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BASIC 9

WEEKLY LESSON PLAN – WEEK 2

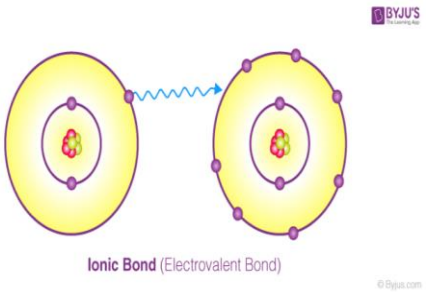
Strand:	Diversity of Matter		**Sub-Strand:**	Materials	
Content Standard:	B9.1.1.2 Demonstrate knowledge of atomic bonding in the formation of chemical compounds				
Indicator (s)	B9.1.1.2.1 Recognize that chemical bond results from the attraction between atoms in a compound		**Performance Indicator:** Learners can distinguish between ionic bonds, covalent bonds and metallic bonds.		
Week Ending	20-09-2024				
Class	B.S.9	**Class Size:**		**Duration:**	
Subject	Science				
Reference	Science Curriculum, Teachers Resource Pack, Learners Resource Pack, Textbook.				
Teaching / Learning Resources	Poster, Word chart, Videos.		**Core Competencies:**	• Digital Literacy • Personal Development and Leadership • Communication and Collaboration	

DAYS/DATE	**PHASE 1 : STARTER**	**PHASE 2: MAIN**	**PHASE 3: REFLECTION**
MONDAY	Discuss the meanings of keywords and terminologies in the Lesson with the Learners. **Keywords;** • Electrovalent • Valence • Electrons • Ion • Chemicals • Electronegativity • electrostatic	1. Assist Learners to identify and explain the various types of inter-atomic bonds. 2. Using a Poster displaying the meaning of ionic bond, explain the concept to the Learners. 3. Learners brainstorm to identify 5 properties of ionic bond. 4. Assist Learners to identify examples of ionic bond. 5. Show Learners video of how electrovalent bond is formed. **Ionic bond;** A chemical bond is formed between two atoms by the complete transfer of one or more electrons from one atom to the other as a result of which the atoms attain their nearest inert gas configuration. There are primarily three ways in which two atoms combine to lose energy and to become stable. One of the ways is by donating or accepting electrons to complete their octet configuration. The bond formed by this kind of combination is known as an ***ionic bond*** or ***electrovalent bond***. This kind of bond is formed when one atom gains electrons	Learners in small groups to discuss about the difference between electronegativity and ionic bonding. **Exercise;** 1. What is Ionic bond? 2. State 3 properties of ionic bond. 3. Distinguish between electronegativity and ionic bond.

while the other atom loses electrons from its outermost level or orbit.

Electrovalent Bond

Electrovalent bonds are produced when electrons are transferred from atoms of one element to atoms of another element, producing positive and negative ions. The bond which is formed by the transfer of electrons between the atoms is called electrovalent bond or ionic bond. Electrovalent bonds are only formed between metals and non-metals. Electrovalent bonds are not formed between two non-metals.

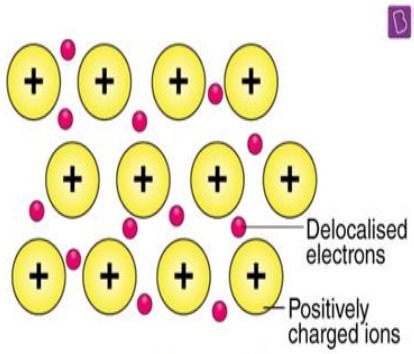


In simple words electrovalent bond involves the transference of a certain number of electrons to another dissimilar atom which has a tendency to gain electrons so that both acquire stable inert gas configurations. The electrostatic attraction always tends to decrease the potential energy. Hence, the potential energy of the system is much less than it was before the formation of an ionic bond.

Electronegativity and Ionic Bonding

- An Ionic bond is the bond formed by the complete transfer of valence electron to attain stability.
- This type of bonding leads to the formation of two oppositely charged ions – positive ions known as **cations** and negative ions known as **anions**.
- The presence of two oppositely charged ions results in a strong attractive force between them. This force is an ionic or electrovalent bond.
- Ionic bonds form between atoms with

		large differences in electronegativity, whereas covalent bonds formed between atoms with smaller differences in electronegativity. • The compound formed by the electrostatic attraction of positive and negative ions is called an ionic compound.	
THURSDAY	Review Learners knowledge on the previous lesson.	1. Discuss with the Learners on how the various types of inter-atomic bonds are formed. 2. Assist Learners to draw diagrams that describe the types of inter-atomic bonds. 3. Learners brainstorm to explain "covalent bond. 4. Discuss examples of covalent bonds and how they are formed with the Learners. The Covalent Bond A single covalent bond is created when two atoms share a pair of electrons. There is no net charge on either atom; the attractive force is produced by inte raction of the electron pair with the nuclei of both atoms. If the atoms share more than two electrons, double and triple bonds are formed, because each s hared pair produces its own bond. By sharing their electrons, both atoms are able to achieve a highly s table electron configuration corresponding to that o f an **inert gas**. For example, in methane (CH_4), carbon shares an electron pair with each hydrogen atom; the tota l number of electrons shared by carbon is eight, wh ich corresponds to the number of electrons in the o uter shell of neon; each hydrogen shares two electr ons, which corresponds to the electron configuratio n of helium. **Table 1. Shells and subshells of electrons** *Name of shell* | *Symbol for shell*[1] [1]Symbol shows electron configuration of complet ed shell, indicating subshells Helium shell ..... | $1s^2$ Neon shell ..... | $2s1^2 2p^6$ Argon shell ..... | $3s^2 3p^6$ Krypton shell ..... | $3d^{10} 4s^2 4p^6$ Xenon shell ..... | $4d^{10} 5s^2 5p^6$ Radon shell ..... | $4f^{14} 5d^{10} 6s^2 6p^6$ Eka-radon shell ..... | $5f^{14} 6d^{10} 7s^2 7p^6$	Learners brainstorm to describe the properties of covalent bonds. **Exercise;** 1. Distinguish between ionic bonds and covalent bonds. 2. Give 3 examples each of ionic and covalent bonds.

FRIDAY	Discuss the meaning of metallic bonding with the Learners.	1. Learners brainstorm to identify examples of metallic bonds. 2. Assist Learners to describe the properties or characteristics of metallic bonds. 3. Demonstrate on the tricks to identify if a bond is covalent, ionic or metallic. 4. Explain to the Learners on why a metallic bond of the same atom different from a non-polar covalent bond. **Ionic Bonds** - A bond between metal and nonmetal elements. Involves transferring electrons. **Covalent Bonds** - Also known as molecular bonds**.** A bond between two nonmetals. Involves sharing electrons. **Metallic Bonds** - A bond exclusively between metals. It creates a bulk of metal atoms, all "clumped" together. An example of this is a copper wire or an aluminum sheet.  Metallic Bonding in Sodium	Learners in small groups to discuss why metallic bonds are weaker than ionic and covalent bonds. **Exercise;** 1. State 4 examples of metallic bonds. 2. Explain 5 properties of metallic bonds.

Name of Teacher: **School:** **District:**