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| Chemical Demonstrations |
| Sugar Lump Flame Tests |

Sugar Lump Flame Tests

This reaction can be applied to curriculum for excellence.

*Through experimentation, I can identify indicators of chemical reactions having occurred ...*

SCN 3-19a

N4 Chemistry in Society

*- Chemical Analysis.*

N5 Chemistry in Society

*- Chemical Analysis.*

**What you will need**

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| Bottle-top crucibles\* | Sugar cubes |
| Ethanol (IDA) | Various metal salts |
| Distilled water | Pasteur pipettes |

**Preparation**

**Bottle top crucibles**

If you have not got them already, you can easily prepare your bottle-top crucibles. You need one bottle top (crown cork, beer-bottle type) for each salt.

* Use a blunt knife or the end of a spoon to remove as much of the plastic insert inside the bottle top as you can.
* Heat the bottle top strongly in a Bunsen burner to burn off the rest of it. If possible it is best to use a fume cupboard for this.
* Leave to cool.

**Salt solutions**

* Place a small amount (about 2.0 to 3.0g) of one of the solid metal salts in a small beaker or other container. You will only have 7 cm3 ish so a test tube would be fine if it is short enough for your Pasteur pipette will reach to the bottom.
* Add 0.5cm3 of water to each salt
* Now add 6cm3 of ethanol over the damp metal salt
* Shake/stir to dissolve as much of the solid as you can.

**What you will do**

* Arrange bottle top crucibles in a row on heatproof mats
* Place a sugar cube in each of a crucible
* Transfer about 1cm3 of each of the salt solutions onto one of the sugar cubes
* Ensure the alcohol/salts bottles are stoppered and moved well away from the practical
* Switch off the lights. The room should be dark to obtain the full effect of the demonstration
* Ignite the alcohol using a lighted wooden splint

## Safety

Wear eye protection and work in a well-ventilated laboratory.



Care with solids – toxic and irritants



Care with ethanol - highly flammable

**If you want to repeat this, you must wait until the bottle-tops have completely cooled or use fresh ones. DO NOT add ethanol to a hot container.**

**It is the responsibility of teachers doing this demonstration to carry out an appropriate risk assessment.**

## Salts to try:

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| Compound | Flame colour |
| sodium chloride | Bright yellow/orange |
| lithium chloride | Crimson |
| potassium chloride | Pale lilac |
| barium chloride | Yellowish green |
| strontium chloride | Bright red |
| calcium chloride | Pale brick red |
| copper chloride | Bright green |
| Boric acid | Green |

**Disposal**

Once cool, place the bottle top crucibles in a bowl of water. Separate out any solids – this residue can just go in the normal waste

Any unused solutions can be stored for use a a future date (in a flammable cabinet).