A group of students records the following properties of five objects (A – D) below. Answer the questions that follow, using their data.

|  |  |  |
| --- | --- | --- |
| **Object** | **Conductor?** | **Mass** |
| **A** | **yes** | **15g** |
| **B** | **yes** | **10g** |
| **C** | **yes** | **15g** |
| **D** | **no** | **10g** |

Based on these properties, can you tell if any of the objects is made of the **same kind of matter** (made of the same material)?

**YES NO**

1. If you answered **YES**,
   1. Which objects are the same kind of matter?
   2. Which **properties** support that claim? Explain your reasoning.

1. If you answered NO,
   1. Why can’t you tell from the data students collected?
   2. What **other properties** might you examine to determine whether they are the same kind of matter? Explain your reasoning.

**Scoring Rubric**

|  |  |  |
| --- | --- | --- |
| **Performance Level** | **Criteria** | **Sample Student Responses** |
| **Proficient** | Student responds ‘NO’ and recognizes that mass in not an essential property, while conductivity is. The student acknowledges that additional properties are needed to identify the material (multiple materials are conductors) and is able to provide examples of other essential properties that could help identify the materials. | *A, B, and C might be different size pieces of the same material. They have different mass, but are all conductors. Being a conductor is an essential property. But more than one kind of material can conduct electricity. They should also test to see if they are attracted to magnets or whether they float or sink.* |
| **Adequate** | Student responds ‘NO’ and identifies at least one essential property that would be the same for objects that are made of the same material, but have different mass. | *A, B, and C might be different size pieces of the same material, but you can’t tell just from whether they conduct. The students should also test whether they are attracted by magnets.* |
| **Developing** | Student responds ‘YES’ and identifies conductivity as an essential property that does not depend on the amount of material you have. The students doesn’t recognize that additional evidence is needed, since more than one material may be a conductor. | *A, B, and C are made of the same material. We learned that even when you break a material in pieces that have different mass, they will still be conductors or insulators.* |
| **Unsatisfactory** | Student responds ‘YES’ but fails to distinguish between properties that are essential and those that depend on the amount of material you have. | *A and C are the same material because both objects have the same mass and both conduct electricity.* |