It is all about the light

Photographing small artwork and products

The best source for more information

- Light, Science, and Magic: An Introduction to Photographic Lighting by Fil Hunter, Steve Biver, and Paul Fuqua

- 5th edition is current, but any edition is all of the information you will need, unless you plan to get a degree or become a professional.

- The 2nd edition is floating around the web as a pdf, but I don't know if this is a legitimate or pirated copy.

Light is more important than the camera

- You can use most of these techniques with just about any camera

- 'Better' cameras will make things easier and can make a visual difference, but even a simple cell phone camera can make acceptable quality for display on the internet (though not really print quality).

The properties of light

- Brightness

- Color

- Contrast

Brightness

- Control of artificial sources can be done by the distance it is placed from the object, or by inserting filters, and if available with controls on the light itself.

- Distance is the simplest since it obeys the 'inverse square law'. In other words if the light is moved from 1 meter from the object to 2 meters it will be ¼ as bright.

Color

- Typically referred to by a color 'temperature'
- Daylight is 5000K
- Incandescent is about 2700-3700K
- Fluorescents are all over the place
- Inexpensive cameras really don't have much control over color balance.
- So you must rely on 'auto white balance'
- Use 'Grey Card' for auto white balance and to determine exposure.

The Goal: A single 'color' light source

- If you have multiple light sources, your ability to correct the color of the digital image will be greatly curtailed.

- The best way to obtain a single color light source is to ensure that your lights are much brighter then the general room lighting.

- This is an area where better cameras and lighting can make a big difference in the 'ease' with which this can be accomplished.

The Goal: A single 'color' light source

- Shooting in RAW format can help adjust colors in photo to get exact match

- Barring manual calibration, AUTO mode is your best bet.

- You can use a shot of a color chart with the same lighting to determine the exact color temperature of your light setup
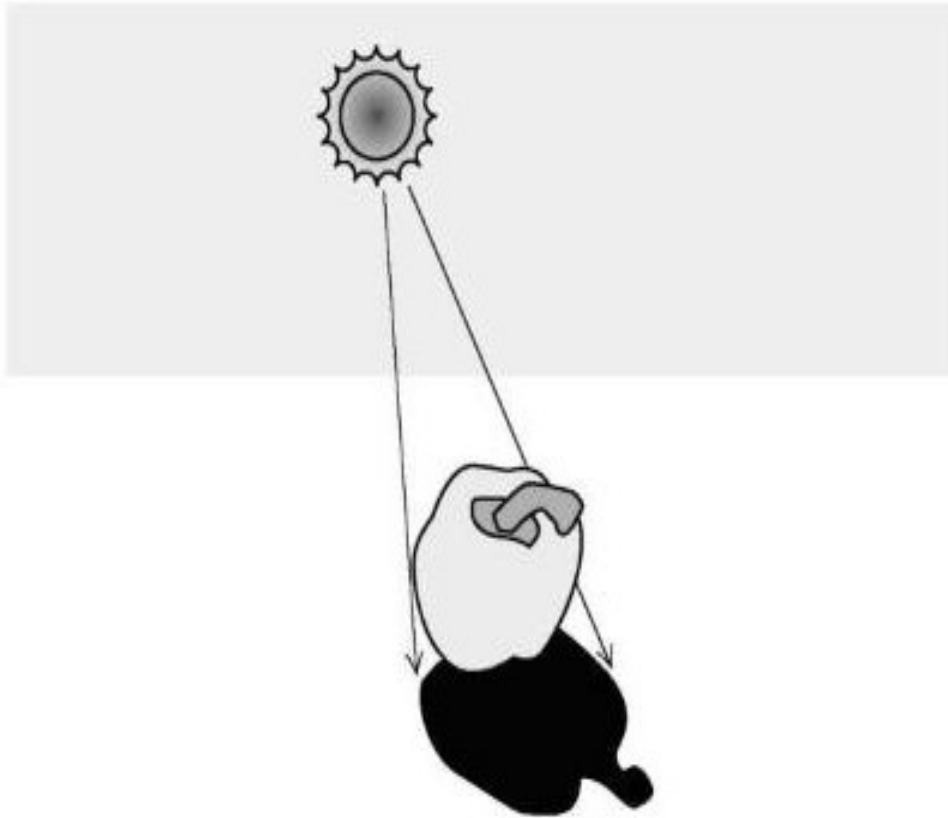
Contrast

- The contrast of the light is determined by its effective size in relation to object being photographed.

- High contrast lights are small in effective size and produce 'hard' shadows

- Low contrast lights are large in effective size and produce 'soft' shadows

What do I mean by 'Effective Size'

- The relative size of the apparent light source to the object being photographed.

- The sun is much larger than any possible object on earth, but because it is so far away it is effectively a point light source that is smaller than any object you might photograph. We are probably all familiar with the harsh photographs we get of people and objects on a bright cloudless day.

- Letting the sun reflect off a white wall to be the only light for photographing a person, can make the light source much larger then the object being focused; hence provide a much 'softer' light.

Small size (high contrast) creates hard lighting

Large size (low contrast) creates soft lighting
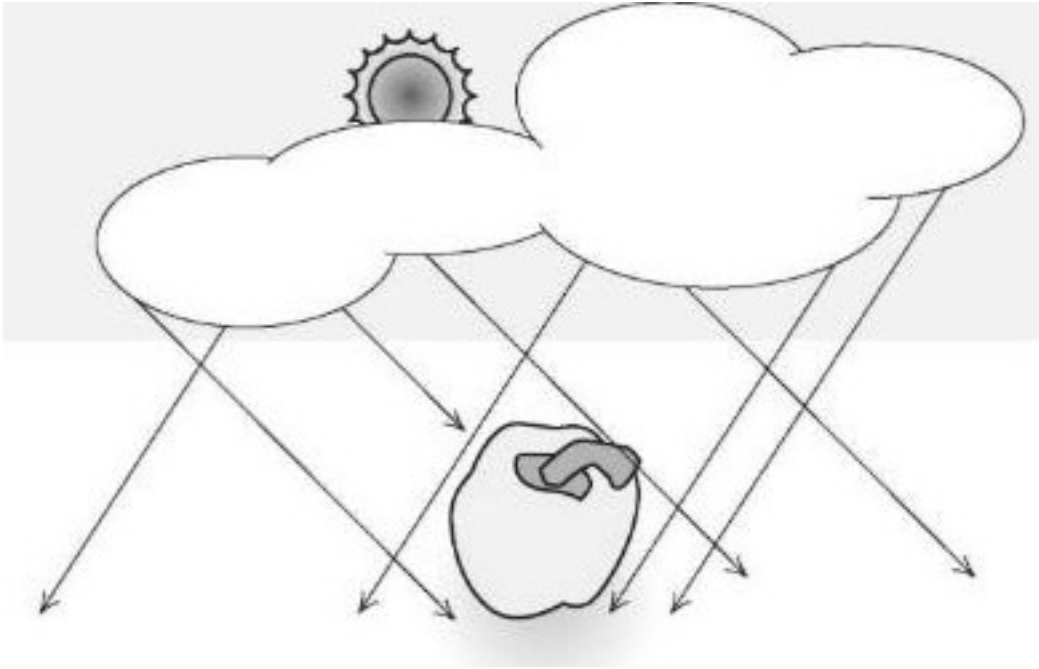
Controlling 'size' of light

- You can use modifiers to control size of light
- Softbox, muslin, etc..
- Reflector
- Light tent
- Distance will control effective size of any light

Three principles of lighting

- The effective size of the light is the single most important decision.

- Two types of reflections are possible. They are what determines what a surface will look like.

- Some of these reflections occur only if light strikes from within a limited family of angles.

Increasing the size of light sources

- Reflecting light off of large surface such as white wall, foam core board, etc.

- Shining light from a distance through a white translucent object. Such as a bed sheet/curtain or frosted ceiling light panels
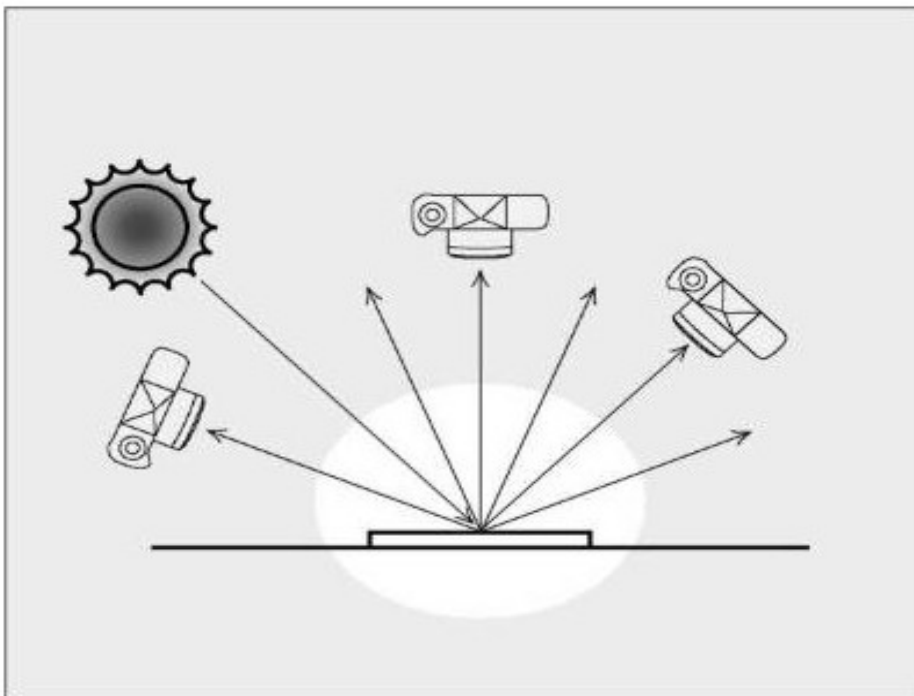
The two types of reflections

- **Diffuse reflection**
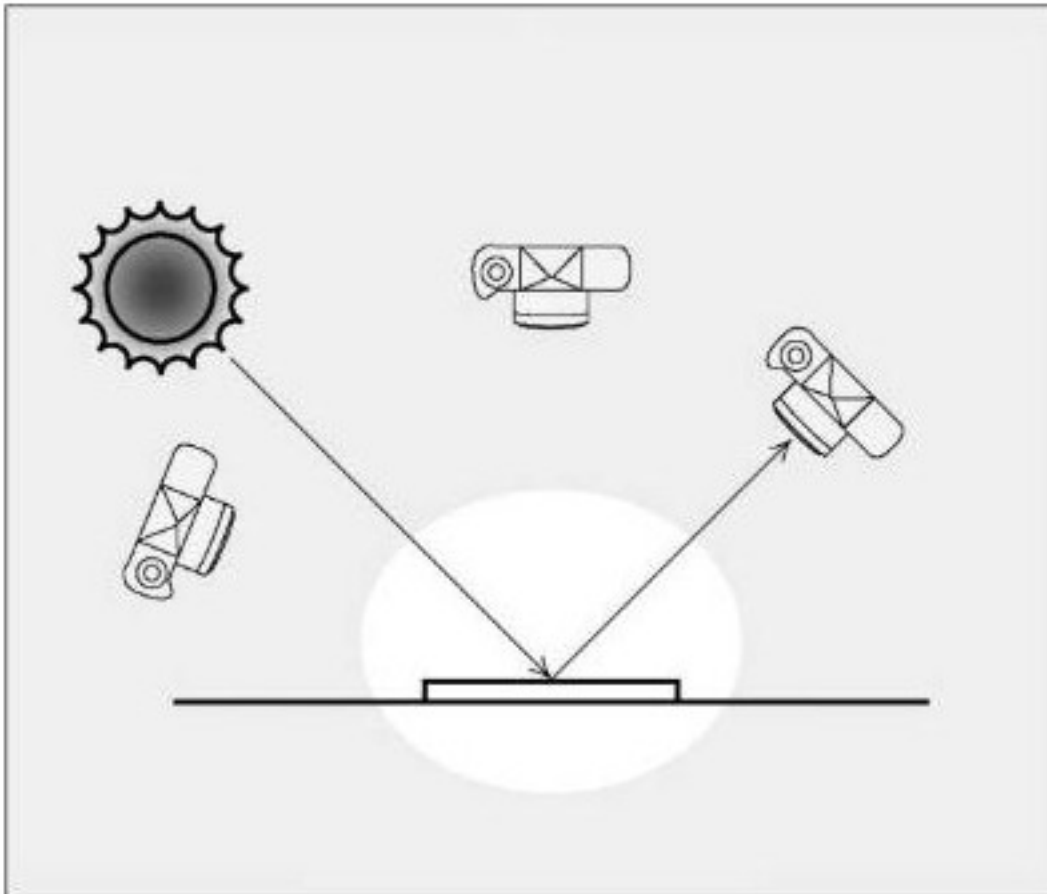
- **Direct reflection**

Diffuse Reflection

- A reflection that is the same brightness regardless of the angle from which we view the object/reflection

3.1 A white card gives off almost nothing but diffuse reflection. Because diffuse reflection from a light source is reflected equally in all directions from the surface, all three cameras see the card as having the same brightness.

Direct Reflection

- Also known as a specular reflection, is a mirror image of the light source that produces them

3.4 Direct reflection. Looking at the mirror, one of the cameras sees a blinding reflection of the light source, whereas the others see no reflection at all.

High Contrast lighting with direct reflection

- Small light source produces 'hard' shadows

- Reflective objects, like glass or mirrors, will 'show' the light source

3.5 Two clues tell us this picture was made with a small light source: hard shadows and the size of the reflection in the mirror.

Low contrast lighting with direct reflections

- Large light source produce softer shadows

- Large light source completely 'fill' the mirror by filling the family of angles that cause direct reflection

3.6 A larger light softens the shadow. More important, the reflection of the light now completely fills the mirror. This is because the light we used this time was large enough to fill the family of angles that causes direct reflection.
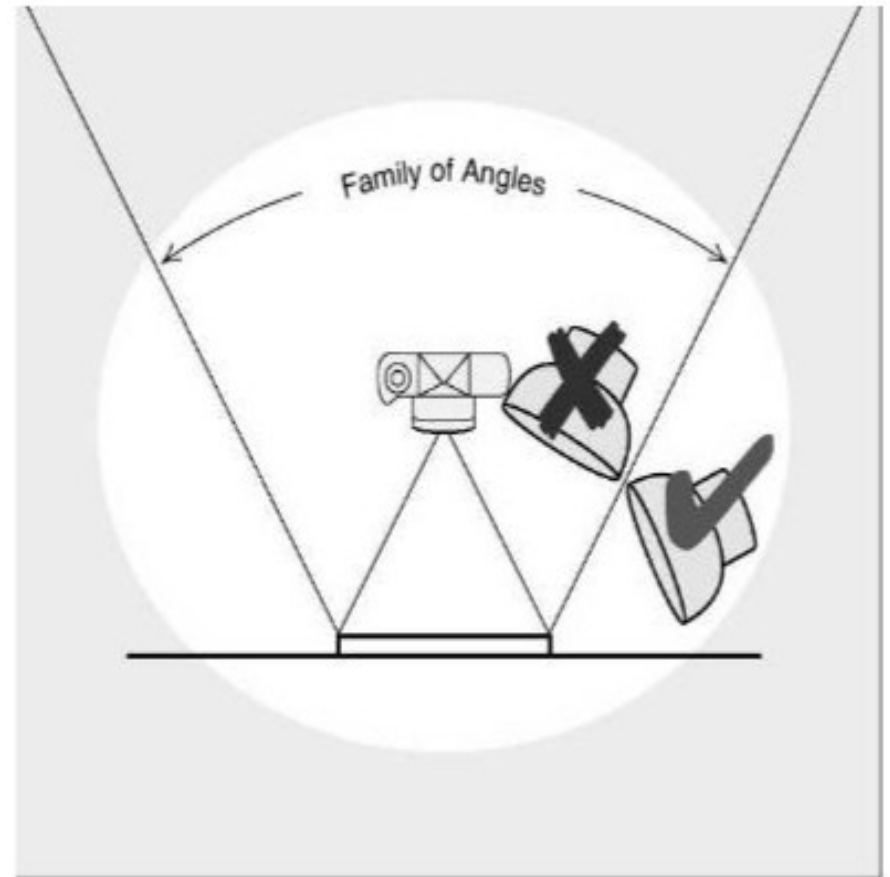
Family of Angles

- When the light is placed within the family of angles that produce a direct reflection.

- Polarized direct reflections are similar, but require more sophisticated treatment.
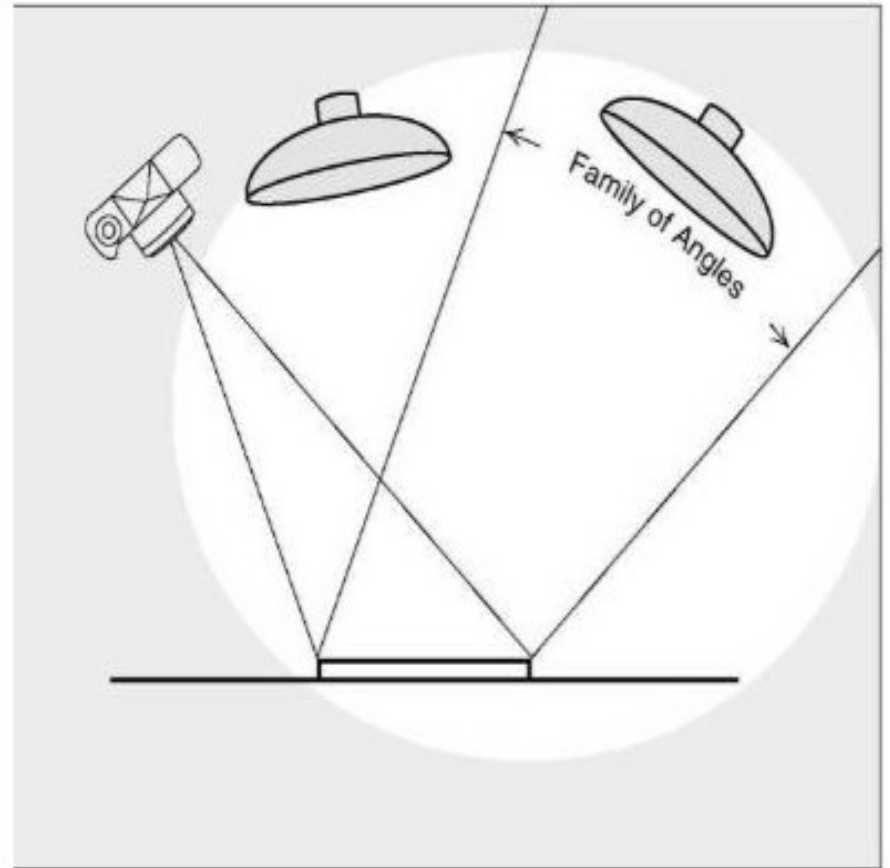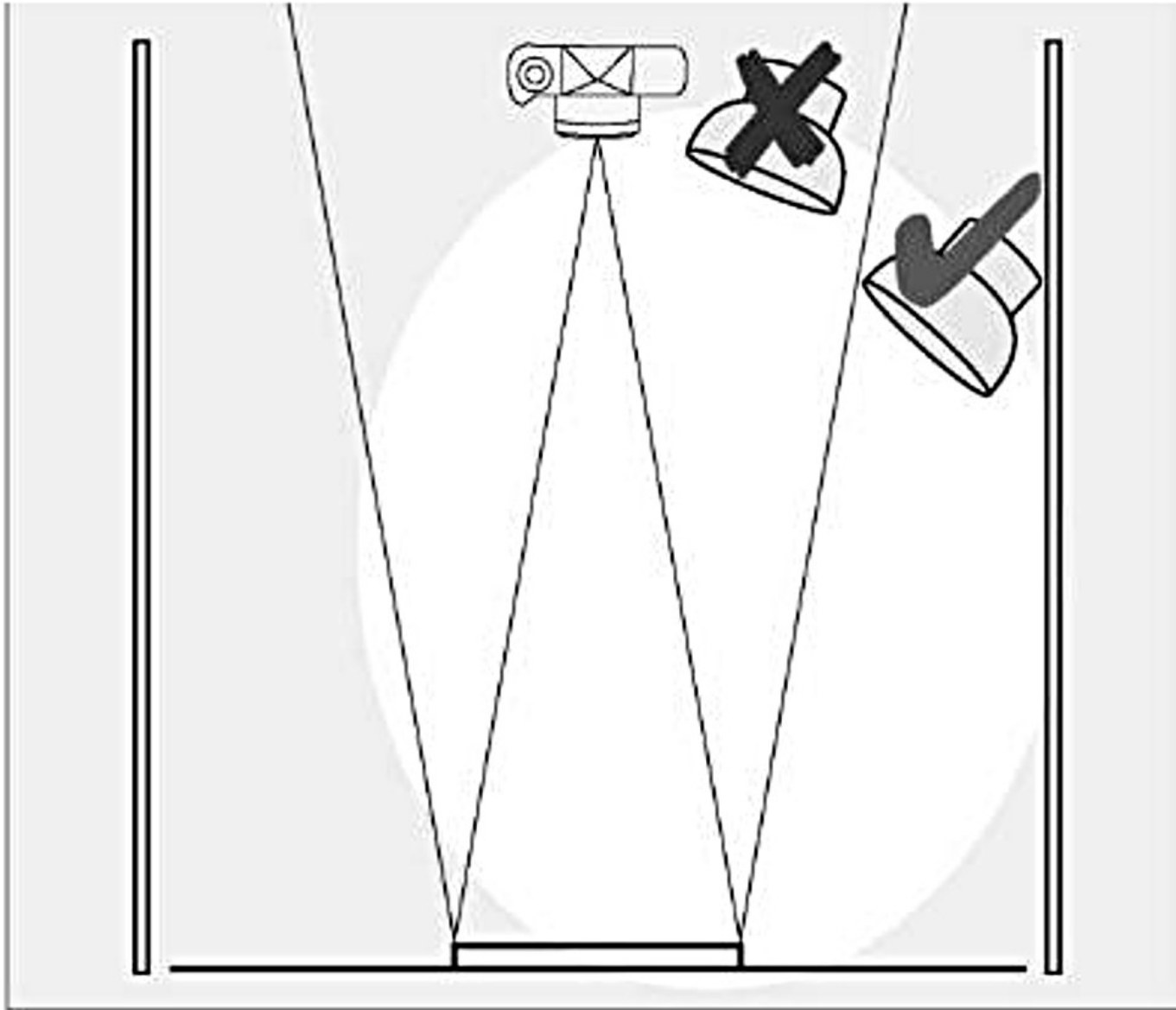
Family of Angles

Photographing a flat object

- Direct reflection produces unwanted glare

- Art under glass can produce glare even if the light is outside of the family of angles. These reflections can be reduced/eliminated with polarizing filters

Family of Angles

Photographing a Flat Object

4.5 A copy setup using a long lens. Because the family of angles that produces a direct reflection is small, finding a good place to put the light is easy.

Subject and Background

- Color of your light source:

  With digital media you can 'correct' for the color of your light source to produce an accurate color rendition of your subject.

- The problems with light tents

  – Background and subject have to be lit with the same lights

  – The color of the background will affect the color of your subject, and is impossible to correct for.

Illustration of potential problem with light tent setup

-

How to avoid the problems with Light Tents

- Don't use them! They only make things 'easier' for a single type of shot—small object on a white background.

- The use of a clear glass or plastic shelf several feet (or more) away from your background material will allow you to light your subject and background separately.

One light set-ups

- Your light must be used to illuminate your subject.

- You can use a reflector to provide fill light and/or soften your primary light

- If using a light colored background you must have your subject rest directly on the background.

- Dark colored backgrounds, or white backgrounds work best with one light.

Two light set-ups

- Treat subject as you would with a one-light set-up. So, use a reflector for the fill light.

- Use second light to control exposure of your background.

- May use second light as fill light, if background is dark and separated, or white and in contact with subject.

Three light set-ups

- Allows full exposure control for all aspects of the shoot.

- Requires the most experience and care to ensure that all components of the photo are exposed properly.

- Main subject light; fill subject light, and background light.

White background with no shadows

- Poker chips on a sheet of glass about two feet above white background

- Three lights, one to illuminate background, one primary, and one fill light

Black object with black background

- Object on a sheet of glass about two feet above white background

- Two lights, one primary, and one fill light

- Use black velvet fabric as background to reduce reflections

Example setup and shots

- Setup

- Shot

Example setup and shots

- Setup

- Shot

Final points

- Lights and related equipment need not be expensive or specialized to provide significant improvement to your shots

- Techniques work with any camera, but the more manual control you have the easier it is to achieve a given 'look'

- The book referenced earlier and some practice are all you really need to achieve spectacular results.