**Intro to Electricity Investigation**

Answer the questions using the websites provided. Use complete thoughts!!

* **Go to:**

[**http://www.energyquest.ca.gov/story/chapter02.html**](http://www.energyquest.ca.gov/story/chapter02.html)

[**http://science.howstuffworks.com/electricity.htm/printable**](http://science.howstuffworks.com/electricity.htm/printable)

[**http://www.edu.pe.ca/kish/Grassroots/Elect/whatis.htm**](http://www.edu.pe.ca/kish/Grassroots/Elect/whatis.htm)

[**http://www.eia.doe.gov/kids/energy.cfm?page=electricity\_science-basics**](http://www.eia.doe.gov/kids/energy.cfm?page=electricity_science-basics)

1.What is electricity?

2. Explain the role of a battery in the circuit.

3. What are the 3 basic units in electricity and what do they measure?

* **Go to:**

[**http://www.explainthatstuff.com/electricity.html**](http://www.explainthatstuff.com/electricity.html)

4. What kinds of materials can electricity pass through?

5. What kinds of materials can electricity not pass through?

* **Go to:**

[**http://www.energyquest.ca.gov/story/chapter02.html**](http://www.energyquest.ca.gov/story/chapter02.html)

[**http://www.explainthatstuff.com/electricity.html**](http://www.explainthatstuff.com/electricity.html)

6. How does electricity travel through wires?

7. A battery stores what type of energy? Explain

**Scientist research**

Thomas Edison, Benjamin Franklin or Michael Faraday, all made important contributions to electrical science. Answer the following questions about each.

8. When and where was the scientist born?

9. What was his life like? (interests, school, family, etc.)

10. What experiments did he conduct with electricity?

11. What discoveries/inventions did the scientist make?

* **Go to:**

[**http://phet.colorado.edu/en/simulation/circuit-construction-kit-dc-virtual-lab**](http://phet.colorado.edu/en/simulation/circuit-construction-kit-dc-virtual-lab)

**Open the DC only circuit simulator**

**Directions:**

**Choose the RUN NOW option**

**Tools to build circuit are in the white box on the right side of the screen**

**To remove parts or change voltage, resistance, etc…..right click on the part for more options!!**

12. Find a way to make a single light bulb light up with as FEW parts hooked up as possible.

When electricity flows through wires and makes something work, like a light bulb, it is

called a circuit.

**Sketch your circuit below**:

13. Go to the grab bag and play with the different objects. Find out which objects allow

electricity to flow and fill in the data table:

|  |  |
| --- | --- |
| Objects that allow electricity to flow (conductors) | Objects that do NOT allow electricity to flow (insulators) |
|  |  |

14. What do the conductors have in common?

15. What do the insulators have in common?

16. **Experiment** with the simulator; see what you can make it do!!!

Build different circuits.

Can you make light bulbs glow brighter?

Can you make light bulbs glow dimmer?

17. Use the voltage meter and ammeter. (use voltage meter on battery, attach ammeter to circuit)

**Sketch the circuit you created and record your readings.**

**Directions:**

**Use the same simulator as above**

Put three resistors on the work area and right click on each to make the resistances different from one another.

Record the resistances in the table below.

Build a circuit using the three resistors, batteries and wires. Draw you circuit below.

18. Complete the table below by:

Measuring the voltage (use voltmeter to measure)

Measuring the current through each resistor (use the ammeter to measure)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Resistor | Individual  resistance  (ohms) | Current  (amps) | Voltage  (Volts) | Resistance in  the circuit  (ohms) R=V/I |
| 1 |  |  |  |  |
| 2 |  |  |  |  |
| 3 |  |  |  |  |

* **Go to:**

[**http://phet.colorado.edu/en/simulation/battery-resistor-circuit**](http://phet.colorado.edu/en/simulation/battery-resistor-circuit)

**Battery-Resistor Circuit**

**Directions:**

**Choose the RUN NOW option**

**Control Panel: Check “show inside battery” in upper right hand corner.**

19. What must happen to the voltage and resistance for the circuit to get hot?

20. What happens to the current when the circuit gets hot?

**(current reading is in lower left corner- AMPS)**

21. What must happen to the voltage and resistance for the circuit to get cold?

22. What happens to the current when the circuit gets cold?

* **Go to:**

[**http://phet.colorado.edu/en/simulation/ohms-law**](http://phet.colorado.edu/en/simulation/ohms-law)

**Ohm’s Law**

**Directions:**

**Choose the RUN NOW option**

23. What happens to I when V increases?

24. What happens to I when R increases?

25. Let Voltage = 6.0 V. How many 1.5 V batteries do you need? \_\_\_\_\_\_\_\_\_\_\_

Let Resistance = 750 ohms.

Calculate the current (I = V / R). \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Does your answer match with the simulation’s answer? (**mA means milliamp……..1000 mA = 1 A**)

26. Describe the relationship between I and R.

27. Fill out the tables below and check your work in the simulation

***Remember, the simulation shows milliamps.***

***You should show Amperes!! (*mA means milliamp……..1000 mA = 1 A)**

**V = I \* R**

|  |  |  |
| --- | --- | --- |
| 8.0 V | **A** | 800 Ω |
| 2.0 V | .044 A | **Ω** |
| **V** | .0058 A | 430 Ω |

**Ohms Practice Questions**

28 .The 12V battery in your car operates a 25 amp car stereo. What is the resistance of this

stereo system? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

29. A “2D” flashlight runs on 3.0V. What is the current through the bulb if resistance is 15 Ω?

30. How many volts must an iPod charger provide to charge an iPod using .85 Amps at 35 Ω?