

# COLOR-A-PIXEL PATCH

## Understanding Satellite Resolution

### Patch Design



COLOR-A-PIXEL

### Activity



Before



After

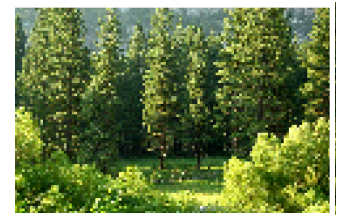
### Introduction

Lots of satellites take pictures of Earth. Often, each satellite is programmed to travel in a specific orbit – meaning a circular path – around the planet, photographing specific areas. As technology has gotten better, we get better and better pictures. The quality of a picture is called its resolution, which is determined by how many individual dots of color (pixels) make up the image.

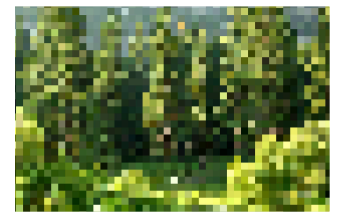
In this activity, we are going to understand how pixels are important to pictures by coloring in each pixel on our own satellite image. As you color each square, the image will start to appear!

### Why do scientists care about resolution and pixels?

Satellite image resolution is important for scientists, because it determines how much detail they have to be able to accurately observe, measure, and analyze the Earth's surface. For example, a high-resolution image would be needed for a researcher to count how many individual trees are in a particular area.



High Resolution



Medium Resolution



Low Resolution



## The Activity

### 1 Choose your satellite image

Pick a recognizable landmark, such as the city or coastline you live in.

Like the country of Italy!



### 2 Turn your image into the color-a-pixel baseline

#### Step A

Once your image is chosen, plug it into the Color-a-Pixel generator.



<https://color-a-pixel.streamlit.app/>

#### Step B

The tool will generate a grayscale PDF containing a grid of  $\frac{1}{2}$  inch squares, each with a number inside.

POSTER

MULTI-PAGES

**Poster-sized PDF**  
(3 feet wide by 2 feet tall)

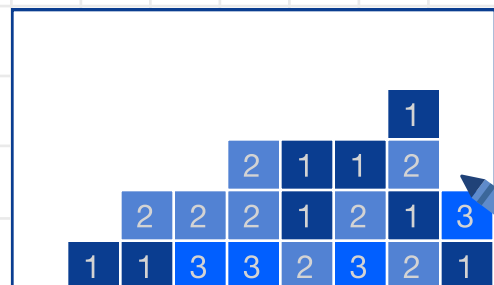
**Multi-page version**  
(6"x6" tiles split evenly across 24 numbered pages of standard 8.5"x11" paper)

For more detailed step-by-step instructions with screenshots, visit: <https://strategies.org/products/color-a-pixel-activity>

### 3 Color!

Start coloring in the image! Pick a blank square, pick up the right crayon from the legend, and color it in.

As more and more squares get colored in, the image will slowly begin to emerge!



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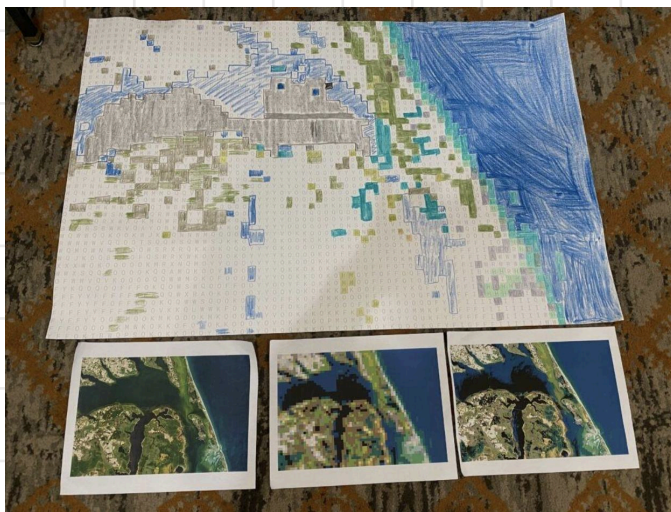
## The Activity

### 4 Discuss the differences between satellite image and the drawing

The resolution of the drawing is 72x48.  $72 \times 48 = 3,456$  total pixels. It may sound like a lot, but compare that to an HD TV screen:  $1920 \times 1080 = 2,073,600$  total pixels.

- What was the resolution of the original image? How much bigger is the original image than the drawn version?
- How does the size of the pixel impact how much you can see in the image? What can you see or not see in the colored version, versus the original? Trees? Big landmarks? Lakes? Farm fields?
- How do you think this impacts scientists who use satellites for their research?

### Example of Color-a-Pixel Activity



**Top:** A partially-completed Color-a-Pixel activity poster.

**Bottom Left:** The source image.

**Bottom Right:** the image at source resolution with pixel colors remapped to the Crayola palette.

**Bottom Center:** The image rescaled to 72x48 pixels with remapped colors.



Get your physical patch at:  
[tinyurl.com/ames-earth-science-patch](https://tinyurl.com/ames-earth-science-patch)

### Extra Resources

#### 1 Inspiration for Satellite Images



Landsat Image Galleries



Pre-generated Color-a-Pixel Activity Files



Landsat Multimedia



Landsat Multimedia 2



Earth Observatory



Earth Observatory Explorer Tool

#### 2 Color-a-Pixel Homepage

<https://strategies.org/products/color-a-pixel-activity>



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