Photographic Documentation Fundamentals

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Setting up a Tripod and Skewing
Setting a DSLR camera
Photodocumenting with a phone

Using Tripods and Skewing

Set your tripod

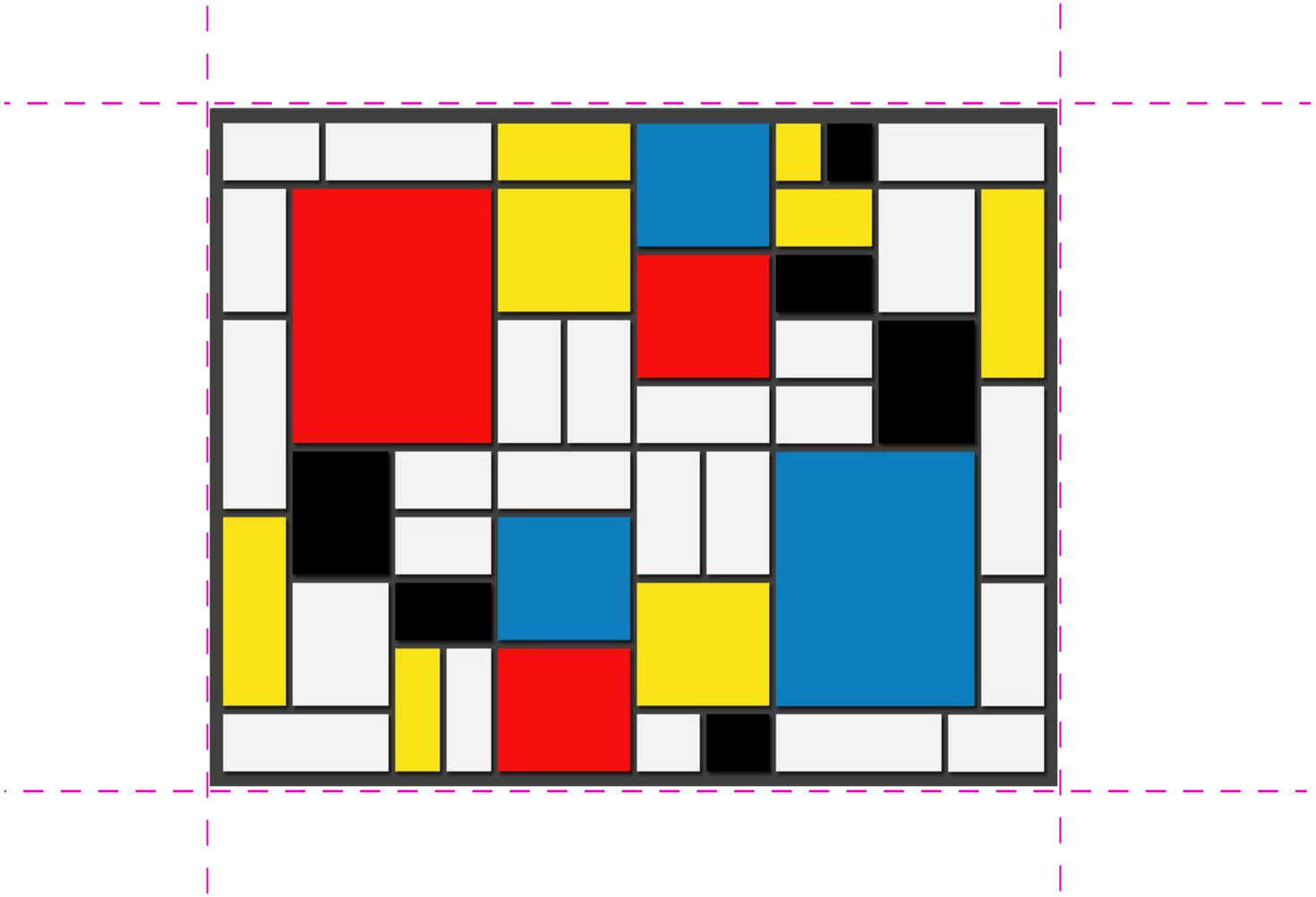
Always use a tripod. Never hold your camera when documenting art. Your hands are not steady enough. A tripod will keep motion blur from your image, which is the blurring from the camera shaking. A tripod also allows you to use slower shutter speeds, if there is not enough available light. If you don't have a tripod, use a stack of books, a table, anything steady.

Problems of skewing

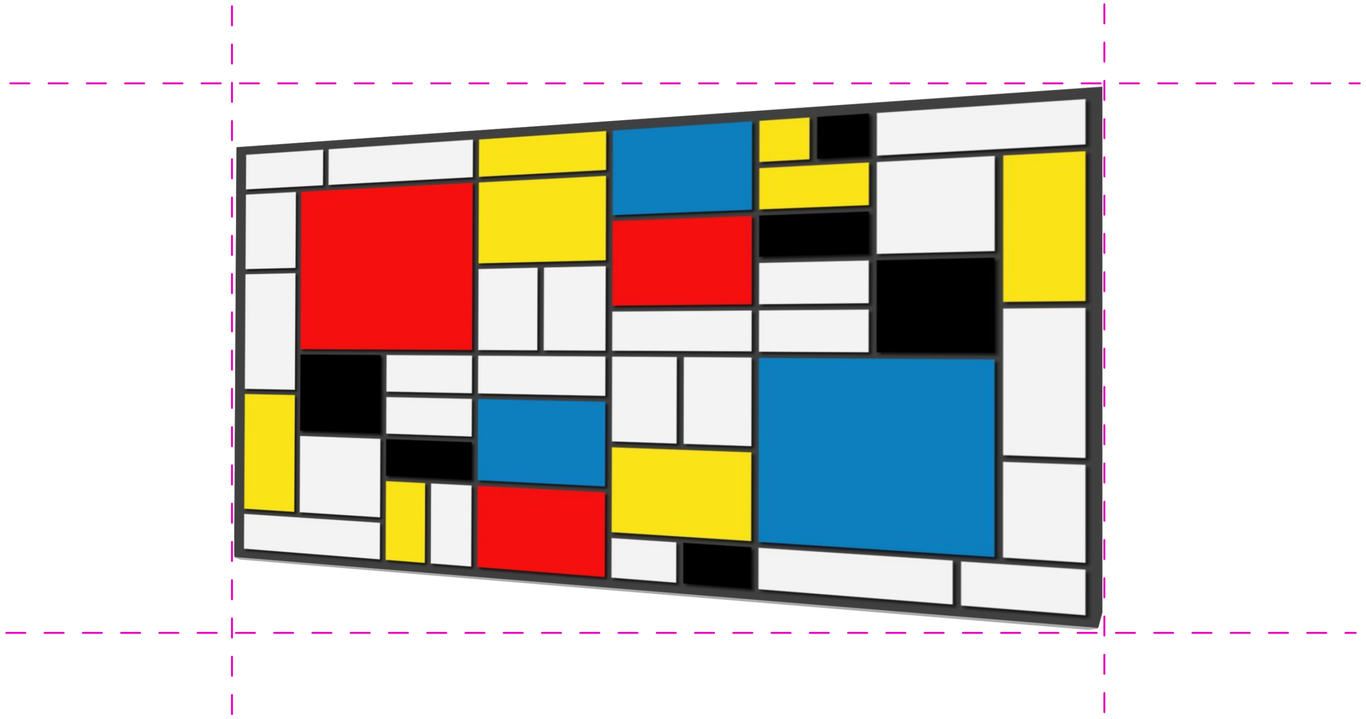
The ideal documentation photo will represent your artwork as a perfect rectangle, assuming your artwork is a rectangle. Even if your artwork is non-rectangular, however, you still want the **plane** that is being photographed to be perpendicular to the line of sight of the camera, so that the proportions of your documentation match your art.

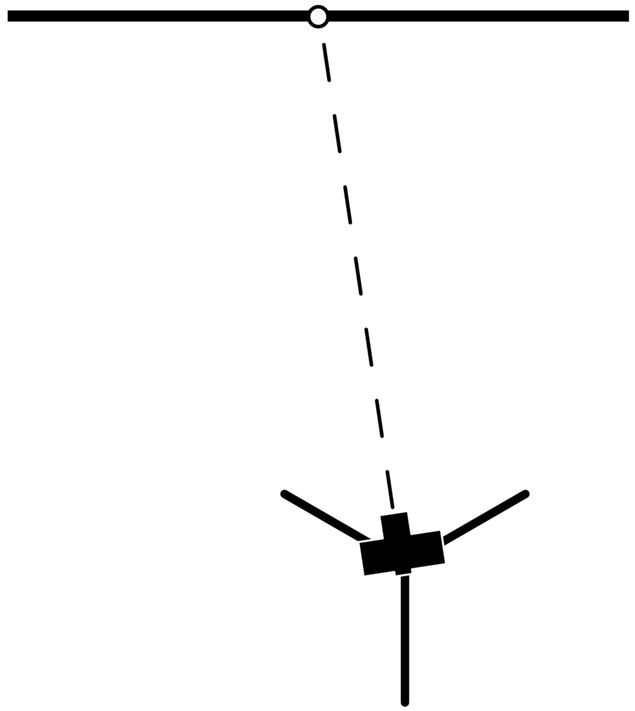
If your camera is not placed exactly at the center of your artwork, you will have skewing, a form of perspective distortion that makes your equilateral rectangle into an odd shape.

Here is the ideal photograph, what you should see if your camera is perfectly centred to your painting:



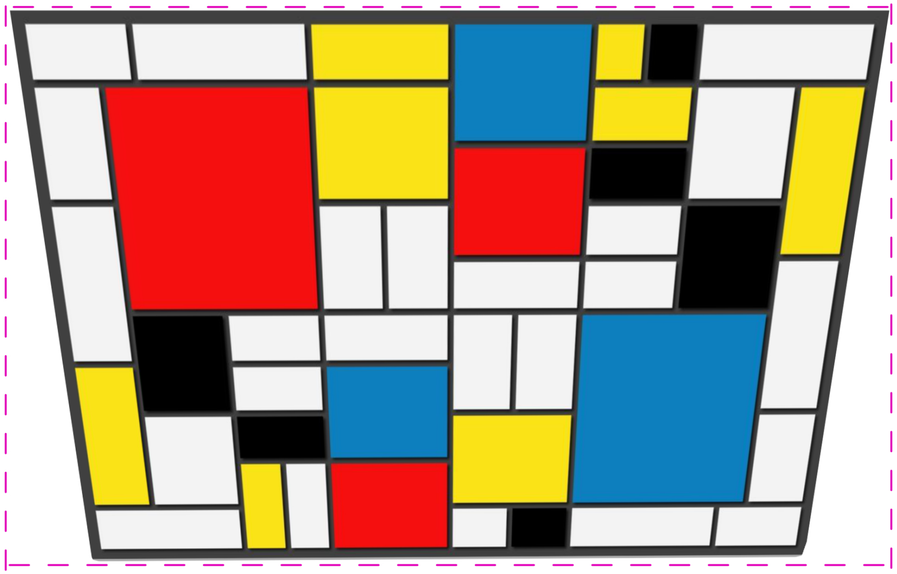
Here is a **skewed** photograph, one where the camera is too far right to the horizontal centre of the painting. The left side will be too short compared to the right.

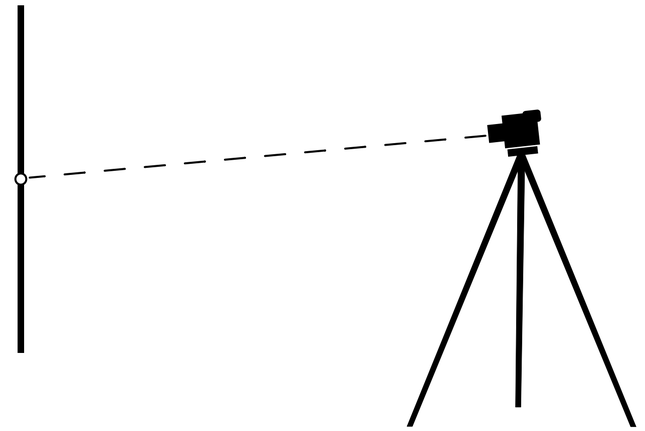




Top view of camera

Here is a skewed photograph where the camera is too high to the vertical centre of the painting. The top of the painting will seem longer than the bottom.





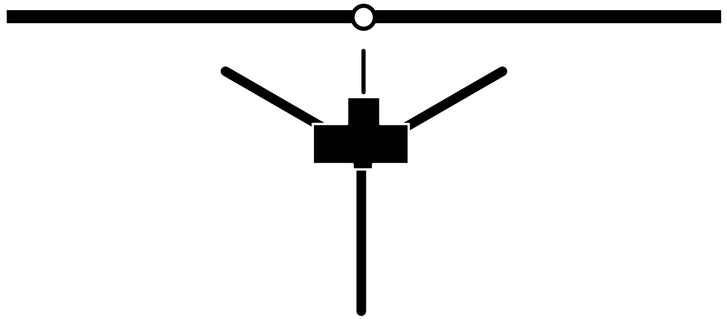
Side view of camera

How to correct for skewing?

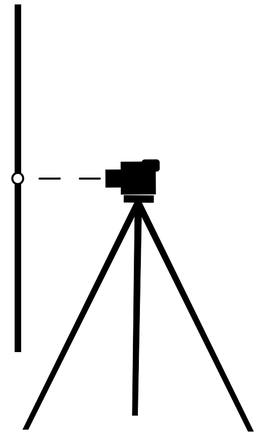
There are many ways to make sure your camera is in the centre of the painting. You could use measuring tape to find the vertical and horizontal centre of the painting, and then use string or masking tape to place your camera. Some methods might be easier than others.

Here is one fast and easy technique for aligning the centre of the painting with the centre of your camera lens.

1. Bring the camera as close to the painting as possible on the tripod.
2. Set the camera lens to the horizontal and vertical centres of the painting. (Use rulers or measuring tape if you can.)



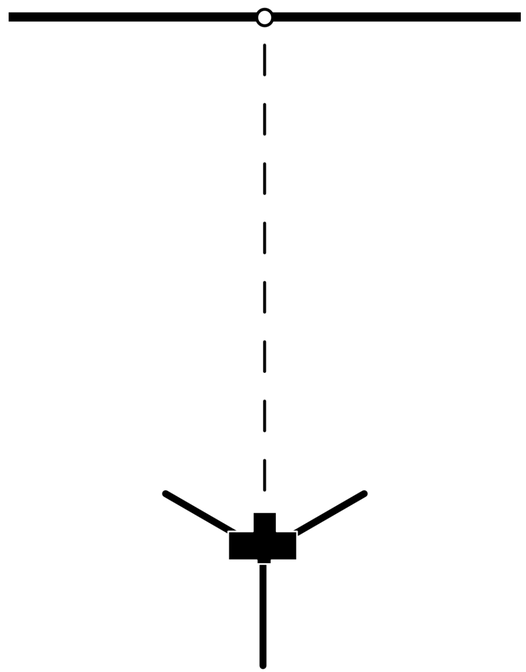
Top view of camera



Side view of camera

Note: Line up the centre of your **lens** with the centre of the painting, not the centre of your camera. The lens of a camera is often offset from the centre of the camera.

3. Pull the camera back until the whole painting is in the frame. Use masking tape or some sort of guide to make sure you pull the camera back in a line perpendicular to the painting.



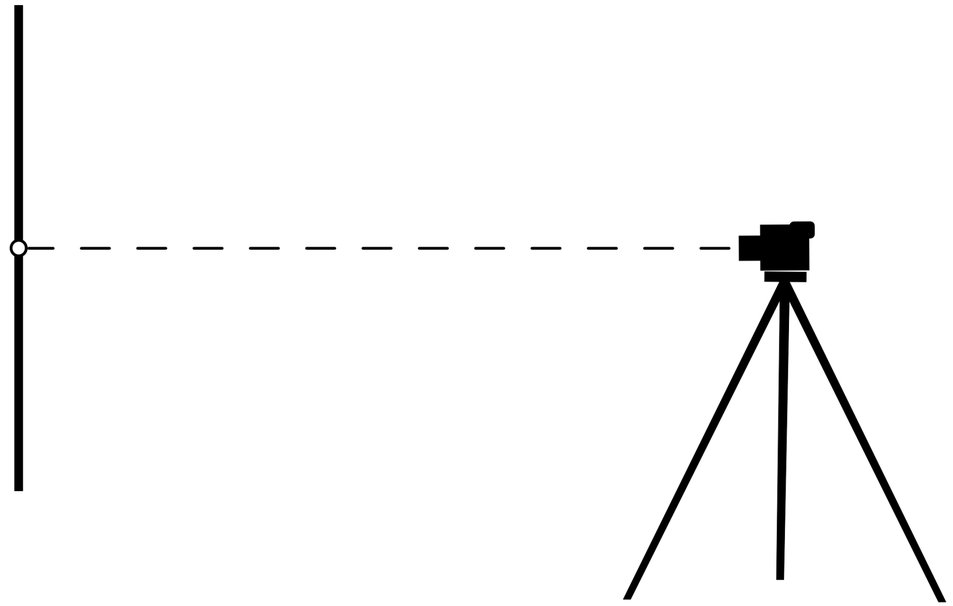


Photo documentation without DSLR cameras and tripods

Photo documentation without DSLR cameras and tripods

If you do not have a DSLR camera, you can take good photos with a phone. The quality of camera phones has increased over the years, and can be comparable to DSLR cameras. There are some problems shooting with phones though.

Problems shooting with Phone Cameras

If you use the camera app that comes with your phone, you will have a few problems:

- The app that comes with the camera is not good quality
- Phone cameras have few manual controls
- Phone cameras use a lot of noise reduction that reduces detail
- Phone cameras will save your photos as JPGs, which will reduce the quality of your image
- When pressing the shutter, it will take a photo right away, catching the movement of your hand, causing motion blur
- Phone cameras use an automatic ISO, which could add a grainy noise to your photo
- Phone cameras usually have wide angle lenses that have barrel distortion in the image. Software in the phone sometimes corrects barrel distortion. Newer phones have a dual “telephoto” lens option that reduces the optical distortion of your artwork. Use the telephoto option if you have it.
- It’s hard to attach a phone to a tripod

I recommend using a camera app on your phone to control the settings of your photo. One good camera app is ProShot ($4.99 at App Store). ProShot allows you to do a few things that are important for taking good documentation:

- Some manual controls
- Saving as RAW files, which are the highest quality file format for photos
- Lets you turn off noise reduction
- Timer function for shutter to prevent camera shake
- Histogram for exposure and setting white balance

Just a comparison of the quality of using the standard camera app to ProShot's RAW format:

The standard camera app quality. Note the loss of detail. This is due to automatic noise reduction and using a lossy JPG file format.

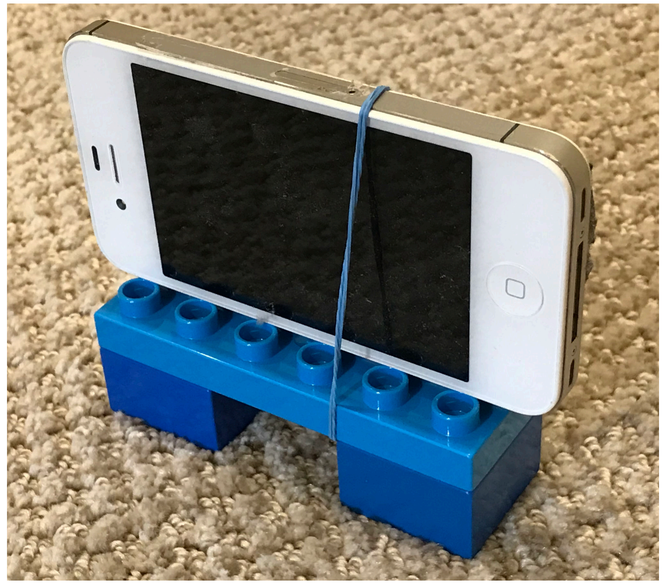
ProShot RAW app quality. Note the extra detail. This is because noise reduction has been turned off and the RAW image file format does not use lossy compression.

Photo documentation with Camera Phones

Set up your camera on a **stable** surface.

A stable surface to rest the phone on is very important. Do not hold your phone while taking documentation photographs. Make sure your camera is balanced and steady so your hand is not touching the phone when taking a photo. A tripod is best, if you can find an adapter to attach a phone.

If you're unable to find a tripod and are stuck at home, it will be up to you to find what works, but here are some very DIY ideas to get you started:



Lego and an elastic

Everyone has a toilet paper roll.

Even clamps can be used!

Next, set the height of your camera phone to the centre of your painting. Make sure the camera phone is aligned to the horizontal and vertical centre of the painting.

Use a table with some books. Use a ladder. Use a shelf. If you have a tripod, there is equipment you can buy to attach a phone to a tripod. The phone must be on a stable surface.

Using Phone Camera Apps

The default camera app on your phone is not great for photography. It usually captures images in JPG format, with little control over exposure.

There are many apps available that are good for photography: Filmic Firstlight, Pro Camera, ProCam, ProShot, etc.. They are not free, but they are inexpensive ($5 - $10).

Some features you want to look for in a phone photography app are:

- Manual shutter speed
- Manual ISO
- Manual white balance
- Time delay shot
- RAW or TIFF file format

This tutorial will use the app, ProShot, which allows for many manual features. If you use a different app, the interface for these options will be different.

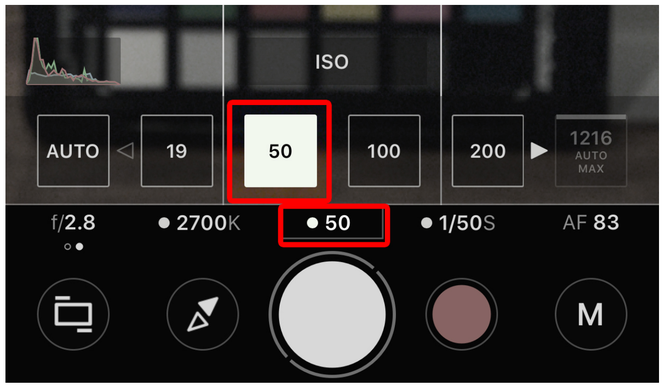
Whatever app you use, you will need to do the following

1. Set Noise Reduction to none.

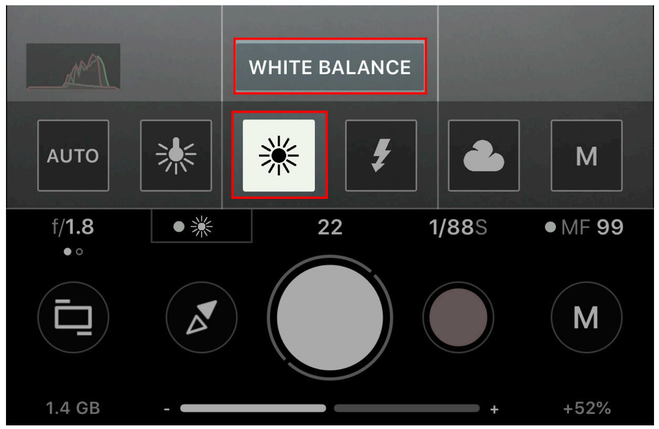
2. Set the camera file format to RAW (or TIFF if raw isn't available). This will make your camera save photos as DNG files.

3. Set exposure to Manual, so you can set shutter speed and ISO. Note, unlike a DSLR, phone cameras do not let you set your aperture.

4. ISO is the sensitivity of your camera sensor. Set ISO manually to low. It will differ on different phones, but for iPhones an ISO of 20 or 50 will be low-noise. On a DSLR, an ISO 200 or 400 would be fine, but on a phone an ISO that high makes the image too grainy.

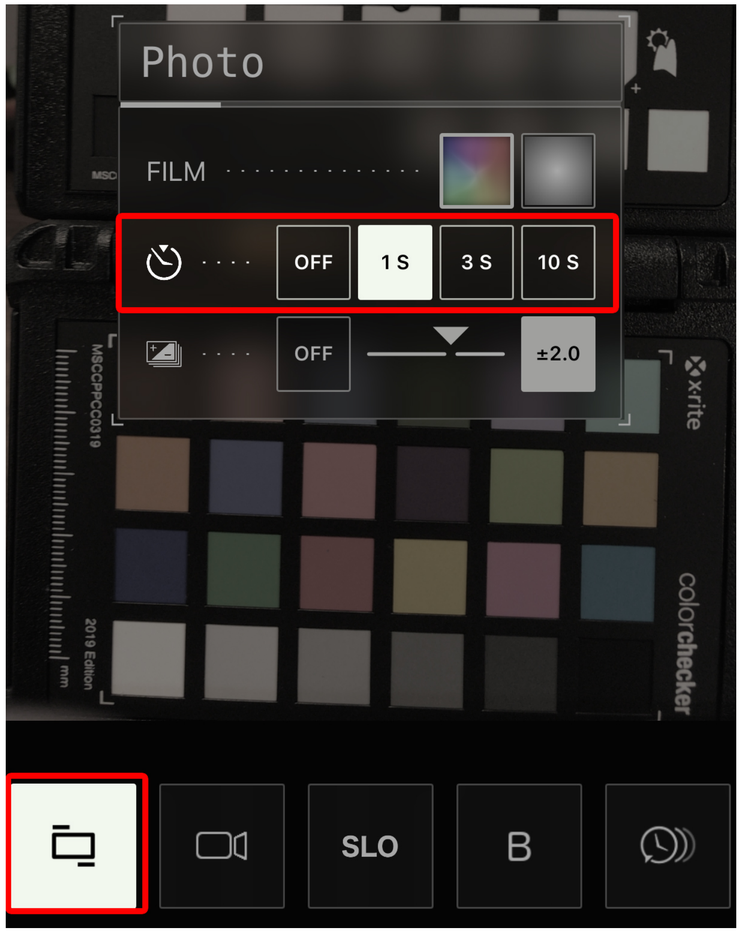


5. Set white balance. If you are using sunlight to light your art, choose the sun icon, or 6500K. If you are using tungsten lights, choose the light bulb icon, or 3200K. Avoid using fluorescent light bulbs.



6. Set your shutter speed. If you can, use the histogram on your camera to make sure your exposure isn't too dark or light. In this example, a grey card was used to set the exposure to the middle of the histogram. Proper exposure required a third of a second shutter speed. A third of a second is too long to hold the camera steady, which means the camera phone must rest on stable surface, or held up by a tripod of some kind.

7. Set the camera to time delayed shot. A time delay will prevent your hand from shaking the camera. For example, a delay of 2 seconds will make the camera take the picture 2 seconds **after** you pressed the shutter. This will give you time to press the shutter and then remove your hand from the phone. In this example, 1 second is chosen, but you could pick 3 seconds or more.



8. Set focus. On ProShot, using auto focus is usually accurate. After setting all your exposure settings, tap the object you want in focus. Manual focus with a camera phone is more difficult than a DSLR.
9. Lastly, if you have a set of white and grey reference cards, photograph your artwork with them in the shot. If there is a problem with white balance or exposure, you can use the values in the reference cards to correct white balance and exposure in editing software. If you do not have a white balance card or a grey card, use a sheet of white paper and keep it visible in the shots. For photographing *Moon* with ProShot, I kept a white balance card and grey card in the shot so I could change the white balance and exposure. It would have been difficult to make accurate colour and exposure corrections without this reference card.

You can buy a white balance and grey card at Vistek or Henry's:
https://www.henrys.com/83167-CAMERON-3-IN-1-GREY-WHITE-BALANCE-LARGE.aspx

Lighting

Lighting in a Studio with Studio Lights

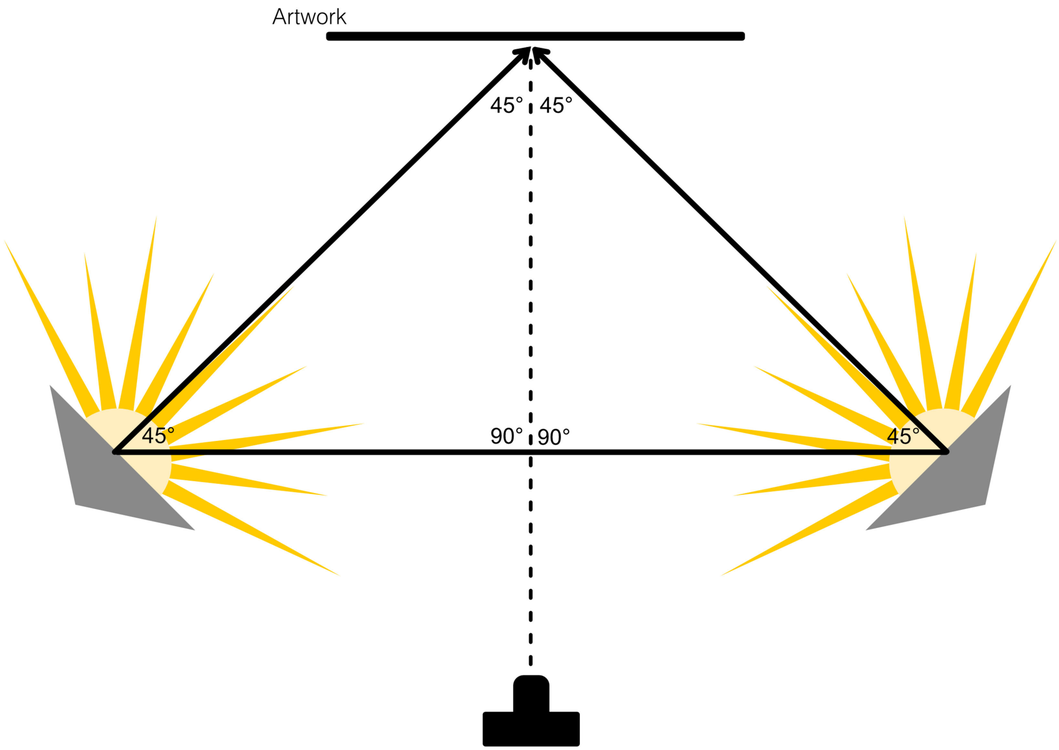
How to Light Artwork without Studio lights

Lighting Flat Art in a Studio with Lights

Documenting art usually happens in a studio with controlled lighting. In general, for flatwork, two-point lighting is used. This means two lights are used to evenly light artwork from the left and right. The lights must be the same brightness, height, distance and angle to the artwork.

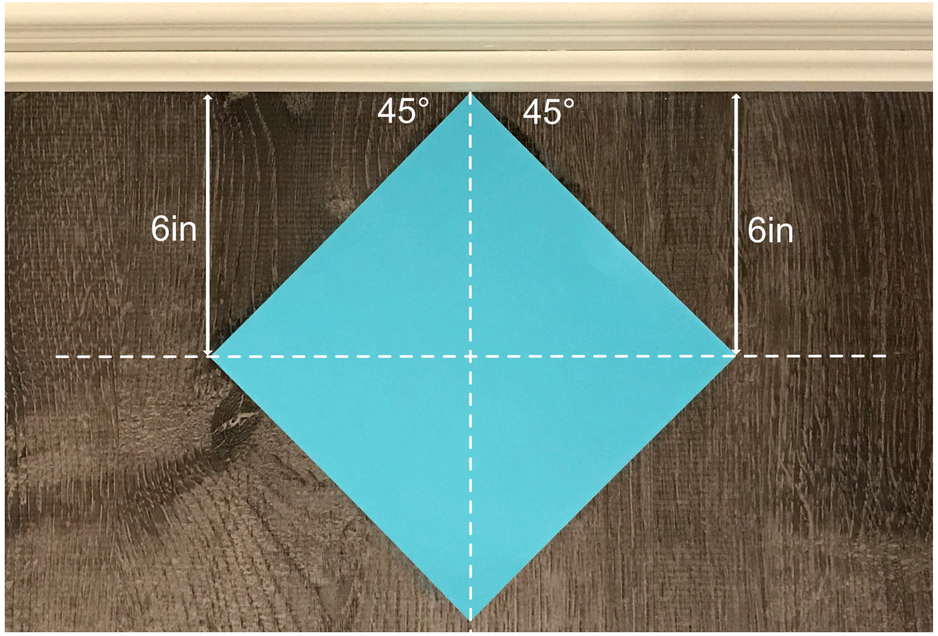
The angles of the lights must be at least 45° to the line of sight of the camera. This will prevent glare. If the angle of the light to the line of sight of the camera is less than 45°, light will reflect straight into the camera and create glare, bright spots in your artwork.

Two-point lighting triangle

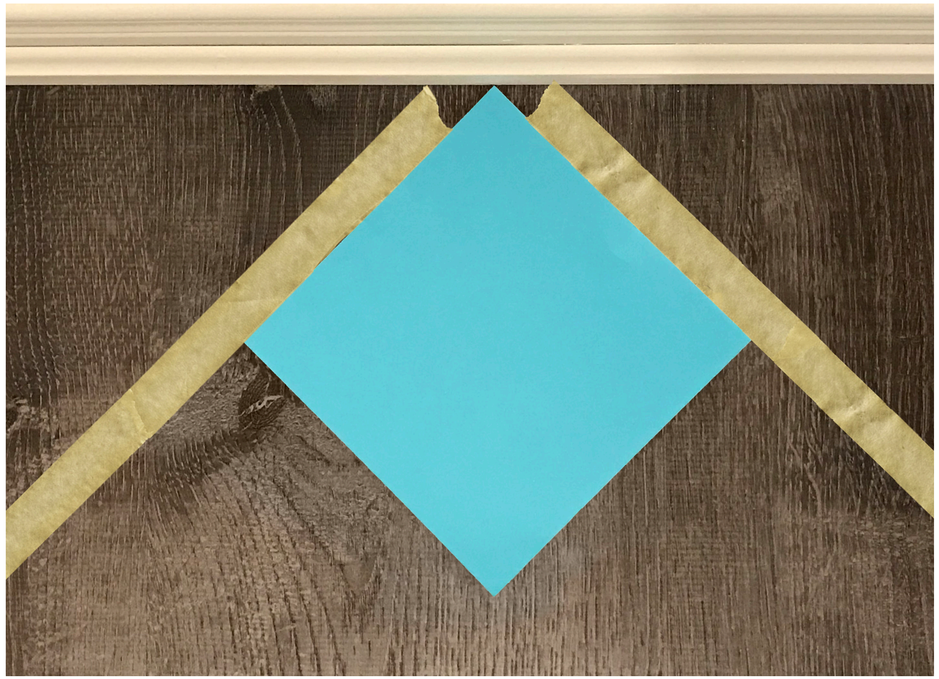


Top view, camera centred to painting and lights at 45° to artwork

A quick way to set a 45° angle is to place a square object on the floor under the centre of your artwork and rotate it 45° to the wall. Measure the distance from the wall to the two outside corners. If they are equal - in this example, they are both 6 inches from the wall - then the card is rotated at a 45° angle.

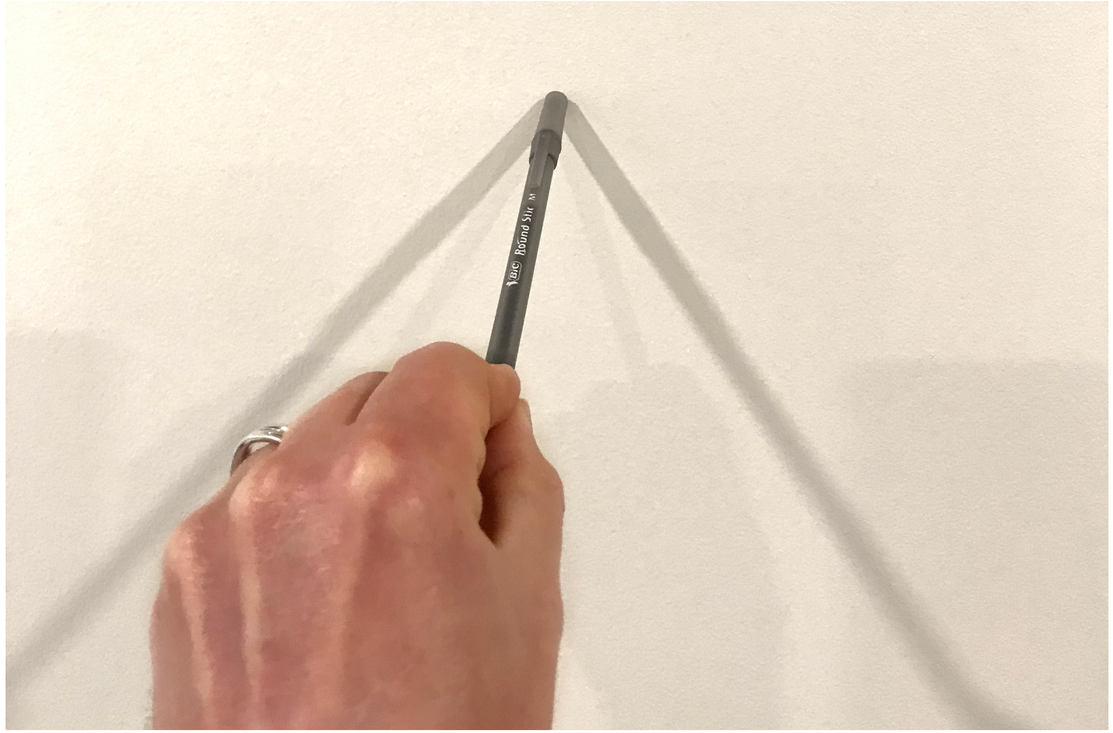


Place a line of masking tape (string or other straight objects could work too) from the centre of the artwork, using the rotated square as a guide, and extend the tape out in a straight line. Place the centre of your lights on this guide and direct the light along the path of the masking tape. Then you will know your lights are at 45°.



Light evenly

If the lights are the same brightness, angle, and distance from the artwork, they will light the artwork evenly. If you have a light meter, check the four corners of your canvas and the centre of the canvas. If the difference in light readings are all less than a stop, your lighting is even. If the difference between light meter reading are 1 stop or higher, reposition your lights. If you don't have a light meter, there is the pencil trick. Place a pencil in the centre of where your artwork will be placed on the wall. If the shadows on both sides of your pencil look the same brightness, then your lights are probably evenly balanced.



In this example, the left shadow is brighter than the right side, meaning the lights are too bright on the left. The left light is also at slightly higher than the right light.

Perfectly set up lights would make the shadows symmetrical in brightness and position.

Light height

Position lights at the same height. If you place the lights in the vertical centre of your painting, you will have a box shadow around the artwork. This is not a problem if you are going to crop the wall out of the photo. If you do want to include the wall in your photograph, it is recommended to place your lights above the centre of your artwork to see a shadow below your painting. A shadow below an artwork is more natural.

Types of Lights

Tungsten or halogen lights (ones with a metal filament inside), are the best lights to use. Only use fluorescent and LED lights if you have nothing else. Consumer fluorescent and LED lights may show inaccurate colours. Some non-professional LEDs and fluorescent lights will cause lines to display in your image as well.

Match the light

Lights should be same brightness and type. Using two bulbs with different brightness and type of light (e.g. tungsten and fluorescent) will cause colour and exposure problems.

Using soft light

The smaller the light source, the more direct the light, and the harsher your shadows will be. The larger the light source, the softer and more diffuse your light will be. Photographers use photographic umbrellas or “softboxes”, large, white fabric boxes in front of their lights, to increase the size of the light source and make shadows less harsh.

When photographing artwork, it is usually recommended to use soft lighting to reduce shadows. On paintings, having dark shadows under thick paint strokes could be distracting. On the other hand, if an artist would like to enhance the texture of the brush strokes, using a direct light might bring out the texture of the paint. Some photographers use a combination of soft and direct light to balance shadows and texture.

How to Light without a Studio

Lighting with a studio and studio lights is important for professional documentation. Without access to a studio and studio lights, you can still take acceptable photos if you keep in mind how lighting works.

Lighting with the Sun

Sunlight is a great light source, but it is not predictable, and it can cause problems in your photography. The sun appears as a small and bright pinpoint light in the sky, and will create harsh shadows, bringing out too much texture in a painting.

Moon by Will Gorlitz, lit with direct sunlight from top left. Notice the harsh texture and brush strokes. Zoom in for detail.

Softening sunlight

To make softer shadows, make your light source larger. The larger the light source, the more angles of light will illuminate the artwork, which makes light “softer”. Cloudy days are great for photography, because the entire sky becomes a “soft” light. Often, in photography, large white sheets are placed over a light to make it a large light source (soft boxes). You can do the same thing with a white bed sheet, or drop cloth. Make sure to use a neutral white sheet. A white sheet with a little colour to it will add a strange shift in the colours of your art.

Moon, by Will Gorlitz, lit with sunlight diffused by a white sheet. Notice the texture of the painting is not as harsh. Zoom in for detail.

Ideas for outdoor lighting

If you have a bright sunny day, place a large white sheet or large piece of translucent white paper between the sun and your artwork, and let the light illuminate the sheet. Make sure no direct light hits the artwork. The sheet will scatter the light from the sun. The light might be too strong on one side, so one trick is to take a white, flat board, and use it as a reflector on side opposite to the sun to balance out the lighting.

Another idea is to make a light tent. Make a box or a tent with white sheets to place your art in. The light will scatter and reflect to create an even balanced light. Since there is a sheet on the top, sides and bottom, light will illuminate the artwork from all angles.

Here is a set up I used to photograph *Moon* by Will Gorlitz for this manual. It is definitely not professional, but it worked! If I had more white sheets, I would have placed them to the left, right and bottom of the painting.

Indoor Lighting with Sunlight

Take everything with strong colour out of the room. If you have things that can't be removed, cover them with a white blanket or sheet. Have an empty room with white walls and place white sheets on the floor. Wait for the sun to shine. When light shines in the windows, it will illuminate from all directions. Put your art on a wall and take pictures.

If you have large windows or patio doors

If you have large windows, or a glass patio door, find a time of the day when the sun is shining through them. Cover the window with a light white sheet (make sure the sheet does not have any colour to it). This will illuminate the entire sheet, and will fill your room with a soft light. A large piece of translucent white paper will work too. The idea is for the whole window frame to become a large light source. Place your art as close to the window as you can. Note, you will have to stand in front of the window, so don't cast a shadow on your art. If you have a way to keep your camera steady, place the art on the floor and place your camera above.

Some problems: if the walls in the room have any colour, they will cast a tint on your photo. Reduce the amount of colour in your space, for example, take out that bright orange couch. Use rooms with white walls and place white sheets on the floor.

Appendix: Optical Distortion

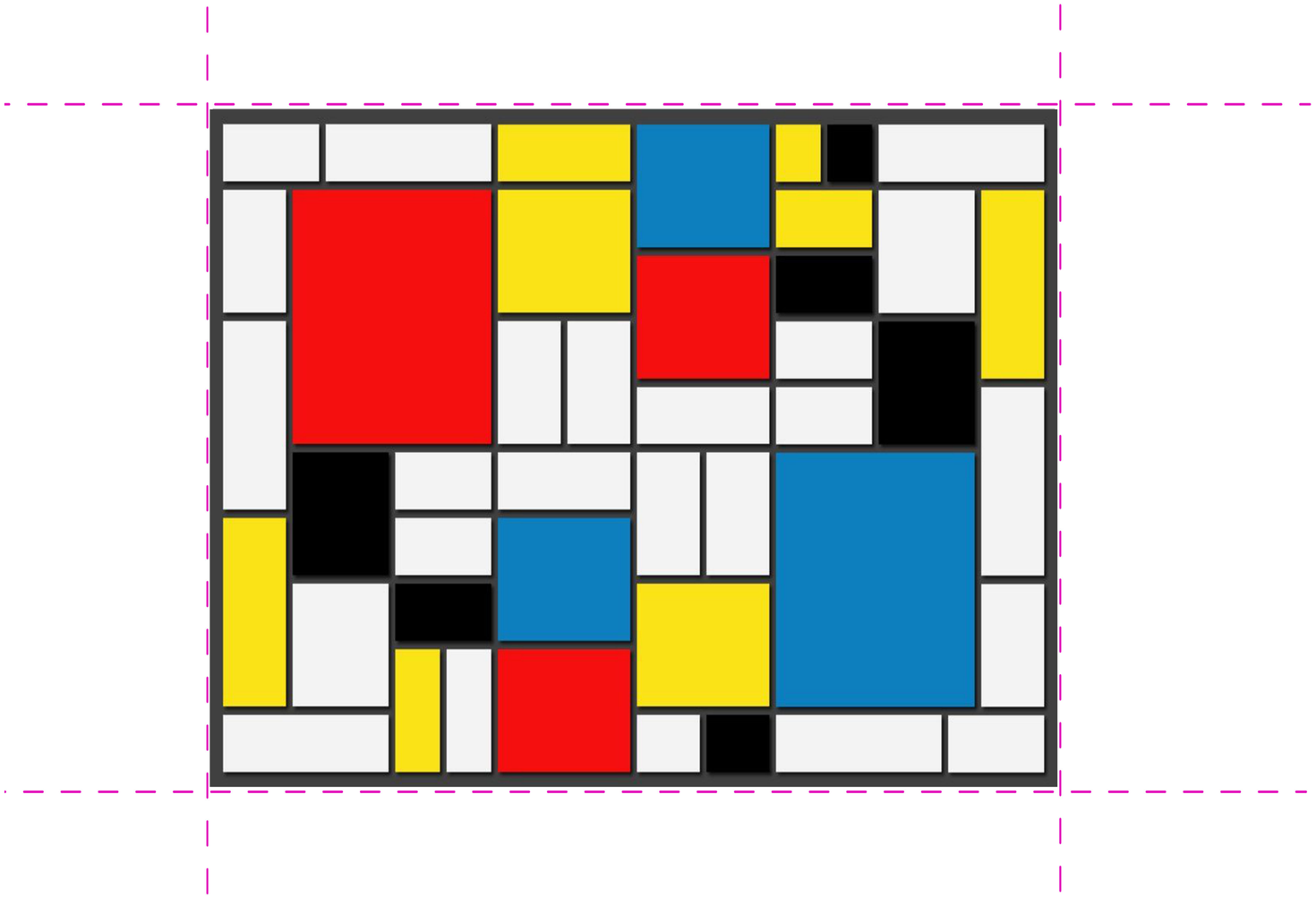
Choosing a Lens and Optical distortion

Different lenses have different optical distortions. This refers to the phenomenon where a lens adds a curvature, convex or concave, to your artwork. Sometimes a lens will have built-in corrections to these distortions, but they are not perfect.

To reduce optical distortion in your photograph, use a “normal” lens. A normal lens has a focal length that is the same as the diagonal length of the camera’s sensor. For 35mm film or full frame sensor, this means a normal lens is 43mm. There are not many lenses made with a 43mm focal length, so people often round up to 50mm, as there are plenty of 50mm lenses available. A 40mm lens would be very close also. For a cropped sensor, a normal lens would be 30mm.

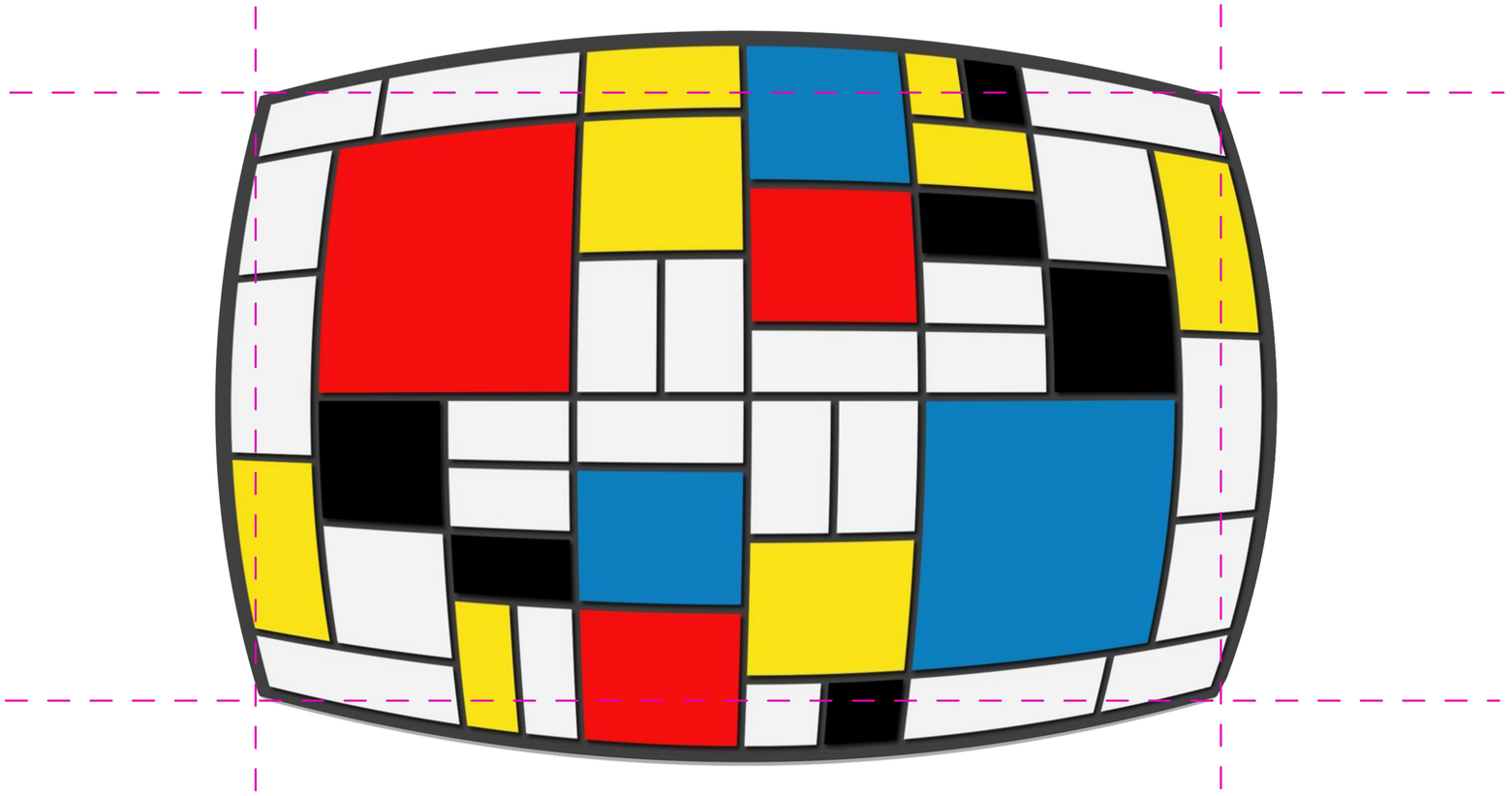
Note: cameras usually come with full frame sensors and cropped sensors. A full frame sensor is larger than a cropped sensor, and is usually expensive. Check your model to find out if it is full frame or cropped.

An ideal lens would give you a perfect rectilinear photograph of your artwork:



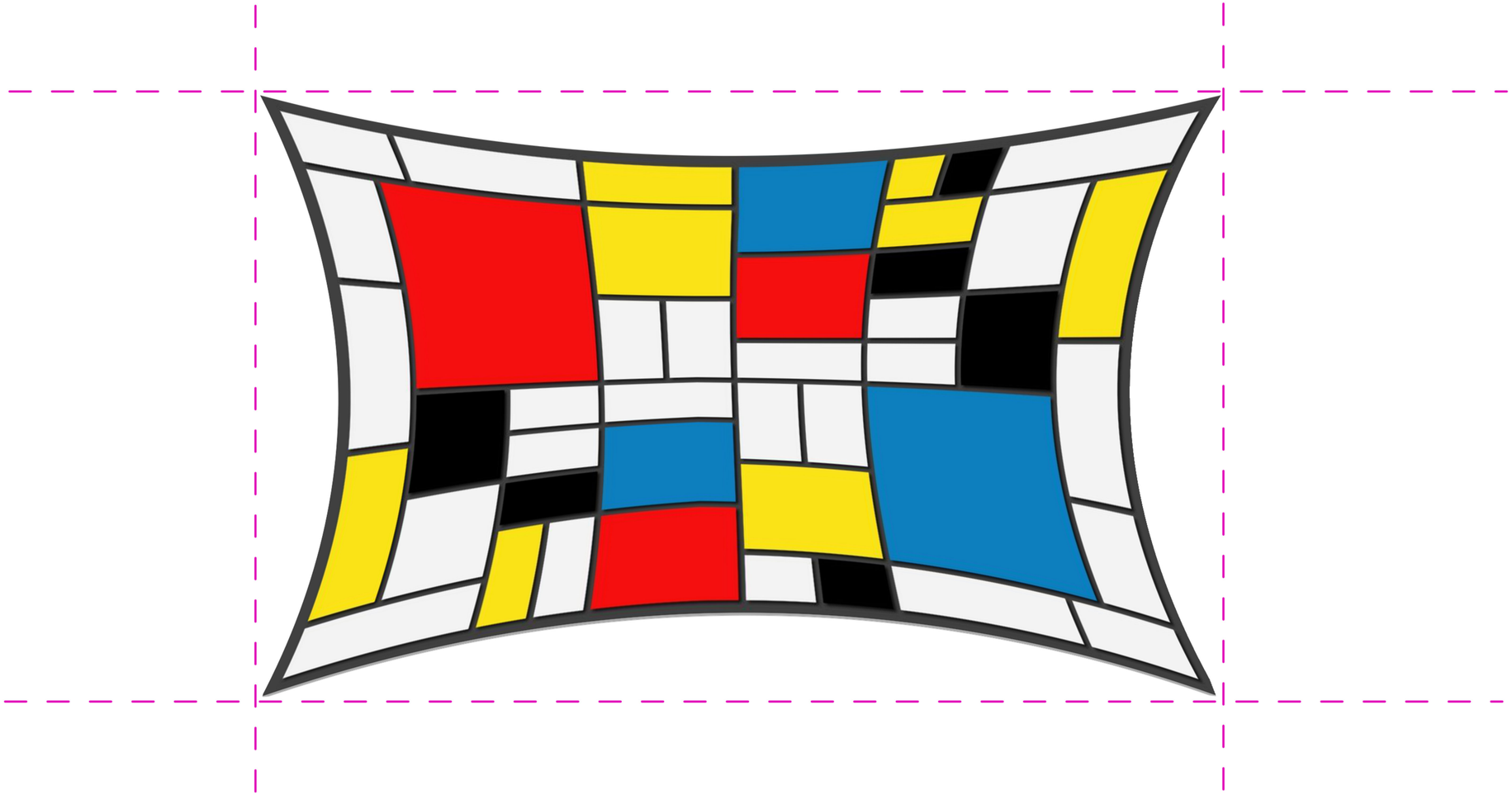
Lenses are not perfect, so most often, your lens will give you an image with optical distortion: **barrel distortion** and **pincushion distortion**.

Barrel Distortion is found in wide angle lenses, that is, lenses with a focal length **less** than the diagonal of your film frame or sensor. Barrel distortion shows a bulging outward of the edges of the photo.



On a full frame sensor, which has a diagonal of 43mm, any focal length under 43mm will be a wide angle. On a cropped sensor, which has a diagonal of 30mm, a lens with a focal length under 30mm will be wide angle. The smaller the focal length, the more exaggerated the distortion will be.

Pincushion distortion is found in telephoto lenses, that is, lenses that have a focal length **longer** than the diagonal of the sensor. Pincushion distortion shows a pushing inward of the edges of the photo.



On a full frame sensor, which has a diagonal of 43mm, any focal length over 43mm will be a telephoto lens. On a cropped sensor, which has a diagonal of 30mm, a lens with a focal length over 30mm will be a telephoto lens. The larger the difference between the normal focal length and the lens' focal length, the more exaggerated the distortion will be.

Zoom lenses

Zoom lenses are lenses with variable focal lengths. Hence, one can “zoom in” and “out” of a subject. They have more forms of distortion than a prime lens, (i.e. a lens with only one focal length, and cannot zoom in and out). For many reasons, when documenting flat art, it is recommended to use a prime lens.

If you only have a zoom lens, find out if you have a full frame or cropped sensor. If you have a full frame sensor, set your focal length to 43mm. If you have a cropped frame, set your focal length to 30mm.

Phone cameras

Phone cameras usually have a wide angle lens. This is not ideal, but phones often use software to correct the distortion of your photograph. If you have a newer phone with a dual lens system, use the telephoto option (on an iPhone, it is the “f2.8” option). It will be closer to a normal lens than the wide angle lens. Make sure to check your phone images for barrel and pincushion distortion.