

Appendix 4 - Student Handout

The Family of Elements: A Project on the Element Groups

In this activity, you will research the properties, uses, sources and history of the elements. Working in partners, you will make element cards, a Power Point Presentation, and a class set of notes that will explain your particular chemical family. Your group will also make an oral presentation about the information you've learned and gathered while you were investigating the elements in your group.

What is a chemical family or group?

A chemical family is:

- ✓ A group of elements with similar chemical properties.
- ✓ A vertical (up and down) column in the periodic table of elements.

Why are we doing this?

Purpose:

In this activity you and your partner will explore the patterns found in the properties of elements. Your team will learn about the properties of elements and the number of protons, electrons and neutrons within each element. You will also learn about the history of the discovery of the elements and how those discoveries have led to many new and practical applications. You will also learn how to use a variety of resources to gain the required information.

Specifically, from this project, you will learn about:

- Chemical symbols of elements
- Patterns found in the physical properties of the elements, including atomic number, atomic mass, and the number of protons, neutrons and electrons.
- Groups, or families, of elements that are organized according to the patterns in their chemical and physical properties; these categories include metals, non-metals, metalloids and noble (inert) gases.
- The appearance, sources and human uses of elements.
- Historical development (when, where and by whom it was discovered) that led to human understanding of the elements

Instructions:

This activity is designed as a group project. It relies on specific research into the properties and history of the elements. A Periodic Table that shows the elemental families can be found in the student agenda, textbook, or online at any one of the references listed below. Each team will be assigned a chemical family of elements to research.

Part 1: PowerPoint Presentation:

You will make a *Power Point Presentation*, which will be presented to the class. This presentation must include information about each element in the family your team is researching, as well as an explanation as to why these elements were grouped together (e.g., their similarities). Your project should include the following about EACH element:

- Element number, name and chemical symbol
- Atomic mass
- Group name
- Number of electrons, protons and neutrons
- Properties
- State in standard conditions (solid, liquid or gas at room temperature)
- Appearance
- Boiling point AND melting point
- Color
- Discovery (who, what, when, where)
- Sources (where does it come from?)
- Uses (what can it be used for?)
- A picture of your element, where possible.
- Citation of all sources used in your project
(To learn how to properly cite sources, go to the following webpage:
<http://www.liu.edu/CWIS/CWP/library/workshop/citmla.htm>. You need to have a **MINIMUM of THREE sources** (for example, your textbook, an Internet site, and another book from the science classroom).
- An explanation (in your own words) as to WHY these elements are grouped together; what are their similarities? This explanation should reflect what you have presented to the class, that is, the knowledge you gained. For example, they may all be grouped together because they are a gas at room temperature.

Part 2: Element Cards

Each element card should have the following information (**see example card at the end of this handout**):

- 1) element name
- 2) element symbol
- 3) atomic mass
- 4) atomic number
- 5) number of protons, neutrons, and electrons
- 6) name of the discoverer
- 7) when it was discovered
- 8) where it was discovered
- 9) common uses (some may only be used in research)
- 10) an interesting fact (or two) that your team learned during your research

These cards should be formatted to fit two per page. The cards should be glued vertically (up and down) on a sheet of Bristol board in the numerical order of their family (cut the Bristol board in half, using a straight edge, and tape the two halves together vertically). The one exception to this is the Lanthanide and Actinide series, which should be glued to the Bristol board horizontally in numerical order.

Each family will be assigned a specific colour. When your element cards are printed, they should be printed on coloured paper that reflects the family's colour, and (if possible) the font should be coloured to contrast with that colour. The idea is to end up with a giant periodic table to be displayed on a classroom wall, with the different families easily recognizable by colour.

Part 3: Class Notes

The final task of this project is to take your knowledge and make a set of class notes about your chemical family. This set of notes should be **NO LONGER** than one page (Comic Sans, 14-point). The set of notes should include:

- 1) Group name and number
- 2) List of elements belonging to your group and their atomic numbers
- 3) Why these elements are grouped together (shared or similar properties)

These notes will be checked by your teacher for content, grammar, punctuation, etc. before being passed in. All groups' notes will be provided to you as study notes.

Sample Element Card

104

B

Blackmorium

104.005

Blackmorium has 104 protons, 104 neutrons and 104 electrons

This element was discovered by Cheryl Blackmore in 2007 in Halifax, Nova Scotia, Canada.

Common uses for Blackmorium include:

- Filling students' heads with scientific knowledge
 - The production of life-long learners
- Changing the mindset of students into science aficionados

Blackmorium makes up over 90% of all Grade Nine scientific learning.

Internet Research Resources:

| | |
|--------------------------------|---|
| Visual Elements | www.chemsoc.org/viselements/ |
| WebElements | www.webelements.com |
| Chemical Elements.com | www.chemicalelements.com |
| Groups in the Periodic Table | http://www.ucc.ie/academic/chem/dolchem/html/elelem/group.html |
| Periodic Table of the Elements | http://dayah.com/periodic/ |
| The Comic Book Periodic Table | www.uky.edu/~holler/periodic/periodic.html |
| Chemicool | www.chemicool.com |
| Celeste | www.chemlearn.com |