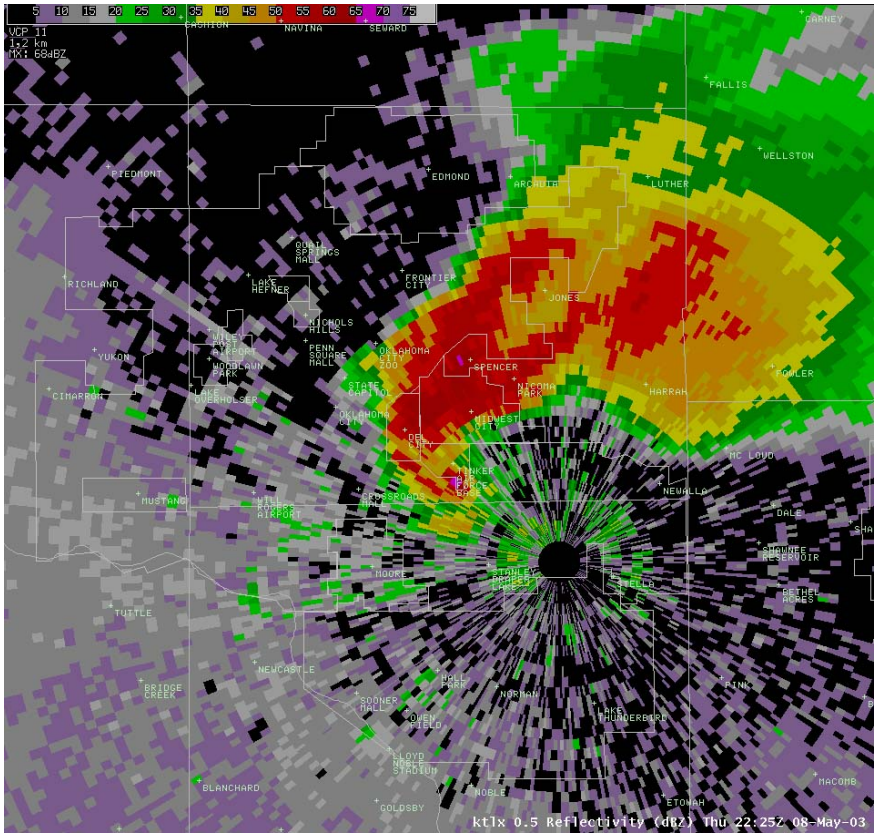
Pixel Painting with Netpbm

pixelpaint: an automated method to convert high resolution digital images into low resolution pixelated art.

Teaching Ideas: This program converts image data into eight levels of intensity, which can then be “false-colored” into a compressed version of the original image. False coloring is an important scientific visualization tool, often viewed by the public in televised weather reports. Doppler image data are usually false colored so that heaviest rainfall areas are easy to discern.

The pixelpaint program produces both 32 and 64 column output from the same initial image, so that different levels of compression can be compared.



The Data: 8 shades in 32 Columns

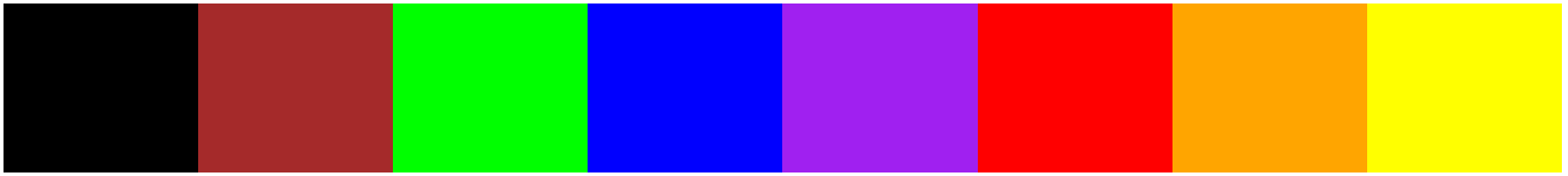
P2
32 40
7
2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 2 1 2 2 2 2 2 2 2 2 2 2 2 1
2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1 2 2 1 1 2 2 2 2 2 1 1
2 2 2 2 2 2 2 2 2 2 2 2 1 1 2 3 3 3 2 2 1 1 2 2 2 2 2 1 1 1
2 2 2 2 2 2 2 2 2 2 2 2 1 1 2 4 3 3 4 4 3 3 2 2 2 2 1 1 1 0
2 2 2 2 2 2 2 2 2 2 2 2 2 3 4 4 4 4 3 4 4 3 2 2 1 1 1 1 0 0 0
2 2 2 2 2 2 2 3 3 3 3 3 4 5 4 4 5 5 5 4 4 3 2 1 1 1 0 0 0 0 0
2 2 2 2 2 2 3 3 3 3 4 5 4 4 4 4 4 4 4 5 5 5 4 4 2 1 0 0 0 0 0 0
2 2 2 2 2 3 3 3 3 4 5 5 5 5 5 5 5 4 4 4 4 5 4 4 2 0 0 0 0 0 1
3 2 2 2 2 2 2 4 3 4 4 5 5 5 5 6 6 5 5 5 4 4 4 5 4 3 0 0 0 0 0 1
3 3 2 2 2 2 4 4 4 5 6 6 6 6 6 6 6 6 5 5 4 4 5 5 4 1 0 0 0 0 1
3 2 2 2 2 3 4 3 5 6 6 6 6 6 6 6 6 6 6 5 5 4 4 5 4 3 1 0 0 0 1
3 2 2 3 4 4 3 4 5 6 6 6 6 6 6 6 6 6 6 5 5 5 5 5 5 3 1 1 0 0 0

Colorize with Crayola 8

The file crayola8.ppm lists, in order, the eight colors in a standard box of crayons, along with their associated rgb values. These are matched by the program, in order, to intensity levels zero (darkest) to seven (lightest).

black: 0 0 0
brown: 165 42 42
green (dark): 0 224 0
blue: 0 0 255
purple: 160 32 240
red: 255 0 0
orange: 255 165 0
yellow: 255 255 0

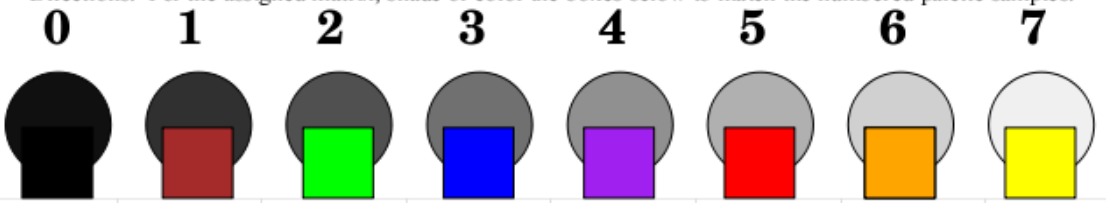
Students can make unique works of scientific art by varying the matching of colors to intensity level.



The Student Handout

Pixel Painting

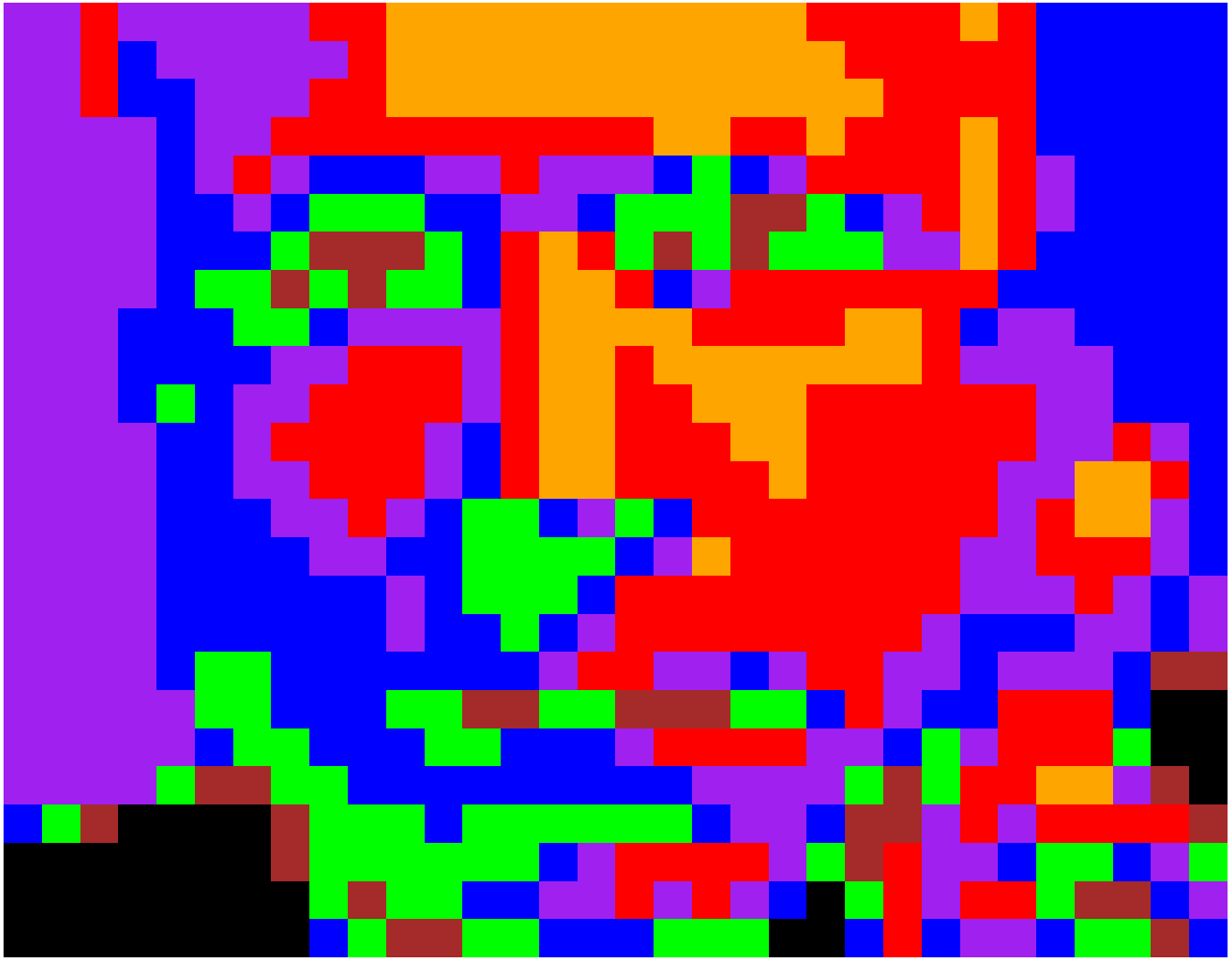
Directions: For the assigned matrix, shade or color the boxes below to match the numbered palette samples.



As a class project, students can make a wall-sized version of the image, by coloring in sheets of one inch square pixels on the student handout, so that intensity numbers are coded to the eight colors.

The student handout may be colored in by crayon, or it may be reproduced onto eight different shades of colored paper, and then individual squares cut out and placed in position.

As an alternative, individual students may simply color in the grid of numbers, making small pixels directly on the paper, or onto a transparency that is overlaid on the data sheet.

The Result:

More Examples: