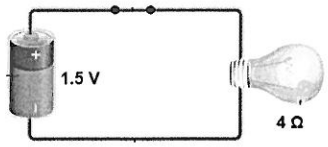
Name:_____ Date:_____ Pd:____ Score: _____

Electricity Minor

$V = I \times R$

1. A light bulb with a resistance of 4 ohms is connected to a 1.5-volt battery as shown below Calculate the current that will flow.



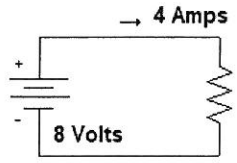
$V = 1.5$ V $I = \frac{V}{R}$

$I = ?$

$R = 4\ \Omega$ $I = \frac{1.5\text{V}}{4\ \Omega}$

Answer: 0.375

2. The diagram below represents an electric circuit. What is the resistance in this circuit?



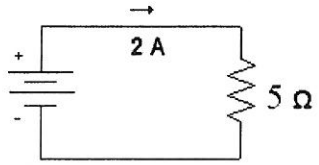
$V = 8$ volts $R = \frac{V}{I}$

$I = 4$ Amps $R = \frac{8\text{V}}{4\text{A}}$

$R = ?$

Answer: 2 Ω

3. The diagram represents an electric circuit. What is the voltage of the circuit?



$V = ?$ $V = I \times R$

$I = 2$ A $V = 2\text{A} \times 5\ \Omega$

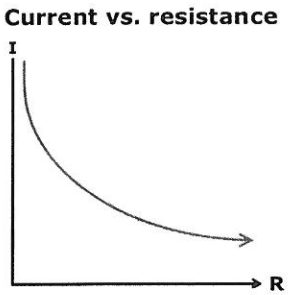
$R = 5\ \Omega$

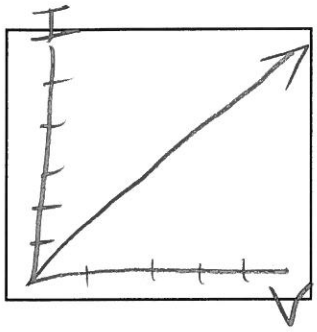
Answer: 10 V

7. Marissa is conducting an experiment to investigate the relationship between current and resistance in the simple circuit shown below. **She makes a series of changes. Determine the result each change has on current.**

Trial	Current will . . .	Explanation
A. Triple the voltage without changing the resistance	Triples the current	Voltage & Current affect each other the same way
B. Exchange a low voltage battery for a new battery with high voltage	Increases	Increasing voltages also increase current
C. Voltage doubled	Current doubled, but resistance remained constant	As voltage increases so does current
Resistance was reduce by half	Current doubled, but voltage remained constant	Reducing resistance allow for a faster current
D. Double the resistance in the circuit while keeping voltage constant.	decreases	Increasing the resistances slows down the current
E. Double the resistance and double the voltage	Stay the same	R & Voltage cancel each other so current doesn't change.

8. Marissa compiles all of her results and creates the following graph to describe the relationships between V, I, and. Provide feedback.

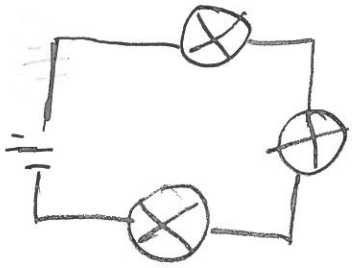
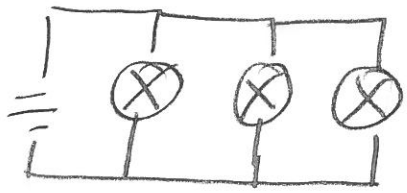


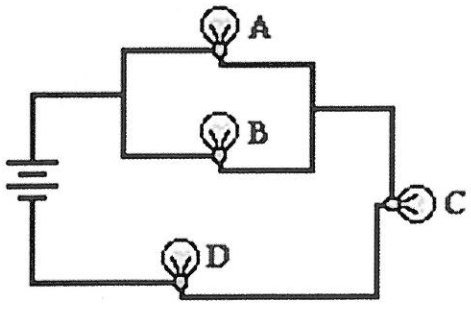


A. Do you agree with the relationship described in Marissa's graph? Why or why not? Yes. Because as resistances increases, current goes down.

C. Use the empty box to create a graph of the Voltage & Current relationship. As V increase, I increases

Series and Parallel Circuits

To the right, draw a closed working circuit of three light bulbs connected in series.		To the right, draw a closed working circuit of three light bulbs connected in parallel.	
What will happen if one light bulb burns out? They all stop working		What will happen if one light bulb burns out? The others continue to work.	
If the voltage of the battery is 9 volts, what is the voltage across each light bulb? 3 volts each		If the voltage of the battery is 9 volts, was is the voltage across each light bulb? 9 volts each	
What will happen to the total resistance if another bulb is added to the circuit? It will increase		What will happen to the total resistance if another bulb is added to the circuit? Resistance decreases	
Describe the brightness of the bulbs if another bulb is added to the circuit. They become dimmer		Describe the brightness of the bulbs if another bulb is added to the circuit. The brightness doesn't change	



Use the combination circuit to the left to answer the questions below:

If the voltage of the battery is 6 volts, what is the voltage across each bulb? 2 volts each, there are 3 bulbs in each loop. So you divide the volts.

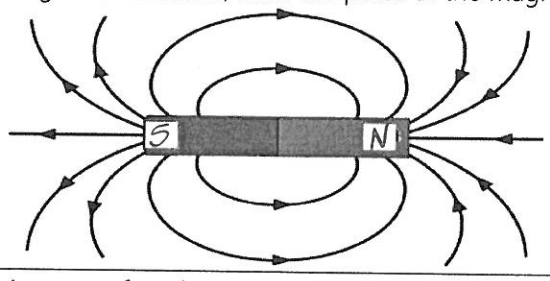
What will happen if Bulb A is removed? The other bulbs still work.

What will happen if Bulb C is removed? All the bulb stop working

Name_____ Date_____ Per_____ Score: _____

Magnetism Minor Assessment

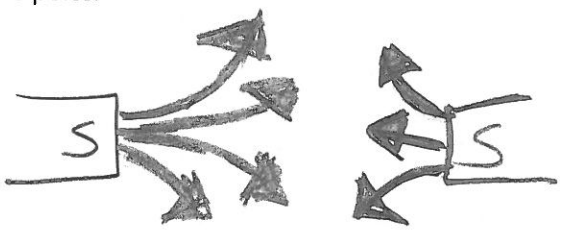
1. Below is a picture of a bar magnet. Based on the sketch of the magnetic field lines, label the poles of the magnet.



2. What are magnetic domains? How do they determine whether a material is magnetized or not?

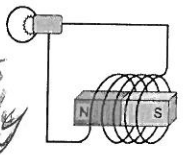
*Atoms grouped together their magnetic fields align.
*If they point in the same direction, they are magnetic

3. A group of students in lab are using iron filings to observe the magnetic fields between two magnets. Draw a sketch of what they would see between two **like poles**.

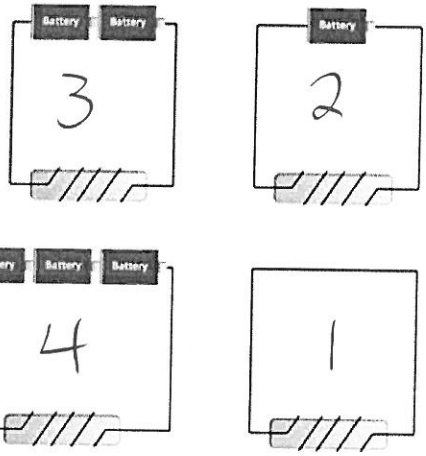


4. For his science fair project, Edgar wants to create a simple generator to produce electricity. To do this, he places a magnet in the middle of coils of wire that are attached to a light bulb. After completing his project, however, the light bulb does not light up. Why?

The magnets inside the wire needs to be moving continously to create a current.

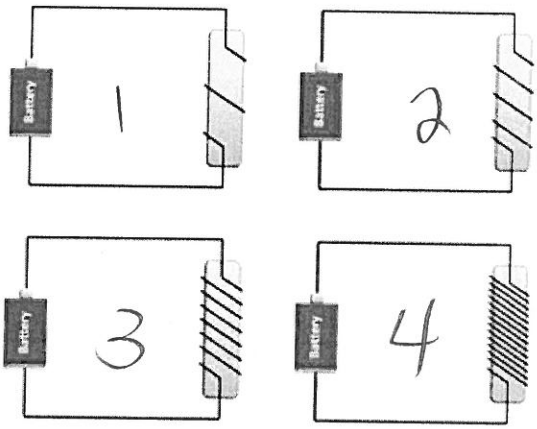


5. Rank the following electromagnets in order of weakest (1) to strongest (4).

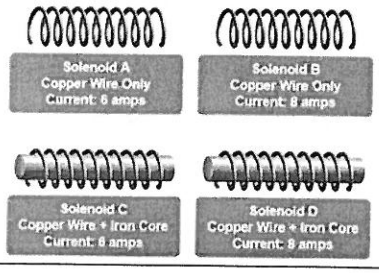


Explain your reasoning: More battery means more voltage creating a stronger current.

6. Rank the following electromagnets in order of weakest (1) to strongest (4).



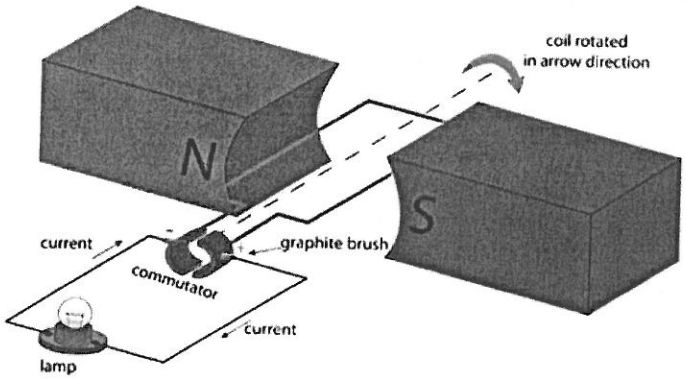
Explain your reasoning: Less coils of wire creates a weaker magnetic field.



7. A solenoid is a coil of wire that produces a magnetic field when carrying a current. Based on strengths of the magnetic fields produced, rank them in order of weakest to strongest.

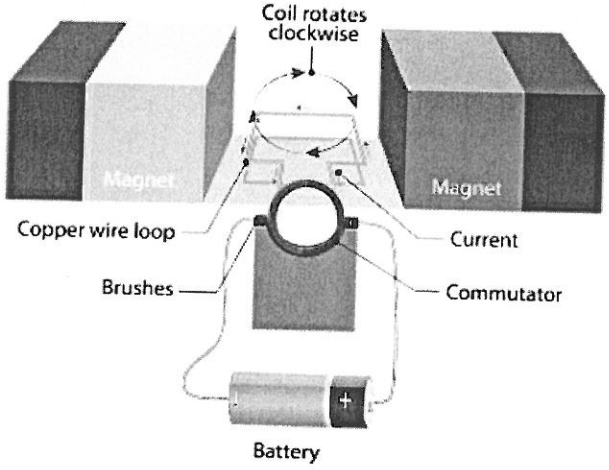
A < C < B < D

8. A generator converts mechanical energy to electrical energy. When a coil of wire is placed between two magnets rotates, the magnetic lines of force are disturbed. This induces a current in the coil. The image below shows a generator. Identify three ways to make the bulb shine less bright.



1. Reduce the coils
2. Spin slower
3. Weaker magnets

9. Electric motors convert electrical energy to mechanical energy. When a coil of wire carrying a current is placed between two magnetic poles, a force acts on it causing it to rotate. The image below shows a simple electric motor.



a. Name 2 things you can do to make to loop spin faster.
1. Stronger batteries
2. Stronger magnets

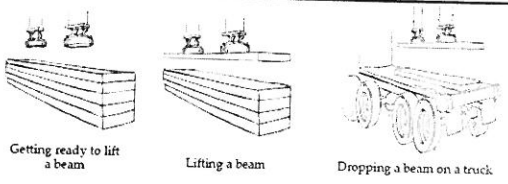
b. Name 1 thing you can do to make the loop spin in the opposite direction.
→ Flip the poles of the magnets.
→ Change the direction of the current.

10. Complete the table with facts that compare and contrast motors and generators:

Motor	Both	Generator
Electric to mechanical * Uses electricity	* Have currents * Use magnets	* Mechanical to Electric * Electromagnetic inductions * Generates electricity

11. The machine you see in the pictures is used to load steel beams onto delivery trucks. There are no hooks or ropes that attach the steel beams to the lifting machine. How is the machine able to pick up and drop the steel beams?

The machine uses an electromagnet to create a magnetic force to be able to lift metal objects.


Getting ready to lift a beam

Lifting a beam

Dropping a beam on a truck