

Science 20 - Identifying Unknown Liquids

Background: It is often difficult to determine the identity or properties of a solution based on its appearance alone. Many solutions are colorless, transparent, have no distinctive odor, and may not safe to touch.

Problem: What diagnostic tests can be used to positively determine the identity of an unknown solution?

Which solution is glucose ($C_6H_{12}O_6$), hydrochloric acid (HCl), sodium hydroxide (NaOH), strontium chloride ($SrCl_2$), and potassium chloride (KCl)?

Manipulated variable: The type of test done on the solution

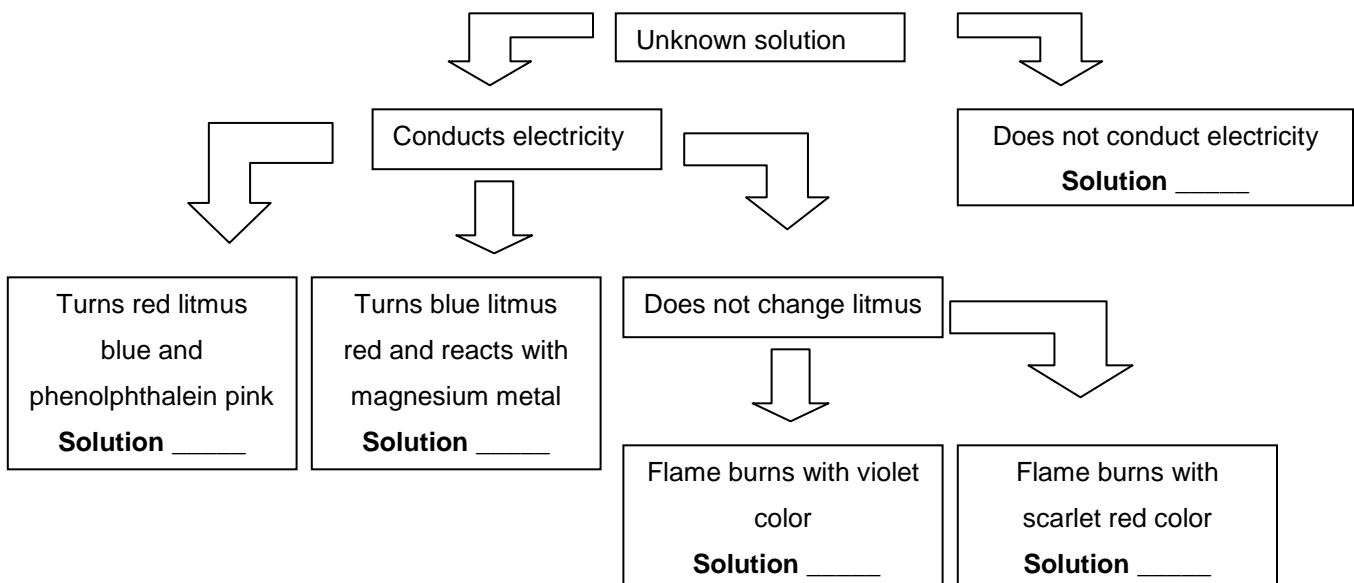
Responding variable: The reaction of the solution to the test

Controlled variables: _____, _____,

Observations:

Unknown Solution	Conductivity Test	Red Litmus Test	Blue Litmus Test	Phenolphthalein Test	Mg Test	Flame Test colour
A	No	No change	No change	colourless	No change	No change
B	Yes	Turned Blue	No change	Pink	No change	No change
C	Yes	No change	No change	Colourless	No change	Reddish
D	Yes	No change	No change	Colourless	No change	Blue-purple
E	yes	No change	Turned red	colourless	Bubbles seen	No change

Complete the following flow chart by filling in the letter of the unknown solution.



Analysis:

Explain what each of the following diagnostic tests would indicate about that solution by circling the correct term or filling in the correct term to complete the statement.

1. A solution that does not conduct electricity would contain a(n) **ionic / molecular** compound.
2. A solution does conducts electricity would contain a(n) **ionic / molecular** compound.
3. A solution that turns red litmus blue would be considered **basic / acidic / neutral**.
4. A solution that turns blue litmus red would be considered **basic / acidic/ neutral**.
5. A solution that does not change the color of blue or red litmus would be considered **basic / acidic / neutral**.
6. A solution that reacts with magnesium metal to produce bubbles would be considered **basic / acidic / neutral**.
7. A solution that turns pink when phenolphthalein indicator is added would be considered **basic / acidic / neutral**. (See indicator list in your Science Data Booklet)
8. A solution that produces a scarlet red flame contains the ion _____.
9. A solution that produces a violet flame contains the ion _____.

Conclusion:

1. The solution containing glucose ($C_6H_{12}O_6$) is solution _____.
2. The solution containing hydrochloric acid (HCl) is solution _____.
3. The solution containing sodium hydroxide (NaOH) is solution _____.
4. The solution containing strontium chloride ($SrCl_2$) is solution _____.
5. The solution containing potassium chloride (KCl) is solution _____.