

DIGITAL MEDIA:



Here is some teaching material I produced when I was teaching NCEA digital media.



I know there are many excellent brands in digital cameras. I have used Canon, went on to Nikon, then to Olympus, (my preference in the days of film and darkrooms.) I have now gone back to Canon.

There are several interchangeable lenses in my kit, and for me, the flip out, rotatable digital view finder is a must.

Technology and Requirements

- Camera – any camera will do but we focus mostly on DSLR's so that you can change the shutter speed and aperture settings. Learn more about [DSLR Cameras](#)
- Editing Software – software such as Adobe Lightroom, Adobe Photoshop, [Gimp](#), Etc.
- Tripod – To help your camera focus better and so you don't have to worry about shaking. See [Tripod](#) for more information on tripods
- Camera Lens – Most DSLR's come with a kit lens of 18-55mm, this will work just fine. See [Photographic Lenses](#) to learn more about lenses.
- Card Reader – to quickly and more efficiently move pictures from your camera to your computer.

Goals

We hope you gain the importance of light when it comes to photography, a basic understanding of your camera, and taking pictures with your camera.



You need to know the capabilities of these items of equipment.



THE PROBLEM

You have a good eye and you are seeing good pictures but they just aren't coming out, on paper, the way you wanted or the way you saw it.

THE SOLUTION

Because your eyes constantly make everything APPEAR normal you now need to learn how the film and lenses record light, scenes, and color. Then, once you have that well ingrained and almost second nature, you need to learn how those different things render on film and print. Few of us realize how powerful the mind is in blocking out what we don't want to see AND how well we automatically can correct bad lighting without even realizing it.

Until we learn those important lessons, we will not have the knowledge or skills to MAKE photographs the way WE want them.

You can spend a small fortune on courses that will get to the fun part right away. Courses that give you assignments to take photos you aren't interested in and overwhelm you with a lot of hi-tech phrases. They'll teach you how to *talk the talk*. HOWEVER, until you learn the basics your castle will be built on sand.

We have created a course that is simple and quick. It is designed to be easy-to-understand yet full of solid information. It will provide the basics YOU MUST learn, and then allow you to go off to any specific subject you have any interest in. Each of these "special" subjects will add more to the basics, offer photographs and other visual aids to illustrate the point, and pass on *tips and tricks* to help you.



Can you understand what is wrong with these images?

Let's start Learning Photography

A few tips that will immediately improve your digital photography:

1. Read the directions!!!!
2. Have Memory Cards to take Lots of Shots.
3. Photograph what you love to Photograph.
4. Start Basic – Focus on Composition
5. Learn Photography – Practice
6. Repeat all steps until you're a Professional Photographer.

A few tips that will immediately improve your film shooting:

1. Read the directions!!!!!!
2. Stick with one film (and film) speed until you thoroughly understand how it works at least for the first 5 or 6 rolls.
3. Stick with one good processor forever.
4. Take notes on the first 5 or 6 rolls when you make mistakes you'll immediately be able to troubleshoot your mistakes.



The reference to film is for those few who still use it.

However the principles still apply in the digital age.

Now lets begin. **Lesson 1**, a simple lesson on light. You may go on to the **advanced photo lessons** if you feel you already have a good background in photography.

Shoot Many Images

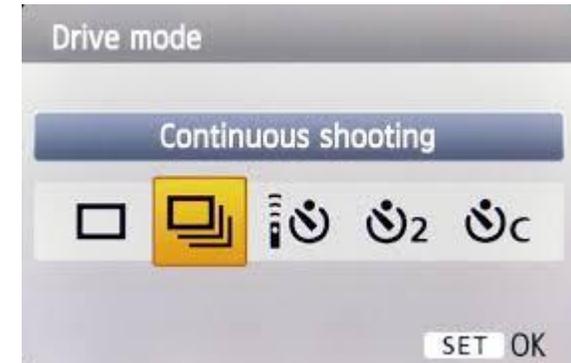


This **digital photograph** of two fox kits was taken at the Bear River Migratory Bird Refuge in northern Utah. I had gone there to take photographs of migrating shore birds but when I realized the gray clumps up the road were moving and they were foxes, I slowly drove closer to take advantage of this opportunity. There were actually four kits playing but the best image was of these two as they looked towards the den at their two litter mates. The sun had barely cleared the mountains so the early morning light was low and warm- ideal!

The best animal photographs are of animals doing animal things. Running, jumping, wrestling, stalking and pouncing- there were lots of good compositions so I shot nearly three hundred images. This was the best of them all. (This photograph won photo contest, so the judges agreed!)

What and Why

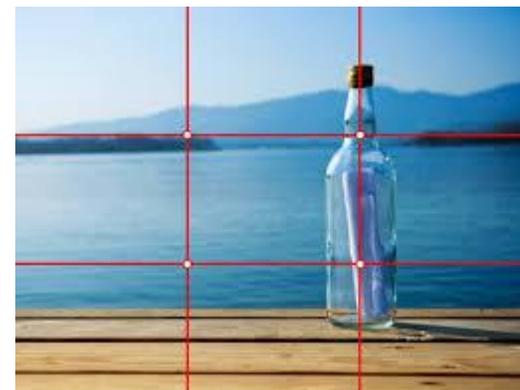
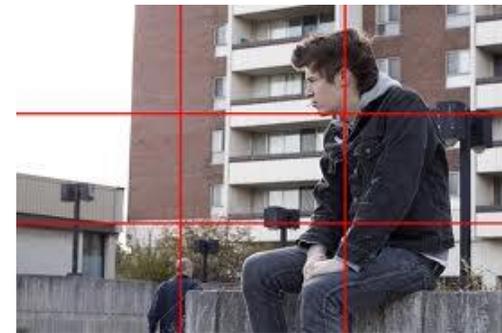
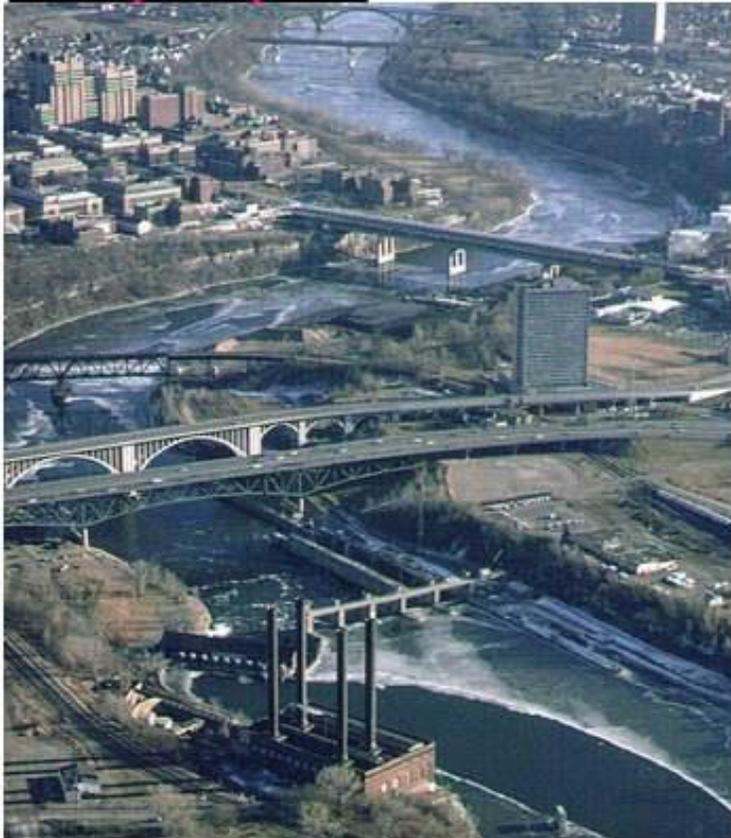
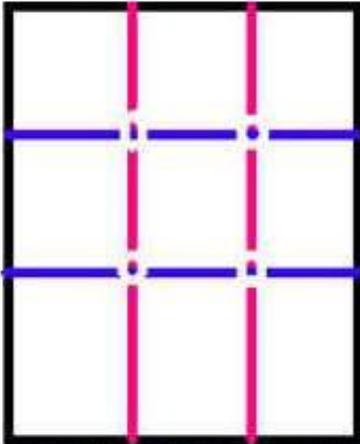
This photograph was taken by a Nikon D200 camera through a Nikon AF-S Nikkor 200-400mm 1:4G lens with a Nikon AF-s TC-14EII teleconverter which increased the magnification by 1.4 times. I positioned my car at an angle where I could shoot through the driver's side window (rolled down) by using a beanbag. Since the lens was zoomed to maximum magnification, I used a cable release to avoid introducing any movement to the camera. To get more than minimum depth of sharp focus, I set the aperture at f/7.1 with the camera set on aperture priority. The camera chose a shutter speed of 1/640th of a second. The ISO was 250 with no exposure compensation dialed in. Because these fox are darker than the surrounding vegetation, I used "center weighted" metering. Since the playing kits moved a lot, I set the shutter at "Continuous-high and the focus-mode selector at "continuous".



If you were going to publish one of these images, which would you choose? Why?

The Art of Composition and Photography

- Rule of thirds



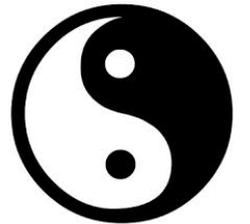
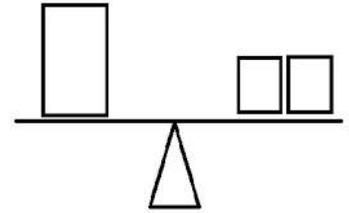
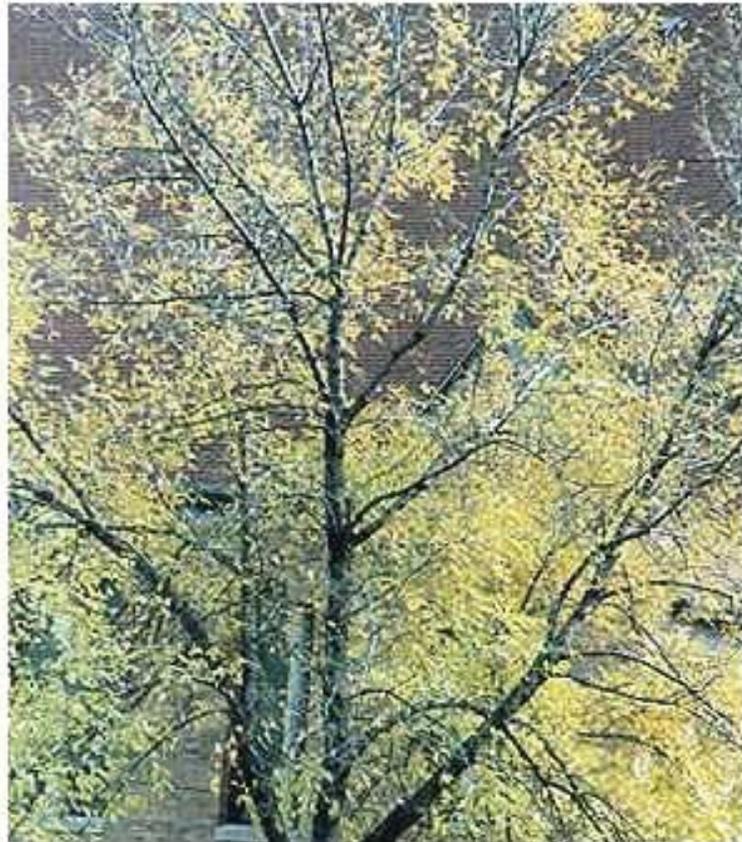
The rule of thirds is a great guideline but some excellent images may ignore it completely.

Symmetry

The exact correspondence of form on the opposites sides of a dividing line. Our eye demands symmetry.

SYMMETRY IS IMPORTANT!

Our eyes have been exposed to symmetry or near-symmetry since the day we were born and our MIND now demands it ... is conditioned to it. So, it is a factor that cannot be ignored. If you are presented with a scene that has symmetry you should not ignore it. You should do your best to compose that photograph precisely so that you emphasize and balance the scene. If you do ignore the apparent symmetry, you will create an un-balanced picture that is uncomfortable to the human eye.



Symmetry may provide compositional balance. However there are many variations.

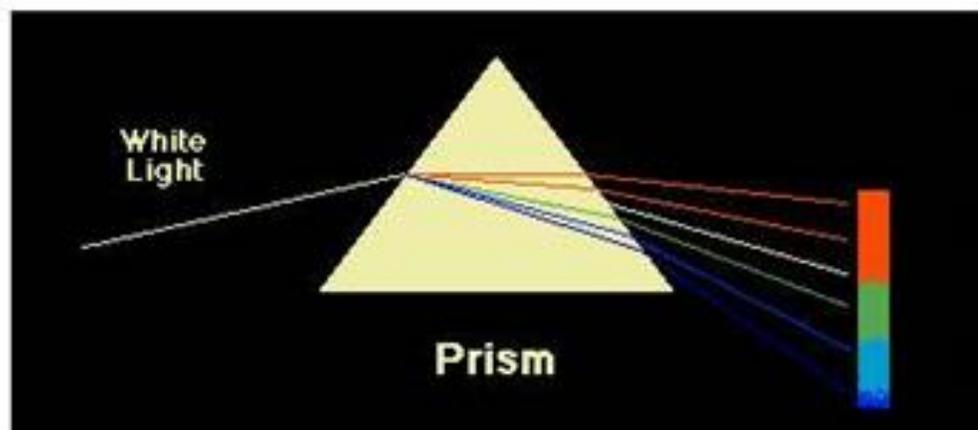
Light and The Photographer

Photography Lesson #1

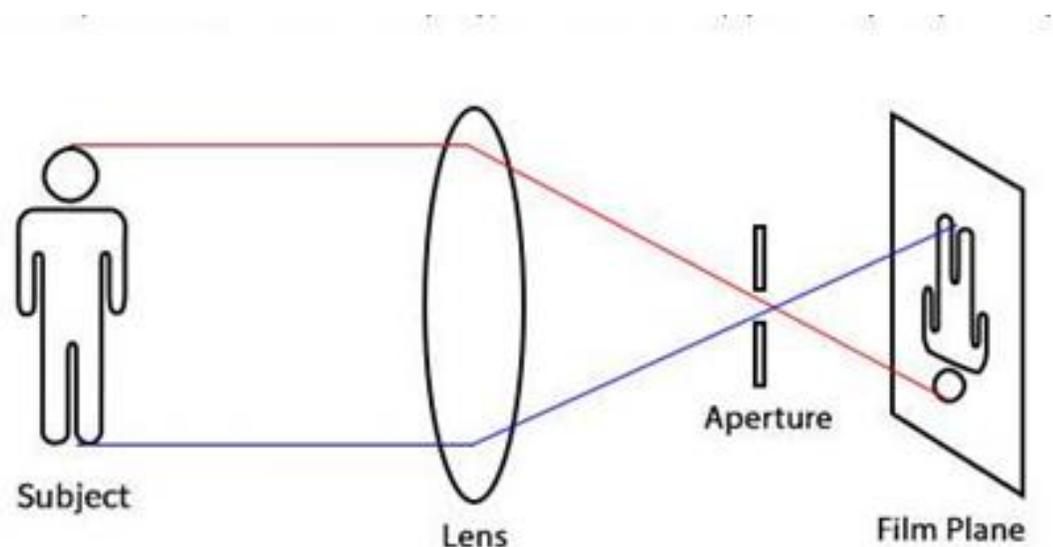
Light is the primary working tool of the photographer. Light is the visible portion of the electro-magnetic spectrum. The spectrum starts from red, the weakest of rays, all the way to violet which is the strongest of rays.

Light rays from the sun are considered white and they contain all the colors of the spectrum. Black is the absence of any color.

When we place a prism in front of a white ray, the prism will diffract (separate) that light into all the colors of the spectrum. Stop for a minute and watch this:



When we place a LENS in front of any ray, that lens will simply refract (bend) that ray.

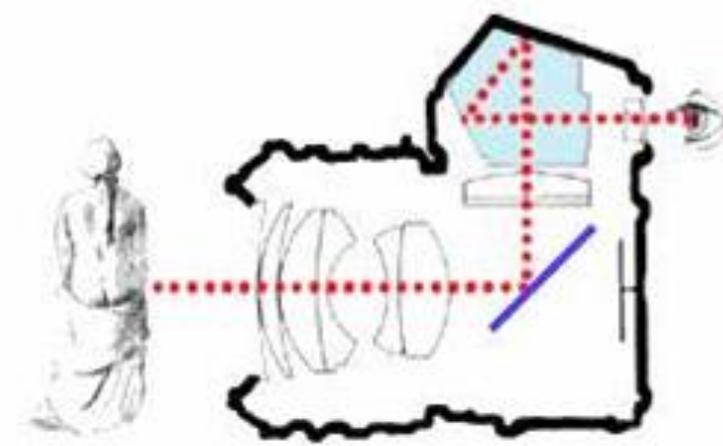
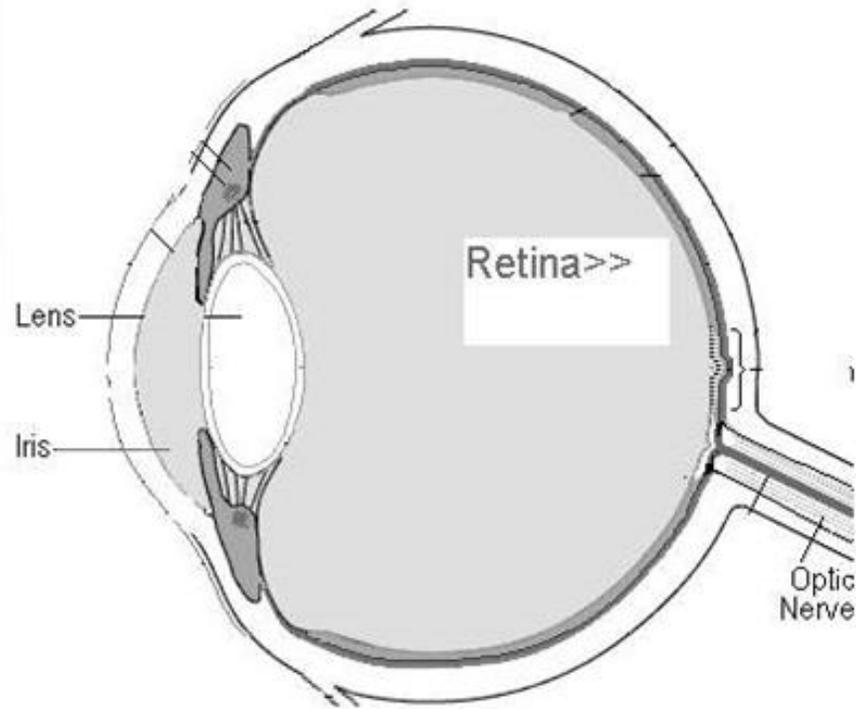


So, **being in focus** simply means moving the lens elements forward or backward until all the rays coming toward the camera from the subject meet at one point; the *focal point* on the film.

In the illustration above, you will see a point where the rays meet. That *point* is also called the *film plane*. At that point, all light rays of the subject must meet to accomplish sharp, focused pictures.

Photography Lesson #2

The human eye looks basically like the crude drawing below. The lens at the left side of the eye focuses light rays onto the retina at the right. The retina converts light rays into *electrical impulses* that are sent to the brain. Our brain then tells us we are seeing a bit of light.



Both digital and film cameras have a lens in front to capture light rays. Light rays enter through the lens to the film, or digital sensor; both of which are sensitive to light. Instead of jumping ahead of ourselves, let's get back to the basics.

About Light Rays

We have different labels for describing the rays we see. Here are a few basic ones:

Transmitted Rays

When you look at a stop light the top light is red, the middle is yellow, and the bottom light is green. That light is *transmitted* by putting a light source behind a colored filter.

Direct Rays

When you look directly into the sun, a camera's flash unit, or a flashlight you are looking at direct light. The light you see is coming *directly* from the source.

Reflected Rays

When you look at anything, you can see that object because direct light is shining on it and being *reflected* back into your eyes.

Ambient Light:

Think of *ambient light* as stray light – light rays that are being bounced around from all sorts of sources. If direct or reflected light on the subject is stronger your subject will appear clearer and less hazy.

Available Light

Available light simply means whatever light is present when not using a flash or other sources of light.

Understanding Color

The COLOR of the subject is determined by the color of the light source and the color of the subject.

Photographic film records light as it actually is. Your eye/brain, however, will always correct light back to "normal". Your brain is constantly compensating.

That is ... if you are inside a place that is lit with light bulbs, those light bulbs actually transmit a reddish-brown light and white objects will be recorded on film as reddish-brown. However your brain will correct that light and a white object will appear white.

Same thing happens inside a place illuminated with fluorescent bulbs. Fluorescent bulbs actually transmit an ugly greenish-yellow light, but your brain corrects that light and it appears white to your eye. Film records that light as greenish-yellow.



Fluorescent light contains only enough green and yellow light to photos turn out a bit "off" in color. However, by using a magenta filter in front of the lens, the overall lighting is more natural and "warm".

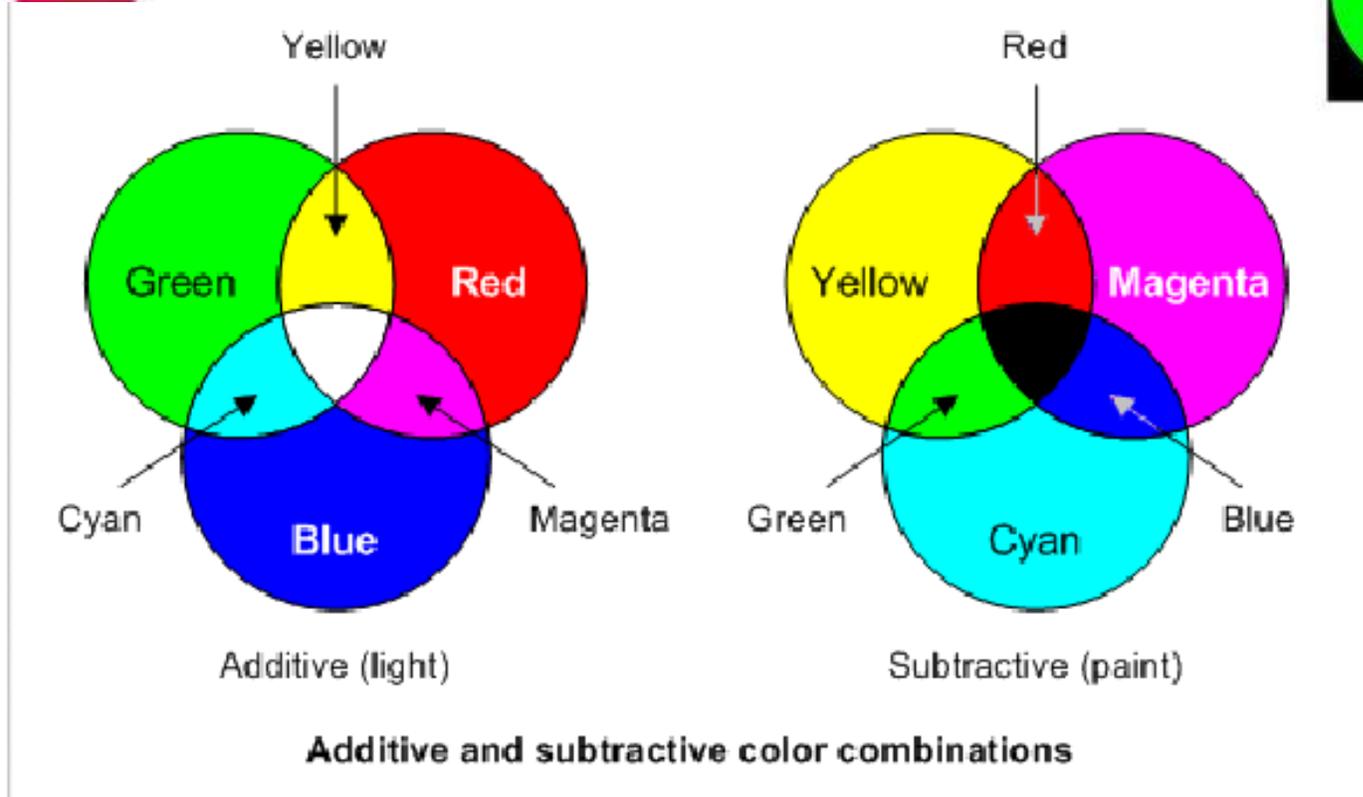
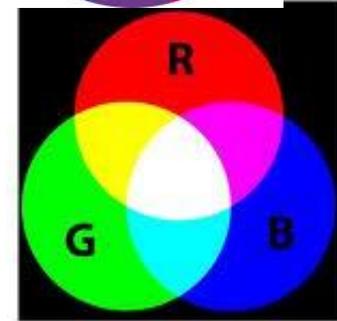




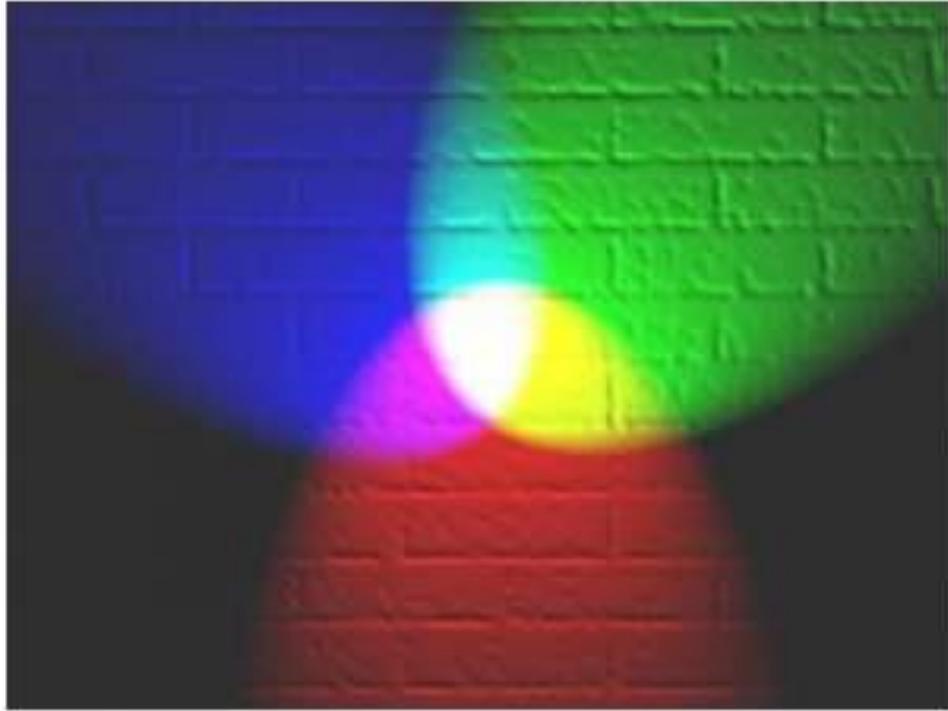
Ask the art teachers and the physics teachers about primary colours.

Their answers will be different but they will both be correct.

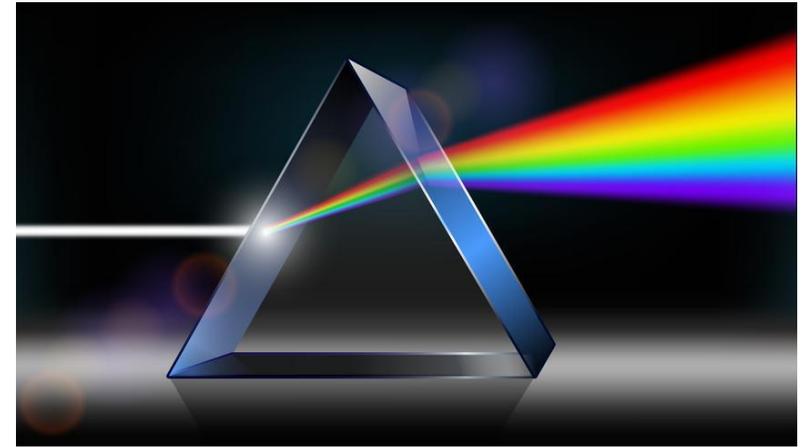
WHY?



Here's another image to show you how using the primary colors, red, green and blue, you can produce the secondary colors.

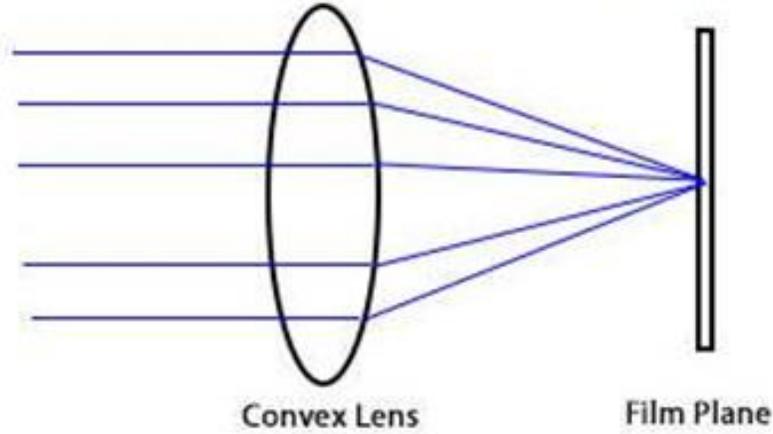


Do **Not** Worry, there will be no test on this. Just read it and think about it for a while. This concept can be a little confusing as in school we learned that the primary colors are different. We must remember that color in the printing world is what we learned in school, but color combinations are different for light. For photography, we must learn the colors of light, not the colors for printing. In photography we are talking about RGB or colors of light that join together to make white, whereas in print all primary colors joined together would create a neutral color, or gray.

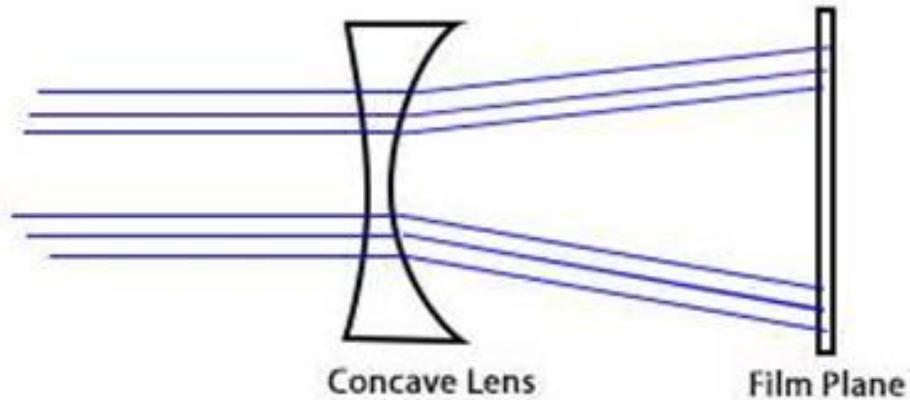


Photography Lesson #3

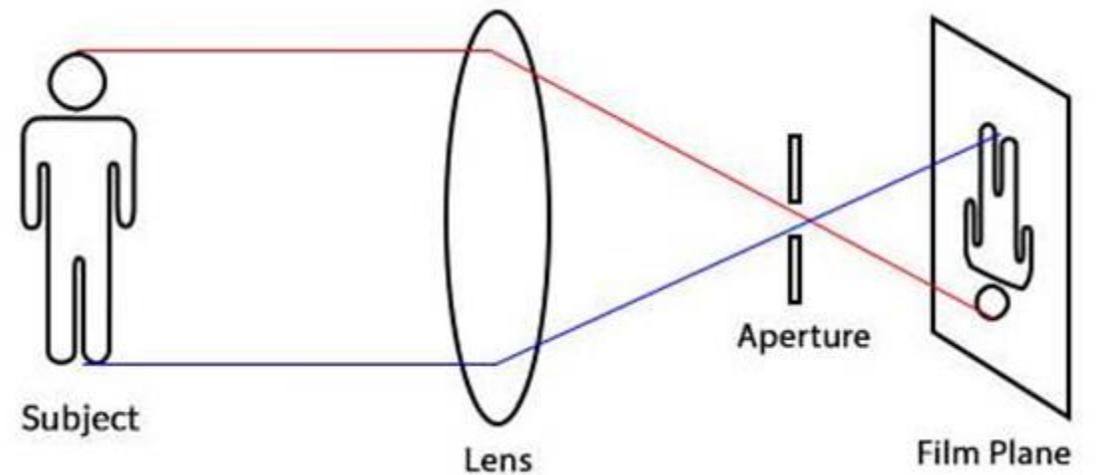
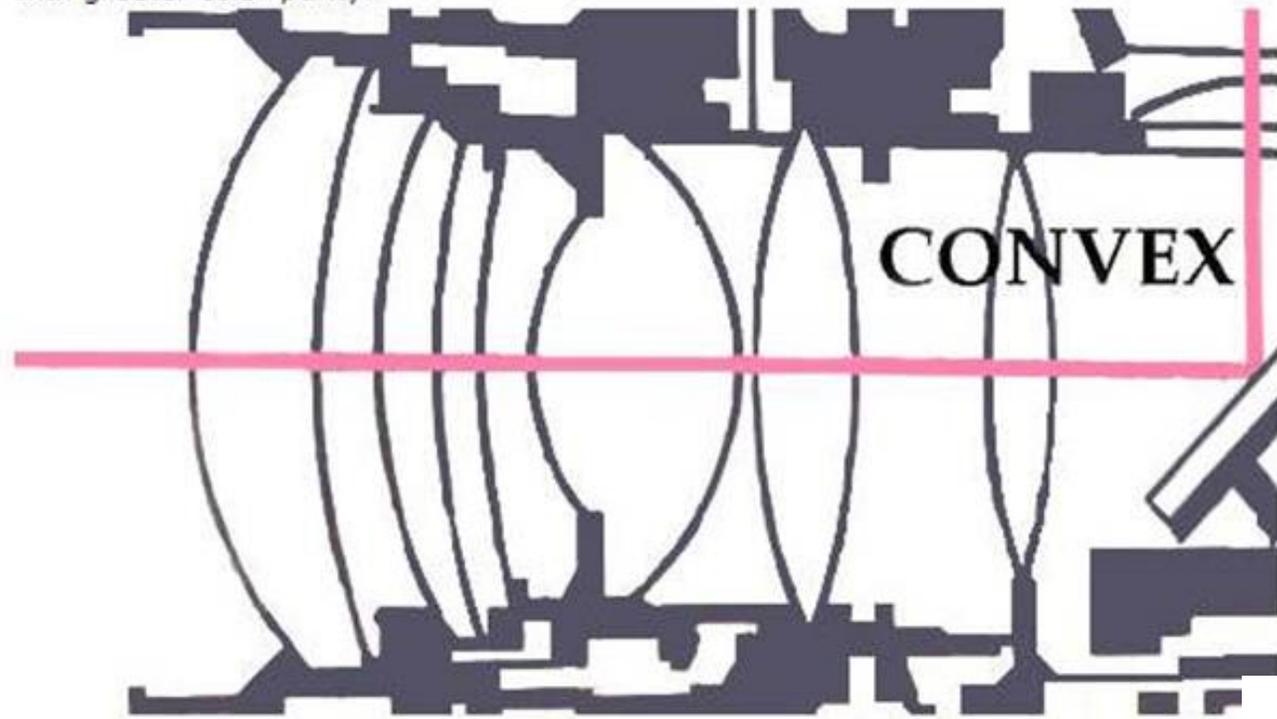
Since optical designs of photographic lenses (wide angle to telephoto) differ so radically we will not go into detail about optics. This lesson will cover a basic discussion of lenses and some good tips on lens use and care. Lenses are designed to refract (bend) light rays. Here is a basic convex lens (crude drawing below). Notice that this bends the light towards the center of the film plane. A magnifying glass is a basic convex lens.



A concave lens bends the light away from the center. In modern camera lenses, you will find a variety of these lenses with some individual elements oddly shaped.



Below is a cutaway illustration of a typical camera lens. Notice the different shapes of the elements. The science of optical design has become quite sophisticated and as it has progressed we, the photographers, have benefited with sharper, faster, lenses with greater color purity.



FOCAL LENGTH

A zoom lens is a lens that covers a range of focal lengths. To start at the beginning, we need to understand what the focal length in photography is.

The focal length determines the angle of view of the camera, meaning how much of the scene you capture. It is measured in millimetres (mm). Focal lengths usually range between 8mm to more than 300 mm.

This measure is just the distance between the centre of the lens and the sensor. A 50mm focal length (in a full-frame camera) corresponds approximately to the angle of view of the human eye.

If we take a photo with a 50mm lens, the scene will look pretty much as we see it without the camera. Shorter focal lengths (**wide angle lenses**) will widen our view. We will see a broader frame in the camera than with our eyes.

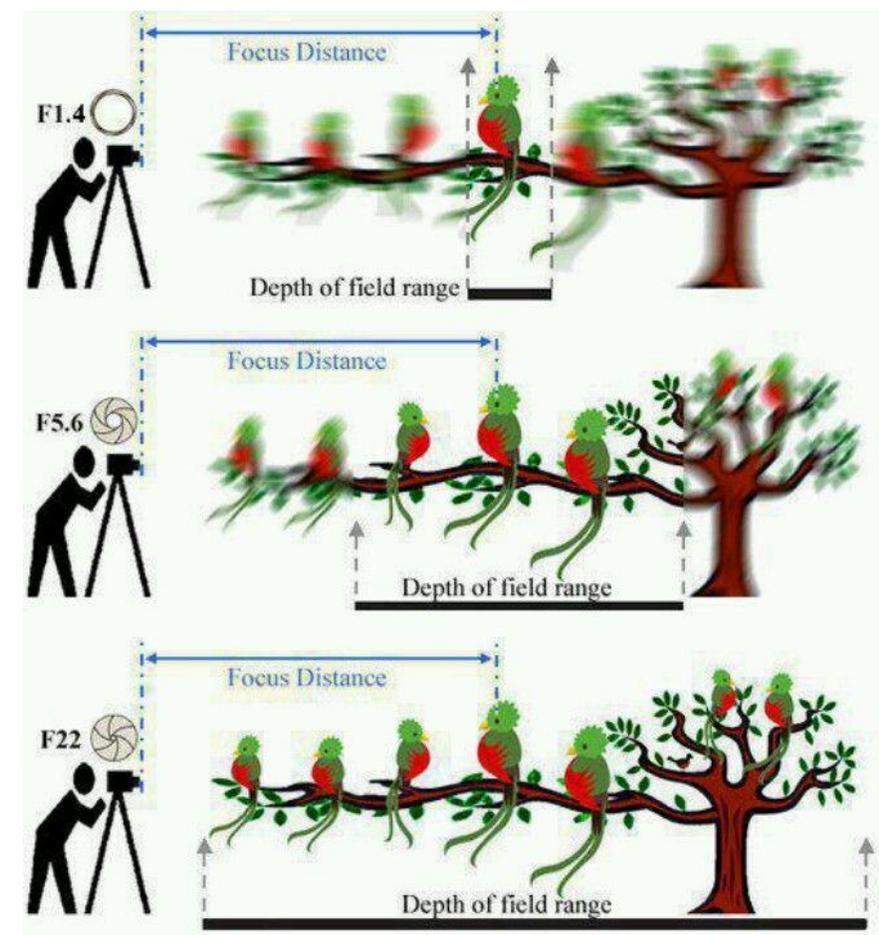
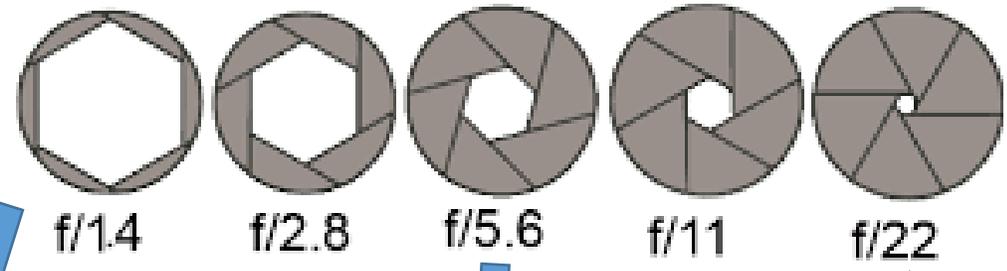
Lenses with longer focal lengths (**telephoto lenses**) will narrow our angle of view. A smaller part of the scene will be in the frame.

Zoom lenses allow you to adjust the focal length of the lens within a specific range. In other words, you can change the angle of view and make it narrower (zoom in) or wider (zoom out).



Depth of field is a term we use in dealing with the sharpness of objects in our field of view. We know the subject we focused on will be sharp, but what about objects *in front of, and behind*? We control the sharpness of those objects by using THE APERTURE which is built inside each lens.

The aperture is used primarily for controlling the exposure (the lesson on Exposure follows this page, be patient) but it also controls the **depth of field** (*depth of sharpness* would have been a better term). Words cannot explain this as well as visuals so take a look below at how different aperture settings can control the sharpness of objects in front of, and behind, the subject you are focusing on:



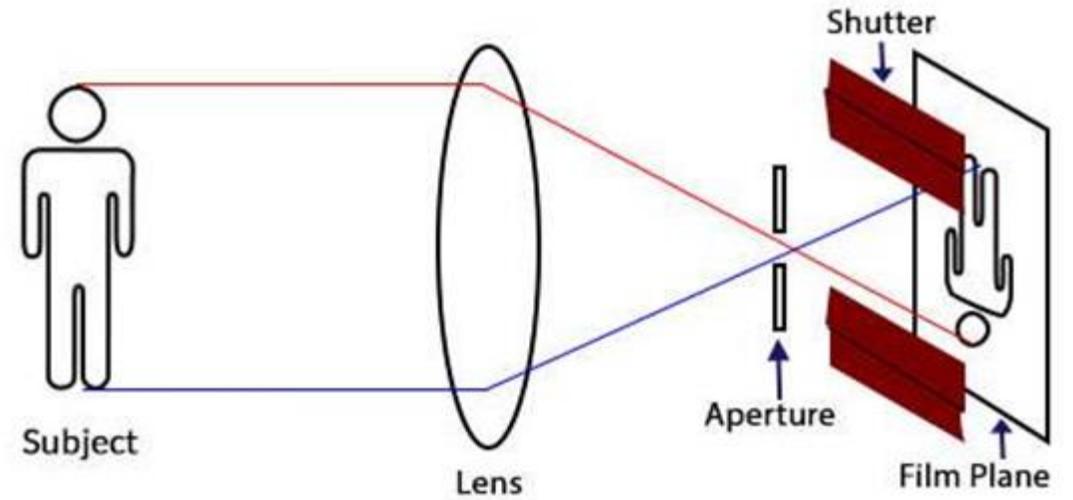
Exposure: Aperture, Shutter Speed & ISO

Getting the right exposure is fundamental in photography. It's like getting your balance in riding a bike, you're never going to win a competition unless you have the awareness of your balance from the get-go. Three settings will factor into your exposure: Aperture, Shutter Speed and ISO.

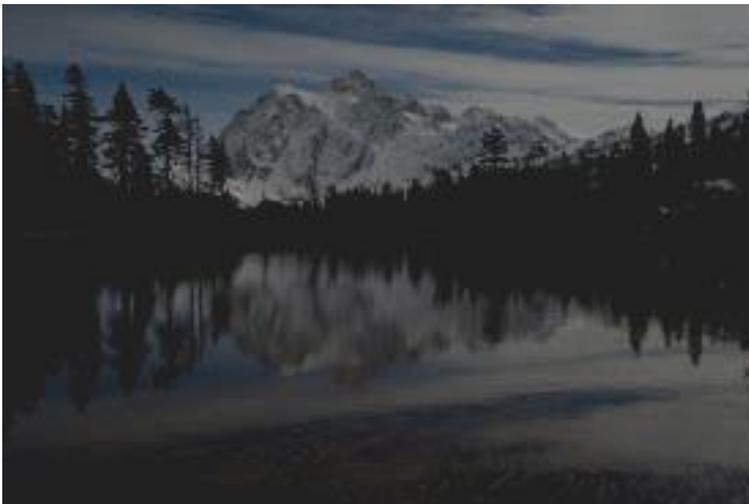
So the question then becomes "How do we achieve correct exposure?"



Study this and learn it, then you will KNOW how to control exposure.



Okay, remember how the lens bends the light rays into the camera and onto the film plane? Good. Between the lens and the film plane are TWO devices we use to for exposure control, to control the exact amount of light hitting the film. THAT'S RIGHT, THERE ARE TWO DEVICES TO CONTROL EXPOSURE....

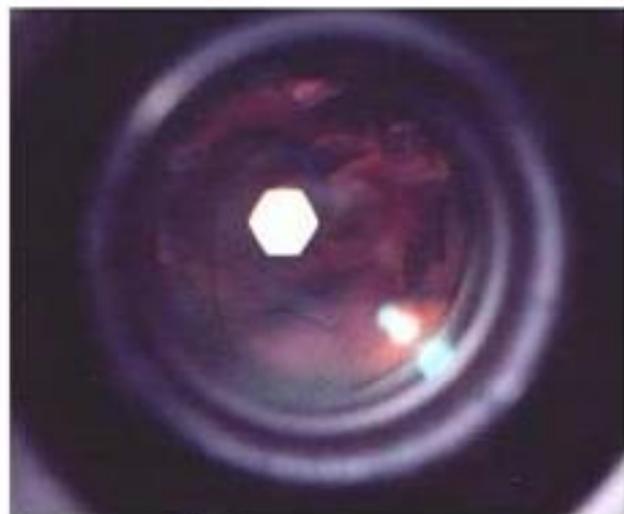


THAT'S RIGHT, THERE ARE TWO DEVICES TO CONTROL EXPOSURE...

THE SHUTTER, is usually a curtain-like device just in front of the film. Think of a shade pulled down on a window, and then quickly open it and close it. FOR AN INSTANT THE ROOM WAS FILLED WITH LIGHT **and the length of time that burst of light filled the room is shutter speed**! That is basically how a shutter controls the amount of light getting to the film.

The time the shade was open determined – to some extent – how much light came into the room – but so did the SIZE of the window! That window opening acted as...

THE APERTURE, which is built inside each lens and controls how much light enters the lens.



"Stopped down" f16 or f22

Now for some clarification on shutter speeds. Looking at the photo below, you will see the numbers that are changing are the shutter speeds in fractions of a second (i.e. 30 = 1/30, 60 = 1/60). This is the time taken from when the shutter opens to when the shutter closes, after you press the shutter release.



Moving from one speed to the next one halves the amount of light that enters the camera. Moving the other way, to a slower shutter speed, doubles the amount of light that enters the camera. This change from one speed to another is called moving a stop. For instance, moving from a speed of 1/30th to 1/60th of a second is going 1 stop faster, and from 1/60th of a second to 1/250th of a second is moving 2 stops.

HERE IS A RULE OF THUMB FOR PROPER EXPOSURE OUTDOORS:

First, take the film speed number as your shutter speed (100 ISO = 1/125th of a second or, if your film speed is 400 then the shutter speed would be 1/500th of a second for instance), your aperture setting is:

For bright sunny days and the sun is on the subject. f16.

For overcast, cloudy. f8.

Sunsets and sunrises, low light. wide open @ 1/30th



These are basic starting points that usually work. The film package also has some excellent, basic exposure suggestions.

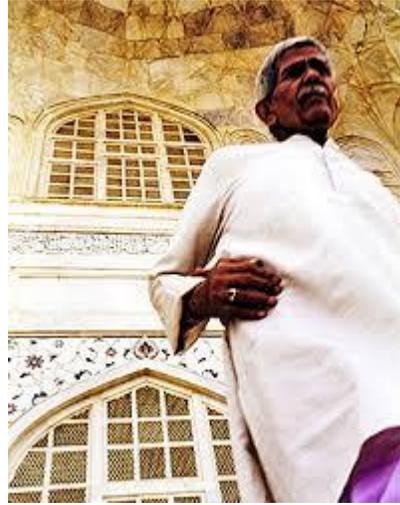
So, you have two methods of controlling exactly how many light rays get on the film and if you understand the above, you then understand how to control exposure for different types of film or different ISO. Re-read it until you understand it, because this is the crux of exposure for daylight photographs.

In order to become more sophisticated with **exposure control** you need to **learn how to use a light meter**. This can get very complicated because there are so many light metering systems out there, and so many ways of using those meters. I submit, after 40 years of shooting, that the only true metering system you NEED to master is the light metering system offered in any good SLR camera.

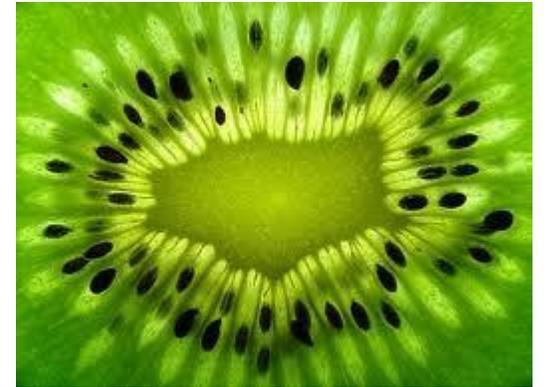


The light meter reads the light coming off the subject matter, through the lens you are using, and is controlled by the film speed you have already set that meter to. It simply is the most sensible, accurate way to meter those light rays. **SLR meters are getting more advanced all the time** offering "spot" metering (you can zero in on one particular spot on the subject, get the right exposure, and lock in that setting and make your photo) ... overall metering, reflected metering, incident metering,and on and on. It is no longer necessary to "bracket" your exposure (shoot one frame over by one stop, one frame at the indicated exposure, and one stop under the recommended exposure). I quit bracketing twenty years ago and have not exposed a frame improperly.

Therefore, I will not get into other methods of metering. All of the recommended exposures from now on will be based on through-the-lens metering with an SLR camera.



What common factor makes these images interesting?



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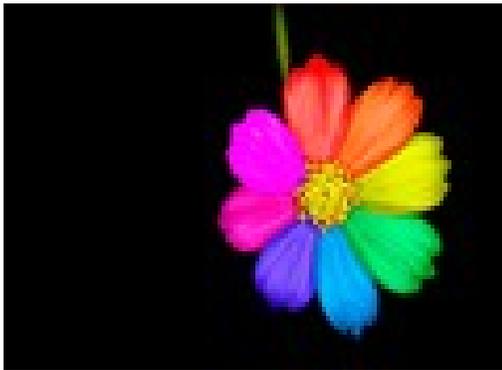
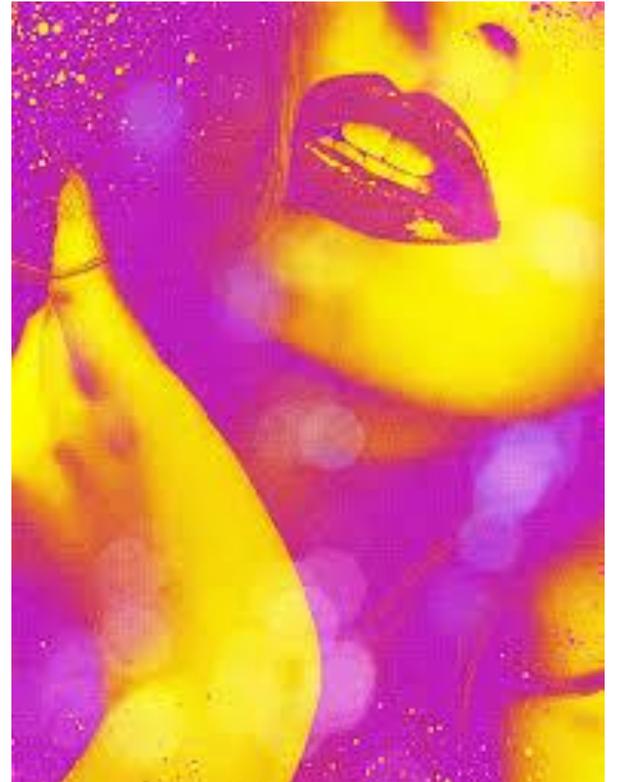


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DIGITAL MEDIA:

HERE
Is a highly
recommended web
site.



READY TO USE GRAPHIC ASSETS



HOME PHOTOGRAPHY COURSES ▾ PHOTOGRAPHY CLASSES ▾ PHOTO TIPS ▾ PHOTO EDITING ▾ LIGHTROOM ▾

In this presentation
we have a few of
the key concepts
from this site.
(But there is much,
much more!)

