More about Digital Cameras

Image Characteristics

Several important characteristics of digital images include:

**Physical Size**
How big is the image that has been captured, as measured in inches or pixels?

**File Size**
How large is the computer file that makes up the image, as measured in kilobytes or megabytes?

**Pixels**
All digital images taken with a digital camera are made up of pixels (short for picture elements). A pixel is the smallest part (sometimes called a point or a dot) of a digital image and the total number of pixels make up the image and help determine its size and its resolution, or how much information is included in the image when we view it. Generally speaking, the larger the number of pixels an image contains, the sharper it will appear, especially when it is enlarged, which is what happens when we want to print our photographs larger than will fit into small 3 1/2 X 5 inch or 5 X 7 inch frames.

You will notice in the first picture below that the Grand Canyon is in sharp focus and there is a large amount of detail in the image.
However, when the image is enlarged to an extreme level, the individual pixels that make up the image are visible--and the image is no longer clear and sharp.

**Megapixels**
The term megapixels means one million pixels. When we discuss how sharp a
digital image is or how much resolution it has, we usually refer to the number of
megapixels that make up the image. One of the biggest selling features of digital
cameras is the number of megapixels it is capable of producing when a picture is
taken. Most digital camera buyers believe that the higher the number of
megapixels, the better their pictures will look. However, this may not always the
case. Megapixels are a measure of quantity, not quality.

Most serious photographers will tell you that all megapixels are not created
equally and there are other factors that should be considered. These include the
type of the sensor used in the digital camera as well as the size of the sensor
and the size of the megapixels themselves. This is why a $10,000 professional
digital camera that is rated at say, 5 megapixels, can produce images that are of
significantly higher resolution than much less expensive cameras rated at 6
megapixels or higher.

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Resolution
Resolution is an indication of digital image quality, which in turn is determined by
the number of pixels. The higher the resolution, the better the image will look. A
low-resolution digital image (at 640 x 480 pixels), for instance, may look great
when displayed on the Internet but it can appear fuzzy when printed or
enlarged. By comparison, high-resolution images, such as those at 1,280 x 1,024
pixels, contain enough pictorial information (sharp contrasts, rich colors, and
picture details) to look good on the Internet as well as when printed or enlarged.

From: www.activeshare.com/US/dig/glossary/

- **256 x 256 pixels** - You find this resolution on very cheap cameras. This
  resolution is so low that the picture quality is almost always unacceptable.
  This is 65,000 total pixels.

- **640 x 480 pixels** - This is the low end on most digital cameras. This
  resolution is fine if you plan to e-mail most of your pictures to friends or
  post them on a Web site. This is 307,000 total pixels.

- **1216 x 912 pixels** - If you're planning to print your images, this is a
good resolution. This is a "megapixel" image size -- 1,109,000 total pixels.

- **1600 x 1200 pixels** - This is the beginning of "high resolution." Images
taken with this resolution can be printed in larger sizes, such as 8 x 10
inches, with good results. This is almost 2 million total pixels. You can find
cameras today with up to 10.2 million pixels or more.

The chart below shows the recommended number of megapixels based on print size.

<table>
<thead>
<tr>
<th>Maximum Print Size</th>
<th># of Megapixels</th>
<th>Image Resolution (in pixels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 X 6 inches</td>
<td>2</td>
<td>1600 x 1200</td>
</tr>
<tr>
<td>5 X 7 inches</td>
<td>3</td>
<td>2048 x 1536</td>
</tr>
<tr>
<td>8 X 10 inches</td>
<td>5</td>
<td>2560 x 1920</td>
</tr>
<tr>
<td>11 X 14 inches</td>
<td>6</td>
<td>2816 x 2112</td>
</tr>
<tr>
<td>16 X 20 inches</td>
<td>8</td>
<td>3264 x 2468</td>
</tr>
</tbody>
</table>

In general, the more megapixels a camera can resolve, the larger size prints you will be able to make while maintaining good quality. However, print quality also may be affected by other factors as mentioned above.

**Comparison of Images taken with Different Cameras with Different Megapixel Capability**

click on the pictures below to view the full-size images

<table>
<thead>
<tr>
<th>Sony Mavica</th>
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<tr>
<td>2.1 megapixels</td>
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The following table provides a general overview of the number of images and relative quality depending on the megapixel resolution of a digital camera equipped with different size memory cards.

<table>
<thead>
<tr>
<th>Megapixel Resolution of Camera</th>
<th>128 megabytes</th>
<th>256 megabytes</th>
<th>512 megabytes</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 megapixels prints up to 8x10 inches</td>
<td>85 pictures</td>
<td>17 pictures</td>
<td>341 pictures</td>
</tr>
<tr>
<td>4 megapixels</td>
<td>64 pictures</td>
<td>128 pictures</td>
<td>256 pictures</td>
</tr>
</tbody>
</table>
Photo File Formats

Most current digital cameras save the pictures that are taken in one, two, or sometimes all three of the following graphic formats:

- **JPG or JPEG** - pronounced JAY-peg; stands for Joint Photographic Experts Group, a committee that developed the standards for the format that is used to compress images. The amount of compression can be adjusted, either in the camera, before the picture is taken or with software after the picture has been taken. The file format which employs this compression is commonly also called JPEG; the most common file extensions for this format are .jpeg, .jfif, .jpg, .JPG, or .JPE although .jpg is the most common on all platforms. Information from Wikipedia at: [http://en.wikipedia.org/wiki/Jpeg](http://en.wikipedia.org/wiki/Jpeg)

- **TIFF** - Tagged Image File Format is a file format for mainly storing images, including photographs and line art. TIFF images are usually not compressed or are compressed only slightly, so file sizes are larger but of better quality. The TIFF format is platform independent, which means that the images may be viewed on a PC or a Macintosh computer and is widely supported by image-manipulation applications such as PhotoShop and others. Information from Wikipedia at: [http://en.wikipedia.org/wiki/Tiff](http://en.wikipedia.org/wiki/Tiff)

- **RAW image format** - A raw image file contains minimally processed data from the image sensor of a digital camera or image scanner. Raw files are so named because they are not yet processed and ready to use with a bitmap graphics editor, printed, or displayed by a typical web browser. The image must be processed and converted to an RGB format such as TIFF or JPEG before it can be manipulated. Information from Wikipedia at: [http://en.wikipedia.org/wiki/RAW_image_format](http://en.wikipedia.org/wiki/RAW_image_format)

If your digital camera supports the RAW image format, you may want to
download the free Microsoft RAW Image Thumbnailer and Viewer for Windows XP from:
http://www.microsoft.com/windowsxp/using/digitalphotography/prophoto/raw.mspx