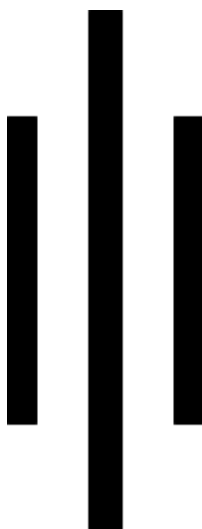


NATIONAL ACADEMY OF SCIENCE AND TECHNOLOGY



A Project Report On

MODERN PERIODIC TABLE, ITS MERITS, AND DEMERITS



Submitted To:
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ACKNOWLEDGEMENT

I want to express my special Gratitude to **Mr. D.B Khadka sir** who gave me this opportunity to present a report on the **MODERN PERIODIC TABLE, ITS MERITS, AND DEMERITS**. I want to extend my gratitude to my parents who supported and motivated me while doing the Project. I want to thank my friends Ritik Chand, Prasab Kunwar, and Ashish Chand who helped me to finish this report within a limited time. I have also taken some references from websites that are mentioned at last page.

**THANKS TO THE EVERYBODY WHO HELPED ME
WITH THIS PROJECT**

Amrit Pant

Certificate of Completion

This is to certify that this Project is made by **Amrit Pant** a student of **Class 11 (Section F)**. From the **National Academy of Science and Technology** on the topic of **MODERN PERIODIC TABLE, ITS MERITS, AND DEMERITS**. Under the guidance of **Mr. D.B Khadka** and have been completed.

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Introduction

The periodic table is an important tool for scientists to understand the elements and their properties. It is used by chemists, physicists, and other scientists in a variety of fields. In this post, we will explore why the periodic table is so important and why it is still relevant today.

The Basics of the Periodic Table

The periodic table is a chart that organizes elements according to their atomic number, electron configuration, and recurring chemical properties. It is a powerful tool for understanding the elements and how they interact with each other. It also allows us to predict the properties of elements that have yet to be discovered.

The Importance of the Periodic Table

The periodic table is essential for understanding the behavior of different elements and their interactions with each other. It provides a framework for understanding the properties of elements and their reactivity. It also helps us make predictions about the properties of new elements, which can be useful in research and development.

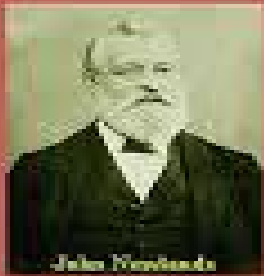
Dobnier's Triade

In 1817, Johann Wolfgang Dobereiner observed that elements could be grouped into sets of three, with the middle element having an atomic weight approximately midway between the weights of the other two elements. This phenomenon became known as Dobereiner's Triads.

Newland's Law of Octave

Newland's Law of Octave states that when elements of the periodic table are arranged in order of increasing atomic weight, every eighth element has similar chemical and physical properties. This law was proposed by John Newlands in 1864, making it one of the earliest attempts to arrange the elements according to their atomic weights.

John Newlands
1863-'65 "Law of Octaves"



John Newlands

Newlands' Arranged Elements in Octaves:

H	F	Cl	Ca/Sr	Br	Pd	I	Po/Lr
Li	Na	K	Cu	Rb	Ag	Cs	Tl
G	Mg	Co	Zn	Se	Cd	Ba/V	Pb
Ba	Al	Cr	V	Ce/La	U	Ta	Th
C	Si	Ti	In	Zn	Sn	W	Hg
N	P	Mn	As	De/Mo	Sb	Nb	Bi
O	S	Fe	Se	Ra/Rn	Te	Au	Cu

<http://web.fccj.mn/~47EarthII/period/period.htm>

Introduction Mendeleev's Periodic Table

It is one of the most important scientific discoveries of the 19th century. It is a tabular arrangement of elements based on their atomic structure and properties.

Discovery

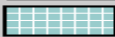
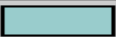
In 1869, Dmitri Mendeleev published the first version of his Periodic Table. He arranged the elements in order of increasing atomic mass and noticed that when he did so, certain elements would fall into regular patterns. This led him to realize that elements with similar chemical properties had similar atomic masses.




Organization

The Periodic Table is organized into groups and periods. Groups are composed of elements with similar properties, while periods are composed of elements with similar atomic structures. Each element is further identified by its atomic number, which is the number of protons in its nucleus.

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Periodic Table of Elements based on Mendeleev's Periodic Law															
I		II		III		IV		V		VI		VII		VIII	
0	H 1.01														
He 4.00	Li 6.94	Be 9.01	B 10.8	C 12.0	N 14.0	O 16.0	F 19.0								
Ne 20.2	Na 23.0	Mg 24.3	Al 27.0	Si 28.1	P 31.0	S 32.1	Cl 35.5								
Ar 40.0	K 39.1	Ca 40.1	Sc 45.0	Ti 47.9	V 50.9	Cr 52.0	Mn 54.9	Fe 55.9	Co 58.9	Ni 58.7					
	Cu 63.5	Zn 65.4	Ga 69.7	Ge 72.6	As 74.9	Se 79.0	Br 79.9								
Kr 83.8	Rb 85.5	Sr 87.6	Y 88.9	Zr 91.2	Nb 92.9	Mo 95.9	Tc (99)	Ru 101	Rh 103	Pd 106					
	Ag 108	Cd 112	In 115	Sn 119	Sb 122	Te 128	I 127								
Xe 131	Ce 133	Ba 137	La 139	Hf 179	Ta 181	W 184	Re 180	Os 194	Ir 192	Pt 195					
	Au 197	Hg 201	Tl 204	Pb 207	Bi 209	Po (210)	At (210)								
Rn (222)	Fr (223)	Ra (226)	Ac (227)	Th 232	Pa (231)	U 238									

 Dobereiner's triads  Known to Mendeleev

 Lanthanide series
 Actinide series
 Known to Ancients

Advantages of Mendeleev's Periodic Table

1. It arranges elements in the order of their atomic numbers and provides a systematic way of representing them.
2. It is easy to learn and understand, making it a great educational tool for students.
3. It allows for the prediction of properties based on the position of elements in the table.
4. It provides a visual representation of the elements and their relationships.
5. It can be used to predict the properties of unknown elements.

Disadvantages of Mendeleev's Periodic table

1. It does not account for some of the new elements discovered since Mendeleev developed it.
2. It does not consider the effects of isotopes on the properties of elements.
3. It does not adequately represent certain properties of elements, such as electronegativity.
4. It does not accurately reflect the exact arrangement of electrons in atoms.
5. It cannot predict the properties of elements that do not fit into the table.

Introduction

The modern periodic table is a representation of the elements that are essential for life. This organization of the elements helps chemists to understand and predict the behavior of different elements. It is an invaluable tool for scientists and students alike.

History

The modern periodic table was first proposed by Henry Moseley in 1913. Moseley realized that certain elements had similar characteristics and that they could be arranged into a table according to their atomic Number.

Elements

The modern periodic table is composed of 118 elements arranged in 18 columns and seven rows. Each element is labeled with its atomic number, symbol, and atomic weight. Elements in the same column tend to have similar properties, such as reactivity, electronegativity, and boiling point.

Advantages of Modern Periodic Table

- Helps to organize the elements according to their atomic structure.
- The structure allows for easier identification and comparison of elements.
- Makes it easier to predict the properties of elements.
- Allows for the categorization of elements into groups with similar properties.
- Can be used to predict and explain chemical reactions.

Disadvantages of Modern Periodic Table

- Position of Hydrogen gas it shows properties both like alkaline earth metals and Halogens
- There is a separate position of Lanthanides and Actinides without proper reason.
- Limitations in the number of elements that can be included in the table.
- Does not provide much information on the physical properties of elements.
- Does not provide information on the effects of different elements on each other.

References:

<https://www.google.com>

<https://www.youtube.com>

<https://wikipedia.org>

<https://notion.so/ai>