

Cracking the Code

Background: Resistors used in electric circuits are mass-produced. Different resistors have different resistance values. Manufacturers speed up the mass production by *striping* the resistors with color bands to indicate the value of the resistor. Different combinations of colors bands communicate the different resistance values.

Goal: To determine the *formula* that relates the color of the first three stripes to the resistance value of the resistor. That is, to *crack the code* used by manufacturers.

Data:

To begin cracking the code, visit:

<https://www.physicsclassroom.com/Physics-Interactives/Electric-Circuits/Four-Color-Band-Resistor>



Trial	Color 1	Color 2	Color 3	Color 4	Resistance (Ω)
1	Brown	Red	Black	Gold	
2	Brown	Brown	Black	Gold	
3	Brown	Black	Black	Gold	
4	Brown	Green	Black	Gold	
Let's try changing Color 1.					
5	Green	Green	Black	Gold	
6	Green	Red	Black	Gold	
7	Red	Red	Black	Gold	
Let's try changing Color 3.					
8	Brown	Red	Brown	Gold	
9	Brown	Brown	Brown	Gold	
10	Brown	Brown	Red	Gold	
11	Brown	Brown	Orange	Gold	
Try to develop a hypothesis. If you can, then test your hypothesis using more trials. <u>Keep Color 4 as Gold.</u>					
12				Gold	
13				Gold	
14				Gold	
15				Gold	
16				Gold	
17				Gold	
18				Gold	
19				Gold	

Claim:

Describe the color code that is used to determine a resistor's resistance value or write the *formula* that is used in the calculation of resistance. Also, use the blanks at the right to indicate a numerical value that each individual color represents.

Black = _____

Red = _____

Brown = _____

Green = _____

Orange = _____

Blue = _____

Yellow = _____

Purple = _____

Grey = _____

White = _____

Evidence and Reasoning:

Support your claim by showing how the formula can be used to determine the resistance value for two of the trials from Trials 12-19. Be clear.