ATL SKILL ()

Q1

DEFINITIONS

GLOBAL CONTEXT ()

KEY CONCEPT ()

RELATED CONCEPT ()

SOLUTION

FORMATIVE ASSESSMENT

Q2

SUMMATIVE ASSESSMENT

Q3

Measuring Electricity

Before You Begin

KEY CONCEPT (Development)
RELATED CONCEPT (Invention)
Q4 We are examining the invention of electrical circuits as a *turning point* in history. What other inventions do you think resulted in an historical turning point?

Technical Background

Voltage

Voltage, measured in *volts* (**V**), is a *potential* difference between a positively and negatively charged part of a circuit. A common example illustrating the concept of voltage that of a water tank or tower.

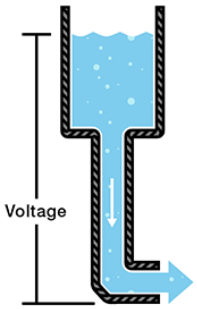


Image courtesy sparkfun.com.

In this illustration, voltage can be seen as equivalent to the *water pressure* coming out of the hose at the bottom of the system. Factors such as the height and size of the tank can have an impact on how much pressure is available. This is the *potential energy* concept. While batteries and other sources of electricity provide power in different ways, the analogy is still useful for understanding what voltage contributes to an electrical circuit.

Voltage Drop / Forward Voltage

Voltage Drop or *Forward Voltage* is the amoung of voltage "consumed" by a load or other component in an electrical circuit.

Kirchhoff's Voltage Law
Kirchhoff's Voltage Law (or *Kirchhoff's Second Law*) essentially states that sum of all voltage drops in a clossed electrical circuit, such as the simple circuits we built in the previous lesson, will be equal to the voltage of the source.

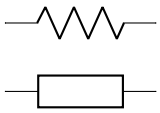
Current

Current, measured in *amperes* (**A**), is the *flow* of electricity within a circuit. You can think of current as the *speed* at which electricity flows.

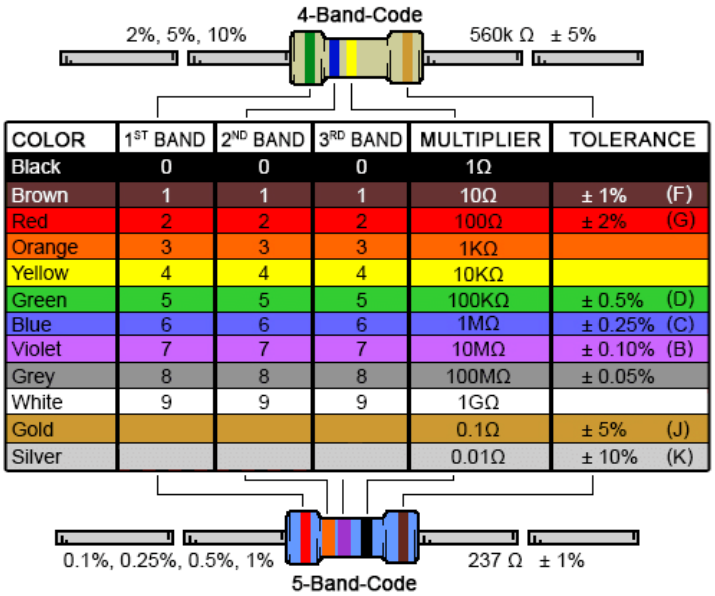
ATL SKILL (Communication Skills)
...make inferences and draw conclusions...
Q5 Considering the water tank example given above for voltage, what changes to the system would have an impact on the flow of water out of it?

Resistance

The Resistor

Name	Description	Symbol	Example
Resistor	A *resistor* is an electronic component designed to reduce the current flow in a circuit. The *resistance* offered by each resistor is measured in Ohms (Ω).		

The type of resistor we will be using are labeled using coloured bands to denote their resistance. You have a copy of the following image in your electronics kits:



COLOR	1ST BAND	2ND BAND	3RD BAND	MULTIPLIER	TOLERANCE
Black	0	0	0	1Ω	
Brown	1	1	1	10Ω	± 1% (F)
Red	2	2	2	100Ω	± 2% (G)
Orange	3	3	3	1KΩ	
Yellow	4	4	4	10KΩ	
Green	5	5	5	100KΩ	± 0.5% (D)
Blue	6	6	6	1MΩ	± 0.25% (C)
Violet	7	7	7	10MΩ	± 0.10% (B)
Grey	8	8	8	100MΩ	± 0.05%
White	9	9	9	1GΩ	
Gold				0.1Ω	± 5% (J)
Silver				0.01Ω	± 10% (K)

Image courtesy digikey.com.

ATL SKILL (Communication Skills)

...use and interpret a range of discipline-specific terms and symbols...

Q6 In the next section, you'll need one of each of the following resistance value resistors: 220Ω, $1\text{k}\Omega$, $10\text{k}\Omega$. These are available in your electronics kit. Determine whether your resistors are $4-$ or $5-$band and identify the correct colour bands for each required value. You can safely ignore the "tolerance" band for now.

220 Ω **1 kΩ** **10 kΩ**

Developing Technical Skills

Reflections