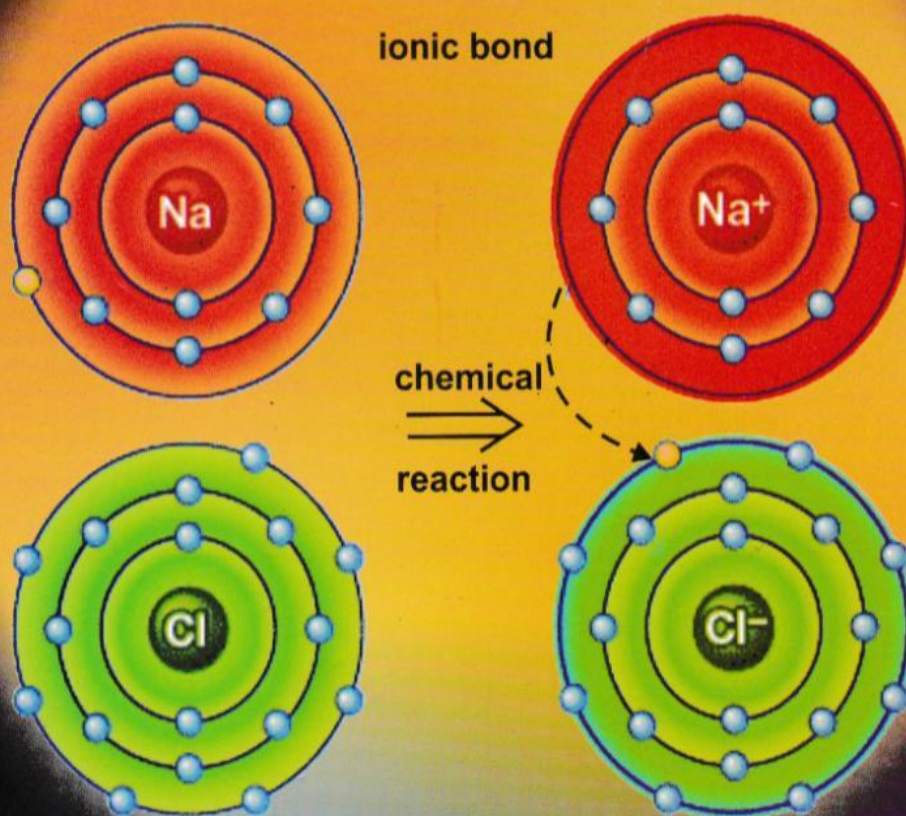


SCIENCE TEACHERS ASSOCIATION OF NIGERIA

CHEMISTRY PANEL

SERIES 13

CHEMICAL COMBINATION & CHEMICAL REACTION



A HANDBOOK FOR CHEMISTRY TEACHERS

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**A HANDBOOK FOR
CHEMISTRY TEACHERS**

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PAPER 11

MAKING STUDENTS EXAMINERS: AN APPROACH OF MASTERING THE TREND OF PERIODIC PROPERTIES ACROSS THE PERIOD AND DOWN THE GROUP

By

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The variation of periodic properties across the period and down the group in the periodic table is a difficult concept to many students of chemistry at the senior secondary school level. Necor (2009) established that students' preconceptions about the trends in periodic table are faulty and filled with misconceptions. An effective method for teaching such concept is the engagement approach. An engagement approach according to Etiubon (2016) is an effective teaching approach that is easy to use and inspires curiosity, thus, making chemistry alive in the minds of students. This implies that engagement strategy can promote reflection of previous activity, conceptual understanding through an interactive engagement of students in heads-on, hands-on activities with immediate feedback through discussion with peers and instructor. Making students examiners is an interesting way of engaging students and promoting critical thinking. According to Zepke and Leach (2010) when students are reflecting, questioning, conjecturing, evaluating and making connections between ideas, they are engaged. Similarly, Udofia (2016) noted that personal involvement and self-initiated evaluation by students make learning a personal activity and meaningful.

Making students to grade like examiners is an example of rich educational experience that challenges students' ideas; understanding and can stretch them as far as they can go from being engaged to being reflective. Explaining trends of periodic properties involves students making use of various decision rules. Weimer (2009) established that self grading of homework has the potential of moving students away from doing homework, but Edward (2007) points out that if students grade their own work they see exactly where they are making mistakes and attend to information more closely. The teaching strategy in this paper, presents to students dummy answer scripts and based on what have been taught, they design a marking guide to mark the dummies. Omilani (2015) established that there is a strong relationship between the teachers' grading practices and students' misconception in chemistry. It is on this assertion that this paper is exploring the use of students' examiners as an engagement approach for mastering the trends of periodic properties across the period and down the group for enhanced students' performance in chemistry.

Lesson Notes for Teaching Trends of Periodic Properties

Class: S.S.S 1
Subject: Chemistry
Topic: Periodic properties
Time: 80 minutes

Instructional Materials: Dummy Answers Scripts, Teacher Made Marking Guide, Scoring Sheet and Model questions

Behavioural Objectives:

At the end of the lesson the students should be able to:

- i) Define the following periodic properties : ionization energy, atomic radius, electron affinity , electronegativity, electrical and thermal conductivity,
- ii) Explain the trends of the periodic properties across the periods and down the groups

Entry Behaviour: The students should have been taught periodic law and classification of elements viz- a viz groups and periods

Procedures

Step I

The teacher introduced the lesson and objectives of the lesson to the students as well as the approach of making them examiners

Step II

The teacher explains and defines the periodic properties of element namely: ionization energy, atomic radius, electron affinity, electronegativity, electrical and thermal conductivity.

Step III

The teacher explains the trends of each of the properties across the period and down the group in the periodic table with concrete examples.

Step IV

The teacher group the students into small homogenous groups of 5-6 six students.

Step V

The teacher presents dummy answered scripts A-E to the students as well as the questions answered in the dummy. Inform them of marks for each question.

Step VI

Students collectively design a marking guide and the teacher facilitates during the process. The teacher also ensures that each group provides their own marking guide with the allocated marks.

Step VII

The teacher allow the students to use the marking guide to grade the answers scripts A-E provided to the groups.

Step VIII

The teacher collects the different grading of the group of dummy scripts A-E and at the same time presents each group with his own marking guides for them to grade the scripts again.

Step IX

The teacher guides the students to observe the difference between the grading based on students and teacher made marking guides by presenting the two graded scripts to each group.

Step X

Group members are allowed to raise objections and remarks to the observed differences if any. After the activity, the teacher summarises the lesson

Table: 1

SAMPLE SCORING TABLE

S/N	Dummy Answer Script	GROUP I		GROUP II	
		S.M.M.G SCORE	T.M.M.G SCORE	S.M.M.G SCORE	T.M.M.G SCORE
1	A				
2	B				
3	C				
4	D				
5	E				

S.M.M.G SCORE – Scores According to Students Made Marking guide

T.M.M.G SCORE- Scores According to Teacher Made Marking guide

Model question: Use the periodic table to answer questions A-F

Table: 2.

PERIODIC TABLE

₁ A							₂ B
₃ C	₄ D	₅ E	₆ F	₇ G	₈ H	₉ I	₁₀ J
₁₁ K	₁₂ L	₁₃ M	₁₄ N	₁₅ O	₁₆ P	₁₇ Q	₁₈ R

- Rank elements R, B, J, in order of decreasing Ionization energy
- Rank elements C, K, O, I and N in order of increasing electron affinity
- The atomic size of G is higher than Q, True or False
- Arrange H, P, Q and I in order of increasing electronegativity
- C has a higher electrical and thermal conductivity than K, True or False
- D and L have equal electropositivity, True or False.

Appendix

Teacher Made Marking Guide

- First find the location of the elements on the Periodic Table and then apply the general trends of decreasing Ionization energy down a group and Ionization energy increases across a period. $B > J > R$. these three are all in Group 8A (18) and Ionization energy decreases down the group.
- $I > O > N > C > K$ – These five elements are in different groups showing different electron affinities. The general trend of electron affinity is that it decreases down the group and increases across the period. Electron affinity increases with decrease of atomic radii across the period and decreases with increase of atomic radii down the group.
- Since they are the main group of elements, the size increase down the group and decreases across a period. So G is bigger in atomic size because the atomic size decreases along the period.

- (d) Electronegativity increases across a period but decreases down a group. $I > H > Q > P$ using the above statement.
- (e) True. The metal
- (f) False. Though D and L are in the same group but electropositivity increases down the group so L is more electropositive than D.

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