**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)

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. |