

## Technicolor Atoms



Name: \_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_

**Purpose:** In this activity you will observe evidence that atomic structure is changed when atoms are heated.

### Instructions:

You will use a piece of nichrome wire with a loop at the end to place some drops of a solution you want to test in a Bunsen burner flame. You will also test a piece of solid copper, and a copper penny, by placing them directly in the flame. Work in pairs or teams of four.

**Note:** Do not exchange wires. For each solution only use the wire that is already in that solution. After you use the wire, be sure to put it back in the solution from which it came.

1. Remove the wire from the solution.
2. Place the tip of the wire with the solution on it in the flame. For testing the copper wire and the penny, place them directly into the flame using the tongs. The two copper samples may need to be cleaned with hydrochloric acid first.
3. Observe and record the color of the flame.
4. Place the wire back in the solution for the next group to use.
5. Record your results in the data table below.
6. Go to the next solution.

Substance Name	Color of Flame
sodium carbonate	
potassium nitrate	
copper nitrate	
strontium nitrate	
potassium chloride	
sodium chloride	
copper sulfate	
strontium chloride	
sodium nitrate	
potassium sulfate	
copper wire	
copper penny	

1. Group the substances based on the color of the flame produced.
2. What patterns do you notice in the groupings?
3. Predict the color of the flame for a substance called strontium sulfate. Explain your reasoning.
4. What evidence do you have that atoms of certain elements produce a flame with a specific color?

### **Making Sense**

The yellow color of the flame for sodium indicates that the sodium atoms changed in some way when they were heated. Consider the following possibility that the electron configuration of sodium changed from  $[\text{Ne}]3s^1$  to  $[\text{Ne}]4p^1$ . What is the difference between  $[\text{Ne}]3s^1$  and  $[\text{Ne}]4p^1$ ? (Are the total number of electrons the same? Are the electrons in the same locations?)

Do you think gold can be made by changing the arrangement of electrons in atoms? Explain.