**Can You Categorize Materials?**

**Purpose/Claim: Materials can be categorized and organized by observable and measurable physical properties.**

**Question- How would you categorize the materials into two or three groups based on physical properties?**

**Data and Observations**

Observe the properties of each object:

Rate the shininess and bendability on a scale of 0-5 (0 being not at all, 5 being very)

Asses the color of the object based on the rainbow, or brown, black, white, or gray

Describe shape using 3-D geometric shape terms (see planner for names of basic shapes)

Write yes or no for magnetism

**Part 1. Physical Properties**

| **Property** | **Copper Wire** | **Pencil**  **Graphite** | **Aluminum**  **Foil** | **Plastic Straw** | **Glass Rod** | **Galvanized**  **Nail** | **Wood** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Shininess**  **(or dull)** |  |  |  |  |  |  |  |
| **Color** |  |  |  |  |  |  |  |
| **Bend-Ability**  **(or not)** |  |  |  |  |  |  |  |
| **Shape** |  |  |  |  |  |  |  |
| **Magnetism** |  |  |  |  |  |  |  |

**Part 2. Electrical Conductivity**

Assess how bright the bulb was lit when connected to each object

Use 0 for did not light; 5 for very bright and other ratings in between

| **What Happened?** | **Copper Wire** | **Pencil**  **Graphite** | **Aluminum**  **Foil** | **Plastic Straw** | **Glass Rod** | **Galvanized**  **Nail** | **wood** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Did the bulb light?** |  |  |  |  |  |  |  |
| **Describe Brightness** |  |  |  |  |  |  |  |

**Part 3. Thermal Conductivity**

Assess how cold the objects were after placement in the freezer

Use 0 for no change in temperature; 5 for very cold and other ratings in between

| **What Happened?** | **Copper Wire** | **Pencil**  **Graphite** | **Aluminum**  **Foil** | **Plastic Straw** | **Glass Rod** | **Galvanized**  **Nail** | **Wood** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Did the object lose heat** |  |  |  |  |  |  |  |

**Part 4. Composition: what elements are found in each of the materials the objects are made from?**

-use internet sources

| **Property** | **Copper Wire** | **Pencil**  **Graphite** | **Aluminum**  **Foil** | **Plastic Straw** | **Glass Rod** | **Galvanized**  **Nail** | **Wood** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Chemical Composition** |  |  |  |  |  |  |  |

**Part 5. Uses- in what way(s) are the materials used in everyday life**

| **Copper Wire** | **Pencil**  **Graphite** | **Aluminum**  **Foil** | **Plastic Straw** | **Glass Rod** | **Galvanized**  **Nail** | **Wood** |
| --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |

**Categorize**

Which materials fit in each category? Why?

| **Metals** | | **Nonmetals** | | **Metalloids** | |
| --- | --- | --- | --- | --- | --- |
| **Materials** | **Properties**  **(reasons)** | **Materials** | **Properties**  **(reasons)** | **Materials** | **Properties**  **(reasons)** |
|  |  |  |  |  |  |

**Analysis:** complete the following paragraph. (type in space below prompt)

**Materials can be categorized and organized by observable and measurable physical properties. Using a textbook during this I managed to figure out what materials were metal, nonmetal, and metalloids using the definitions of the textbook. There were metalloids in this project and they were pencil graphite and aluminum foil because they had properties as metal and not but still conducted energy really well. I would use a plastic straw because it does not conduct electricity and energy that well so it wouldn’t heat like aluminum foil. So the frying pan would be more safe with something that does not conduct energy that well so it makes the process easier to hold. The only errors on this project was a broken pencil graphite and that affected my results so that messed me up. Not being able to go outside because it is not cold enough made my process and lab testing/research harder.**

Use evidence collected to support answers. You can answer these in any order to form your paragraph.

* Restate the claim/purpose as your topic sentence (3 pts)
* Based on the observations collected, how would you classify each material (nonmetal or metal)? Explain your reasons? Were there any metalloids? Explain. (30 pts)
* Which of the samples used would work better to cover the handle of a frying pan? Explain your reasoning. (15 pts)
* What errors occurred during the lab that could have altered the results? Explain. (yes, there are always errors!) (15 pts)
* Wrap up the paragraph by explaining/stating/summarizing how the claim was supported or not. (3 pts)
* Check your spelling and grammar (6 pts)

**Grading Rubric -**

Each Question will be graded on the following criteria:

| **Element** | **Sophisticated (3 pts)** | **Emerging (2 pts)** | **Early (1 pt)** | **Missing (0)** |
| --- | --- | --- | --- | --- |
| **Claim**  statement | Makes an accurate and complete claim (statement) in response to the question. | Accurate but incomplete claim | Responds to question with inaccurate claim. | No claim made that responds to question. |
| **Evidence**  (data) | The evidence contains all appropriate data from an observation | Evidence contains most of the appropriate data | Evidence contains some of the appropriate data | No evidence from observations are included |
| Interprets all of the data accurately. | Interprets most of the data accurately | Interprets some of the data accurately | Does not interpret any evidence. |
| **Reasoning**  (the how and the why) | Answers how or why the evidence supports the claim with sufficient (enough) relevant scientific information | Answers why or how the evidence supports the claim with insufficient relevant  scientific information | Answers why or how the evidence supports the claim with no relevant scientific information | Does not provide any reasoning |
| Uses all pieces of evidence and relevant scientific vocabulary to explain the relationship between the claim and evidence (how & why) | Uses most pieces of evidence and relevant scientific vocabulary to explain the relationship between the claim and evidence (how & why | Uses some pieces of evidence and relevant scientific vocabulary to explain the relationship between the claim and evidence (how & why | Uses no evidence and relevant scientific vocabulary to explain the relationship between the claim and evidence (how & why |

Overall, the paragraph will be assessed using the following criteria:

| **Element** | **Sophisticated (3 pts)** | **Emerging (2 pts)** | **Early (1 pt)** | **Missing (0)** |
| --- | --- | --- | --- | --- |
| writing | All sentences are complete. | Most are complete | Some are complete | None are complete |
| Writing | Paragraph contains minimal grammatical & spelling errors. | Contains a few errors. | Contains some errors. | Contains many errors. |