

SkillCheck

- Observing
- Predicting
- Measuring
- Working co-operatively

Safety

- Handle chemicals safely.
- Be careful around open flames.
- Tie back long hair.
- Wash your hands thoroughly after doing this investigation.

Materials

- felt pen
- 9 small test tubes
- test tube rack
- wooden splints that have been soaked in a selection of solutions containing metal ions
- Bunsen burner
- diffraction-grating glasses

In this activity, you will heat several compounds in the flame of a Bunsen burner until the flame takes on a colour characteristic of the metal ion in the compound. The colours are related to the arrangement of electrons in each ion.

Question

How can you use a flame test to identify metal ions?

Procedure

1. Label the top of each test tube with the symbol of the metal ion that is in solution: Na, Ca, K, Li, Ba, Sr, Cu, Unknown 1, and Unknown 2.
2. Your teacher will set out a supply of wooden splints that have been soaked in solutions of metal ions. Take one splint per group for each metal ion, and place it in the appropriate test tube.
3. Light a Bunsen burner. Set it so that it has a blue flame. Have one person put on diffraction-grating glasses.
4. Place the wooden splints in the flame, one at a time, and note the colour of the metal ion.
5. Test the two unknown solutions. Both are metal ions from the seven you have tested. Try to identify them.
6. Clean up and put away your equipment.

**Analyze**

1. How did you identify the ions in your unknown solutions?
2. Which metal ions were difficult to distinguish?
3. Suggest how the diffraction-grating glasses can help in identifying metal ions using the flame test.

Conclude and Apply

1. Describe how the flame test enabled you to identify the unknown metal ions.