

## **Lesson Plan**

**Title:** Introduction to the Periodic Table of Elements

**Unit:** Chemistry: Atoms, Elements-Chapter 6

**Grade:** SNC1D

**Time:** 75 minutes

**Date:** November 17, 2015

## **Description:**

### **1. Overall Curriculum Learning Expectations:**

C3 demonstrate an understanding of simple chemical reactions and the language and ways to represent them.

### **2. Specific Curriculum Expectations:**

A1.11 communicate ideas, plans, procedures, results, and conclusions orally, in writing, and/or in electronic presentation, using appropriate language and a variety of formats (e.g., data tables, laboratory reports, presentations, debates, simulations, models)

C1.1 assess social, environmental and economic impacts of the use of common elements or compounds

### **3. Major concepts:**

- Elements and compounds have specific physical and chemical properties that determine their practical uses
- The use of elements and compounds has both positive and negative effects on society and environment

### **5. Key concepts:**

- Elements cannot be broken down in simpler substances
- Metal and non-metals have characteristic physical properties
- Elements are organized according to their atomic number and electron arrangements on the periodic table
- Atomic models evolved as result of experimental evidence
- Atoms contain protons and neutrons in a central core surrounded by electrons

### **6. Learning/Teaching Resources:**

- Case study article (Alice in Wonder Land, Mad-Hatter disease, “Heritage deadline could mean lights out for many of Canada’s lighthouses” newspaper article – the effect of mercury historical and real life implication in Canada)
- Flashcards (all elements names and chemical symbols) with magnets/tape attached on the back
- Computer with speakers
- Projector
- A blank periodic table of elements to be projected on the whiteboard/blackboard
- A periodic table of elements to be projected onto the whiteboard/blackboard
- Index cards with element’s name, properties, source name, discovery, uses and notes

- Periodic Table of Elements – Missing Information worksheets
- Exit cards worksheets

### **7. Introductory Activity (10 minutes):**

Present the case study to all students. Discuss the “Alice in Wonderland” story with the whole class making reference to the character of the Mad Hatter and ask what implications mercury poisoning do the students think has on our everyday life. The purpose of this introductory activity is to facilitate a conversation about the different types of elements that we are exposed too. This will lead into a discussion about the periodic table of elements.

### **8. Development strategies:**

#### **Activity 1 (35 minutes): Element Clap Game**

In this activity the teacher is using the multimodal approach towards to learning the periodic table of elements through memorization based on the atomic number of each element. The class will be divided into pairs: one student will dance, clap, and pronounce the name of the element, each clap representing the placement on the periodic table (e.g., He - Helium - Atomic number is 2, sequentially two claps), while the other student will take on learning the same chemical element by producing their own clap in a repetitive manner. The purpose of this game is to engage students in memorizing the atomic number (placement) of the elements on the periodic table in a fun and interactive way. It is also a great pedagogical tool to assess how students learn while working in groups and teaches them how to focus.

#### **Rules for “Element Clap Game”**

1. Choose a song/ instrumental music
2. Have a periodic table of elements in front of the class (projection)
3. Have students get into pairs
4. Explain to the students that while to song plays, one students will start off at the first element in the periodic table and clap to the beat of the song, then the other student will repeat the element. Once both students have clapped the element, they move onto the next element.
5. By the end of the song the group that has gone to the furthest atomic number on the table will win the game.
6. This activity can be done in a variety of ways to make it more interesting and challenging, such as: having students not repeat the element but moving to the next, changing the speed of the song, have students perform a dance for each element, rotate partners for each element, not providing a periodic table for visual aid, etc.

#### **Activity 2 (15 minutes): Match the Flashcards**

In this activity the students will return to their seats in their pairs and are assigned flashcards with one set of cards containing the element names and the other set of cards containing the symbols. Based on the number of pairs in the class, the flashcards will be distributed evenly. They will match the two sets of cards by name to the chemical

symbol. Once complete, the pair will use a magnet/tape to place the matched cards on a blank periodic tablet of elements projected on the board based on their memory/understanding of the element placement learned in the Element Clap Game. The purpose of this activity is to continue exploring the names and symbols of the elements and their placement on the table.

### **Activity 3 (10 minutes): Missing Information Worksheet**

Once every pair has successfully placed their matched flashcards on the blank periodic table, they will be handed a Missing Information worksheet that is to be completed individually. Using their periodic table (found in the textbook) they are to find the information that is missing from the element label (atomic number, symbol, name, and atomic mass). The purpose of this activity is to continue exploring the elements on the periodic table and understanding how to read them.

### **9. Culminating Activity (10 minutes):**

Once all three activities are completed students will be asked to fill out a short review/reflection sheet, which consists of reflective question on what students learned from the activities, what they liked and disliked about them, and what they want to learn about the unit. The class will then briefly share their answers in a class discussion to further explore their understanding of the activity/lesson. The sheets will be collected and used as an evaluative/feedback tool for the teacher.

### **Differentiated Instructional Strategies:**

Students with different learning abilities will be accommodated and given support needed to complete the activities to ensure their comprehension and understanding of the lesson study. The Element Clap Game is designed for a collaboration of students in groups; this ensures that weaker students have the support and guidance of their group. This activity engages in physical movement that makes learning easier in helping students to memorize/recognize the atomic number and name of each element. Students unable to clap or dance will be accommodated with an alternative means of counting the atomic number. The flashcards activity is more tactile learning, which will help students match the symbol to name of the element. All activities involve audio/visual elements to ensure students' knowledge and understanding of the periodic table of elements unit.

### **On-going Assessment/Evaluation:**

Teacher will conduct an on-going assessment throughout the activities, taking anecdotal notes on individual students knowledge and understanding, communication skills (including group collaboration), and application skills (applying flashcards to periodic table of elements). There will be no formative assessment for these activities, as this is an introduction to unit plan. The reflection sheets that will be collected will be used to better evaluate what the students have learned and what they have yet to learn or what they should be instructed on. This is largely a tool for the teacher to review and implement strategies for upcoming unit activities.

**Next Steps:**

The next class will expand on the periodic table of elements, looking at the element groupings and learning to read an element label. To further demonstrate their knowledge and understanding of this, students will be completing the Periodic Table of Elements Questions and Post-Reading worksheets to be marked for formative assessment.

Name:

Date:

### Periodic Table Worksheet - Missing Information

Atomic Number → 1 H ← Element Symbol

Element Name → Hydrogen ← Atomic Mass

1.008

Find the missing information and fill it in - You may use your Periodic Table

B	3	9.012182
37	55.845	Ir
72.64	Si	5
Mg	44	39.0983
88	Pb	95.96

Name:

Date:

### Periodic Table of Elements Worksheet – Questions

- \_\_\_\_\_ 1. What is the element symbol for Iron?
- \_\_\_\_\_ 2. What element is number 35 on the periodic table?
- \_\_\_\_\_ 3. The atomic mass for Titanium is?
- \_\_\_\_\_ 4. True or False: Francium is an alkali metal.
- \_\_\_\_\_ 5. Which has a higher atomic number: Calcium or Iodine?
- \_\_\_\_\_ 6. What is the element symbol for Magnesium?
- \_\_\_\_\_ 7. The atomic mass for Magnesium is?
- \_\_\_\_\_ 8. True or False: Silver is not a transition metal.
- \_\_\_\_\_ 9. What element has an atomic mass of 183.84?
- \_\_\_\_\_ 10. What is the heaviest alkali metal?

### Post-reading Period Table of Elements Grouping

Now that you are familiar with the Periodic Table of Elements, try to organize the following elements into their element groups. On the blank line preceding each element, place the letter of the correct grouping.

- A. Alkali Metal
- B. Alkaline Metal
- C. Transition Metal
- D. Noble Gases

- \_\_\_\_\_ 1. Silver
- \_\_\_\_\_ 2. Potassium
- \_\_\_\_\_ 3. Argon
- \_\_\_\_\_ 4. Barium
- \_\_\_\_\_ 5. Fe
- \_\_\_\_\_ 6. Li
- \_\_\_\_\_ 7. Krypton
- \_\_\_\_\_ 8. Au
- \_\_\_\_\_ 9. Calcium
- \_\_\_\_\_ 10. Os

Name:

Date:

Reflection Questions – Periodic Dance/Flash Cards

What did you learn from today's activities?

What did you like or dislike about the activities?

What do you want to learn from this unit?

## Case Study:

**Mad hatter disease**, or **mad hatter syndrome**, is a commonly used name for occupational chronic mercury poisoning among hat makers whose felt work involved prolonged exposure to mercury vapours. The neurotoxic effects included tremor and the pathological shyness and irritability characteristic of erythrim.

Use of inorganic mercury in the form of mercuric nitrate to treat the fur of small animals for the manufacture of felt hats seems to have begun in 17th-century France and from there spread to England by the end of the century with the Huguenots. By the Victorian era the hatters' condition had become proverbial, as reflected in popular expressions like "mad as a hatter" and "**hatters' shakes**". Similar phenomena had been described in St Petersburg, Russia, in 1829. In France, the National Academy of Medicine described the health hazards in 1869, and in 1898 a law was passed to protect hat makers from the risks of mercury exposure. In Britain, mercury poisoning among hatters had become a rarity by the turn of the 20th century. In the United States, where the occupational illness was thoroughly described in New Jersey in 1860, the practice continued until 1941; mercury poisoning in the hat making industries of Danbury, Connecticut gave rise to the expression "**Danbury shakes**". Hat makers in Tuscany, Italy, were also affected and exposed workers received financial compensation.

Although Lewis Carroll's iconic Mad Hatter character in *Alice's Adventures in Wonderland* has often been linked to the occupational hazards of hat making, it is thought that the character was directly inspired by the eccentric furniture dealer Theophilus Carter.

Heritage deadline could mean lights out for many of Canada's lighthouses

**MICHAEL MACDONALD**

HALIFAX — The Canadian Press

Published Thursday, May 28, 2015 6:50PM EDT

Last updated Thursday, May 28, 2015 6:52PM EDT

"For many older lighthouses, the problem is lead paint, flakes of which have accumulated in the surrounding soil after countless repainting chores.

That's the challenge for a non-profit group in eastern Cape Breton that wants to take over two century-old range lights in Margaree harbour.

Stewart Applegath of the Margaree Harbour Heritage Lighthouses Group said Ottawa offered the group a chance to take ownership before the contaminated soil was removed, which the group declined.

"Obviously, we wanted to be safe," he said, adding that a federal official told him it could be another two years before the handover takes place. "We thought it might speed things up, but at the end of the day, we couldn't just consider speed as the most important thing."

On Nova Scotia's Flint Island, the problem is mercury contamination.



Mr. MacDonald said a former lighthouse keeper told him that the grounds were long ago fouled by a spill of the toxic metal once used to suspend the heavy, rotating Fresnel lenses inside some lighthouses.

“Some of them are environmental nightmares,” he says. “That has driven up the cost and slowed the process down.”

The lead-contaminated soil near the island lighthouse at Port Mouton, N.S., had to be removed and replaced in 2011 with a helicopter at a cost of about \$1,400 an hour, Mr. MacDonald said.

**Flashcards:**

<b>Deck 1</b>	<b>Deck 2</b>
Hydrogen	1 H 1
Helium	4 He 2
Lithium	7 Li 3
Beryllium	9 Be 4
Boron	11 B 5
Carbon	12 C 6
Nitrogen	14 N 7
Oxygen	16 O 8
Fluorine	19 F 9
Neon	20 Ne 10
Sodium	23 Na 11
Magnesium	24 Mg 12
Aluminium	27 Al 13
Silicon	28 Si 14
Phosphorus	31 P 15
Sulphur	32 S 16
Chlorine	35.5 Cl 17
Argon	40 Ar 18
Potassium	39 K 19
Calcium	40 Ca 20