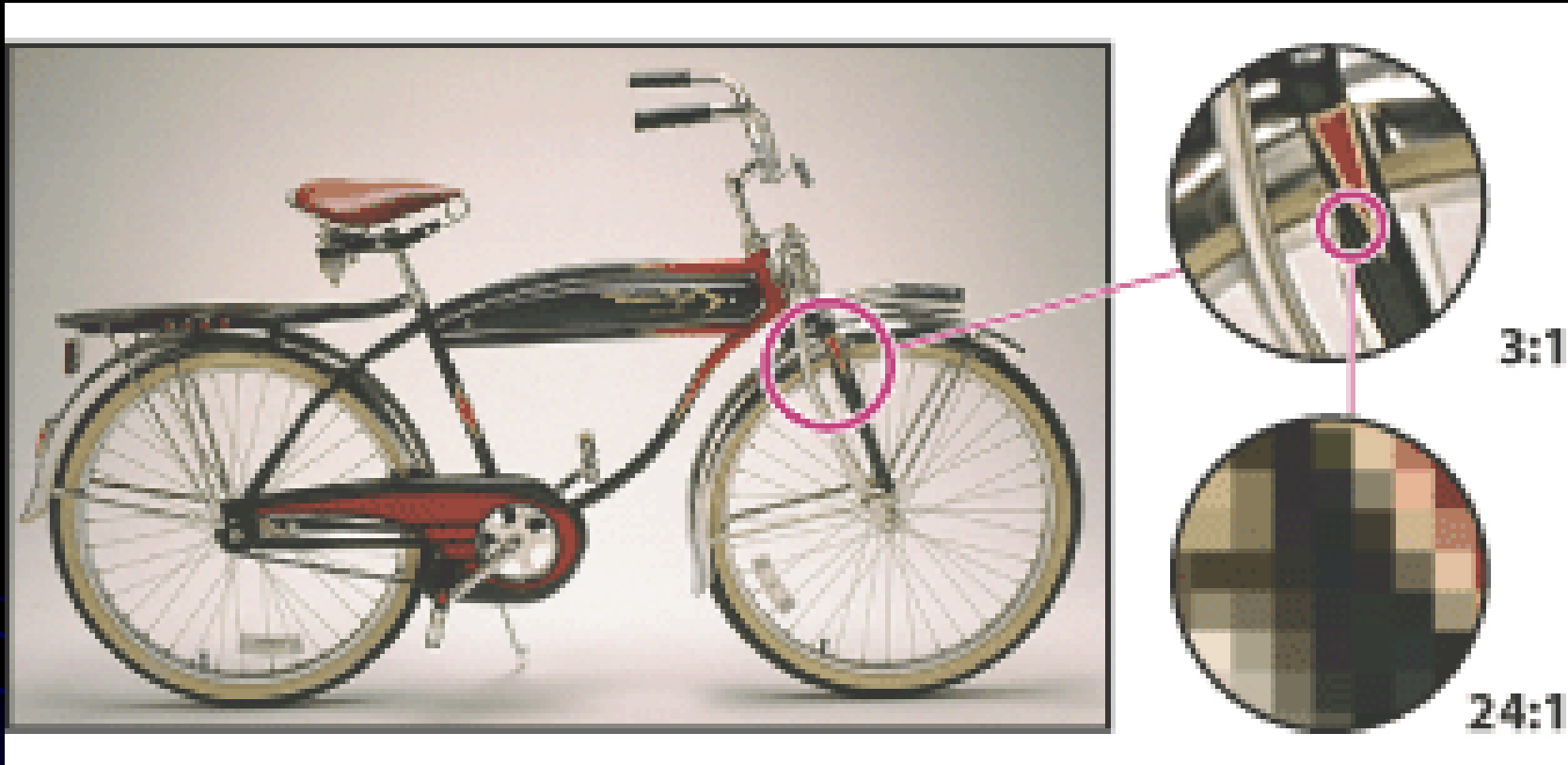# About bitmap images

- Bitmap images--technically called raster images--are made up of a grid of dots known as pixels.

- When working with bitmap images, you edit pixels rather than objects or shapes.

- Bitmap images are the most common electronic medium for continuous-tone images, such as photographs or digital paintings, because they can represent subtle gradations of shades and color.

- Bitmap images can lose detail when scaled on-screen because they are resolution-dependent, they contain a fixed number of pixels, and each pixel is assigned a specific location and color value.

- Bitmapped images can look jagged if they're printed at too low a resolution because the size of each pixel is increased.

Example of a bitmap image at different levels of magnification

# Understanding image size and resolution

- The amount of detail in an image depends on its pixel dimensions, while the image resolution controls how much space the pixels are printed over. For example, you can modify an image's resolution without changing the actual pixel data in the image--all you change is the printed size of the image. However, if you want to maintain the same output dimensions, changing the image's resolution requires a change in the total number of pixels.

# Pixel dimensions and image resolution

- The number of pixels along the height and width of a bitmap image is called the pixel dimensions of an image.

- The resolution of an image is determined by the number of pixels per inch (ppi) printed on a page.
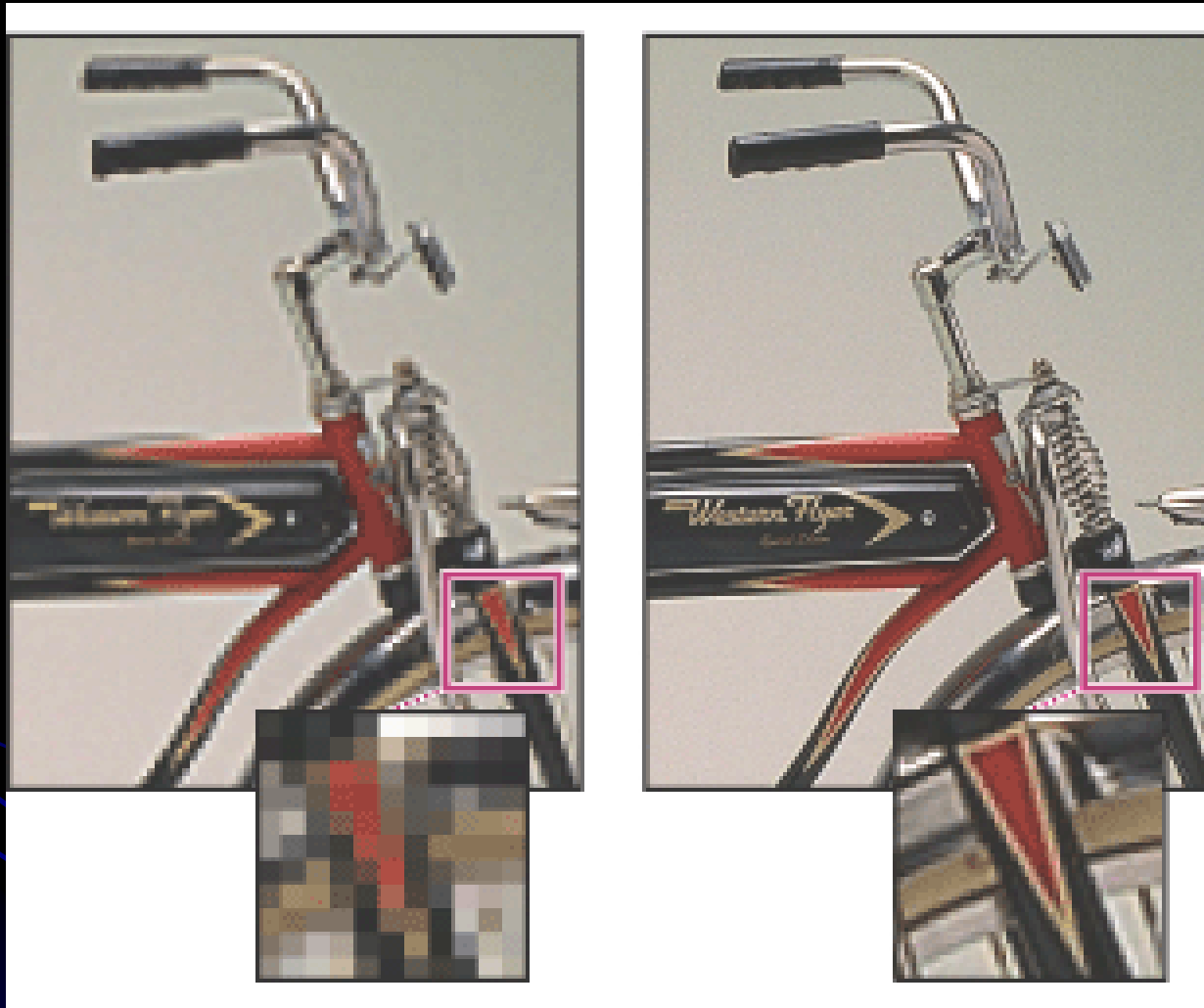
**Example of an image at 72-ppi and 300-ppi**

- ON-Line Resolution
  - 72 ppi
- Print Resolution
  - 300 ppi

- When printed, an image with a high resolution contains more, and therefore smaller, pixels than an image with a low resolution. Higher-resolution images can reproduce more detail and subtler color transitions than lower-resolution images because of the density of the pixels in the images. High-quality images often look good at any print size.

- You can't improve a lower-quality image by printing it at a high resolution. Changing the print resolution of an image simply makes each pixel larger, which results in pixelation--output with large, coarse-looking pixels.

- Increasing the print resolution of an image doesn't add any pixel information to the image. You can make a low-resolution image look its best by picking a print size that makes the most of the pixels it has.

# File size

- The file size of an image is the digital size of the image file, measured in kilobytes (K), megabytes (MB), or gigabytes (GB). File size is proportional to the pixel dimensions of the image. Images with more pixels may produce more detail at a given printed size, but they require more disk space to store and may be slower to edit and print.

- Another factor that affects file size is file format. Due to varying compression methods used by GIF, JPEG, and PNG file formats, file sizes can vary considerably for the same pixel dimensions. Similarly, color bit-depth and the number of layers and channels in an image affect file size.

- Photoshop supports a maximum pixel dimensions of 300,000 by 300,000 pixels per image. This restriction places limits on the print size and resolution available to an image.

# Changing image size and resolution

- Once you have scanned or imported an image, you may want to adjust its size. In Photoshop, the Image Size dialog box lets you adjust the pixel dimensions, print dimensions, and resolution of an image.

# About resampling

- *Resampling* refers to changing the pixel dimensions (and therefore display size) of an image. When you *downsample* (decrease the number of pixels), information is deleted from the image. When you *resample up* (increase the number of pixels), new pixels are added. You specify an *interpolation* method to determine how pixels are added or deleted.
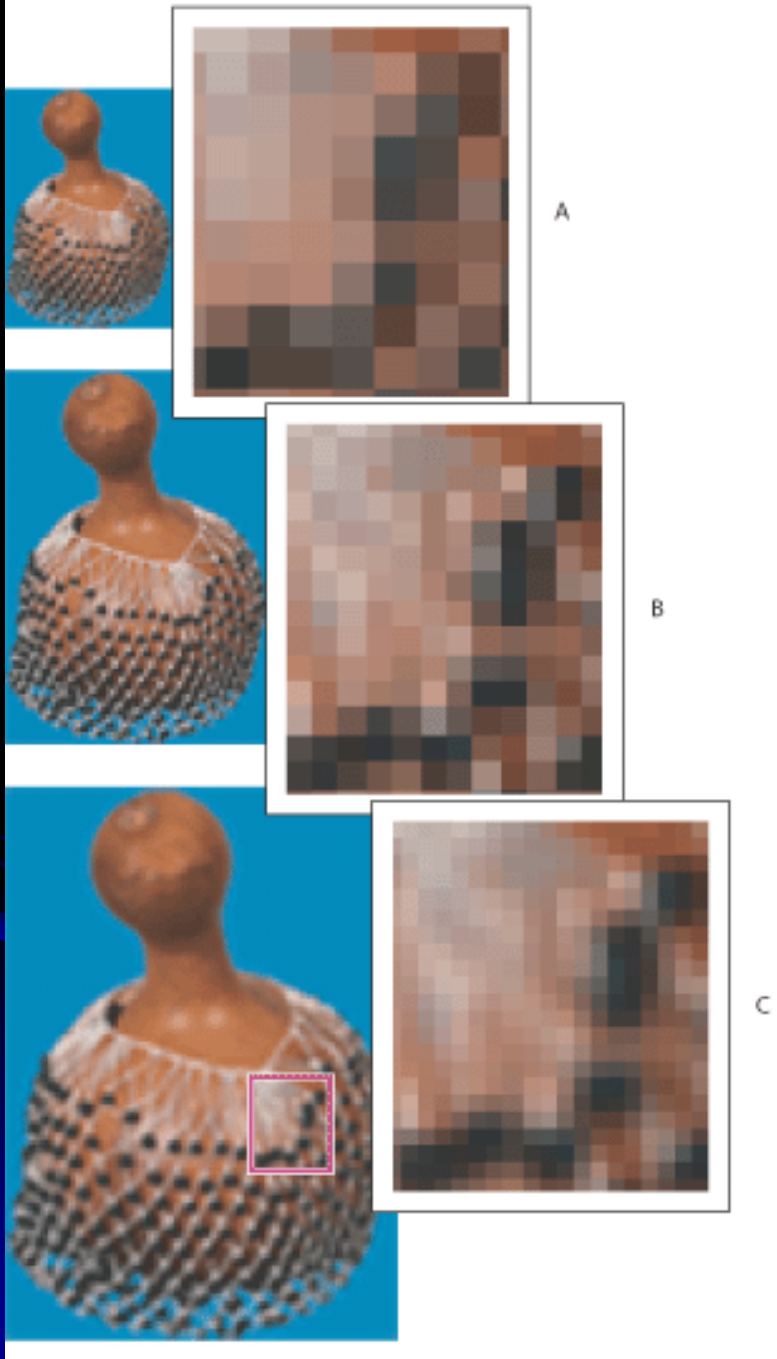
**A.** Downsampled

**B.** Original

**C.** Resampled up
(selected pixels displayed
for each set of images)

- Keep in mind that resampling can result in poorer image quality. For example, when you resample an image to larger pixel dimensions, the image will lose some detail and sharpness. Applying the Unsharp Mask filter to a resampled image can help refocus the image's details.