

Aspect Ratio

Aspect ratio is the mathematical relationship between the width and height of a rectangular shape. To obtain the aspect ratio you divide the width by the height and express it with respect to 1. For example, a full frame sensor has a width of 36 mm and a height of 24 mm. The aspect ratio is, therefore, 36/24 to 1, or 1.5:1, usually rounded and expressed as 3:2.

Aspect ratio is an important factor to consider when making photographs. You need to consider both the aspect ratio of your camera sensor and the aspect ratio of your final output media. As camera sensors and most common output media do not have matching aspect ratios, some cropping is required. This means that the subject matter in your image needs to be composed so that when the captured image is cropped to the required output format, important subject matter is not lost through the cropping that is required. Alternatively, the size of the output image will need to be adjusted to fit the aspect ratio of the output medium.

The aspect ratios for common camera sensors and output media are shown in the following table.

Aspect Ratios				
Camera Sensors				
Type	Width (mm)	Height (mm)	Aspect Ratio	Common name
Full Frame	36	24	1.5:1	3:2
APS-C Canon	22.2	14.8	1.5:1	3:2
APS-C Nikon	23.6	15.6	1.5:1	3:2
Four Thirds	17.3	13	1.33:1	4:3
Displays				
Type	Width (pxls)	Height (pxls)	Aspect Ratio	
Computer Screen HD	1920	1080	1.77:1	16:9
Computer Screen 4K	3840	2160	1.77:1	16:9
Projector HD	1920	1080	1.77:1	16:9
Printing Paper				
Size	Width	Height	Aspect Ratio	
A4 (mm)	297	210	1.42:1	
A3 (mm)	420	297	1.42:1	
A2 (mm)	594	420	1.42:1	
10" x 8"	10	8	1.25:1	5:4
150 x 100 mm (6 x 4")	150	100	1.5:1	3:2

It should be noted that the physical size of the sensor has no bearing on the number of megapixels that can be captured. The Nikon Z5 and the Nikon Z9 both have a full frame sensor, but the Z5 has a resolution of 24 MP while the Z9 has 45 MP.

Examples

Let's consider some practical examples to see why aspect ratio is an important factor in composition and image output.

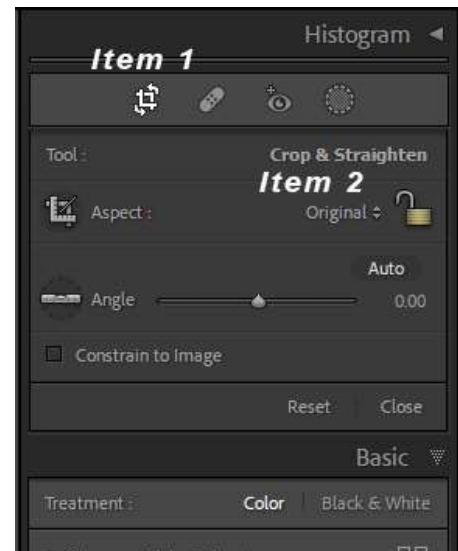
Example 1

Your camera has a full frame sensor, and you wish to output to an 10" x 8" print. The first step in your processing is to crop your image to a 5:4 aspect ratio so you can constrain the important subject matter, to prevent the crop from cutting off anything important.

Regardless of the editing software you use, there will be a function to obtain a 5:4 crop.

In Lightroom, the following steps need to be followed.

1. Open your image in the Lightroom Develop module.
2. Select the crop tool, item 1 in the screenshot to the right.
3. Open the aspect ratio list by clicking the drop down arrow, located near the padlock icon, item 2 in the screenshot to the right.
4. Select the 5:4 aspect ratio from the list that appears.
5. Adjust the position of the crop area to include the part of the image to be retained, by clicking on the image and dragging the crop area to the required position. Refer to screenshot below,



Example 2

Your camera has an APS-C sensor, and you wish to output your image to fill the available area for projection. The first step in your processing is to crop your image to a 16:9 aspect ratio so you can constrain the important subject matter, to prevent the crop from cutting off anything important.

Again, regardless of the editing software you use, there will be a function to obtain a 16:9 crop.

In Lightroom, follow steps 1 to 3 above. Then, after selecting the 16:9 crop ratio, adjust the crop position to retain the required subject matter, as described in steps 4 and 5 above.



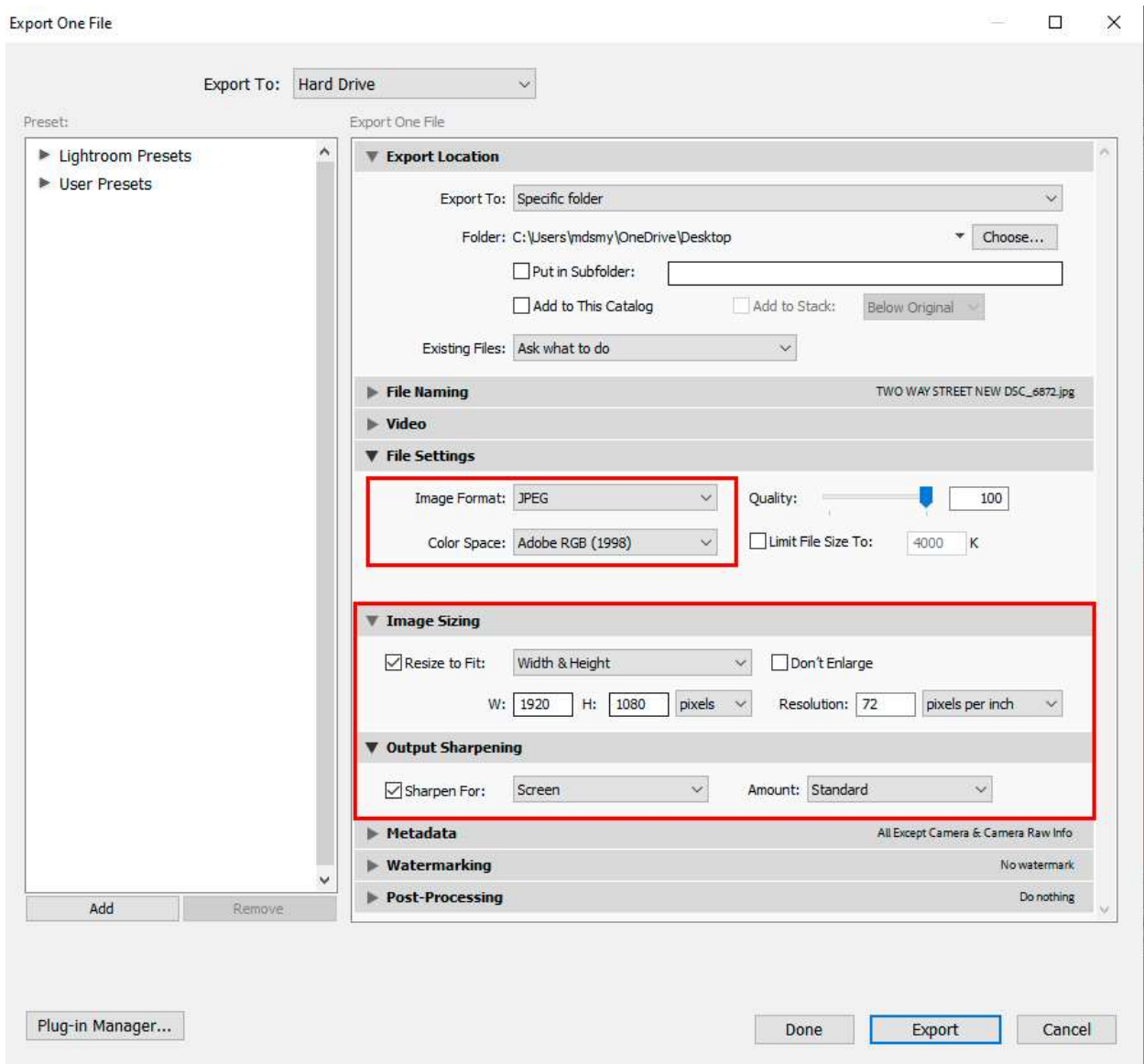
By following the above procedures, you will have an image that matches your desired output format, and you will control the included subject matter, so there are no surprises or lost important information in your finished output.

The above procedures can be applied for whatever sensor type your camera has and any output media you choose.

Example 3

Your camera has a full frame sensor, and you wish to resize for projection without cropping. To achieve the required 16:9 aspect ratio your image will not fill the entire screen. In Lightroom, go to the Export menu and choose the settings as shown on the following page.

Setting the size to 1920 x 1080 pixels automatically ensures that the image will fit the smallest dimension, that is, a 3:2 aspect ratio image will be resized to 1620 x 1080 pixels.



By ensuring that you also tick the box marked “Sharpen for” and selecting screen, the downsampled image will also be sharpened.

Printing images

Printing has a number of separate requirements apart from managing the aspect ratio, such as controlling colour management and re sampling the file to suit the printer’s native resolution, all of which are covered in separate documents and a workshop targeting the management of output.

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