

Scientific data is often represented by assigning ranges of numbers to specific colors, then representing the data by these 'false colors' rather than the actual numbers. This allows the eye to see patterns in the data that can be hidden by the numbers themselves.

Materials:

- Colored pencils or crayons: White, Orange, Red, Yellow, Green, Blue, Black
- Piece of 8.5 x 11-inch paper
- Metric ruler

Procedure:

Step 1) From your color 'pallet', select each color to represent numbers in the indicated ranges:

Number Range	Color
0 - 5	Black
6-10	
11-15	
16-20	
21-25	
26-30	
31-35	White

Step 2) Draw a 100-cell, square grid with 10 cells (pixels) on a side, and each cell 1-centimeter on a side.

Step 3) Using the number grid below, color-in the cells on your grid with the colors you selected in from your color pallet in Step 1.

Problem 1 - If the numbers represent temperatures in degrees centigrade, where are the hottest and coldest areas in the false-color image?

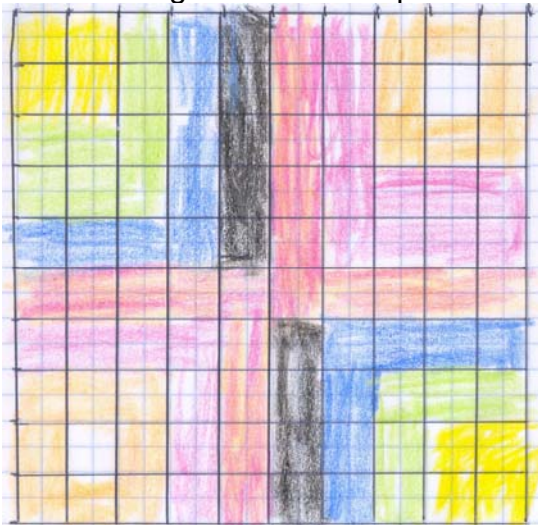
Problem 2 - If the numbers represent the speed of a gas in kilometers per hour, where is the gas moving between 6 - 10 km/h?

20	16	11	6	2	21	23	27	28	29
17	18	12	8	1	22	22	26	33	28
14	13	15	7	3	23	23	28	28	27
14	12	13	9	4	24	24	23	24	25
6	7	8	10	5	25	25	24	24	24
21	22	21	22	22	25	24	25	24	23
23	24	25	24	21	4	10	8	6	8
26	27	26	24	21	2	8	15	14	12
27	33	26	23	22	3	7	13	20	18
26	27	27	24	23	1	6	13	22	17

Here is one combination:

Number Range	Color
0 - 5	Black
6-10	Blue
11-15	Green
16-20	Yellow
21-25	Red
26-30	Orange
31-35	White

The resulting false-color map is shown below:



Problem 1 - If the numbers represent temperatures in degrees centigrade, where are the hottest and coldest areas in the false-color image?

Answer: **In the two white pixels in the upper-right and lower-left corners.**

Problem 2 - If the numbers represent the speed of a gas in kilometers per hour, where is the gas moving between 6-10 km/h?

Answer: **In the pixels shaded blue in the above image.**

Note: *This process is identical to old-fashioned 'paint by numbers' games, except that the colors do not have to represent the actual colors of a physical object. There are no 'natural' colors for temperature, speed, chemical composition or dozens of other scientific quantities that are often rendered as an image. That is why scientists call them 'false-colors'.*