UNDERSTANDING AND CONTROLLING LIGHT

A Short Guide

By Kent DuFault

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CONTENTS

UNDERSTANDING AND CONTROLLING LIGHT

Photographers can spend many years, if not a lifetime, learning how to control light.

UNDERSTANDING AND CONTROLLING LIGHT

Any photographer, photography class, or photography book that you ever come across, will tell you that photography is all about light. And this makes sense, when you think about it, because without light, it's dark, and we can't even see in the dark much less take a picture.

But when these leaders of the photography world are telling you it's all about light, they're not talking about the presence, or absence, of that light. They're talking about the quality, characteristics, and use of that light.

Think about that for a moment. Have you noticed the quality and characteristics of light? Of course you have! You may not have thought about it. Who among us hasn't stood outside and admired the warm glow of a sunset, or,had to squeeze our eyes tightly when a car's headlights swept across our face. These are examples of the quality and characteristics of light.

UNDERSTANDING AND CONTROLLING LIGHT

Photographers can spend many years, if not a lifetime, learning how to control light. An entire multi-million dollar industry is centered on producing “stuff” that will allow a photographer to master light and make it do what he or she wants.

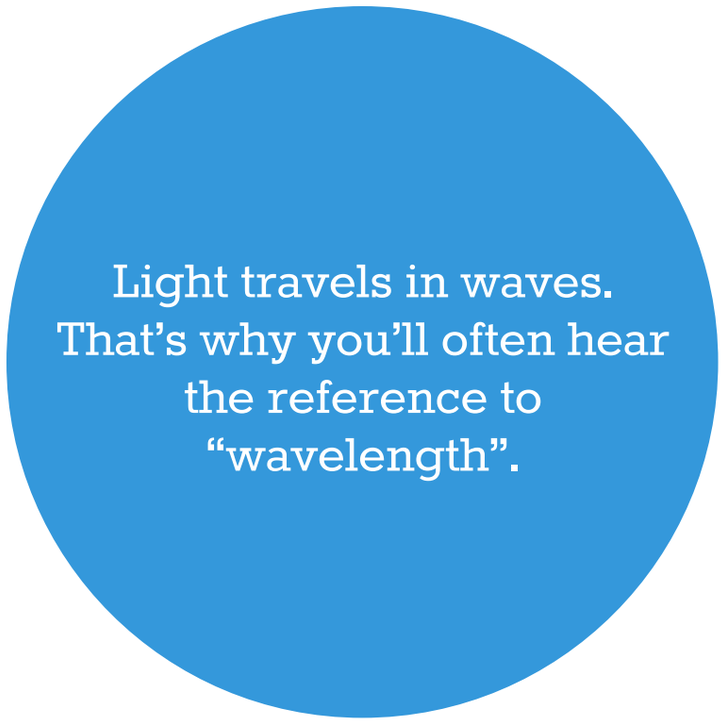
The purpose of this guide isn’t to turn you into a lighting expert. That just isn’t possible: only practice and experience can get you there.

Our goal is to give you some basic knowledge about-

- Light
- How light works
- The characteristics of light
- An explanation of commercially made light modification equipment
- Examples of what that equipment does to the light
- How you can make some of this equipment for yourself

WHAT IS LIGHT?

WHAT IS LIGHT?



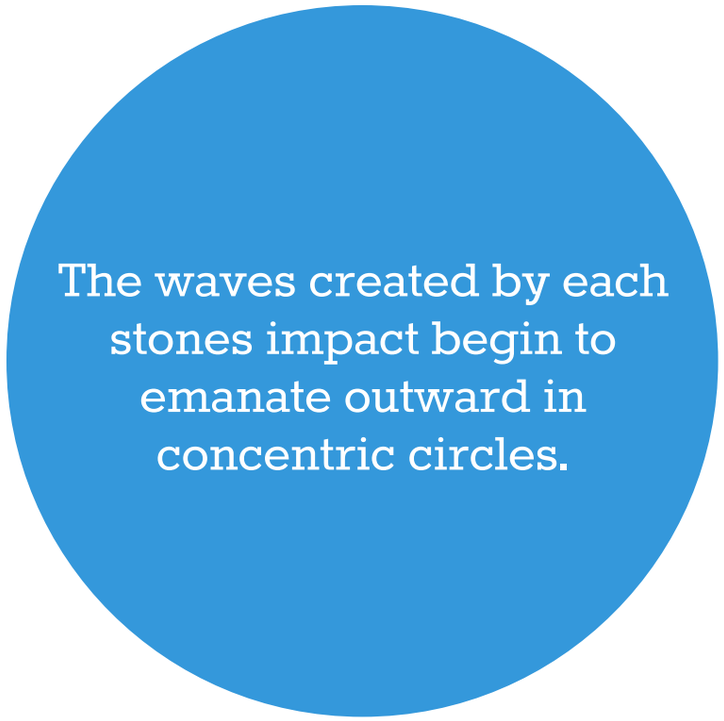
Let's take a moment, and step back into our high school science class. Most of us probably learned two facts about light: facts that we may have forgotten: facts that are crucial to a photographer as they learn to master the control of light.

Fact one- Light travels in waves. That's why you'll often hear the reference to "wavelength".

Here is a formal definition of light-

Visible light (commonly referred to simply as light) is electromagnetic radiation that is visible to the human eye, and is responsible for the sense of sight.[1] Visible light has a wavelength in the range of about 380 nanometres (nm), or 380×10 9 m, to about 740 nanometres – between the invisible infrared, with longer wavelengths and the invisible ultraviolet, with shorter wavelengths.

WHAT IS LIGHT?



Primary properties of visible light are intensity, propagation direction, frequency or wavelengthspectrum, and polarization, while its speed in a vacuum, 299,792,458 meters per second, is one of the fundamental constants of nature. - Courtesy if Wikipedia

Now- All that seems pretty boring doesn't it? The good news is- You don't really need to know all that! (But it doesn't hurt, right?)

Think of light this way- You are standing on the edge of a dock, overlooking a lake. You have a large rock in each of your hands. You throw the left rock into the water. A second later, you throw the right rock into the water. The waves created by each stones impact begin to emanate outward in concentric circles. As the waves gain distance from the point of origination, they become longer (wavelength), and when the waves created from each stone collide- they modify; they change direction, size, shape, etc.

WHAT IS LIGHT?

Light waves work the same way!

When you light a subject for a photograph; you switch on a constant light source, fire a flash, or place your subject in the sunshine: light waves begin illuminating the subject.

Now- it's up to you to manually change the path of those light waves to alter their characteristics: just like when the concentric circles of waves, (created by the rocks), collided and changed. By manually altering the light waves, you will bend them, lengthen them, color them, bounce them, disperse them, eliminate them, squeeze them, and flair them out.

This process will change how that light illuminates your subject!

By manually altering the light waves, you will bend them, lengthen them, color them, bounce them, disperse them, eliminate them, squeeze them, and flair them out.

FACT TWO- LIGHT HAS A “TEMPERATURE”

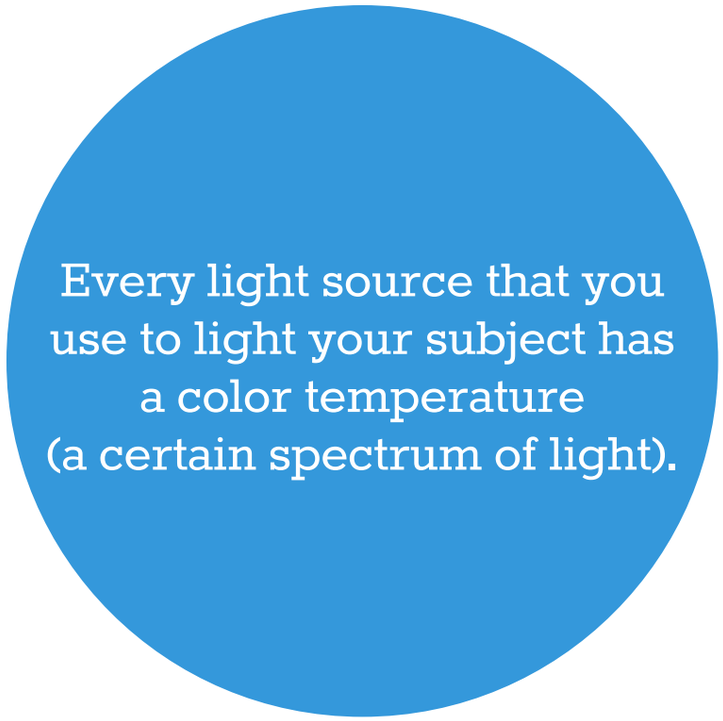
LIGHT HAS A “TEMPERATURE”

Do you remember your science teacher talking about the spectrum of light? He, or she, probably walked the class to a window, pulled out a small triangular piece of glass called a prism, set it on a window sill, and stood back. All of your classmates then leaned over and marveled at the rainbow of colors.

What you were in fact looking at is dissected light. White light is made up of different colors called the light spectrum. Each color along the spectrum has a specific temperature measured in Kelvin.

The higher the Kelvin temperature, the colder, or bluer, the light will appear to our eyes. The lower the Kelvin temperature, the warmer, or more red / orange, the light will appear to our eyes.

LIGHT HAS A “TEMPERATURE”



There are two facts that you need to glean from this-

1. Every light source that you use to light your subject has a color temperature (a certain spectrum of light).

   Unless, you’re trying for special effects, it’s best to keep the temperatures similar among your light sources.

   Example, you’re going to use household lamps to light a food photograph. Use the same bulb in every lamp- manufacturer, wattage, bulb type. This will ensure that they have a similar color temperature. Only professional photographic equipment will be precise in color temperature. When you’re beginning- you don’t need to be that picky.

   And, don’t forget that you will need to tell your camera, (white balance setting); what type of light you are using!

LIGHT HAS A “TEMPERATURE”

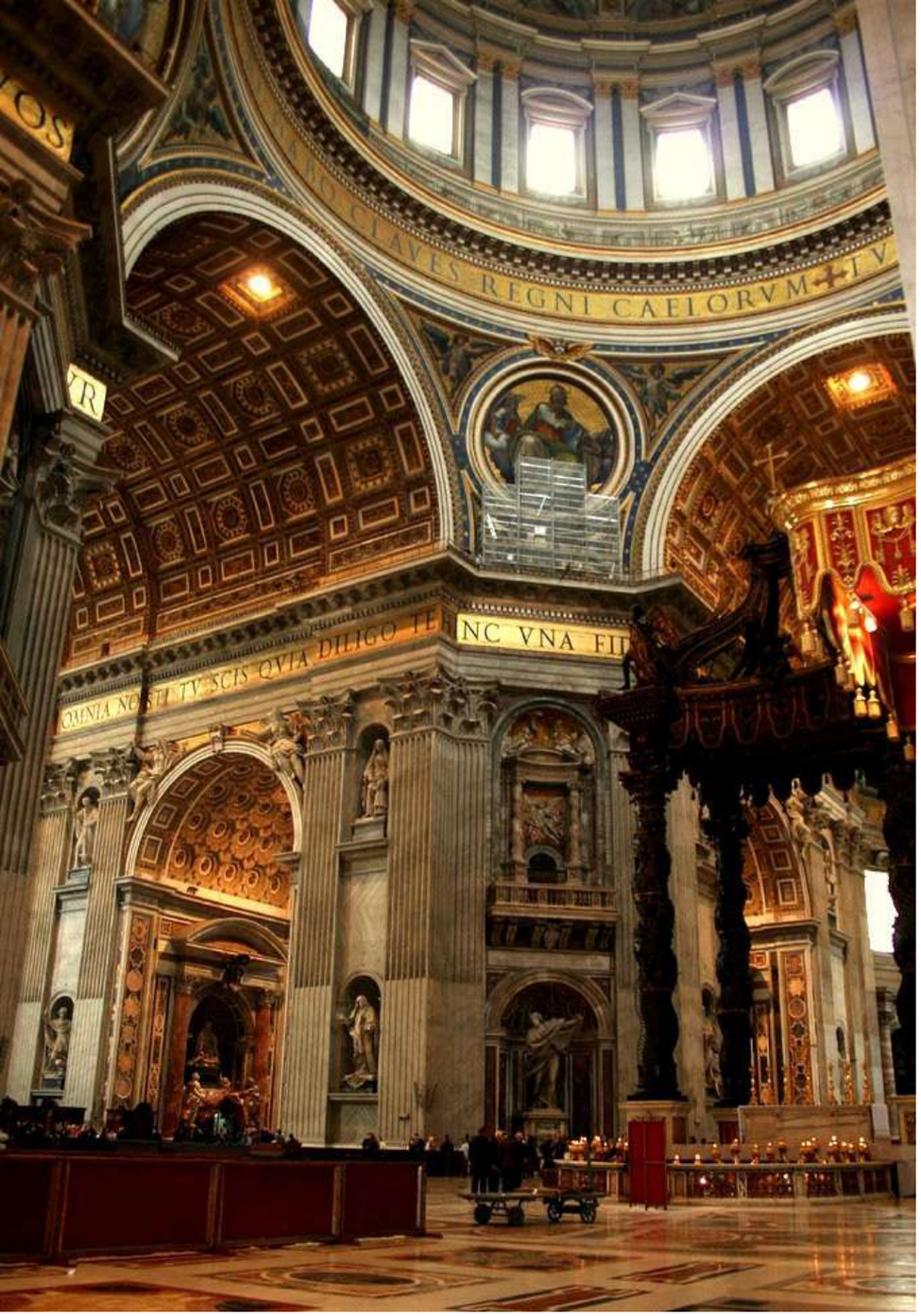
A colored gel works by eliminating all other colors of the spectrum as light passes through it

You can alter the color temperature of light by introducing a colored gel in front of it.

A colored gel works by eliminating all other colors of the spectrum as light passes through it. It filters them out. You put a blue gel in front of a warm light, and blue light passes through, all the other light spectrum is stopped, or filtered out.

This is important because you can use this several ways. What if you want to take a photograph- but your light sources have varied color temperature? You can put a gel on one, or more of the light sources to “balance them”.

Example- You desire to take a picture using the interiorof a church, you want to capture the details of the church (with existing lighting), but you want to use your portable flash to light a bride. Interior lighting is generally in the warm end of the lighting spectrum. Flash, however, is more toward the blue (cold) end of



the spectrum. The difference between the two can be stark and unpleasing. Solution- You pull out a brownish gel called, a warming gel, (sold at camera stores), and you place that gel over your flash. The gel will eliminate the blue light from your flash, allowing only the warm, reddish, rays of the spectrum to pass through.

Congratulations! You have balanced your light sources.

Notice the warm light of the interior versus the cooler daylight coming through the windows. Understanding color temperature is a big step toward controlling light.

Now that we've covered the characteristics of light, and we have a basic understanding of how those characteristics can be altered, let's look at some of the tools available for a photographer to do just that!

BENDING, ALTERING, DISPERSING, AND SQUEEZING LIGHT

BENDING, ALTERING, DISPERSING, AND SQUEEZING LIGHT

There are many ways to bend, alter, disperse, and squeeze light: infinite ways really.

As a beginner, start with your portable flash. Most flash units today have a feature where the head swivels and tilts. This is used to produce “bounced flash light”. This is the easiest method to begin learning how to control light.

Let’s look at two examples-

This photograph was taken using a direct portable flash. Notice the harsh quality of the light. It produces a flat, almost shapeless look on the model. The shadows are harsh.

BENDING, ALTERING, DISPERSING, AND SQUEEZING LIGHT

This photograph was taken using a portable flash. But, the photographer swiveled the head to the right, and then tipped the head up, so that the flash output bounced off the ceiling.

Notice how different the light is from the previous picture? It's directional, so there is modeling to the subject's face. It's also softer because the light has been dispersed over a wide area, bounced, and then returned to the subject.

This bounce method also causes the shadows to soften (not so dark) because the light waves are literally bouncing around the entire room at different angles.

THIS IS ENTRY LEVEL LIGHT CONTROL

THIS IS ENTRY LEVEL LIGHT CONTROL

Take some time to play with your flash. Alter the angle of light and its qualities. You can do this by swiveling the head, put paper, cloth, or plastic in front of it. See how much you can vary the light on a particular scene!

Here are two very important points to remember about bounced light!

1. The light will “pick up” the color of the object it is bounced off. Therefore, whenever possible, try to bounce the light off of a surface that is close to a neutral white. Example- if you bounce the light off of a green wall, the light will shift toward the green spectrum, and that will throw a green tone on your subject.

2. The amount of light that bounces off of your chosen surface will have less intensity than direct flash (the reason being that the light waves had to travel further and they are dispersed). A light surface, such as a white wall, will bounce more light (because of reflectivity), than say, a dark surface, such as a paneled wall.

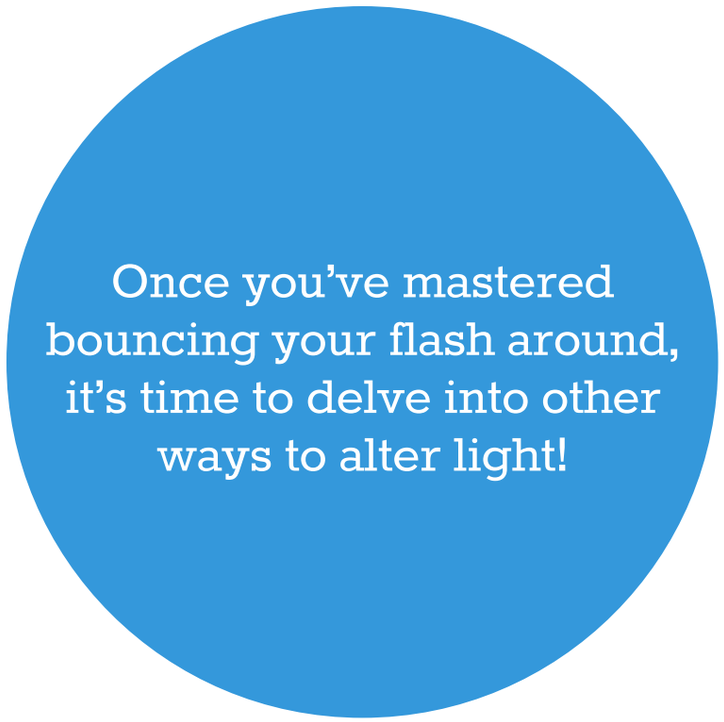
The light will “pick up” the color of the object it is bounced off.

A very dark surface will bounce almost no light. You'll need to make a judgment on the distance, and color, of an object that you wish to bounce light from.

This light source picked up the color of the green plastic bucket.

This photographer doesn't have an external portable flash. He's attempting to control the pop-up flash on his camera. Good idea!

ADVANCED TOOLS FOR LIGHT CONTROL



ADVANCED TOOLS FOR LIGHT CONTROL

Once you've mastered bouncing your flash around, it's time to delve into other ways to alter light!

Common Photographic Tools for Light Modification

1. Softbox
2. Umbrella
3. Bounce Panel
4. Flag
5. Scrim
6. Barndoors
7. Snoot
8. Gels

SOFTBOX

SOFTBOX

A soft box is a tool that provides soft, yet directional light.

Here is a commercially made professional softbox-

Here is an example of a homemade softbox-

SOFTBOX

A softbox is a device that you introduce your harsh direct light into one end, and it disperses that light by bouncing it around inside.

A softbox is a device that you introduce your harsh direct light into one end, and it disperses that light by bouncing it around inside. When the light exits the other side of the box- it is soft.

Softboxes are available from small sizes, (for portable flash), to huge sizes (for commercial studio lights).

They have a certain advantage over umbrellas because they are more directional, and they have less fall-off into unwanted areas.

Two things to remember about the use of a softbox- The larger the soft box is, relative to the subject, the softer the light.

A softbox used to light a car, for example, could be as big as a room! The closer a softbox is to the subject, relative to the subject size, the softer the softbox light will be.

SOFTBOX

Many photographers see the softbox as the answer to all lighting solutions. But that isn't always the case. You can actually create a flat uninteresting photograph by making the light too soft!

This is an example of softbox lighting that is overdone. The photographer has removed all shadows, and specular highlights, creating a flat uninteresting photograph.

This is an example of good softbox lighting. There is detail everywhere, but the photograph has specular highlights and visible shadows which maintain a three dimensional look.

UMBRELLAS

UMBRELLAS

Umbrellas work much like a softbox in that a harsh light source is introduced, the light is bounced around, and it exits with a softer quality of light.

There are two types of umbrellas: the shoot through type, and the bounce type.

Here is a commercially made shoot through umbrella-

As you can see, the light is directed toward the umbrella, and the umbrella is pointed at the subject. This creates a softer light by widening it and dispersing it.

This type of lighting, while softer than a direct flash, still maintains some of the stronger direct wavelengths. It is a good choice when you want softer, yet distinct, lighting.

The disadvantage to this type of light modification is that it isn't easy to prevent light from spilling all around your set.

UMBRELLAS

This is a bounce umbrella light setup. The flash is directed at the umbrella. The light waves hit the inner surface of the umbrella, which is usually either a white fabric, or a metallic fabric, and then the light bounces back in the direction of the original light source. The white fabric umbrella creates a softer light; the metallic version creates a slightly harsher light.

How can you tell the difference between a shoot through umbrella, and a bounce umbrella? The outer portion of a bounce umbrella will be covered in black so that no light passes through!

The bounce umbrella adds a feature that the shoot through variety doesn't have; it allows you to feather the light that lands on your subject. This is helpful, if you want some light hitting the subject, but you don't want light bouncing around everywhere.

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BOUNCE PANEL

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Besides, just using the swivel head on your portable flash, a bounce panel is your easiest entry into light control. They're easy to use, easy to move around, inexpensive to purchase from a camera store, and, easy to make on your own.

Here are examples of two commercially available bounce panels. Some panels have a fixed fabric; others allow changing the fabric to change the quality of the bounced light. Some are circular for the convenience of collapsing into a small package for transport. However, we feel that the rectangular versions are generally easier to use.

Bounce panels work the same way as bouncing a flash off off of a wall, or ceiling. The difference is that the bounce panel is portable and moveable. A bounce panel allows you to place it where you want, and change the quality of light by adjusting the distance to the subject, the angle of the light hitting the panel, and the color of the panel.

BOUNCE PANEL

This is a fairly sophisticated example of a homemade bounce panel.

It's so easy to make bounce panels! Go to a local art supply store and ask them for foamcore. Many professionals use foamcore in their studios. It's relatively inexpensive, pretty durable, and can be purchased with white on both sides, or, white on one side, black on the other, or, in different colors. The downside to it is that it isn't collapsible for transport. Some photographers will cut sections of foamcore that they then tape together with duct tape. This way the panel starts out smaller (easier to transport) but can then be "unfolded" to a larger size.

A handy accessory for any light modification equipment is several decent light stands and a dozen or so spring clamps. You can start out with one or two light stands and add to your inventory as you grow. The spring clamps you can buy at any home improvement store.

BOUNCE PANEL

Spring clamps are very useful to attach your light modification gear to light stands.

You can also make collapsible frames out of PVC pipe. Then cut a heavy white fabric to the size of the frame.

Sew some elastic corners onto the fabric so it can slip over the frame and will be held in place.

You can also just wrap the fabric around the frame and secure it with spring clamps.

It's important to pull that fabric tight. If it's loose, or sagging, the intensity of light that is bounced back will be significantly reduced.

BOUNCE PANEL

A bounce panel can also be as simple as a piece of cardboard painted white, or, cardboard covered with tinfoil that you glued on.

FLAG

FLAG

A flag is constructed the same way as a bounce panel, with one major exception; a flag is covered with something flat-black.

A flag is constructed the same way as a bounce panel, with one major exception; a flag is covered with something flat-black.

Its purpose is the exact opposite as well. Whereas a bounce panel is meant to bounce light back onto your subject, a flag is meant to absorb light and not let light pass through it.

Where MightYou Decide to Employ a Flag?

You're shooting a portrait. You want dramatic side lighting with deep shadows. You set up an umbrella to the left of your subject and shoot a test picture. The lighting looks good, but the light is passing by your subject and bouncing around off other nearby objects: the resulting shadow isn't very dark or dramatic. Your solution- put up a flag to the right of your subject. The flag will prevent any light from passing through it, and the flat-black surface will reflect no light.

FLAG

The flag will prevent any light from passing through it, and the flat-black surface will reflect no light.

The Result of Your Effort?

Those dense shadows you wanted!

A word of caution- If you intend to make your own flags, either by painting a surface, or by putting black fabric on a frame, make sure you use flat-black paint (not gloss), and a heavy (thick enough so light won't pass through) flat-black fabric (no sheen).

SCRIM

SCRIM

A scrim is also much like a bounce panel. The difference here is that a bounce panel is opaque and a scrim is translucent. A bounce panel bounces light and a scrim allows light to pass through.

A scrim softens light by dispersing it, and a bounce panel softens light by bending and dispersing it.

Scrims are often used when there is a light source that you can't turn off (such as the sun) but you want to alter the quality of that light. They're also a good choice when you want to soften light just a little bit.

Here is a large commercial grade scrim being used to soften harsh overhead daylight. A scrim breaks up the harsh wavelength of direct light and allows a soft light to pass through.

SCRIM

This scrim is being held in place by an assistant. Scrims are a nice because you can add them, and remove them, from the lighting setup quickly.

If you decide to make your own scrim, the best way to do it is with the PVC frame we discussed earlier.

Then, make a visit to a fabric store and ask for white, rip-stop, nylon. This fabric makes a perfect scrim material.

You can also use nylon screening or other types of fabric. Use your imagination!

BARNDOORS

BARNDOORS

Barndoors work like mini flags. They attach to a light source and are adjustable to control where light passes through to the subject. They don't soften light; they simply squeeze it, and cut it off.

Commercially made barndoorsthat "attach" to a light

Barndoors are often used in theatrical productions. They are typically available for commercial "hot" light.

But you can find models made for flash, even portable flash. In our opinion, unless you're getting very sophisticated in your light control, snoots are easier to use.

SNOOT

SNOOT

A snoot, works much like a set of barn doors, in that it squeezes the light into a tighter dispersion pattern.

The difference is that where barndoors are adjustable, a snoot is fixed. The benefit of a snoot is there is no light falloff, and they're easier to use with portable flash.

An example of snoot lighting

An example of a homemade snoot

There are many ways to make a homemade snoot. But, we're going to share with you the easiest way, and in fact, as you learn to manipulate light, you will find a million uses for this product!

BLACK WRAP

BLACK WRAP

Black wrap should be attainable at any professional photographic equipment retailer.

Black wrap is a metallic, flat-black, material that is similar to a heavy-duty tinfoil. It comes on a roll like tinfoil, and it is relatively inexpensive.

It's bendable, pliable, fire resistant, and you can puncture holes in it, or cut shapes, to manipulate the light as it passes through it.

To make a snoot with black wrap simply tear off a section that is large enough to wrap around the head of your light source (forming a cone, or tunnel). You can then bend, or squeeze, the black wrap to allow just the amount of light you desire to pass through.

Snoots are an excellent tool for placing a tiny direct light onto your subject with little to no light spill.

GELS

GELS

if you turn on a white light, and let that light spill onto the gelled light, it's like dropping the food coloring into the water.

We touched on gels earlier. There is a very important aspect of light that you need to understand as relates to gelled lighting.

Imagine that you have a glass of clear water. You also have a dropper filled with dark red food coloring.

When you drop the food coloring into the water, it begins to disperse, when it has mixed completely with the water the red color is almost gone. You have just a faint pink hue.

Now, let's put that into the context of gelled light. When you put a gel on a light, and shine that light onto something in a darkened room, the gelled light will be deep and intense.

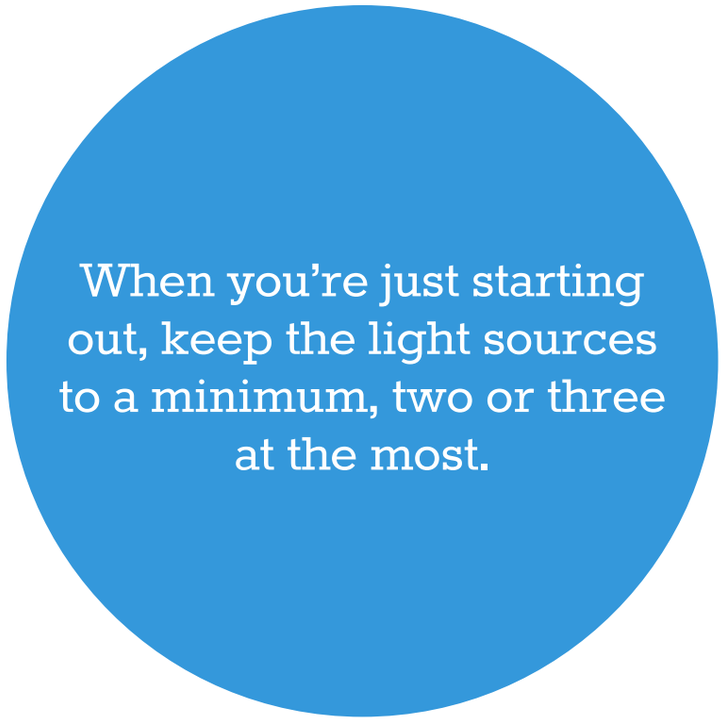
However, if you turn on a white light, and let that light spill onto the gelled light, it's like dropping the food coloring into the water. The white light will dilute the gelled light by throwing all the colors of the spectrum back into the mix.

GELS

So, here are the points you need to remember- don’t let white light hit your gelled light, and, multiple, colored, gelled light will “mix” color when they intersect.

MIXING LIGHT SOURCES

MIXING LIGHT SOURCES



This is stepping into the realm of an advanced guide. We want to hammer home one point.

When you’re just starting out, keep the light sources to a minimum, two or three at the most. Once you’ve mastered controlling those lights; you can expand.

Many professional photography shoots incorporate up to dozens of lights: each one doing a specific job. But that takes experience. If you jump in too heavily, you’ll only frustrate yourself.

Have fun!

Hey there!

Let's get real for a minute... Learning photography can be super challenging! But we're here to help you every step of the way! Here are 3 of our most useful *(and FREE!)* photography resources:

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Grab 3 free photography cheat sheets that will help you understand the basics.

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