**Year 8**

**Term 6- Independent work**

 **20 May 2020**

**Lesson 1**

**The Periodic Table**

**Read the information below, then answer the questions that follow.**

Dmitri Mendeleev came up with the first version of the modern periodic table. He himself said that he saw, in a dream, a table where all elements fell into place as required. He awoke and immediately wrote it down on a piece of paper.

The modern periodic table arrange the elements in order of increasing atomic number. We move along periods to the right with increasing atomic number, for example, we jump straight from hydrogen on one side to helium to go from atomic number 1 to 2. We call these horizontal rows periods, listed down the left hand side of the table. The period of an element tells us the number of electron shells, for example, magnesium is in period 3 and has 3 electron shells whereas neon is in period 2 and so has 2 shells of electrons.



The groups are the vertical columns, listed across the top from left to right. The group of an element tells us the number of electrons in the outer most shell. For example, carbon has 4 electrons in its outer shell whereas oxygen has 6 electrons in its outer shell. They are both in period 2 and so have 2 electron shells.

**Copy out the questions below and write your answers in full sentences.**

**Checkpoint questions:**

1. What does the period of an element tell us?
2. What period is nitrogen in? How many electron shells does nitrogen have?
3. How many electron shells does sodium have?
4. What does the group of an element tell us?
5. What group is nitrogen in? How many outer shell electrons does nitrogen have?
6. How many outer shell electrons does lithium have?

**Copy the key knowledge table into your exercise books.**

**Key knowledge- Do your look, cover, write check by learning the answers to the questions below.**

|  |  |
| --- | --- |
| Name the scientist who came up with the periodic table. | Mendeleev |
| Define “period”. | Rows in the periodic table |
| Define “group”. | Columns in the periodic table |
| State what the period of an element tells us. | The number of electron shells an atom has |
| State what the group of an element tells us. | The number of outer shell electrons an atom has |

**Complete the sentences below in your exercise book.**

**Recall Quiz:**

1. The scientist responsible for creating the Periodic table was called…
2. Sodium (Na) is in the second period. This tells us that it has \_\_ electron shells.
3. Sodium is also in group 1. This means…
4. \_\_\_\_\_ are rows, while \_\_\_\_ are columns.

**Application Task - I do**

1. Name the element that is in Group 1 and Period 4. Potassium
2. Name two elements in group 4. Carbon and Silicon
3. State the number of outer shell electrons Fluorine has. 7
4. State the number of electron shells Potassium has. 4

**Application Task - We do**

1. Name the element that is in Group 2 and Period 3. M\_\_\_\_\_\_\_\_\_\_
2. Name two elements in group 5. Nitrogen and \_\_\_\_\_\_\_\_\_
3. State the number of outer shell electrons Oxygen has.
4. State the number of electron shells Lithium has.

**Application Task - You do**

1. Name the element that is in Group 7 and Period 2.
2. Name two elements in group 2.
3. State the number of outer shell electrons Phosphorus has.
4. State the number of electron shells Calcium has.

Challenge: State the number of electron shells + number of outer shell electrons for the following:

Sn – I – Al – H –

**Lesson 2**

**History of the Periodic Table**

**Read the information below, then answer the questions that follow.**

Prior to Mendeleev’s table, there were attempts by other Scientist to group the elements. An English scientist called John Newlands put forward his law of octaves in 1864. He arranged all the elements known at the time into a table in order of relative atomic mass. When he did this, he found that each element was similar to the element eight places further on. For example, starting at Li, Be is the second element, B is the third and Na is the eighth element.

Mendeleev’s table was published just five years after John Newlands. Similar to Newland, he also arranged the elements known at the time in order of *relative atomic mass*, but he did some other things that made his table much more successful. He realised that the physical and chemical properties of elements were related to their atomic mass in a 'periodic‘ (repeating) way, and arranged them so that groups of elements with similar properties fell into vertical columns in his table. These properties were similar between certain elements, repeating in periods. Mendeleev overcame some of the problems by leaving gaps for elements that he thought had not been discovered and in some places changed the order based on atomic weights. Elements with properties predicted by Mendeleev were discovered and filled the gaps. The modern periodic table was organised by atomic number after the discovery of the subatomic particles.

**Complete the questions below in your exercise book.**

 **Checkpoint questions:**

1. The elements in the periodic table was firstly arranged based on \_\_\_\_\_\_\_\_\_\_\_\_\_.
2. Which scientist came up with the law of octaves?
3. In Mendeleev’s arrangement elements with similar properties fell in the same \_\_\_\_\_\_\_\_\_\_\_\_ in the table.
4. Why did Mendeleev left gaps in his table?
5. The elements in the modern periodic table is arranged based on \_\_\_\_\_\_\_\_\_\_\_.

**Copy the key knowledge table into your exercise books.**

**Key knowledge- Do your look, cover, write check by learning the answers to the questions below.**

|  |  |
| --- | --- |
| Describe how are elements arranged in the periodic table. | In order of atomic number (lowest to highest) |
| State the name of the scientist who proposed the law of octaves, arranging elements by relative atomic mass. | John Newland |
| Why scientists did not accept John Newland’s table? | Some metals were grouped with non-metals with dissimilar properties.  |
| Describe what Mendeleev did when creating the modern periodic table. | Left gaps so that elements with similar properties could be placed together |
| Why was Mendeleev’s table was later accepted by scientists? | Elements with properties predicted by Mendeleev were discovered, filling the gaps in his table. |

**Complete the sentences below in your exercise book.**

**Recall Quiz:** Complete each of the following sentences.

1. *John Newland’s early table of elements was rejected because…*
2. *The modern periodic table is arranged in order of…*
3. *Both Mendeleev and Newland arranged the elements in order of…*
4. *Mendeleev left \_\_\_ so that elements with similar properties could be placed together.*
5. *Mendeleev’s periodic table was accepted because…*

**Application Task – I do – Exam Question**

Evaluate Newlands’ and Mendeleev’s tables. You should include:

* a comparison of the tables
* reasons why Mendeleev’s table was more acceptable. (6 marks)

 

**Application Task – You do – Exam Question**

Compare and contrast Newlands’ and Mendeleev’s tables. In your answer, you must include a comparison of the tables and reasons that Mendeleev’s table was later accepted by scientists. (6 marks)

  **Response**

Firstly, both tables have more than one element in a box. Secondly, both tables have similar elements in the same column and are missing the noble gases. Finally, both tables arranged the elements in order of atomic weight.

One of the reasons Newland’s table was not accepted was that he had many more dissimilar elements in a column whereas Mendeleev left gaps for undiscovered elements.

Mendeleev also predicted the properties of missing elements, which were later discovered, fitting the gaps and matching the predicted properties.

**Write your response in your book using the starter sentences given to help you.**

Firstly, both tables have more than...

Secondly, both tables have similar elements in the same \_\_\_\_ and are missing…

Finally, both tables arranged the elements…

One of the reasons Newland’s table was not accepted was that he had…

whereas Mendeleev…

Mendeleev also predicted…