Using the Flame Test Interactive Screen Experiment

Introduction

The flame test is a simple method by which many (but not all) metal ions can be identified by the colour they impart to a Bunsen burner flame

The purpose of this Interactive Screen Experiment (ISE) is to enable you to investigate the flame colours produced by several metal salts, and to understand some of the experimental procedures.

The ISE you will be using is a computer resource based on your interactions with a set of real images of a flame test, rather than a computer generated simulation. The outcomes will therefore be a far closer representation of reality, enabling you to connect this exercise more closely to a real situation.

Getting started

The ISE is a Flash-based stand-alone Windows executable application, and requires no additional software (such as Internet Explorer etc.) or installation to run. To activate the flame test ISE, locate the resource named "Flame_Test_OER.exe" in the archive, extract it to your desktop and double-click it. The ISE will now run. Alternatively (and necessary for Mac users), launch the resource "Flame_Test_OER.swf" in the same way, in which case the resource will open in an internet browser window (you may need to install the relevant free Flash plugin, but your system will guide you in this operation).

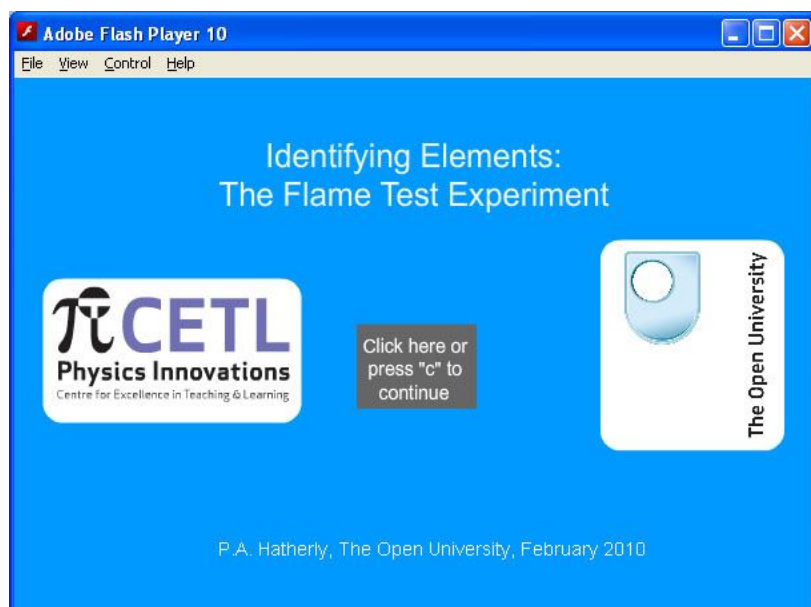You will be presented with the title screen of the flame test ISE, as shown in Figure 1.

Figure 1. The flame test ISE start-up screen

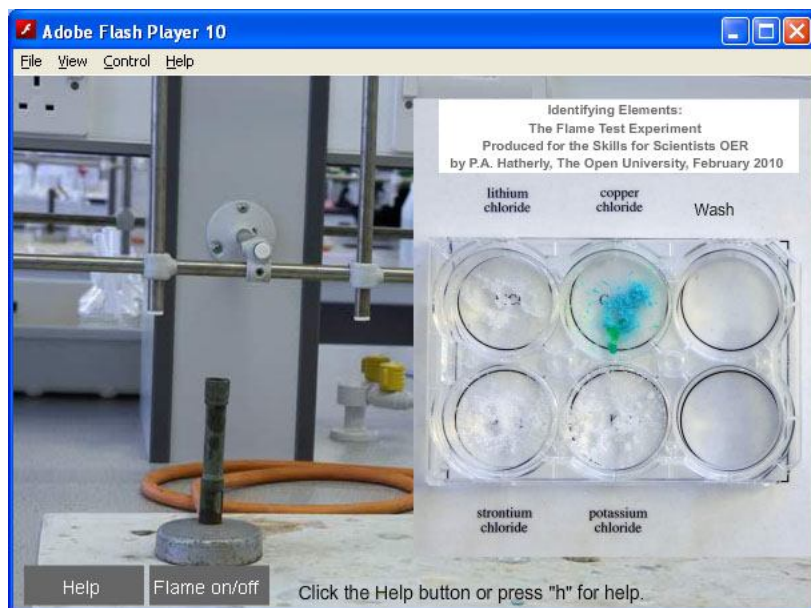Clicking the central button or pressing "c" will take you to the main screen for the ISE (Figure 2).

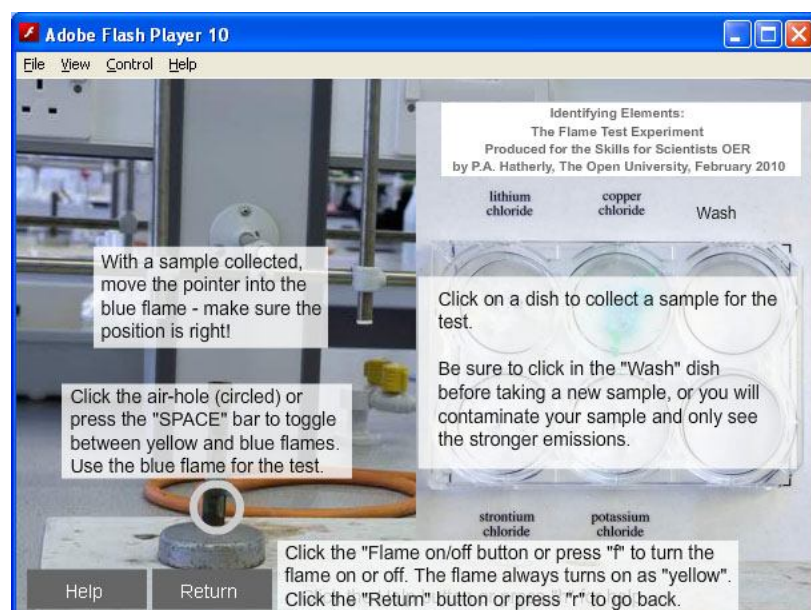Figure 2. The main screen of the flame test ISE

Figure 3. The help screen for the flame test ISE.

Using the flame test ISE

At any point, you can access the help screen by clicking the "help" button, or pressing the "h" key. You will see the screen above (Figure 3), giving information on using the ISE. Clicking the "Return" button or the "r" key returns the ISE to its previous state.

Returning to Figure 2, to use the ISE you first need to turn on the Bunsen burner. This is accomplished either by clicking the "Flame on/off" button, or pressing the "f" key. You will now see the Bunsen burner with a yellow flame (Figure 4(a)).
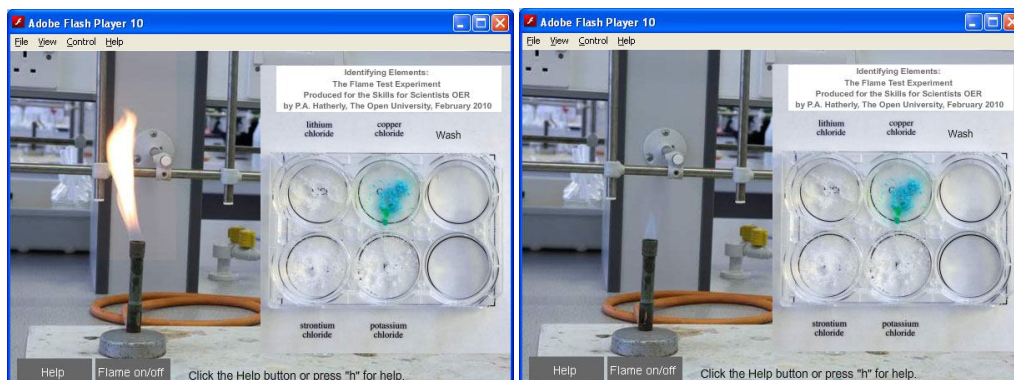

Figure 4. The appearance of (a) the yellow flame and (b) the blue flame

In order to perform flame tests, you need a hot, blue flame which is achieved by opening the air hole at the base of the Bunsen burner. To do this on the ISE, either click on the air hole (circled in Figure 3) or press "space". The flame will now appear as in Figure 4(b)

Now simply click on one of the samples in the tray, and move the mouse pointer into the blue flame. When the pointer is in the correct place in the flame, the flame colour will change to that characteristic of the metal ion in the sample you have selected. As an example, Figure 5 shows the appearance of the flame for copper chloride
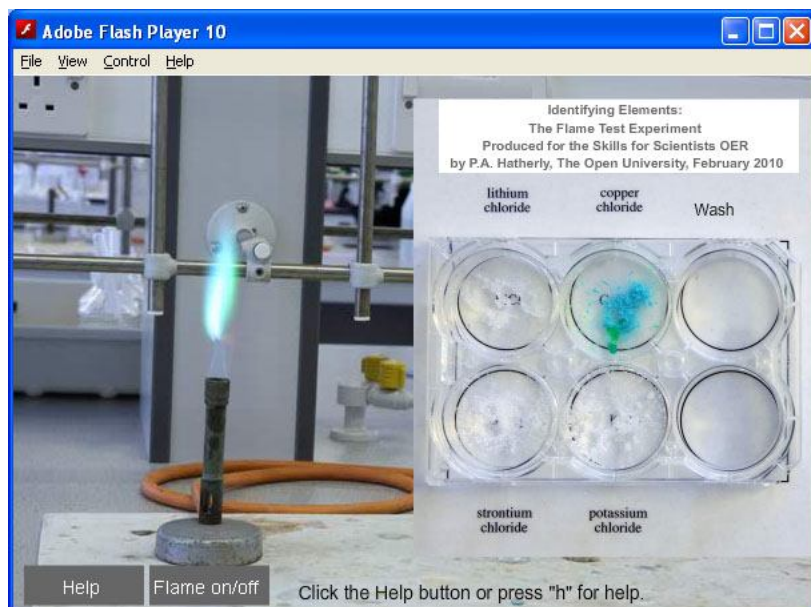

Figure 5. The flame test experiment illustrating the colour of the copper flame.

At the conclusion of each test, be sure to click on the dish marked "wash". This ensures the current sample is "cleared", allowing a new sample to be selected.

Some suggested activities using this ISE include:

- In-lecture demonstration of flame tests
- Laboratory training
- Use as a reference for "live" flame tests, although limited to the samples available in the ISE.

P.A. Hatherly

piCETL and Physics and Astronomy

The Open University

February 2010