How to Study and Revise Chemistry Effectively

Written by Michael Leong, Principle Tutor of Learning with Chemistry

Many students think that learning a subject like chemistry involves reading the notes and textbooks over and over again, and if there is time, write down the main points from the notes and textbooks into a new notebook NEATLY with Colourful markers and highlighters to make studying less mundane. However, does that really help? Based on many students' experience, I believe you will agree that the effectiveness is minimal.

In this post, we are going to share some methods to help students review and revise Chemistry more effectively, and if it works for you, why not try it for other subjects as well?

Different topics in Chemistry require different methods of studying.

For topics that are facts and require memorizing, such as "Qualitative Analysis", "Solubility of Salts", "Organic Chemistry Reagents and Conditions" etc for the Secondary/IGCSE levels, and others like "Colours of Compounds and Certain Complexes", "VSEPR Theory and the Shapes" etc for the JC/IB levels, writing it down a couple of times may prove to be a good way to remember them. However, if this doesn't work too well for you, we will recommend an accumulative way to memorize it. For example, for "Solubility of Salts", memorize the solubility of the sulfate salts on day 1. On day 2, memorize solubility of chloride salts, and recap what you have memorized for the sulfate salts. On day 3, memorize solubility of the carbonates, and recap what you have memorized for the chloride and sulfate salts. This way, by breaking down huge information into smaller bits each day, we are sure that it will be easier to process and remember the information. Give it a try! Though it seems to be requiring so much work and effort on daily basis, well, it takes less than 10 minutes a day!

On top of that, all students should begin to understand yourself better, and know that there is a 1.5 to 2 hour period within the day when you are most alert and attentive. Make good use of this short period of time within the day to review subjects and topics that require most attention. All topics and subjects that require understanding and memorizing should be done during this period (in bite size, of course!). This way, it will make learning most efficient. It is much better than you trying to memorize the

solubility table during a period of time that you are so sleepy and lethargic, that most probably you end up needing more than 2 hours to memorize that.

For other topics that require you to explain certain concepts, such as collision theory in kinetics (rates of reactions), it will be crucial for you to understand the concepts first, before memorizing the answering techniques. For instance, "how does increase in temperature affect rate of reaction?" To answer this, student needs to understand a couple of concepts:

(1) Increase in temperature increases the kinetic energy of the particles.

(2) Thus more particles now possess energy greater than activation energy (the minimum amount of energy required for a reaction to occur).

(3) The frequency of collision increases.

(4) The number of successful collisions thus increases.

(5) Thus rate increases.

If all the above 5 points are understood, then you can easily combine them and phrase them properly in your answer: "When temperature increases, the kinetic energy of the reacting particles increases. This increases the number of particles colliding with energy greater than activation energy. In addition, the frequency of collision also increases, thus number of successful collisions increases and hence rate increases".

Understanding the concepts are very important, as it minimizes the time and effort needed to memorize certain things. However, it is also crucial to note that depending on the level of the student, there are some concepts that are too difficult to explain and hence out of the syllabus, thus students just need to accept it. For example, for Year 4/ Grade 10/ Secondary 4 students, it is required for students to know that transition metals form coloured compounds and variable oxidation states. At this level students have to accept this without any understanding of the concepts because the reasoning is too difficult at this level. But once they go to JC/ IB Grade 12/ Year 6, they will need to understand how and why these happen, and will be required to explain them effectively.

Last but not least, overall revision for Chemistry. Students love to re-read their notes or re-write their notes during revision. However, this is not a wise decision. If students feel that they are still unsure about the contents of the topics, do review and

revise the notes once through, but definitely not more than once. And NO, please do not try to write notes again if you have done that before. Instead, note that it is much more important to review all the questions and papers the student had done over the year. This is because no matter how many times student spent reading through the notes, the phrasing in the notes never change, and the sentence structure in the notes doesn't readily answer any questions given to you. In short, the notes doesn't teach you how to answer questions. However, when you review and study past questions done, it will help you to take note how the phrasing of the questions are used, and when the questions are phrased in a particular manner, what do they mean and what kind of answers are required from you. It teaches you how to answer the questions and apply your content knowledge.

Hence, it is much more important to (1) practice questions to get exposed to the variety of questions and phrasings they may ask, and (2) to review the answering techniques required for the particular questions. (2) is rather important in the local context, because examiners often require students to answer in a specific manner. Even if the answers given meant the same thing, but when key words or phrases are missing, students will still lose marks for that.

Last but not least, but definitely the most important of all, positive attitude and mentality of the student! Improvements can only materialize if the student's mentality is positive. The student must be motivated to do well. Whether they like the subject or not is one matter, but if they can accept the subject and embrace it, top it off with encouragement and motivation from peers, teachers and parents, they will be able to do well! Sadly, on the other hand, if the student are too preoccupied with setbacks in the subject and constantly have thoughts on giving up, then they will be stuck in a downward spiral. Self-fulfilling prophecy is a powerful too. It can make you or break you!

Hence, to all students out there, or parents who are finding tips for your child to better grasp the learning of chemistry, do approach the learning of Chemistry positively. With positivity, I strongly believe that the above methods of review and revision will definitely help to boost the learning process. Do try these out to see if it's effective! Never try, never know! Learning with Chemistry wishes all students all the best in your revision!!!