

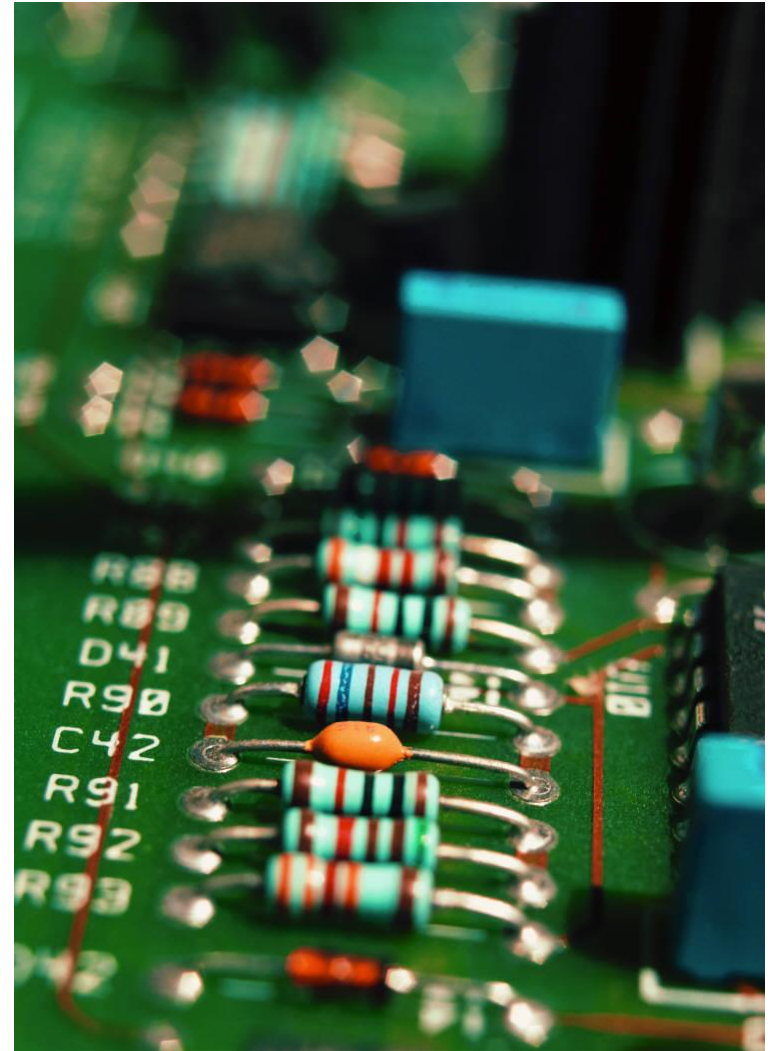
# Resistance

# What are Resistors?

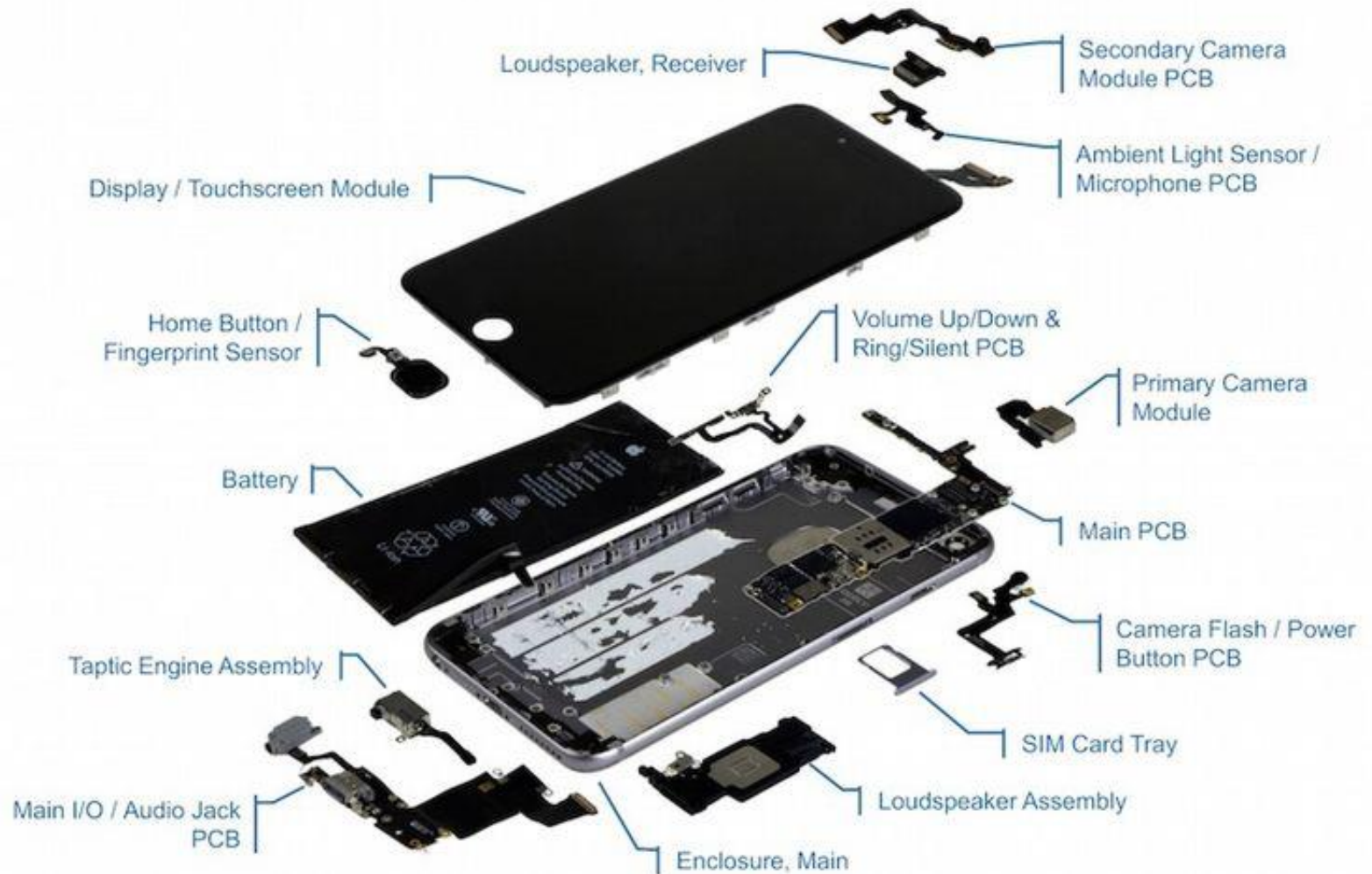
- A **resistor** is part of an electric circuit that **resists** the flow of **electric current**.
- Symbol for a resistor:



- We put resistors in a circuit in order to **control** the amount of **energy** going into different parts of a device.



# Cell Phone Case Study

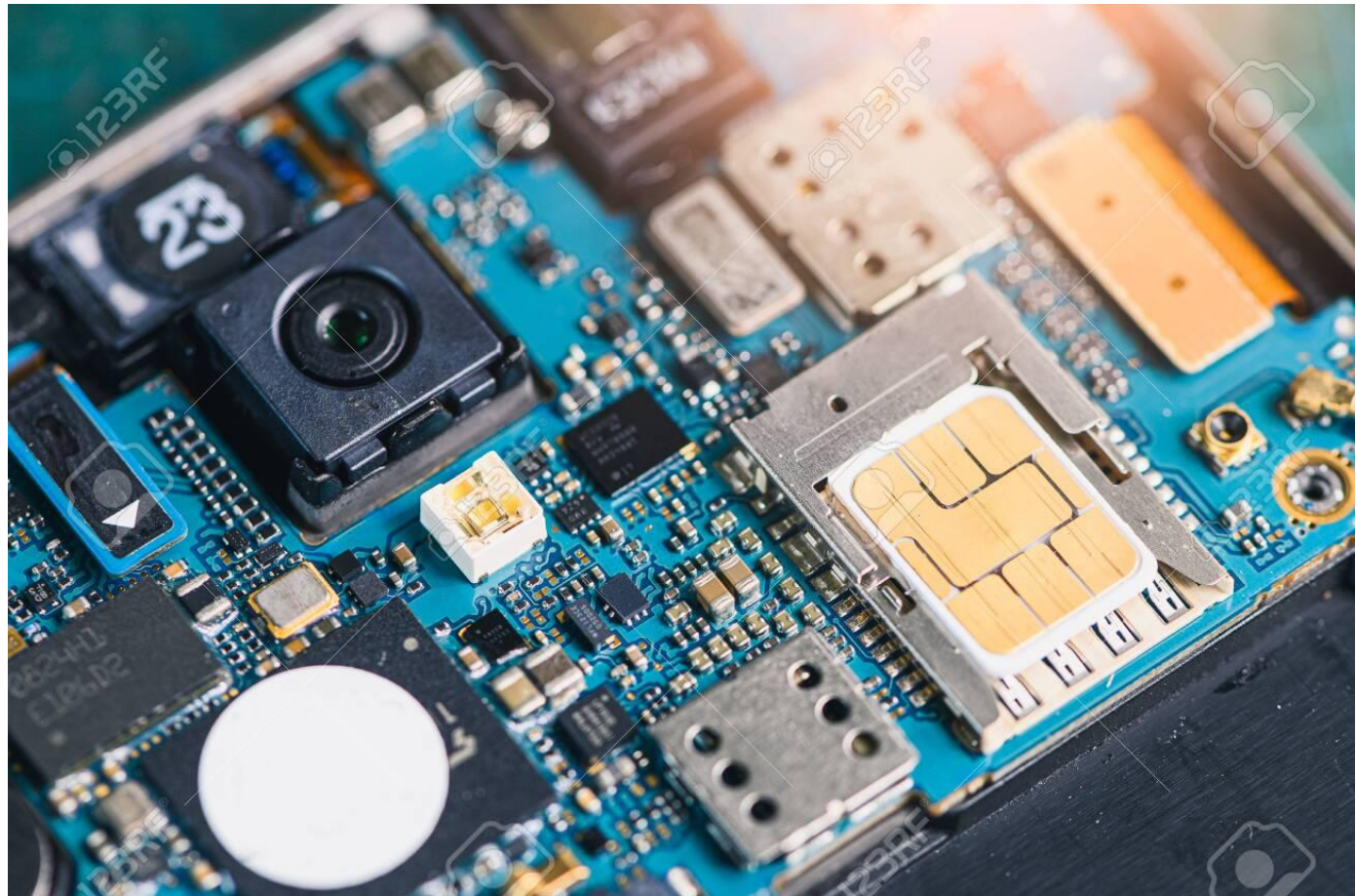
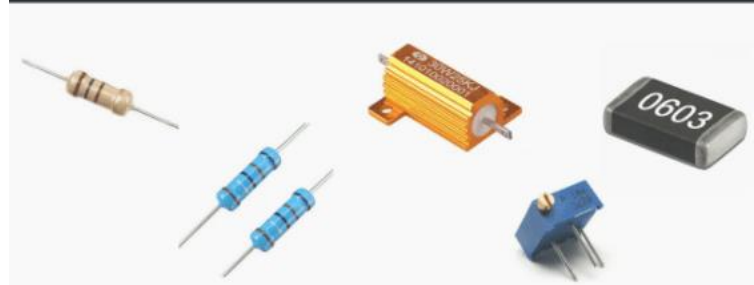


# Cell Phone Case Study

- E.g. All the electrical components in your cell phone are powered by a single 3.8V battery!!
- But different parts (i.e., speaker vs. screen) have different power requirements!!
- So we need to put resistors in part of the circuit to consume the extra energy!!

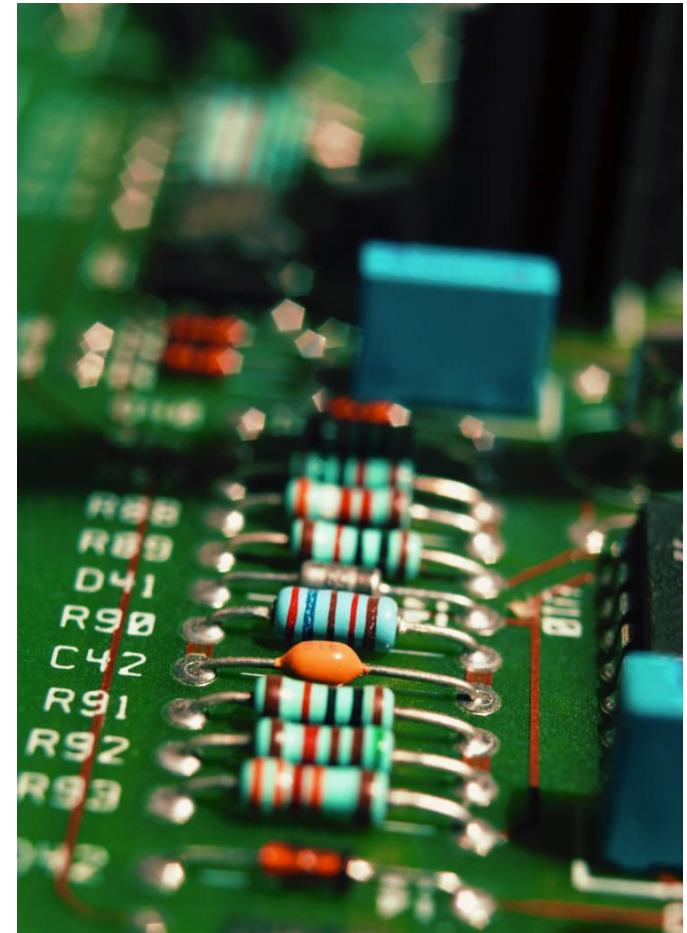


# Different Types of Resistors



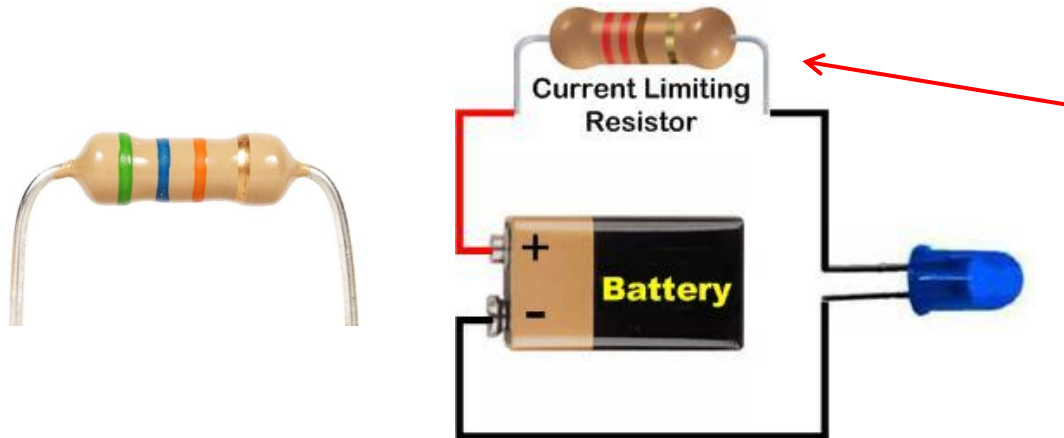
# What are Resistors?

- As current flows through a device/resistor, some of the **electrical energy** is **transformed** into another form, such as **light** or **heat** energy.
- Every device in a circuit has some amount of **resistance**, even the **WIRE!!**



# Resistance and the Ohm ( $\Omega$ )

- Resistance is expressed using **ohms** ( $\Omega$ ).
- The higher the value, the greater the resistance. (E.g.  $10\ \Omega$  will resist current more than  $2\ \Omega$ .)
- When a resistor is connected to an electric cell, the amount of **current** that flows through the circuit depends on **the amount of resistance**



Some of the electrical energy gets converted into "heat" energy!

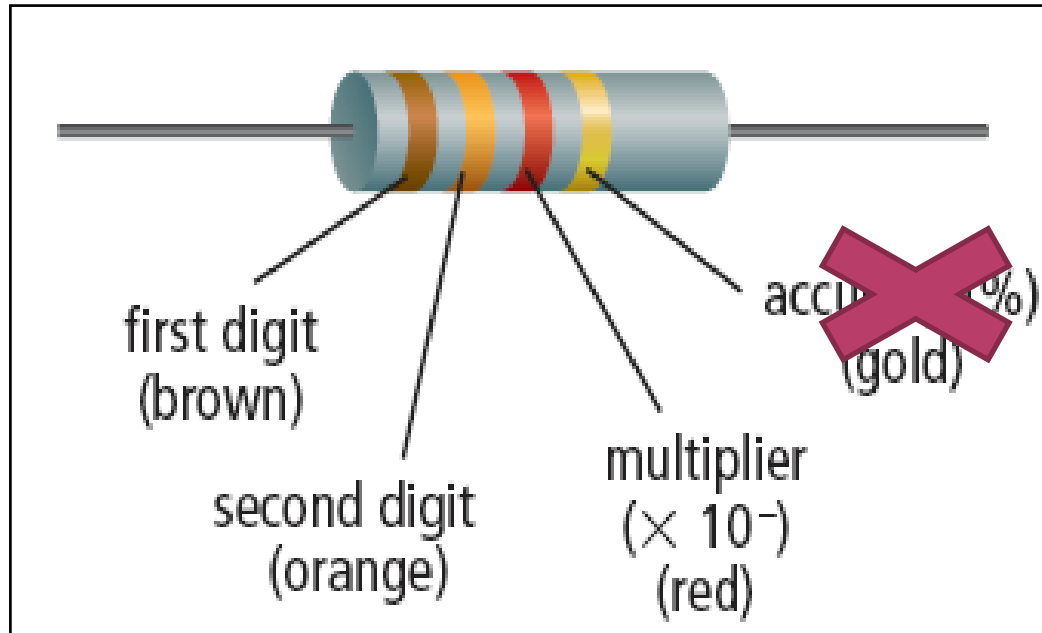
# Resistor Colour Code

- Each resistor has a 4-band colour code that indicates resistance.
- Resistance can be determined from the three non-metallic colours.





# Resistor Colour Code



This resistor has a value of:

$$13 \times 10^2 \Omega = 1300 \Omega$$

Colour	Value
Black	0
Brown	1
Red	2
Orange	3
Yellow	4
Green	5
Blue	6
Violet	7
Grey	8
White	9

- Give the value of each resistor indicated by the colour bands.

	1 <sup>st</sup> band colour	2 <sup>nd</sup> band colour	3 <sup>rd</sup> band colour	Resistor Value ( $\Omega$ )
(a)	blue	green	red	6500 $\Omega$
(b)	violet	black	yellow	700 000 $\Omega$
(c)	green	blue	brown	560 $\Omega$
(d)	brown	red	black	12 $\Omega$
(e)	grey	violet	orange	87 000 $\Omega$
(f)	red	brown	red	2100 $\Omega$

## Example #1

The value of a resistor is **230  $\Omega$** . What are the first three bands of colour on this resistor?

**red, orange, brown**

## Example #2

The value of this resistor is **6400  $\Omega$** . What are the first three bands of colour on this resistor?

**blue, yellow, red**