theme: **leisure & lifestyle**

job: Nina Gronw-Lewis, Glass artist and Jewellery designer

Nina uses all sorts of different coloured, hand-made glass. You're going to make your own coloured glass.

You will make glass beads from borax (sodium borate), which melts in a Bunsen flame. Adding metal salts gives a range of colours.

Procedure: Making borax glass beads

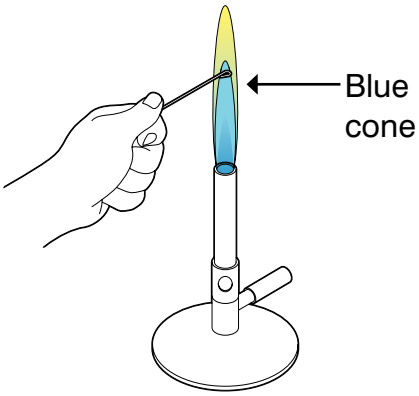
Note: You must wear eye protection.

1. Make a small loop, about 2 mm across, at the end of a nichrome wire. Make four of these looped wires.

2. Place one spatula of borax on a watch glass. Stand it in one corner of a heat-resistant mat.

3. Place the wire loop in the hottest part of a roaring Bunsen flame (at the tip of the blue cone – see fig. 1). Hold it there until it is red hot, and the flame is no longer yellow. This cleans the wire.

Fig 1



4. Dip the hot wire into the borax to pick up some of the powder. Put it back into the flame. The borax will bubble, and then melt into a bead of molten glass on the wire.

5. While it's still hot, pick up more borax and melt it, until your glass bead is 2-3 mm in diameter. Be careful not to shake the molten glass off the wire. Keep it over the mat.

6. Allow it to cool and solidify. Place it on a clean area of the mat. The bead should be colourless. If not, the wire wasn't clean – heat it for longer next time.

7. Repeat steps 3 to 6 with the other three wires. You should have four borax glass beads.

Procedure: Colouring the glass

8 Take one of the watch glasses containing a metal compound. Write its name in the table below.

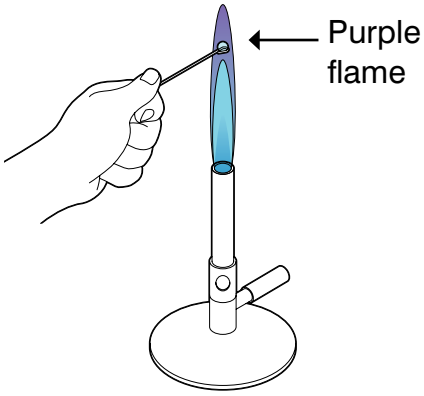
9 Dip one glass bead in the compound to pick up **a few specks** of the powder. If you get more, tap the wire to shake it off.

10 Hold the bead in the middle of the purple-coloured outer flame. (See fig 2) Keep it red hot for 10-15 seconds to allow the metal compound to react with the glass. Allow the bead to cool. Note its colour in column 2 of the table.

11 Using another bead, repeat step 9. This time heat the bead in the blue inner flame. Keep it red hot for 10-15 seconds, then cool it for 10 seconds by lowering it into the darker blue cone just above the Bunsen. Remove it and note its colour in column 3.

12 Repeat steps 8 to 11 with a compound of a different metal.

Fig 2



Note: If any of the beads are too dark to see their colour, you used too much metal compound. Make another bead and try again, using less of the metal compound.

metal compound	colour of glass heated in purple outer flame	colour of glass heated in blue inner flame

Comparing results

- Share your results with classmates who used different metal compounds. Add their results to your table.
- Compare the colours produced by:

  1. different compounds of the same metal, such as copper oxide and copper sulfate
  2. the same compound in the inner and outer parts of the flame.

- What is the connection, if any, between the colour of the metal compound and the colour of the glass?