



eduresourceza.com

SECONDARY SCHOOL IMPROVEMENT PROGRAMME (SSIP) 2016



GRADE 12

SUBJECT: PHYSICAL SCIENCES

TEACHER NOTES

SESSION 6 TO 8

(Page 1 of 3)

SESSION 6

Introduce this topic by revising the Grade 10 and 11 content on waves especially the wave equation and the relationship between wave speed, frequency and wavelength. Then explain everyday situations like when an ambulance or a police car approaches you with their sirens on.

Explain in terms of the waves being compressed as the ambulance approaches you, that you observe a higher pitch and a higher frequency because the wavelength is decreasing. Explain then what is observed when the ambulance moves away. Learners have the misconception that the sound becomes “louder”. Show them that “loudness” is determined by the amplitude of the wave and the frequency or the wavelength.

The Doppler equation is based on the concept of relative motion so discuss this concept with them as the source approaches the listener i.e. motion of one object relative to another. Learners have to be able to identify properly who the source and who the listener is for each scenario.

It is important to stress to learners that when doing calculations, they must write down the initial equation showing $\pm$ signs, then chose + and – for the substitute values and finally calculate the asked value. Also point out to them that the speed of sound is not to be assumed as $340 \text{ m}\cdot\text{s}^{-1}$, the value of v must be used as given in the question or used as is from the information sheet.

Learners need to be exposed to word questions, as well as graph questions, where they have to take **values from the graph** to use during their calculations.

SESSION 7

Once the factors have been explained that influence the rate of reaction, discuss the factors in terms of the collision theory. Emphasise to the learners that the rate is the frequency at which collisions occur and is measured in per second. Thus, it is the number of collisions or effective collisions per unit time or per second. Also, concentration will be the number of particles per unit volume.

Once the basic theory is understood, transfer this information into graphs depicting the rate of a reaction. Show the learners what it means in terms of the gradient (steepness) that if the concentration increases, the gradient will increase etc. Ensure that learners work from graphs, read off graphs and calculate the gradient from graphs. This is a skill that is well tested in past papers and will continue to be tested.

Ensure that learners practice the Maxwell-Boltzman distribution curves and show them how the graph changes when the temperature increases, when the concentration increases and when a catalyst is added.

Practice all practical skills for identifying the types of variables and drawing conclusions from experiment type questions.

SESSION 8

Begin the session by introducing the concepts of open and closed systems and dynamic equilibrium. Spend time on making sure the learners know that the reactants are on the left hand side of the arrow in a chemical equation and that the products are on the right hand side.

Explain the meaning of the double arrow and what it stands for in terms of equilibrium.

Introduce Le Chatelier's Principle and spend time on explaining how an equilibrium will shift if you change concentration, temperature or pressure. Emphasise to the learners that "Le Chatelier" questions are mostly answered by doing the following steps:

- (i) stating the change
- (ii) state what effect the change has on a reaction
- (iii) apply it to the reaction given and then finally,
- (iv) give a final sentence of closure.

Then K_c calculations must be introduced by first allowing the learners to practice writing the equilibrium equation and constant for different reactions. Remember that solids are not used, nor pure liquids. Only gases and aqueous solutions' concentrations are used in the K_c expression.

Once they have mastered this, then introduce basic concentration calculations from stoichiometry from Grade 10 and 11. Then only do you introduce the learners to the mol table.

Encourage them to write out every heading in full and not to use "ICE" or "RICE". They must say "initial mol" etc.

Once this has been mastered, then let them work on full K_c calculations from start to end. Break the calculation up into smaller more user friendly pieces, so that it makes more sense to the learners.

Good luck and enjoy your teaching.