In order to choose three picture sizes for the given problem, I first need to find a set of valid image resolutions to be able to choose form.

Given that the image sizes have a 16:9 ratio and the design layout widths are in 12-pixel increments (with no height constraints), I can safely assume the widths are the limiting factor in figuring the image resolution.

By figuring out the least common multiple between 16 and 12, I can find the smallest non-zero width the image can have that will fulfill both the aspect ratio and the design layout.

$$\begin{aligned} &Multiples: \\ &12 = 12,24,36,\left[48\right] \\ &16 = 16,32,\left[48\right] \end{aligned}$$

Now that I have a base width for the image, I must also find a base picture height as well. The only constraint given to me about the image height is the 16:9 ratio. Using algebra, I can find a proportional height (which should give me a whole integer since 48 is a multiple of 16).

$$\begin{aligned} &\frac{16}{9} = \frac{48}{(height)} \\ &16 \bullet (height) = (48) \bullet (9) \\ &height = \frac{(48 \bullet 9)}{16} = 27 \end{aligned}$$

Utilizing what I now know, any picture image of the dimensions 48n by 27n (where '*n*' is any whole, positive integer), I can find and choose three picture sizes.

The image resolutions that I've decided upon are:

1.) 96 x 54 (for thumbnails)

2.) 480 x 270 (for general-purpose images)

3.) 1248x702 (for game play images)

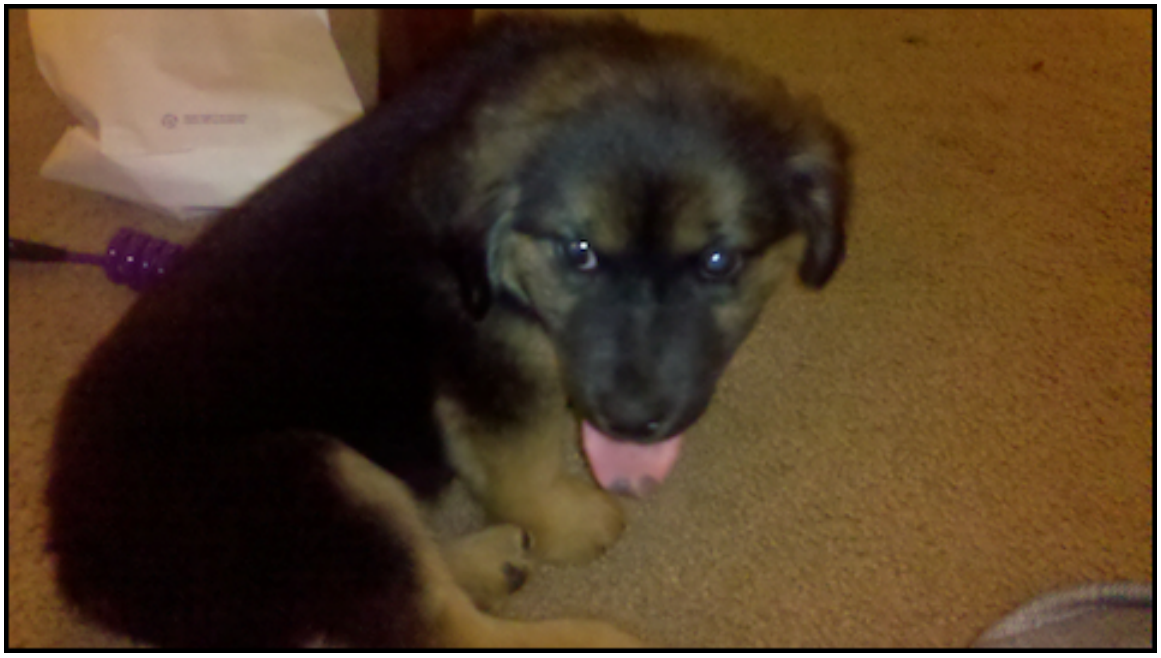
Image #1

Image Size: 96 x 54

Note: The reason I chose this resolution is that it's at a sufficient size where all the major details can be seen while taking up a minimal area.

Image #2

Image Size: 480 x 270



Note: Specifically for general purpose images, I also chose this size with mobile platforms in mind. Although current mobile devices can display images significantly larger than this (such as the iPhone 4 and HTC Thunderbolt), I must also account for the consumers who own earlier models (like the iPhone 3G/3GS and Motorola Droid/DroidX) where this picture size would nearly consume their entire screen.

Image #3

Image Size: 1248x702 (too large for an example picture)

Note: I chose 1248x702 for game play images. It was the closest resolution to 720-HD quality while avoiding to stretch a picture beyond its natural resolution. Although 1920x1080 (1080-HD level) was a valid resolution, not every game or console supports 1080p output; this choice was a reasonable compromise.