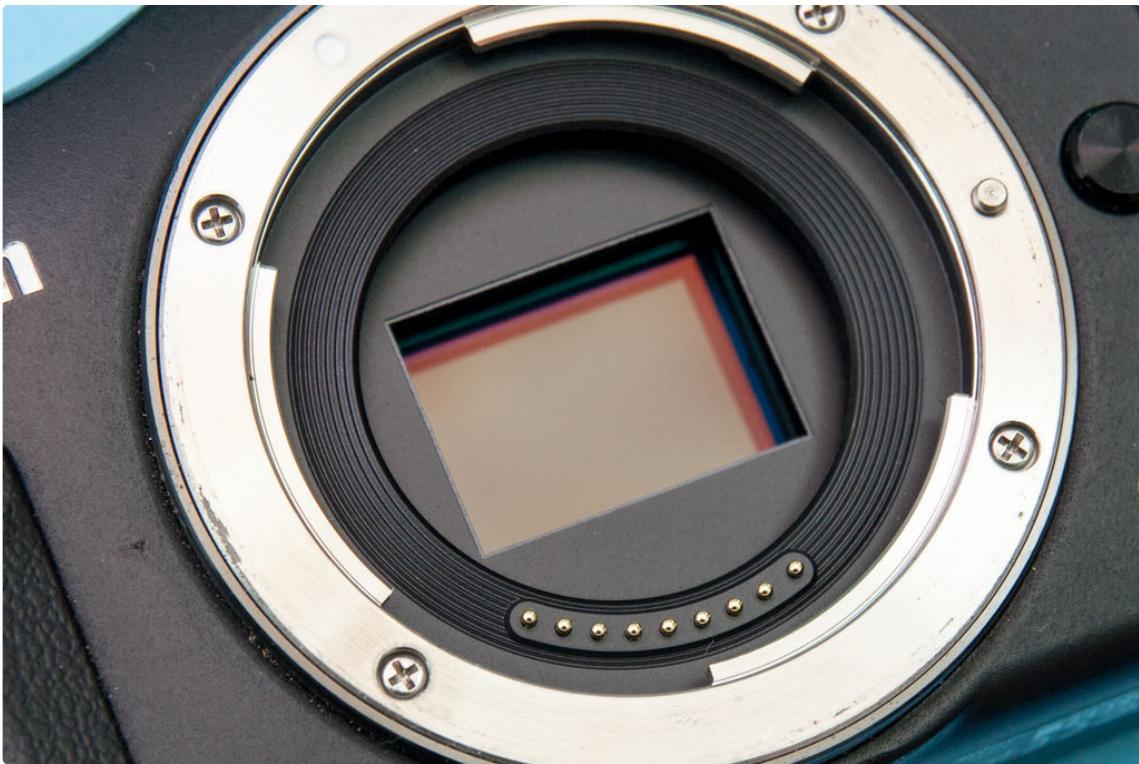


If you are planning a rafting trip, you probably don't want to use a super expensive camera, with custom underwater housing to protect it from the probable droplets of water that will get on it, potentially shorting the electronics in your camera. Instead, maybe opt for an affordable underwater camera. Underwater cameras are pretty unbeatable, you have to sacrifice sensor size for rugged durability, but for a camera that can stand up to the elements, underwater point-and-shoots are the way to go.

Alternatively, if you are setting up a location with controlled lighting to take pictures of retail goods, and want a consistent and controllable aesthetic, you're probably better off working with a tripod-mounted Mirrorless or DSLR camera.

The lens and battery are the heaviest parts of your camera, so if you are going on a hike, and don't want to lug your big camera in your pack opt for a point-and-shoot or mirrorless camera to lighten your load. My go-to on-the-go rig is a mirrorless camera with a pancake lens. This means it has a slim profile and is super lightweight.

MegaPixels vs. Sensor Size



Understanding megapixels and image resolution can be a huge benefit to your decision to buy a camera. What is a megapixel anyways? Megapixels refer to the camera's ability to render images of different dimensions, and how many pixels per inch you will be able to print. For example, your average smartphone camera has an 8-megapixel camera. This means that the image dimension has a surface area of about 8 million pixels that have interpreted light into a photograph. Megapixels are calculated by multiplying the width and height of the image rendered. An 8MP photo is 3264 pixels wide and 2448 pixels high contains an area of 7,990,272 pixels of light-data interpreted into a photograph.

This chart demonstrates how megapixels and resolution scale in correlation to printing.

MEGAPIXELS	RESOLUTION	PRINT SIZE	TYPICALLY FOUND IN...
3	2048 X 1536	~ 7" X 5"	{ WEBCAMS
4	2464 X 1632	~ 8" X 5.5"	{ SMART PHONES
6	3008 X 2000	~ 10" X 6.5"	{ POINT-AND-SHOOTS
8	3264 X 2448	~ 11" X 8"	{ and DSLRs
10	3872 X 2592	~ 13" X 8.5"	
12	4290 X 2800	~ 14" X 9"	
16	4920 X 3264	~ 16" X 11"	

Camera sensors are advertised to have anywhere from 3-50 megapixels, and while you may think that a high megapixel count is better, that is not always the case.

Images with a small sensor and a high megapixel count won't render as nice of a high-

quality image as a camera with a larger sensor size and lower megapixels. When using a camera with a smaller sensor, like with a smartphone, the photo-sensing pixels can't capture as much light, and your details become 'noisy'. When a sensor is larger, the image details are captured more accurately because there is literally more physical space on the sensor to interpret the light.

Where do you want your images to go?



If you are hoping to buy a camera so that you may print your photos to give as gifts, or enlarge as art pieces, it is imperative to use a camera that has some advanced control over file size and color in the camera. Point-and-shoots are great for quick snaps that will just be published to the web, but if you are hoping to share your images as high-quality prints look towards a mirrorless or prosumer DSLR.

Video

Some cameras have a dedicated video mode, so if you would like to capture video footage as well as photographs, look for a camera that is video-capable.



Moving Forward

This lesson went over which kind of cameras are suitable for different shooting situations, and how to select a camera based on your shooting needs. Be warned, purchasing a camera can become very expensive if you don't do a little bit of homework about your potential purchase, ensuring that your camera will fulfill your image making needs. If you are still facing confusion or have questions about a potential purchase, please add to the discussion in this class and we can work together to determine the best camera for your requirements.

Next, we will go over all of the components of your camera, and understand how the parts of your camera work together to create images.

LESSON 2: GETTING TO KNOW YOUR CAMERA



When you unbox your digital camera, some assembly will be required.

Your camera will most certainly come with a camera body, a battery, and a battery charger. It may also come with cables to move photos from your camera's memory storage to your computer.

This lesson will help familiarize you with your camera and provide some tips on getting started on the right foot.



The Manual

Reading the manual to anything sounds like a terrible way to spend a few hours, however, those little booklets are packed with useful information about your camera.

The camera manual includes all of the technical information that explicitly outlines modes of operation on your camera. It seems unbearably boring, but time with your camera's manual is one way to get acquainted with the features at your disposal. Even if you consider yourself a camera pro, you'll be surprised when you learn about a feature you've never used on your camera buried deep in the manual.



The Battery & Battery Charger

Your digital camera will most likely have been shipped with a proprietary battery designed to fit inside your camera. Some cameras will take standard sized batteries, like AA and AAA sizes, however, they are becoming less available as cameras become more technologically advanced.

To charge the battery, plug the battery charger into the wall, and match the battery's contacts with the charging points inside the charger. It will only fit into the charger one way, but it varies brand to brand.

I recommend buying at *least* one additional battery for your camera. This way you can always be charging at least one as a backup. Or if you are travelling on a trip and anticipate a lot of shooting in one day, it's handy to carry a spare. The worst feeling is when you are trying to capture a moment, and the little dead battery icon flashes on, and you know have a finite amount of time left to take pictures.

The life span of camera batteries varies greatly camera to camera, and replacement camera batteries usually can be found at reasonable prices if you don't purchase a name-brand battery.



Memory

Most cameras will not come with memory, so you will have to purchase the class of memory designed to work with your camera. SD type and CF type are the most common kinds of camera memory, but occasionally microSD or others could be used, so be sure to check the manual.

The compact computer within the camera needs to *record* each image onto the memory card inserted into the camera. I recommend getting a card with at least 16 GB of storage, as a good all purpose card. It can store lots of high-quality images, and if your camera also shoots video, the card has the capacity to save a few short clips.

When you are transferring images from your camera to a computer, you will need to use a memory card reader plugged into your computer's USB port. Your computer may have a card reader built into it. Some cameras will come with a cable to transfer images directly from the camera without using a card reader, but I find that using a card reader is easier and less cumbersome.

These days, depending on your camera, there are even WiFi capable types of memory. These WiFi memory cards often have to be used with proprietary apps, software, and cameras - so be sure to check the manufacturer's guidelines that your camera can use a WiFi card, and which brands your camera manufacturer recommends for use.



The Lens

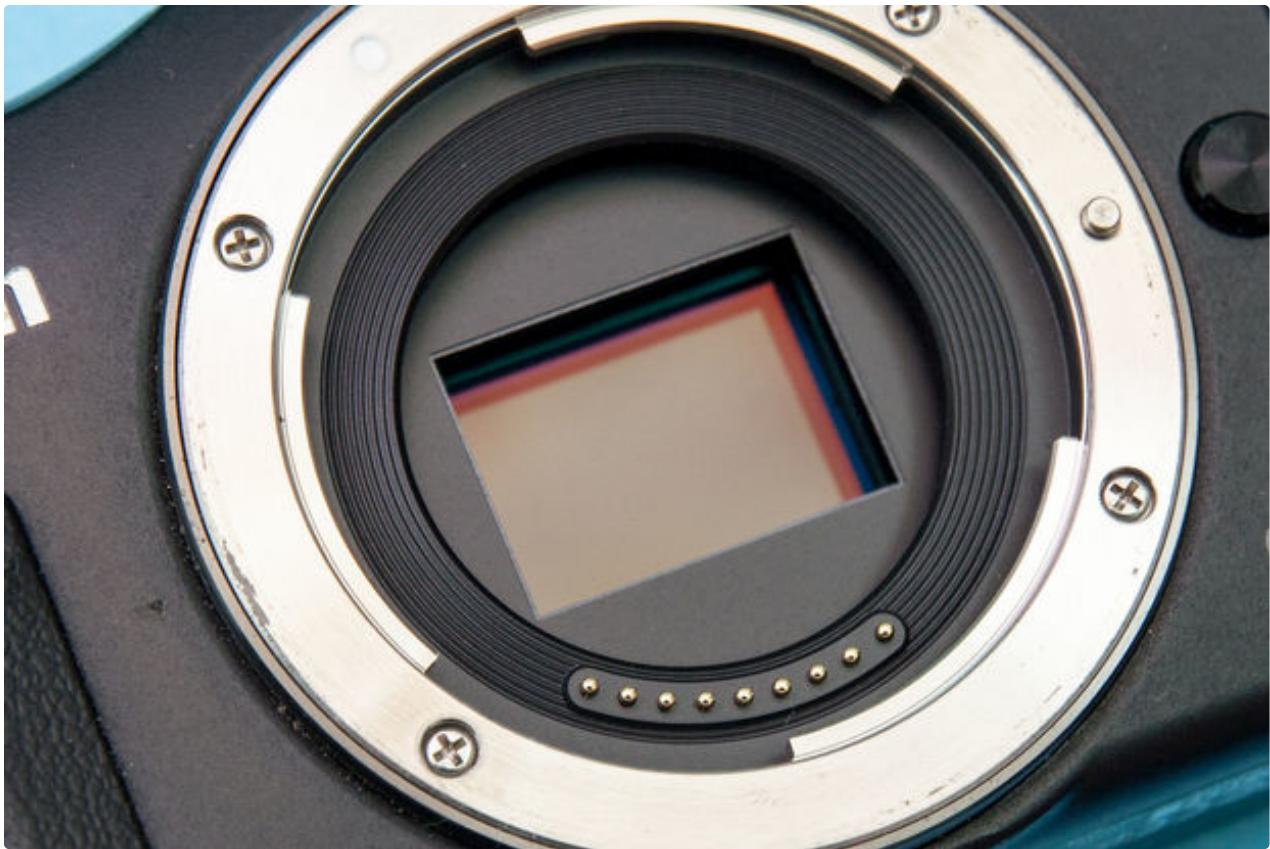
Now that we have met the operational needs installing our battery pack and memory card into the camera, let's take a minute to understand how cameras turn light into pictures.

Within the lens tube of your camera, there are series of convex and concave lenses that can articulate within the cylinder to refract a focused light onto your camera's sensor. As the lenses are moved further apart by extending the lens tube, aka 'zooming in', the resultant image is magnified.

It is important to take good care of the optical glass of your camera. A trip to the beach can be a real lens-killer if any grains of sand get into the mechanism. The zoom rings will begin to crunch, and slip - if this happens you will need to send your camera out for repair.

You can keep the surface of your lens pristine with [a lens care kit](#). Specks of dust on your lens can create unwanted sun flare or wacky light diffractions in your image, and all lenses need regular cleaning. Even your smartphone's camera lens should get a hearty wipe-down regularly. Pretty much every time I pull out my phone to take a picture I start by giving my lens a quick swab with my shirt.

If your camera lens can accept a filter, look into getting a [UV filter](#) to protect the optical glass. I was shooting in a crazy windstorm when I was still living in Reno, and a rock flew into my UV filter and cracked it, but at least it didn't chip the lens! There are other [creative lens filters](#) that you can use to render pretty artsy effects too.



The Sensor

We can liken a camera's sensor to a fixed piece of film that we never have to take to a photo processing lab, because the sensor *is* the developing lab. The sensor captures light data that has passed through the barrel of the lens tube and then turns that information into a digital image file that can be reviewed and saved.

The sensor is the most delicate part of your camera. If you are shooting with a point and shoot, you will most likely never see this part of your camera, because a fixed lens is always protecting it. With DSLRs and mirrorless cameras, the sensor is accessible via the lens mounting port. Be careful when swapping lenses so that the sensor does not accumulate any dust or particulate while you are changing lenses.



The Shutter

The *shutter* refers to the light blocking curtain between the lens and sensor. The *shutter button* is what you push so that the curtain sweeps open and allows light to enter your camera.

Photographers will often talk about shutter-speed, which is the amount of time the shutter remains open to allow light to hit the sensor. Shutter speeds vary, and can range from a thousandth of a second all the way to a few hours, depending on what you are trying to capture. If you are using your camera in automatic mode, the camera has a built-in light meter that will determine how long the shutter should be open every time you depress the shutter button.



The Viewfinder/Screen

I can't think of a contemporary digital camera that doesn't have at least one display. Some nicer cameras will have an LCD screen for reviewing images, as well as a second LED screen that displays exposure information.

If you are working with a DSLR, there will be a button to activate *live view* so that you can see what the camera is capturing. The live view button flips up the mirror that is directing light to the viewfinder, and instead directs that light into the sensor, allowing you to view your subject through the LCD display.

Getting a screen protector will ensure that your display will be protected from scratches that can dull the screen over time. It's much easier and cost effective to replace a scratched screen protector rather than have to send your camera in for the display to be serviced after it has been damaged.



Protecting Your Camera

Camera soft cases come in all shapes and sizes, but it really comes down to personal preference, and what type of bag is right for your body. Backpacks are great for holding lots of stuff, or a mix of camera gear and personal items. Shoulder bags are versatile as long as they aren't too weighty. A camera bag is one of the few items I recommend you go to a store to try on. If you are going to put your gear in a bag, you want to make sure that you like the way the bag is designed to protect your equipment, as well as determine the comfort of the carrier on your body.



There are hard cases available, like Pelican Boxes, that are designed for rugged all-weather use and heavy travel. Often these hard cases have rubberized gaskets to prevent the elements from leaking in, as well as an egg-crate foam to hold the gear in place while in transit. Hard cases are awesome because they are pretty much bust-proof, I watched my former photography professor drive over his pelican case with a VW van to prove a point one time, but they can be clunky and cumbersome.

More often than not, I keep a small soft case inside my backpack to protect my mirrorless camera, but can easily transfer that small soft case to another small purse or bag.



Exploring the Camera

Before you get serious about taking pictures, spend a few hours poking all of the buttons and wheels on your camera. By familiarizing yourself with where features are located on your camera when scrolling through all of your camera menus, you'll be able to determine where options for image adjustments are located.

Some cameras even have a way of 'favoriting' most your used functions, and you can create a custom menu of the settings you adjust the most.

Familiarizing yourself with the camera menus will help you use the camera as a tool in a more efficient way. Like any skill, photography takes some dedication to get through the completely monotonous part. We will go over this more in our [Camera Settings lesson](#).



Class Project

Take your camera for an adventure, and go for a photo walk. Consider your camera both tool and toy. Share an image from your walk in this class, be sure to include a story about your photo.

LESSON 3: IMPORTANT CAMERA SETTINGS



Once you've read the manual, start exploring the menus and settings. It's one thing to know that your camera has a special setting for what you want to do; it's another thing to find it in the field when the opportunity to take the photo you want is rapidly fading. Fumbling with the camera is a great way to not get the shot you want. The most coveted shots are of fleeting moments, not of still things, even two seconds of lost time messing with your camera can lead to missing a worthy photo.



Memory Formatting

Before we dive into why formatting memory is important, remember that each image you make *is recorded* to an ejectable memory card. That recording time can differ based on the write speed of the memory card, the size of the image you are capturing, how long your shutter is open during your exposure, etc.

Formatting your memory card helps optimize your camera's ability to record images by resetting the data on your memory card and wiping all files from it.

Camera models write data to memory differently depending on the brand, and even model generation. Some cameras will even populate multiple files for each image made, so be sure to check your settings. To ensure fast write speeds to the memory, format the card for each camera you use - this way the file system on the memory card is native to the camera, without traces of other filetypes potentially corrupting your data.

CAREFUL: Formatting a memory card erases the entire contents of the card, so be sure to have transferred all of the images you wanted to keep to a computer or hard drive.

To format your memory card, turn your camera off, insert the memory card into the camera, then turn on the camera. Open the menu and navigate to the option that allows you to format the card.

After the memory has been formatted, you're in great shape to start tinkering with other options and settings.



Filesize and Image Quality

It's easy to liken a digital photograph's filesize to the olden days of film photography. In film photography, there are multiple sizes of films available to use with different kinds of cameras. There is 35mm film, or 120mm film, even big sheets of 8"x10" film (All of those things still exist btw, and are becoming increasingly expensive to work with as digital reduces the market demand for film use, but there are many still championing working with film.) All of these film sizes are designed to scale to different print qualities - an increase in film size correlates to finer details and better tonal quality.

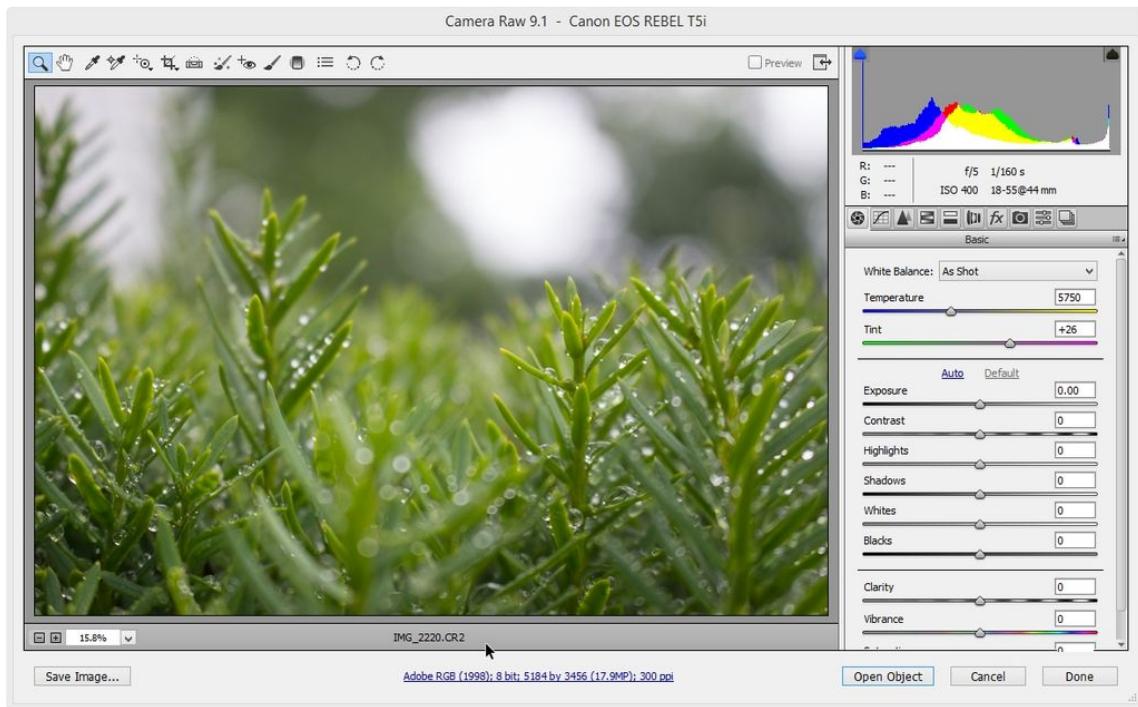
In our [Choosing a Camera lesson](#), we went over concepts like resolution and sensor size. The filesize settings within the camera assert control over picture size, or pixel dimension, and image quality.

Your camera can write and record a .JPG file and nicer cameras are capable of producing some kind of RAW file format. Let's address the difference between .JPG files and RAW files, which will also guide us to the concept of compression, and how it can affect image quality.

While your shutter is open, the camera sensor is flooded with light data from the lens tube, and this data is written to your camera's memory. As this information is being written to memory, the camera's computer analyzes the data to tone and render your image. This recording is quickly compressed into a .JPG file.

If your camera is capable of shooting RAW images, it will generate an image with a .CR2 (Canon Raw) or .DNG, which means 'digital negative' filetype. A RAW image file does not undergo any kind of compression and takes longer to write to memory because there is additional tonal and exposure data being taken into account. All of that additional exposure

data only serves you if you intend to digitally process your photos on your computer. Your RAW images may appear to have a lower tonal contrast while viewing them on your screen, this is because your highlights and shadows are not being compressed like they are during .JPG image writing.



Take note that RAW files need to be processed in a digital post-processing environment like Photoshop, and converted into another file type like a .JPG or .tif before it can be printed or shared. So if you shoot in RAW, be prepared to digitally process your images on your computer. [Instructables author blinkyblinky](#) does a great job explaining RAW processing in [this instructable](#).

80% of the time I am shooting .JPG, because I know that my images are going to the web on Instructables and don't need to be viewed at super high resolution or scaled for print. Because .JPG files are compressed, they take less time to write to your camera's memory, I move to RAW when I know that I have to print my images, or may need to use a high-res source file for multiple uses.

More on Compression

In addition to file type, you can control the compression quality on your images. Your camera will be able to create files of different pixel dimensions, ranging from Small to Large, with different compression options - normally called "Fine" and "Superfine". To the naked eye it is hard to tell the difference but when we zoom in to observe image pixelation, you can notice the difference in the quality of the details, or even banding in skies & gradients.

It is best practice to set your camera to record with the best possible image quality and biggest dimensional size because it gives you the most options later. When you manipulate file quality settings, the size of the resultant image file will be affected. Higher quality images take up more memory than compressed small-sized images. If your camera is running out of memory space, you can always reduce your image quality and size to get more images on the card, but those images will not look as good as the ones you've already made.



Color Temperature and White Balance

Color temperature refers to the toning of your images. The best way to make sure your images have the correct color temperature on your camera is to look at your black, white, and gray tones in the images you are creating. This is called *white balancing* - if your grays and whites have a slight bluish/greenish or yellow/magenta cast toning your image, try adjusting your color temperature in your camera settings.

Color temperature is called out in your camera with little icons that look like some common kinds of light sources. A lightbulb for indoor light, a sun for bright daylight, a cloud for overcast skies, etc. Each setting adds the *opposite tones*, trying to remove the color cast that is associated with different light sources.

The below graphic demonstrates how different light sources can affect your white balance, and how your camera settings compensate with designated settings.



Most modern digital cameras have a way to adjust the color temperature of the images you are trying to shoot. *Color temperature* is usually represented in two ways : by calling out a lighting condition (i.e. Daylight, Flash, Cloudy, etc), or in a unit of measurement called Kelvins.

If you have the ability to set your camera's color temperature in Kelvins, color temperatures more than 5,000K will be more bluish, while lower color temperatures 2,700–3,000K will render warmer or more orangey/yellowish tones. If your photos look a bit yellow, then turn the temperature down, and if they are blue turn the temperature up.



Shooting Modes

Your camera most likely has a little wheel on the top with lots of modes and quick-select features it is capable of. If there is not a wheel, refer to your camera's manual to determine how you can select between shooting modes.

Common Camera Modes

Automatic - Your camera auto selects all exposure data for your scene, and you have minimal controls over settings like color temperature or card formatting.

P(rogram) - Your camera is still autoselecting all the settings for your camera's exposure data, but you have control over color temperature and exposure brightness.

Close-up or Macro Mode - Your camera will adjust its depth of field so that the background is out of focus, and just your foreground, or the objects near your lens, have sharp details.

Landscape mode will expand your camera's depth of field so that your foreground and background are tack-sharp. Your camera's flash will be disabled in landscape mode unless you turn it back on to use as a fill flash for the foreground. (We will go over this more in our [Artificial Lighting lesson](#))

Panorama Mode - Your camera may be capable of capturing a panorama, and will have special instruction in your camera's manual on how to access that function. In all honesty, I rely more on my smartphone to create Panoramas because it uses an internal accelerometer to stitch together panoramas with pin-point accuracy.

Sports or Action modes push your camera's sensor to be more light sensitive so that when you are making a photograph your shutter doesn't have to be open as long to capture motion.

Your camera may also have some advanced shooting modes, we will touch on these camera modes (like the ones marked 'M' 'Av' or 'Tv' on your camera) in our [What's Next lesson](#).



Class Project

Go out photographing and adjust your camera's color temperature setting to see what kind of effects you are able to create in various lighting conditions. Share a photo of from your experimentation to complete this lesson!

In the next lesson, we will go over How to Hold the Camera, and why it is important to pay attention to the way your camera is positioned in the space you are making images within.

LESSON 4: HOLDING THE CAMERA



It seems like we wouldn't have to go over this - but there are some serious benefits to understanding how the way you hold the camera affects your images. If you are struggling to get a good composition or a sharp shot, playing around with different camera angles and body postures can be vastly beneficial.

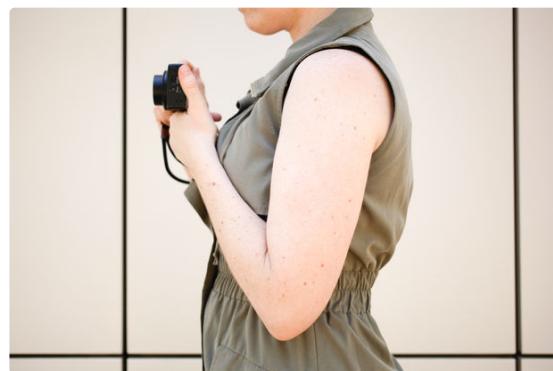
This lesson will outline some do's and don'ts for improving your images with some simple body adjustments.



Body Posture

While I was working on my photography degree, one of our professors would regularly take us out into the field to help us with technique while observing our form. I'll never forget the day I was hunched over a bush taking a picture of bees buzzing in lavender when they came over to me, unfurled my rounded back and said to me "There are other ways to lower your camera, don't be afraid to use some muscles." They then directed me to widen my stance, bend the knees, and bring my arms in closer to the body. Paying attention to your own body's stability will make you a better photographer, and *really tell you when you should be using a tripod*. Engage your core muscles while shooting, become a pillar of stillness. Good shooting posture does more than improve your images, it's also kinder on your body!

When Standing



As a simple exercise, hold your arms out in front of you. Look at your hands down to your fingertips. Are they moving or swaying at all? Unless you are super buff, I am guessing your body is swaying ever so slightly. When we hold cameras far away from the body, they become less stable, and if we are shooting in low light and the camera's shutter will be open for a longer amount of time, it is imperative for the camera to remain still to avoid blurry images. By bringing the limbs closer to the body, and into the core, we are far more stable. While standing up, you can usually achieve solid contact points by resting your elbows against your sides, or even into your tummy.

When Crouching...



Sometimes you're going to have to get low to the ground to get your shot. When holding the camera while crouching, you actually don't want to rest your limbs on hard objects around you or joints. This actually creates more wobble. For example, you may be tempted to rest your elbow on your knee while you are composing your shot. When your joints are touching like this, you can shake and shiver to hold yourself in position. Instead, bring the elbow back slightly so it may rest on the squishy and shock absorbing part of your thigh. This squish stabilizes your movement and reduces camera shake.

How Holding the Camera Affects Perspective

The following goes over how holding the camera in your hand will change the *perspective* or *point-of-view* of your photographs. These same principles apply on your smartphone just as much as they do on your DSLR.

Bird's Eye View/Top Down



High Angle



Low Angle



Swing Right or Left



Head-on or Eye-level



If the images you are creating look distorted in your screen, try adjusting your angle in the wrist and hand. Move the body around to frame the shot from different perspectives. Don't

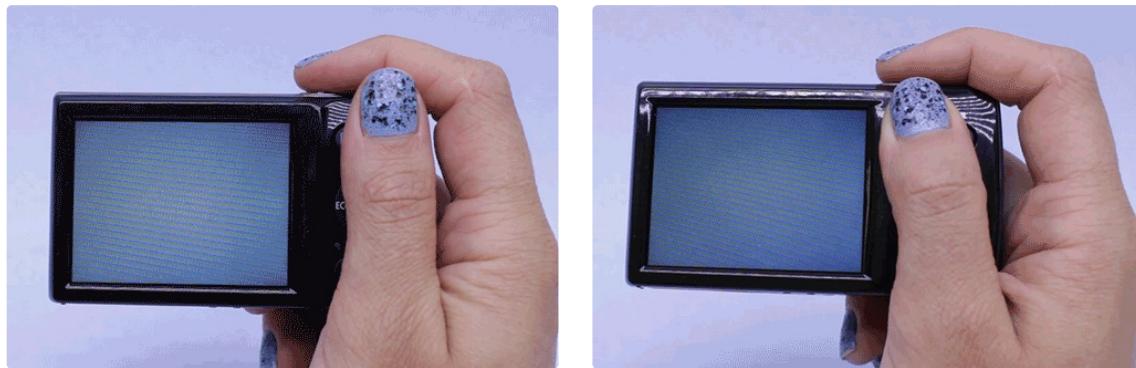
be afraid to look like a dork in public contorting your body to get the shot you want,
sometimes you just have to so you can get the perfect picture!



Still Getting Camera Blur?

If your photographs are still turning out blurry, it could be a matter of correcting your shutter finger.

When you really smash your finger onto the shutter, often you end up curling your whole hand flexing so hard that you ever so slightly twist the camera. This is problematic because it can result in moving your camera away from the shot you had composed or blur in low light situations. With your shutter finger hovering over the button, roll your finger back across the button instead of hooking your finger straight down onto the shutter.



If you have observed and corrected all your shakes and wobbles and you're STILL getting blurry images, maybe it's time to use a [tripod](#).



Class Project

Share some photos demonstrating the five perspectives that we went over in this class.
Bird's Eye View, Tilted Down, Tilted Up, Side Swing, and Neutral.

LESSON 5: TRIPODS AND SUPPORTS



A tripod is regarded as an essential piece of equipment for any photographer.

Photographers rely on tripods for lots of reasons: to support heavy cameras, to get consistently framed shots, to take timed family portraits, etc.

The number one occasion that calls for the use of a tripod is photographing in low light.

There are times of day when there is less light in your setting, like sunset and night, and your shutter has to be open for longer to get the right amount of light data to have a proper exposure. Your camera's shutter will have to be open for more than a thirtieth of a second (1/30th) while shooting in low light or darkness, meaning that your image may be blurred if it isn't locked down on a tripod.

Tripods make you a more accurate photographer. Taking photos of small objects can be challenging even in the brightest light. When you are trying to frame a very small static shot, minor movements can be critical to a strong composition and steady shot.

Tripods can also be cumbersome. They aren't really suited for use when you may be trying to capture rapidly shifting motion, or walking through different settings.

This lesson goes over the pros and cons of working with all different kinds of tripods and helps outline which is the best suited for use in any situation.



Collapsible Tripod

Your standard collapsible tripod has three legs that can extend and lock at various lengths, a head that swivels and pans, and if you're lucky, a bubble level to help you frame your shot just right. Some tripods have small points on the end, with a screw-down rubber foot. These spikes help get more traction on dirt, gravel, or grass turf. The rubber foot is more suitable for slick indoor flooring.

The very top of your tripod will either have adjustable arms that help it articulate, or a ball joint that your camera attaches to. Ball head tripods are great for traveling because there are no bulky arms sticking out of it, just a screw to adjust the position of the camera. Tripods with articulated arms may be clunky and cumbersome, but are way more precise than ball-head tripods and great for composing still lifes and group portraits.

Lightweight tripods may sway a bit in the wind. Using them less than fully extended can reduce camera shake. You can weigh them down with something heavy like a backpack or camera bag to help reduce motion-blur, this way you are pulling the rig down into the ground and stabilizing the legs.

Tripods can even jitter after you depress the shutter button. To avoid the image blur you get from releasing the shutter, try using your camera's 2-second or 10-second timer function. Yeah, you'll have to wait for your shutter to actuate, but that extra time insures that all the vibrations from your touch aren't making your images blurry.



Mono Pod

Monopods are an awesome solution for wanting the stability of a tripod while you are on the go. They are great to use when you are shooting action shots, and allow you to create a movable but stable plane between your camera and the ground. Remember, the more stable and still you can keep your camera, the sharper your images will be.

Monopods are super portable, and typically very lightweight. Furthermore, they are much quicker and easier to set up than any tripod, since they only have one articulating limb.

It is common practice for pro photographers use monopods to stabilize heavy telephoto lenses. But even if you are just starting out and your camera feels too heavy in your hands, try using a monopod raised to a comfortable viewing level so that you may compose your shots comfortably.

Monopods do have their drawbacks. They are not a substitute for a tripod in dark conditions, as they will inevitably sway and create camera shake without the support of two additional legs.

I recommend practicing with a monopod in your home or in a park before you try to take it out to capture any kind of motion or action. Each monopod will have a little bit of a learning curve, so knowing your gear in-and-out before using it in a practical way will help hone your image making skills.



Clamping Mounts and Articulated Leg Tripods

Articulated Leg Tripods refer to tripods that have legs that are made out of flexible repositionable ball-joints that can level cameras on uneven surfaces or be wrapped around awkward shaped objects. These guys are not always designed to hold large cameras, so make sure that the one you select can bear the weight of your camera.



Clamp Camera Mounts are awesome for sticking a camera somewhere awkward where there is not a stable plane to set up a tripod or rest a camera. Clamp mount rigs come in all kinds of shapes and sizes, some have goosenecks so they can be repositioned and adjusted once they are clamped to a surface, some have ball heads so that you can have more precision and completely reduce camera shake with the camera properly stabilized and weighted over the legs.



Selfie Sticks

I know what you're thinking, "A Selfie Stick?! REALLY?!?" I am here to tell you resoundingly "YES! A THOUSAND TIMES YES!"

Part of being a great photographer is acknowledging that sometimes you have to look like a total dork to get a great shot. Instructables HQ is along one of California's epic Tourist destinations, the San Francisco Embarcadero. Every day on my way to work I would pass oodles of visitors taking photos with selfie sticks, trying to capture their visage in front of the picturesque San Francisco Bay and historic architecture. I scoffed at them, thinking they look ridiculous. Then one day, Pier 9 Shop Manager J Sassaman, came up to me and took a selfie with me using the longest selfie stick they could find on the internet, and then turned the camera around to take a super high up shot of the building we were in. J's enthusiasm for the photography tool converted me to a proud selfie stick owner and user, and I've never looked back.

Anecdotes aside, selfie sticks are awesome to use with cell phones, but some models of selfie sticks are specifically designed to take larger/heavier cameras and can be used with a standard tripod mount. If you are going to use it with just your phone, pick one out with a phone adapter that you know will effectively hold your phone and make sure you understand the shutter mechanism on the base of the stick before you take it into the field for use.

Selfie sticks can also double as a monopod, and that is some serious bang for your buck.

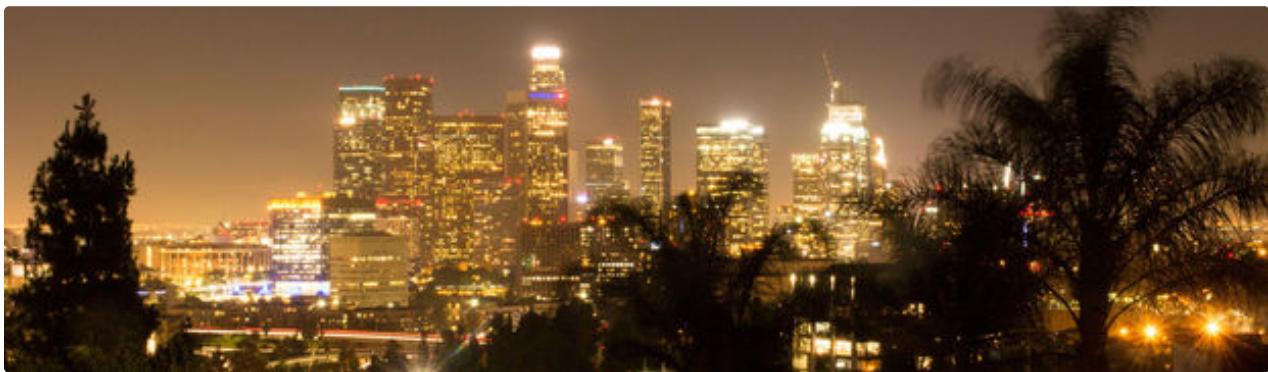


But Really, Tripods Are Great

When I first started out, I thought all the answers to fix my bad photos were gear related. I used to be obsessed with buying lenses and flashes, but as I honed my skills as a photographer, I developed a visual style that relied on just a few pieces of equipment over and over again.

Now, the largest growing collection in my gear stash is tripods of all shapes and sizes, because a great photo starts with great composition and perspective. If I'm not able to hold the camera steady for the picture I am trying to get, I'll use a tripod to assist me. If I want to nail perfect perspective without needing any post-processing on a computer, I'll use a tripod to fine tune my framing.

We'll talk a little bit more about tripods in upcoming lessons, but they are infinitely valuable in helping make great photos.



Homework

Be a night hawk! Find a tripod solution that works for you and your camera. Consider the types of images you are trying to capture, then go forth into the night and make photographs!

LESSON 6: NATURAL LIGHTING



Every photographer has a love/hate relationship with the sun. Thank goodness for the super hot star that fills our landscapes and windows with lots of glorious light beams, yet harnessing the sun's rays for photography can be tricky. Shooting in direct sunlight yields great high contrast photos, but we get pesky harsh shadows that can be distracting. Shooting in the shade can be just as gorgeous, with your subject bathed in soft diffused light, but exposing for shadows can leave our images dark and with a bluish color cast.

This lesson goes over some of the most common natural light scenarios and how to adapt your camera settings and physical positioning to perfectly light your photographs.

How Time of Day Effects Light

Depending on the time of day the light will take on different color casts and brightnesses. When clouds cover the sky, the color temperature of your image can take on a cooler tone. Twilight and sunrise hours lend themselves to dim pinky skies, while high noon yields bright neutral tones and higher contrast.

For the purpose of this class, I photographed a vista in my neighborhood that, on a clear day, includes the world famous Hollywood Sign.



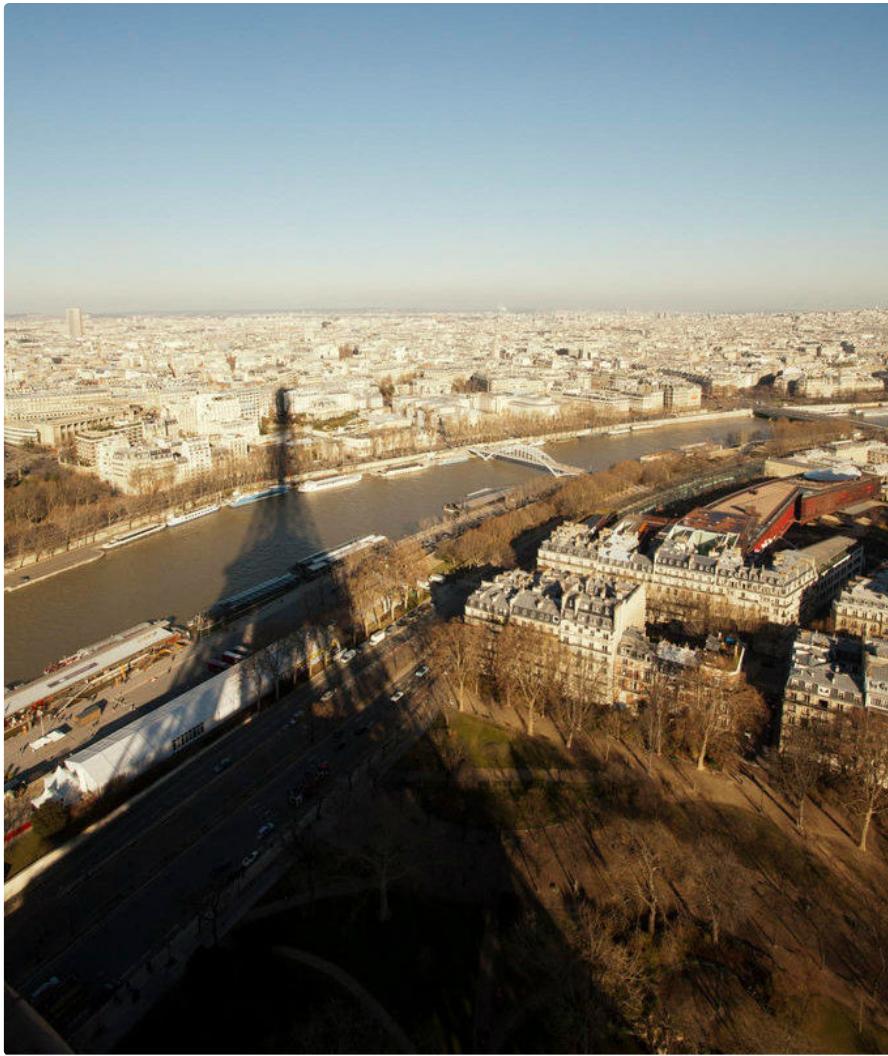
There are two special times of day that are spectacular for making photographs, we refer to them as Golden Hour and Blue Hour. *Golden Hour* is the first hour and last hour of sunlight in the day. The sun is still able to be a direct light source, but dim and more diffused than mid-day sun. *Blue Hour* refers to the hour before and the hour after the sun has set, when the sun is below the horizon but still filling the sky with light.

I put an app called [SunSeeker](#) on my phone to help me figure out where the sun is going to be to help me plan for shadows and brightnesses depending on the time of day. It's a bit pricey for an app (\$12), but it's a great tool for planning natural light photographs.



Shadows

Shadows will vary in form as the light source creating them moves - i.e. the sun creating longer shadows as the sun sets in the sky. Shadows also help establish depth in images, the human eye and brain recognize that an object that throws a shadow takes up space, and the size of the shadow in relation to the object can indicate scale and dimension.



Shadows can also indicate time in your composition. We innately recognize long shadows as things that occur in the early morning or just before sunset. If you want to have your subject contextualized by time, it is important to look at how shadows affect both the exposure and the context of your image.



There are lots of ways to tell a story with just shadows, they can create a dominating presence in our images that are able to carry narrative more than objects or people or settings can at times. We can harness shadows in our imagery through a better understanding of the light sources creating them.

For example, let's use every photographer's most faithful light source, the sun. Shadows produced by the sun are clearly defined with crisp edges. The closer an object is to the surface that it is casting a shadow on, the crisper the shadow will appear. As the object moves toward the light source, and away from the surface, the shadow's edges begin to blur.



When it is cloudy outside, the sun is diffused by the overcast sky, and all the shadows in your setting will soften, and have very little form. This is perhaps my favorite quality of light, it is a soft diffused light that evenly fills in shadows and flattens space and dimension in an aesthetically pleasing way. It also renders much cooler tones in your image, reference how to manage cool tones in our [Camera Settings lesson](#).

When we move indoors, we begin to encounter multiple light sources, and multiple shadows can be cast by a single object. We will go over this more in our [Artificial Lighting lesson](#).



Shade

Photographers really do have it made in the shade. Shooting images in the shade of trees or tall buildings render lower contrast and have a bluish color cast. (Look back to our [Camera Settings Lesson](#) to see how to correct for that). Shade is your best friend because all shadows disappear and you are able to get soft blankets of light coating your subject vs harsh sunspots and high contrast values.

Working with your subjects at the edge of a shadow cast by a tree or building will yield the best tonal quality. When you position your subject at the edge of a shadow, facing where the direct sun is hitting, you get a soft diffused light falling on your subject, but don't end up with dark tones in your background.

Try to avoid placing your subject in a shadow where the background is in direct sunlight. The bright sunlight falling on the background may cause your camera to adjust its settings so that your background is the proper brightness but your subject appears dark.



Window Light

Window light is a personal favorite of mine for indoor photography, and especially helpful for food photography. It is like a softbox of light that fills a space unless there is direct light coming in from the sun. You can get some really beautiful results from the comfort of your own home. I often find myself tinkering with the way people and subjects are arranged next to indirectly sunny window light, and getting a myriad of results quickly.



Window light can create all kinds of interesting light and shadow profiles on your subject. Try adjusting the angle that your subject is facing the window, and how it is positioned next to the window (with the light in front, to the side of, behind, etc.)



The Moon

That's right! THE MOON! The first time I realized how bright the moon was, I was astonished. Consider the moon the original sun reflector, it bounces and reflects the sun's rays, throwing a ton of light onto the earth's surface and into the night sky.

You may want to use a moon position calculator to figure out when the moon is going to be out in your shooting location. Because the moon's phase is constantly changing, this means that it is throwing a different amount of light down onto the earth's surface every night. There are some [web apps](#) and [phone apps](#) available to help you determine where the moon will be in the sky, its phase, and its rise and set times.

When shooting in the dark, your camera needs to make very long exposures, so it is critical to have your camera rock steady. The worst is pushing the shutter, waiting for your camera to process the long exposure, only to see that a slight breeze has ruined your shot with camera shake.



These images were made with a monopod during a full moon hike just outside of an urban area. A monopod doesn't reduce all shake, but if your shutter isn't open for too long you can pull off a steady shot. For this shoot, I figured out when the moon would be at its highest position in the sky, thus the brightest, and planned to be at the top of the trail to capture some images during that period.

Class Project: Reflecting Light

For this class project, we are going to go over how to make a super simple light reflector, perfect for shooting inside or outside. Working with a reflector is awesome because you can create a secondary light source in your image that is fairly manipulatable and completely mobile. Most often you need a reflector to shine extra light on your foreground when your background is very bright, or if you want to create a highlight beam on your subject in a shade or shadow.



For this project you will need:

- Piece of Foam Core Posterboard
- Aluminum Foil
- Spray Adhesive
- Heavy Duty Spring Clamps (optional, just to clip your reflector to anchor it)

I am forever a fan of cheap and easy solutions, I got all the supplies except for the spray glue at the dollar store. For tips on how to use spray glue, check out my previous class [that is all about glue!](#)





This concept scales easily, and if you need a really big reflector, you can piece together smaller planks of foam core board with good ol' fashioned gaffers tape or clear packing tape.



Make your own reflector and share your images from your build or photo shoot to complete this lesson. Have fun with it too, be sure to see what flashing light on a variety of surfaces looks like. Can't wait to see what you share!

Our next lesson dives into the world of Artificial Light, it's electrifying!

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LESSON 7: ARTIFICIAL LIGHTING



Being aware of electric lighting used indoors and outdoors will better tune your eye to color casts and shadows, but incorporating artificial light into our images can be challenging. This lesson goes over some of the most common sources of artificial light, and how we can harness these various light sources to make awesome photos.



That Darn Flash

Understanding your camera's flash module is critical to getting great images that use flash effectively, and avoid overexposure or uneven lighting.

It is important to note that flashes are different than a continuous light source like a light bulb. They discharge a *LOT* of light at a fraction of a second. Your camera's battery directs current to a tiny electrical component called a capacitor to discharge a high amount of electricity into a tiny xenon tube inside your camera's flash housing. That tiny pop you hear when the flash goes off is the sound of that light tube being charged. The brightness and intensity of the flash will vary - it depends on how big the flash-head is, how it is designed into your camera, even the charge level of your battery - depending on your camera.

Some cameras have settings that allow you to control the intensity of the on-camera flash. If your camera has a flash built into its body, reference your camera's manual to see if there is any custom functionality beyond automatic control.

On average, the light being thrown from your camera's flash will usually travel a max of about 15 feet, so be sure that your subject is positioned near your camera. Also be aware of 'bounce' surfaces nearby.



If your camera has a pop-up flash, try diffusing it with a semi-translucent sheet of plastic like [eejit](#) has [in their Instructable](#).

Fill Flash

The most common use of on camera flash is called Fill Flash. Fill Flash is exactly what it sounds like, you are using your camera's flash to illuminate shadowy subjects in the foreground of your image.



The above picture of my dog Stella was shot in front of window light without, then with, a fill light from the camera's flash module. When using fill flash, it can dimensionally flatten your images, so be aware of how your image appears when using flash.

If your subject appears too washed out while using flash, try backing away from your subject, and zooming in with your camera lens. This way the light has to travel farther, losing intensity as the photons from the flash pop need to travel farther to bombard your subject with light.



Indoor Lighting

Remember back to our [Important Camera Settings Lesson](#) when we went over color temperature and setting white balance on your camera. Indoor lighting's color temperature typically ranges from 2700°K to 3000°K , and the presets on your camera are designed to adapt to very specific kinds of indoor lights, removing the color cast associated with incandescent and fluorescent bulbs. Shooting in semi-automatic and manual modes allows you to white balance your photographs to match your light source. If your images ever appear blue or orange indoors, try adjusting your camera's white balance.

With the advent of compact fluorescent lights and LED light bulbs, we can find lights that can go to just about any color temperature. [Some of them can even be controlled by your smartphone!](#)



I know this is a no-brainer, but indoor lighting isn't as bright as the sun, and your camera settings need to be adapted for shooting inside. Your shutter will typically be open longer than it was while you were shooting in natural light, so depending on your camera and the settings you have access to manipulating, you may need to use a tripod inside to get a crisp shot.

The benefit to working with indoor lighting is that bulbs are usually quite soft and diffused unless you are directly next to your light source. Lightbulbs can throw shadows in all kinds of directions, we will get to some creative use of this later in the lesson, but it is important to be aware of the shadows being created from multiple light sources in a room, or if there are multiple color temperatures being emitted.

Supplemental Lighting

If you are having trouble getting great shots with existing light in the environment you are photographing in, it's time to bring in some additional light sources. The following goes over some easy options and what they are used for.

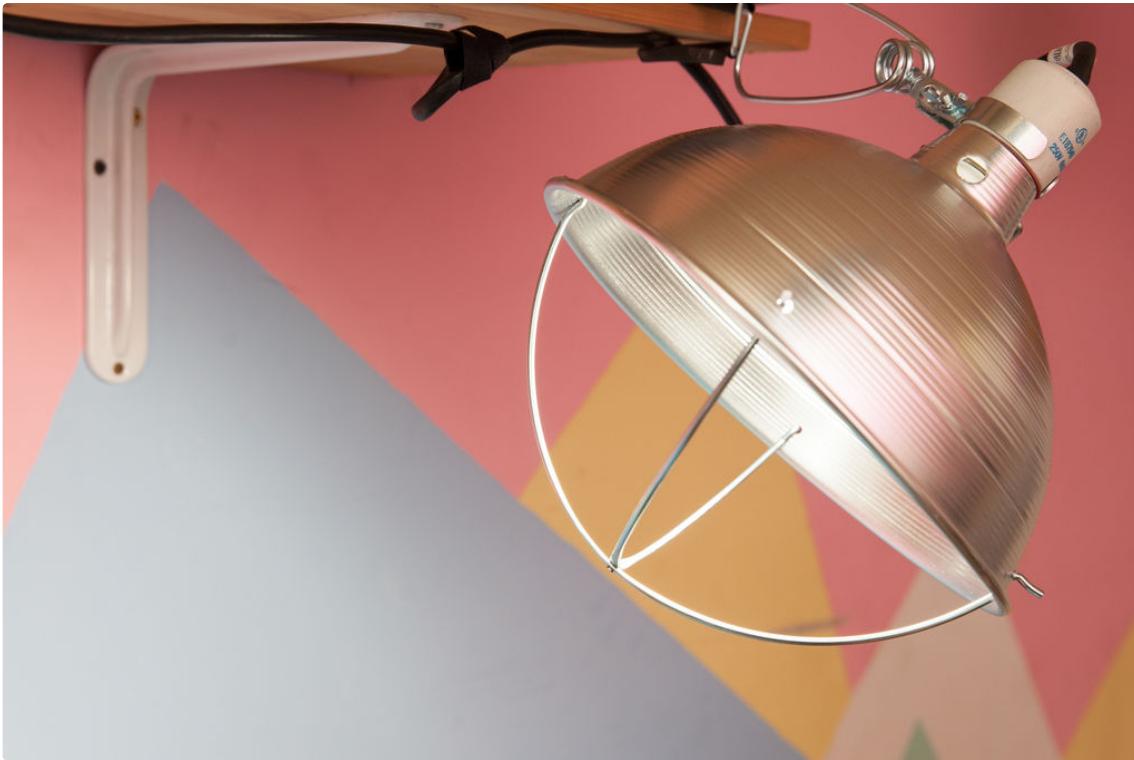
Light Stands



Using light stands is a great way to have controllable, and movable light sources for your photographs that can be packed away and stored when not in use. [This set is an affordable starting kit](#) that could work for lots of different lighting situations.

Light stands have a lot of couplers that photographers can use to attach fancy diffusers like umbrellas to them, but these kinds of setups are bulky and unwieldy, and can get expensive quickly

Clip Lights



Using clip lights or clamp lights is one of the fastest ways to mimic studio light indoors. This style of light is even faster than working with a light stand because you just plug them in, clamp them to something near by, position the dish, and turn them on.

They store easily, and can quickly be implemented in staged photographs to create fill light.

My 'home-studio' is actually just a converted one-car garage, with a fancy paint job. There is no natural light that comes in, and I rely entirely on movable clamp lights with LED bulbs. Using two or more clip lights attached to shelves or light stands has revolutionized my ability to make great images in any poorly lit space.

Paper Lanterns



A paper lantern is awesome for lighting a larger space with soft diffused light. It differs from a clip light because it is able to throw light spherically, whereas a clip light has a dish that only allows it to throw light hemispherically.

I most often use paper lanterns for shooting in my kitchen because it fills the room with a soft light that can act as a great fill light for the natural light coming in through the windows. My shadows are rendered soft, and the objects photographed are evenly toned.

Class Project: Harnessing Light

It's time to use different artificial light sources to illuminate *your* images. For this class project, we are going to build a dimmable 2-point lighting rig. This is the kind of lighting set up I use for 90% of my photographs on Instructables, and versatile to no end.



Materials Needed:

- 2 clip lights
- 2 dimmable LED light bulbs
- Extension Cord with splitter at the end
- AC Dimmer
- 2 shower caps



Connect the AC Dimmer to your power outlet, and put then plug in the extension cord coming out of the AC dimmer. You now have a mobile variable-power outlet that you can plug the clip lights into. Clip your light to a nearby shelf or object. Don't be afraid to use A-clamps or gaff tape to hide your cords.



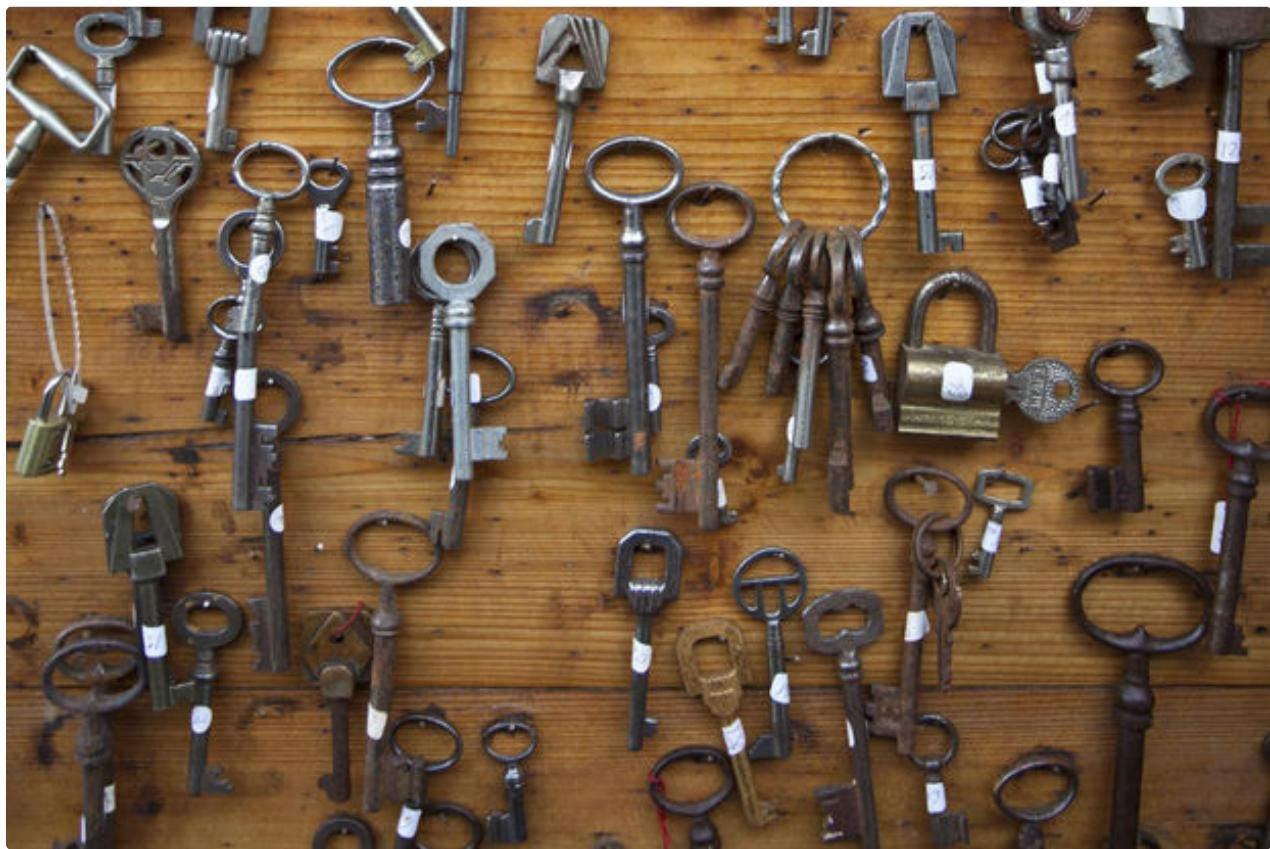
The dimmer switch can help you control the light intensity of the clip lights, perfect for dialing in the amount of fill light you need in mixed-light indoor setting. By stretching a shower cap over the clip light's dish, we are able to get a desirable soft diffused light being thrown onto our subjects, instead of a direct light that casts a harsh shadow.

Get a clip light and explore how attaching it to different objects in a fixed scenario affects the exposure and composition of your photographs. Share your results with other Instructablers in the Class Project module to complete the lesson.

If you want to really play, see what happens when you add a third lighting source, Instructables author [EvanKale](#) does a great job explaining [the advantages of 3-point lighting](#). You could even combine your artificial light source with the reflector we made in the last class.

[In our next lesson, we tackle Composition and dive into what separates a lucky shot from a great photograph.](#)

LESSON 8: COMPOSITION



What is composition?

Composition is a set of visual rules that has been handed down from eons and eons of painting. Early photographers tried to mimic the compositions of the old masters, like Vermeer and Rembrandt. Some of the first photographs and Daguerrotypes have a very painterly quality to their scenes because up until the invention of the camera, paintings were the only way humans could interpret and recreate what we had seen. Early photographers mimicked painting because it was the only way they could imply a value for their image creation process - thanks, Painting!

The more you take photos, the more you will 'learn to see'. Photographers talk about this concept a lot. Your eyes and brain become attuned to framing compositions before you even have your camera out. To become excellent at creating structure and beauty in your images, it first starts with an awareness of the shapes and forms that exist all around you.

My former roommate who is a musician once told me "Playing music only becomes fun once you practice enough to make it fun". I think this statement applies to any creative practice, and to apply it to photography, the images you compose will only become better as you make mistakes and capture lots of images.

With the advent of digital photography, we no longer have to process rolls and rolls of film, instead, we are able to rapidly learn how to take photos by making lots and lots of images. In olden times, you know, 15 years ago, you were limited to 24 or 36 shots per roll, then you would have to wait for the images to be developed by a photo lab.

Being a great photographer takes practice, so make lots of pictures! And be your own critic!



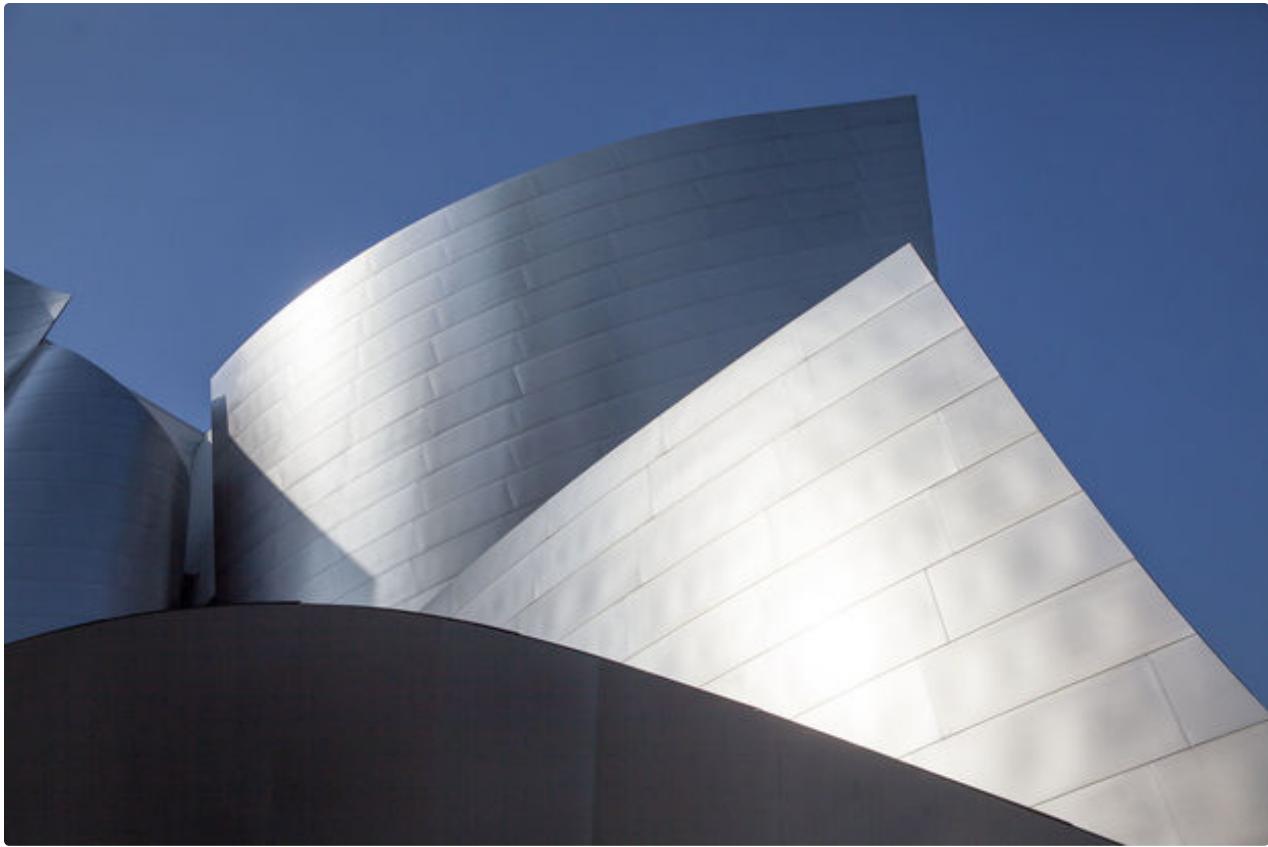
Rule of Thirds

Photographers often frame their compositions so that they are divided into 9 equal parts. Images are vertically and horizontally sliced by 2 lines on each axis, creating 3 columns and 3 rows. To create an aesthetically pleasing composition in your image, try arranging your subject matter along these grid lines, with important focal points at the intersections of the grid.



If you decide to place your subject matter in the center, instead of to the side slightly, balance the image by putting equal amounts of space on each side of the subject. This way you are still creating a 'thirdsing' in your image with negative space around your subject.

Some cameras help you out a little by having the ability to superimpose a thirds grid over your image while you are composing your shot before you depress your shutter, so search through your camera's viewfinder options to see if that feature is available to you.



Negative Space

The space around your subject can make or break your composition. You may have the perfect light for your portrait or snapshot, but a busy background that crowds your subject can distract the viewer from the focus of your subject.

Negative space is what shapes the form of your subject, creating the leading edge of the background surrounding your foreground and subject-matter, kind of like an outline. Try to imagine each object or person in your foreground as just a silhouette, then consider how do the forms of these silhouettes look arranged next to one another?

By moving your physical position around your subject, shooting from multiple angles, you are able to exercise greater control over the negative space and shapes in your composition. You can give your subject a lot of space to create scale in your image, or crop closely so that you may remove all the distracting elements from your images.

Even your shadows can have distinct form and shape, so be sure to pay attention to how the shadows in your image interact with your subject and foreground.



Perspective and Framing

Creative use of perspective is perhaps the most important and challenging compositional device to master. How we hold our camera, and where we photograph our subjects from can help frame and contextualize our images' mood and flow. Your viewer *sees and feels* the moment you have framed from the perspective you shot your image. If you are shooting at eye level, try shooting from the hip to neutralize your subject even more within its background. Alternatively, try shooting from super high to give your viewer a sense of dominance and mastery over a landscape or vista. We covered this in [How to Hold the Camera](#).

Consider your background, there are frames in the wild that are great perspective indicators for your viewer. Archways and doorframes can contextualize your subject in their setting, but there are plenty of natural features that can act as frames as well, like trees lining a trail or mountains converging ridgelines to a tree, etc.

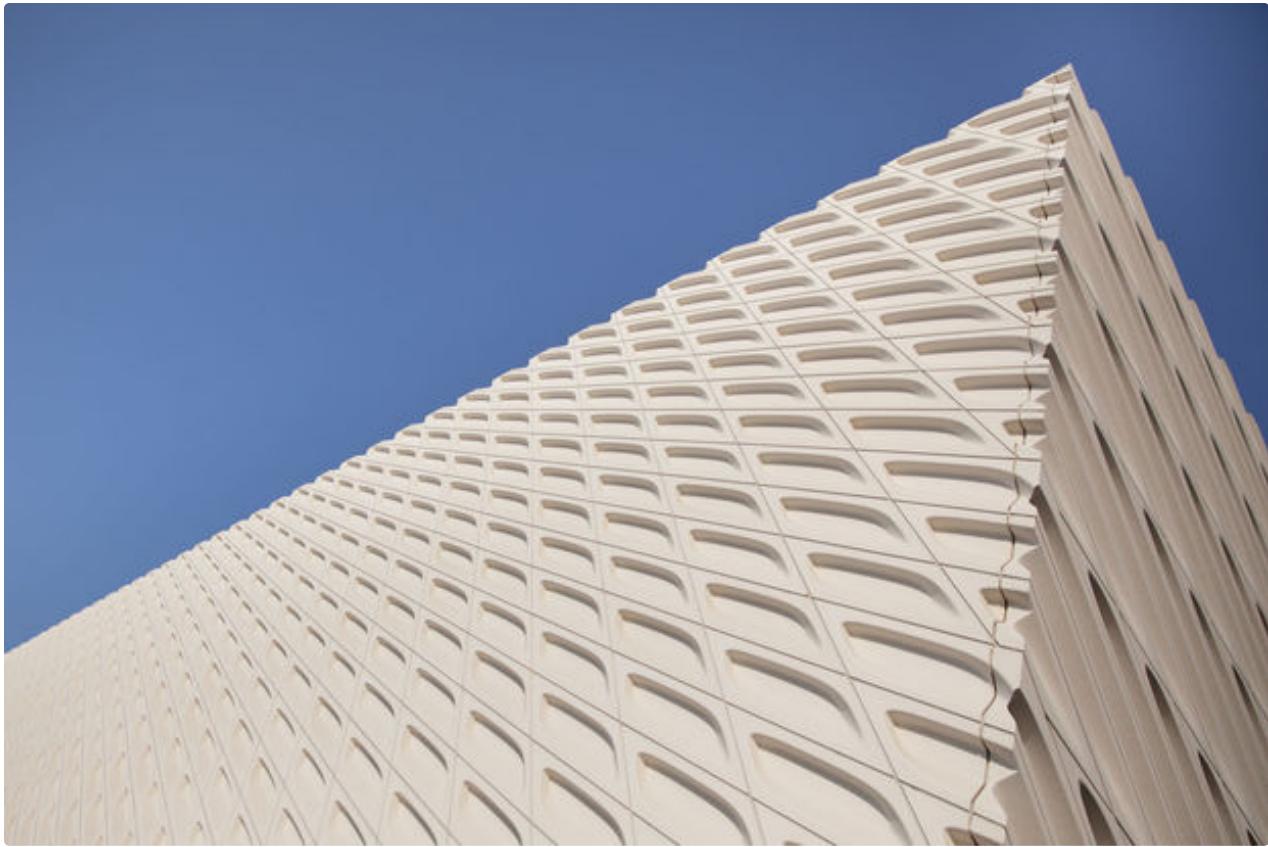


Symmetry & Patterns

Symmetry and patterns are all around us. They occur in nature as well as man-made structures and features. We can use symmetry as a compositional device to create the harmonious balance in our images, or break symmetry to draw focus to one particular point in a balanced background.



Pattern is a powerful compositional tool to use to imply rhythm in your images, the human eye is trained to seek pattern in what it sees and your brain is comforted by its ability to find order or peace in the images we present our eyes with. Pattern can help develop an images implied texture and help convey depth as well. A pattern that converges to one side or into your horizon line will help contextualize your subjects in the space you are photographing them.



Leading Lines

By noticing where lines converge in your image, you are able to direct the gaze of your viewer. Our eyes naturally want to follow the edges of features, the paths of streams, and the spans of roads. Converging lines can convey a sensation of depth, or a feeling of endlessness. Horizontal and vertical lines can help connote emotion in images.

Landscapes often are filled with lots of soothing compositional horizontal lines, but if you fill your frame with the many vertical lines of tall buildings, the viewer is made to feel small and impressed by the powerful vertical composition.



By arranging lines in your composition in interesting ways, you can manipulate the viewers' eyes to be pulled to particular focal points and subject matter, or indicate motion in a particular direction.



Color

Like many other compositional devices, color is noticed on a subconscious level and can literally tone the mood of your images. Images with lots of bright colors are perceived as happy and cheery, while images that are mostly black, gray, and white are considered more serious.

Color can also add highlight points in your scene when used selectively. Your eye is drawn to the spots that are 'different' in your image, the points that break up the harmonious rhythm of your composition. Color is a great way to guide your viewer's eye to different parts of your frame.

Get inspired by how photographer Lauren Randolph uses color in her [Chromological Order series](#), carefully placing bright pops of color in landscapes to convey mood and form. (and big thanks to Lauren for being such a patient model during our [How to Hold the Camera](#) lesson and [What's Next](#) lesson :D)

Ditch the Rules



Rules are meant to be broken, right? Not all the rules for composition make sense all the time, and every once in a while, you will stumble upon a form that will baffle you on how you should frame it, or need to be photographed from lots of angles and distances.

By playing with the rules of composition, and meshing common components, we can construct compelling images that draw the eye to lots of points in a busy image, or a single point in a flattened space. Understanding composition comes from developing a practice and observing the kinds of images you like to make. The times when you push the shutter again and again, and finally, after lots of shooting you have an 'AH-HA!' composition and get your shot. Sometimes it takes patience to make it work, so keep moving around your subject matter to nail the composition that makes the most sense.



Are You Ready?

A good photograph is a well-timed image. A photograph captured at the *precise moment* can tell such a big story. Often this means waiting and anticipating the motion and gestures of your subject.

Beloved street photographer Henri Cartier-Bresson, a true master of timing, once said:

"Photographers deal in things which are continually vanishing and when they have vanished there is no contrivance on earth which can make them come back again."

Consider this, if you are giving someone a really cool gift, like a brand new bike, for that perfect reaction shot of the recipient, you have your camera out before you present them with the gift, right?

If you are photographing a sports event and want to capture a big play, try watching through your camera's viewfinder or LCD screen, with your finger resting on the shutter.

It's a good practice to also take lots of shots so that you may have lots to choose from later. If your camera has a burst mode, just hold your finger down on the shutter button to capture multiple shots in succession.

Class Project



My friend Shevawn and I took inspiration from Frida Kahlo to make some portraits and have some fun playing around with lighting.

Use your new compositional awareness and lighting know-how to mimic a famous work of art. Have fun with it. Who is your favorite painter? How do they render light in their paintings? Does it look flat or unrealistic? Experiment with the skills you have learned in this class to get as close as you can to the original work, but also, I am excited to see how each of you interpret great art from history.

In our next lesson, we will touch on what the Next Steps are for leveling up your photography practice and cover a deeper explanation of what is going on inside the camera.

LESSON 9: NEXT STEPS FOR PHOTOGRAPHY



Congrats! You've made it through understanding the very basics of digital photography! The lessons in this class were a broad stroke over a skill that can become very granular very quickly. The most important takeaway from this class is that you begin to *see differently*. (Or at least think differently about the world you are viewing.)

It's my hope that you are walking down the street one day, and notice the world around you in such a way that it inspires you to take out your camera and *make* a photograph. When you look into the back of your camera's viewfinder or screen, you take a moment to select your settings based on your environment, compose your shot, and depress the shutter at just the right moment. *Making* a photograph means responding to your environment.

The mark of a great photographer comes down to two things - being able to know just *when* you should depress the shutter to capture the moment and the perspective, or point-of-view, of the camera. Perspective is very powerful because when others see your images, they will imagine themselves in the perspective from which you captured the subject.

If you're ready to dive deeper into the technical steps of photography, consider the following.



Advanced Shooting Modes

Shooting in Manual Mode is the best way to exert complete control over the lighting conditions you are making images in, so let's take a moment to address the concept of the Exposure Triangle.

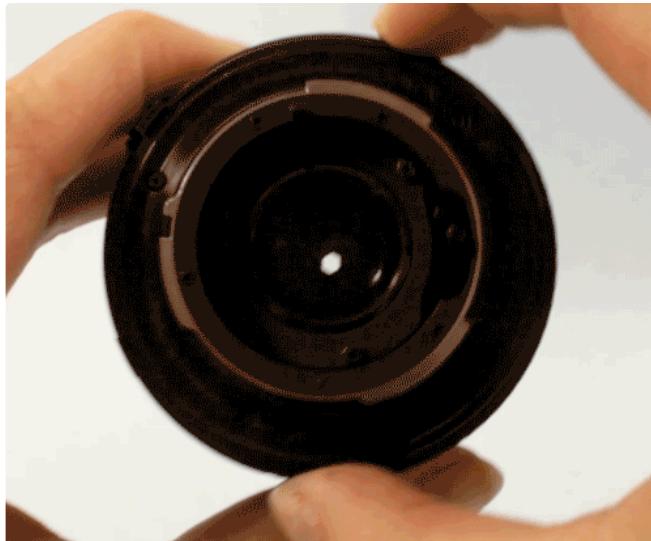
There are three things that affect your camera's exposure levels. ISO, aperture, and shutter speed. All of these settings are measured in *stops*. Plainly, a stop refers to the doubling or halving of light. For example, if you would like to brighten an image by one stop, you would have to double the amount of time your shutter is open. Let's look at all the ways we can have control over exposure and brightness.



Start with **ISO**, this term is carried over from the days of analog photography as a way to measure light sensitivity of different speeds of film. Today, ISO refers to how light sensitive the sensor is going to be. When your ISO is 200 it is less light sensitive than when your ISO is set to 1600. The benefit of shooting with a higher ISO is that you can shorten your exposure time because your sensor is more light sensitive. As you increase ISO your image quality does become more 'noisy' because your sensor needs to strain its technological capabilities to grab enough light data in a shorter amount of time.

Shutter speed refers to how long your shutter is open and is usually measured in tenths or hundredths, even thousandths, of a second. Your camera will display values like '60' or '125' or '4000' - this means the shutter is open for a 60th of a second, or a 125th of a second, even a 4000th of a second (FAST!). Some cameras are capable of shooting for much longer, for 30 seconds or longer, so refer to your camera's manual on how to access these settings. Be sure to use a tripod if you are shooting any slower than 1/60th of a second, that's when camera shake from your hands becomes noticeable.

Your camera lens contains the **aperture**. I've likened the dilation of an aperture to squinting your eyes when it is bright outside. If you are trying to view something far away in the distance in full sun, it can be difficult to make out without squinting. Squinting is essentially reducing the amount of light able to hit your eyeballs. An aperture works in a similar way, closing and opening to allow more or less light in. The smaller your aperture is, the longer your shutter will need to be open to ensure proper exposure.



Aperture also controls depth of field. **Depth of field** refers to the field of distance that is in focus. Low numbered f/stops like f/1.4 - f/5.6 will have a pretty shallow depth of field, and your background will be blurred. High numbered f stops like f/22 and up will yield images that have a long field of focus, and everything in your image will have sharp details.

To *increase* your exposure brightness by 1 stop:

- Double your ISO - for example going from ISO 200 to 400
- Double the size of your aperture - moving from f/4 to f/2.8 **OR**
- Double the duration fo your exposure - moving from a 1/250 of a second to 1/125 of a second.

To *decrease* your exposure brightness by 1 stop:

- Halve your ISO - for example going from ISO 200 to 100
- Halve the size of your aperture - moving from f/4 to f/5.6 **OR**
- Halve the duration fo your exposure - moving from a 1/250 of a second to 1/500 of a second.

This [desktop applet](#) by the folks over at Stanford does a great job presenting an interactive way to see how your settings affect exposure, depth of field, and image quality - as well as some of the science about how digital cameras interpret light.



You can tell if your camera is set to the right camera settings by referencing the exposure meter in the viewfinder or LCD display. Your camera manual will tell you how your camera's light meter works, or if there are any special settings that can be applied.

If you only want to control the duration of your shutter and not think about the rest, your camera most likely has a shutter or time priority mode (marked with **Tv** on your camera settings). In this mode, you can dial in the shutter speed you want to capture motion at, and your camera calculates the rest of the exposure settings to get a balanced exposure. This is great for shooting indoors or in low light.

Alternatively, try Aperture priority mode (marked with **Av**, or something similar depending on brand). This allows you to control the depth of field of your images without having to think about shutters speed or ISO, as long as your camera's ISO is set to 'Automatic' or '**A**'.



Advanced Lighting

Your camera may even come with what is called a 'hot-shoe'. This is a mounting port where you can attach an external flash. External flashes are awesome because they are a more controllable and directable light source that can be dialed to specific levels of brightness. Most flashes on the market are designed to 'talk' to your camera brand specifically, so be sure to check that whichever flash you are looking into purchasing is compatible with your camera's make and model. Modern external flashes have an automatic mode that is able to detect how bright it's flash pop should be. Pretty cool! Your camera's manual will have a section titled 'External Flash Control' if your camera is eligible for an automatic external flash.

If you decide to try and use an external flash, I recommend you look for one with an omnidirectional flash head that can pivot and swivel. This way you have more creative control over which direction you 'throw' your light. Learning how to use a flash can have a comparable learning curve as learning to use a camera, so **READ THE MANUAL**.

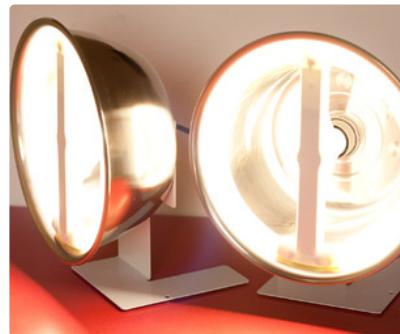
Simple Builds

Now that you're feeling good about your photography skills, here are some easy projects that will help you take your images and practice to the next level without a lot of fuss.

Check out these other i'bles authored by the infinitely innovative Instructables community:



This lego brick lens cap keeper by [DancingPope](#) is a brilliant way to keep you from losing that darn thing.



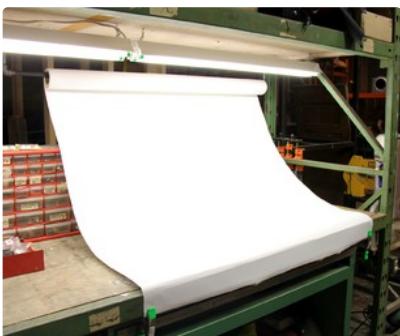
See how [andrea biffi's](#) mixing-bowls turned beauty-dishes throw light perfectly for product photography lighting.



[AngryRedhead](#) demonstrates how to get a beautiful all black background using natural and synthesized light.



This clever build by [pikesley](#) is a tripod strap with great results.



[noahw's](#) workbench mounted photo backdrop is a must for those shooting and telling stories from their workshop.



[Benny Johansson](#) turns a plastic food container into a flash Bouncer with interchangeable Mirror and diffuser.

Now it's time to tell your DIY story! Document your next DIY build like a pro for an [Instructable!](#) Excellent photo documentation is at the heart of every great Instructable. Perhaps you'll even be eligible to enter one of [Instructables' fabulous contests](#), and win an awesome prize! Can't wait to see what you make :D

That's a Wrap!

Thank you for following along! I hope this was an enlightening experience when it comes to the world of creating photographs, and that you feel confident in your photography practice while you are making images. Keep practicing, and focus your skills on the aspects of photography that interest you the most. There is so much creative opportunity once you've understood this fundamental skillset, I can't wait to see what stories you share using your camera on Instructables.

I'd love to hear any feedback you have about this class, or see any resultant projects that came from skills you learned in these lessons. Reach out and say 'HEY!'.

-Audrey