

Identifying Solids

You will design and carry out an investigation to use the physical properties of a substance to identify its classification

Helpful info: Electrical resistivity is an intrinsic property that quantifies how strongly a given material opposes the flow of electric current. A low resistivity indicates a material that readily allows the movement of electric charge.

How to use multimeter to measure resistance:

- Switch on your multimeter, and set the dial to resistance mode.
 - Resistance is measured in ohms, indicated by the Ω symbol.
- Most multimeters are not autoranging, meaning you will need to set the correct range for the resistance you expect to measure. If you're not sure, start with the highest setting.
- Place one probe at each end of the circuit or component you want to test.
 - It doesn't matter which probe goes where; resistance is non-directional.
- If your multimeter reads close to zero, the range is set too high for a good measurement. Turn the dial to a lower setting.
- If you set the range too low, the multimeter simply reads 1 or OL, indicating that it is overloaded or out of range. This won't hurt the multimeter, but we need to set the dial to a higher range.
 - The other possibility is that the circuit or component you are testing doesn't have continuity—that is, it has infinite resistance. A non continuous circuit will always read 1 or OL on a resistance test.

Purpose: To determine the types of solids (ionic, metallic, or molecular covalent) of six unidentified substances

Equipment & Materials:

- Safety glasses
- List all other equipment you will require for this lab.

Procedure:

1. Write out a set of steps to collect data that will help you to identify the types of solids for six unidentified substances. Be sure to number your steps. Steps should be short but easy to follow. Describe any safety precautions you will take. Be sure to look at Table 1 to see what you will need to test.

2. Once your teacher has approved your design, carry out your procedure.

NOTE: The Materials and Procedure section of this lab will be worth 13/58 marks for this lab. Unlike future labs, you cannot just reference materials and procedure.

Observations and Data:

Be sure to record **detailed** observations **in addition** to completing the table:

Table 1: (copy into your lab report)

Unknown	Appearance at room temperature	Hardness	Solubility in water	Conductivity of aqueous solution	Conductivity of solid	Melting point (high or low)	(analysis) Type of Bond
A							
B							
C							
D							
E							
F							

Analysis:

Initial Paragraph: For each unknown, explain how you determined the type of bond (on a chemical level, be detailed. Ex. Ionic bonds dissolve in water because the dipoles of the water are able to pull the ions out of their crystalline lattice, Since ___ dissolved in water that lead us to believe it was bonded ionically).

1. What properties in general do **covalent-bonded** substances have?
2. What general properties do **ionic-bonded** substances have?
3. What general properties do **metallic-bonded** substances have?
4. Which compounds melted most easily? Using their determined bond types explain why some substances melt easily and the others do not melt at all.
5. What limitations are there in using your classification system (flow chart) to determine substance bond types?

Identifying Solids Lab Report

/40

	A (100%-80%)	B (80%-60%)	C (60%-50%)	D (50% or less)
Purpose /1	Purpose describes the reason for doing the experiment	Purpose describes part of the reason for the experiment	Purpose doesn't describe the reason for doing the experiment	no purpose
Hypothesis /3	Hypothesis is educated, gives expectations and relates to purpose	Hypothesis appears to be uneducated or unrelated to the purpose	Hypothesis appears to be uneducated and unrelated to the purpose	No hypothesis
Materials and Procedure /10	All materials are listed and the procedure is brief but includes all steps and is easy to follow	Some materials missing or the procedure is missing steps/not easy to follow.	Some materials missing and/or the procedure is missing steps and not easy to follow.	No procedure or materials
Data and Observations /10	Observations are detailed and include information of before during and after the experiment	Observations are not detailed or don't include information from before, during and after the reaction	Observations are not detailed and don't include information from before, during, or after reaction	Observations do not exist
Analysis /10	Analysis explains observations, and answers questions	Analysis answers questions but doesn't completely explain observations	Analysis does not explain observations and questions are answered incorrectly	Analysis contains very little analytical information or does not exist
Conclusion /3	Answers purpose, summarizes findings, relates to hypothesis and is correct.	Answers purpose or summarizes findings, relates to hypothesis and is correct	Doesn't answer purpose/ hypothesis, or is incorrect	Doesn't exist
Sources of Error /3	Has more than 2 correct sources of error	Has 2 correct sources of error	Has less than 2 correct sources of error	Has no sources of error