SNC1 **Electrical Resistance 274306** **Name:** _____

1. Electrical current is measured in _____.
2. Electrical potential difference (voltage) is measured in _____.
3. A poor conductor in a circuit is referred to as a _____.
4. In nichrome there are few loosely held _____.
5. The atoms of nichrome vibrate causing it to _____ _____.
6. The resistance across a copper connecting wire is close to _____.
7. Electrical resistance equals the _____ difference across the resistor divided by the _____ through it.
8. The SI unit of resistance is the _____, symbol Ω.
9. Electric current will flow through your body if a large _____ _____ exists across your body.
10. Convulsions in a human can occur if as little as _____ Amperes of current flow.
11. Death in a human can occur if as little as _____ Amperes of current flow.

After viewing the video, answer the following questions:

12. Classify the following as GOOD resistors or POOR resistors;

water = _____ light bulb = _____

copper wire = _____ nichrome wire = _____

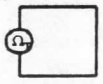
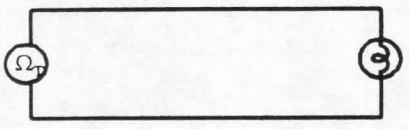
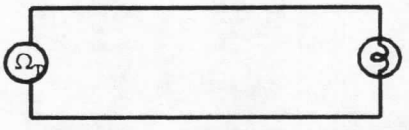
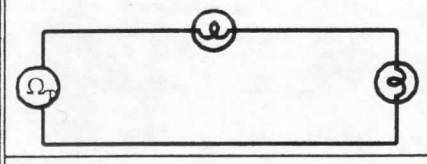
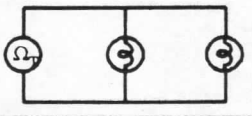
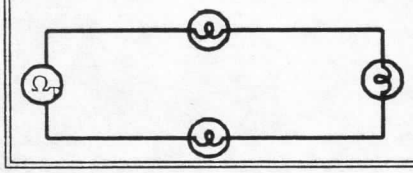
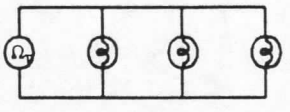
13. Two light bulbs are connected to a 1.5 V dry cell battery one at a time. One bulb is noticeably brighter than the other. **Explain.**

Name: _____

Date: _____

TOTAL RESISTANCE OF CIRCUITS

Set up the following circuits.
Use the multimeter as an Ohmmeter to measure their total resistance.
Answer the questions on the following page.

Total Resistance			
Series Circuits	**Total Resistance (Ohms) (Ω)**	**Parallel Circuits**	**Total Resistance (Ohms) (Ω)**
RESISTANCE OF LEADS ONLY 			Ω_T =
	Ω_T =		Ω_T =
	Ω_T =		Ω_T =
	Ω_T =		Ω_T =

Use the results from the notes and your table to answer the following;

1) What is the resistance?

2) What is the resistance of just a lead (or conductor)? _____ Ω

3) Is it easy or hard for a battery to push coulombs through a lead wire?

4) As more lights are connected in SERIES:
   A) the total resistance of the circuit becomes _____ so we say the load becomes _____
   B) the (easier/harder/the same) for the battery to push coulombs through the circuit.
   C) the current in the circuit becomes _____ .

5) A short circuit could just be described as a circuit which has _____ resistance and causes the current to _____ rise when the switch is closed.

6) As more lights are connected in PARALLEL:
A) the total resistance of the circuit becomes _____ so we say the load becomes _____.
B) it is (easier/harder/the same) for the battery to push coulombs through the circuit.
C) the _____ the current in the main circuit.

7) An Overload is a parallel circuit which has very _____ total resistance because of too many loads connected. This causes the current to _____ rise as more loads are connected..

8) If several appliances (like a stereo, CD player, lamp, and a computer) are all connected to one extension cord or "power bar" an Overload circuit can be created.

A) Compare the voltage of the electricity going through each appliance in an overload circuit to the voltage if only one appliance were connected. The voltage is _____in the overload circuit.

B) Compare the current going through the extension cord in an overload circuit to the current expected if just one appliance were connected. The current is _____ in the overload circuit.

9) Household plugs offer some resistance to current flow because the connections are never completely clean and tight. From your knowledge of what happens when current flows through a site of resistance, which part of such an overload circuit would be most likely to overheat and cause a fire?

Fuses & Circuit Breakers

1) A short circuit causes the current to _____ rise when the switch is closed. It is the result of a path with _____ resistance around the light bulb.

2) Fuses (and Circuit Breakers) are connected in _____ to the rest of the circuit, because if too much current flows, the fuse will _____ and _____ the current.

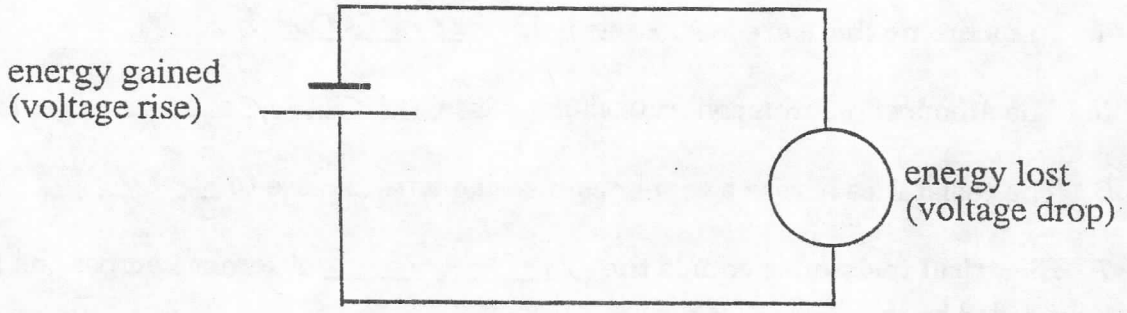
3) The more lights that are connected in SERIES, the less likely a _____ circuit will occur.

4) The more lights that are connected in PARALLEL, the more likely an _____ circuit will occur.

ELECTRICAL RESISTANCE AND OHM'S LAW

Electrical resistance is the ability to impede the flow of electrons in conductors.

When electrons flow through a conductor, the electrical resistance causes a loss of electric potential (voltage). There is a "difference" in the amount of electric potential after the electrons have flowed through the conductor.



The symbol for electrical resistance is **R**.
The SI unit for electrical resistance is the ohm, Ω.

Ohm's Law

In 1827, George Ohm (1789-1854) discovered the relationship that exists between the potential difference across a conductor (such as copper wire) and the electric current flowing through it:

"The potential difference between two points on a conductor is proportional to (directly related) to the electric current flowing through the conductor. "

Electric Potential (Voltage drop)	=	Electric Current	x	Electrical Resistance
V	=	**I**	x	**R**
Volts (**V**)	=	Amperes (**A**)	x	Ohms (Ω)

Example:
A 100-Watt lightbulb has a tungsten filament with a resistance of 144 Ω and a current of 0.833 A flowing through it. What is the **voltage drop** ?