**Edison’s Lab: Inventing the Light Bulb Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Date\_\_\_\_\_\_\_\_\_ Period\_\_\_\_\_**

**Drawing / Captions**

Score:

Drawing/Captions \_\_\_\_

Summary Paragraphs(s) \_\_\_\_

Total \_\_\_\_

Total÷2 (Average) \_\_\_\_

Rounded Average \_\_\_\_

Place a check by each expectation you completely fulfilled

\_\_\_ 1. Each filament tested is clearly identified – type of metal, thickness (gauge), length.

\_\_\_2. Drawing shows all parts of the set up – black wire, red wire, power box, filament, tape

\_\_\_3. Labels identify all parts of the set up

\_\_\_4. The time each filament glow is identified for each power level

\_\_\_5. The intensity of light is recorded for each filament for each power level

\_\_\_6. Additional outcomes for each power level are identified – melting, smoking, sparks, etc.

\_\_\_7. Troubleshooting techniques are included

\_\_\_8. Longer wires burn longer than shorter wires at the same power levels

\_\_\_9. Longer wires burn less brightly than shorter wires at the same power levels

\_\_\_10. Thicker wires burn longer than thinner wires at the same power levels

\_\_\_11. Thicker wires burn less bright than thinner wires at the same power levels.

\_\_\_12. Steel wool glows/sparks sporadically

|  |  |  |  |
| --- | --- | --- | --- |
| 1 | 2 | 3 | 4 |
|  |  | 8-10 Basic expectations covered. | Basic expectations exceeded. Innovative ideas are incorporated into the assignment |

**Summary Paragraphs(s)**

Place a check by each expectation you completely fulfilled.

Basic expectations:

1. *What part of your light bulb gave out light?* Filament-\_\_\_\_
2. *Is there evidence of any other form of energy besides light coming from the light bulb?* Heat-\_\_\_\_
3. *What type of metal is in the insulated wire?* Copper-\_\_\_\_ *Why was this metal chosen for to transfer the current from the power box to the filament?*

Copper has low resistance-\_\_\_\_

1. *What type of metal was used for the filament?* Nichrome and steel-\_\_\_\_ *Why were these metals chosen to be a filament?*

Nichrome and iron have high resistance-\_\_\_\_

1. *How did the thickness and/or length of the nichrome wire affect the results of the investigation? Base your answer on specific observations.*

\_\_\_Longer wires burn longer than shorter wires at the same power levels

\_\_\_Longer wires burn less brightly than shorter wires at the same power levels

\_\_\_Thicker wires burn longer than thinner wires at the same power levels

\_\_\_Thicker wires burn less bright than thinner wires at the same power levels.

Advanced expectations:

1. *If you were able to accurately measure the temperature of the wire you could conduct an experiment comparing the thickness of the wire and temperature. Write a hypothesis in an “If..then.. “format that demonstrates your understanding of the relationship between wire thickness and temperature.*

\_\_\_If the length of wire is increased, then the heat produced by the wire will decrease.

1. *Most modern light bulbs have a vacuum inside. Why?*

\_\_\_ Oxygen in air causes metals to burn or **oxidize**. Removing air allows the filament to last longer because it is not oxidizing

1. *Possible additional topics to discuss with Mr. Edison:*

*\_\_\_*Introduce Ohm’s Law -resistance depends on the thickness and length of a wire.

\_\_\_Use/find a metal that is more heat resistant.

\_\_\_Use/find a metal that is brighter (more white)

\_\_\_ Use heat for other applications besides light (toaster, waffle iron, curling iron, etc.).

\_\_\_Explain the potential of steel, positive or negative.

\_\_\_Express concern of heat as a safety issue.

\_\_\_Discuss how the power level affects the results.

\_\_\_other \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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| --- | --- | --- | --- |
| 1 | 2 | 3 | 4 |
|  |  | 8 total expectations are covered.  At least 5 must be from the basic expectation list. | Basic expectations exceeded. Innovative ideas are incorporated into the assignment |