SATL MODEL LESSON FOR TEACHING EFFECT OF TEMPERATURE ON RATE OF REACTION

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ABSTRACT

Physical Chemistry is an experimental science based upon theories supported by mathematical input. It is therefore crucial that one who teaches Physical Chemistry should give a wholesome knowledge about any issue relating to this vital discipline in chemistry. To achieve this end, a systematic approach to teaching and learning method is the most appropriate teaching method [1-2]. It helps to ingrain knowledge so that illustrations of different parameters through systematic diagrams are helpful in in-depth transformation of knowledge relating to any concept. *[AJCE 4(2), Special Issue, May 2014]*

INTRODUCTION

Chemical kinetics is a vital discipline to grasp in order to comprehend a chemical change in its perspective. This makes available essential sources of such information through which a chemical reaction is uncovered. It thus helps to resolve the mysteries behind a chemical change. Subject of chemical kinetics depends upon various physical factors such as concentration, volume, pressure and temperature etc. Temperature dependence of a reaction takes up a central position to move in this reaction. It helps to identify the thermodynamic aspects of the reactions of the participants involved in a desired change. In addition to that for a reaction to be positive, effective collision is required. Effective collisions occur when molecules have critical energy to react with each other.

Chemical kinetics is a vital skill sought for by physical chemists in particular and hence its comprehension is highly desirable. In order to enhance understanding of these complex concepts the best, it is imperative that approach to teaching and learning (SATL) methodology is followed [3-7]. This technique is such that one grasps the knowledge, understands it in its deeper meaning and improves the ability to undertake creative steps for research and development.

METHODOLOGY

For any chemical reaction, the concentration of a reactant or product is controlled by a number of factors in a variety of ways. These include nature of reactant, concentration, pressure, temperature, catalysts etc. Further to that, temperature acts as a backbone in the investigation of any reaction kinetics.

In this presentation we highlight the role of temperature in thermodynamics. SATL lesson is being put designed to underline the concepts behind the involvement of the factors such

as connectivity between different kinetic parameters and temperature. The concepts are being arranged so that students can enhance their skills towards better comprehension. This in turn will help them to build their own connection between different phenomena [4-6]. Figure (1) illustrates the linear connections that highlight salient issues related to the effect of temperature on the reaction rate.

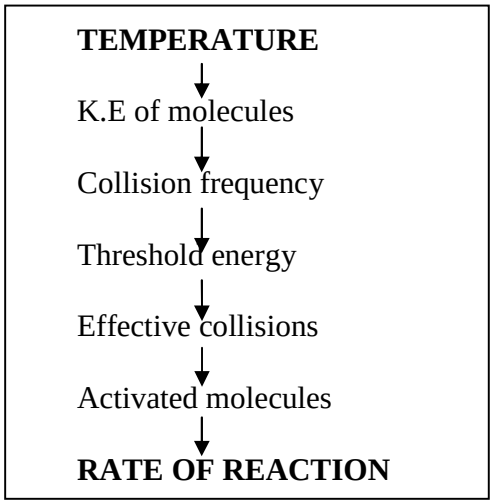

Figure 1: Linear Connections

Figure (1) can be converted into SATL pattern diagram (SD-0) as presented in Figure (2)

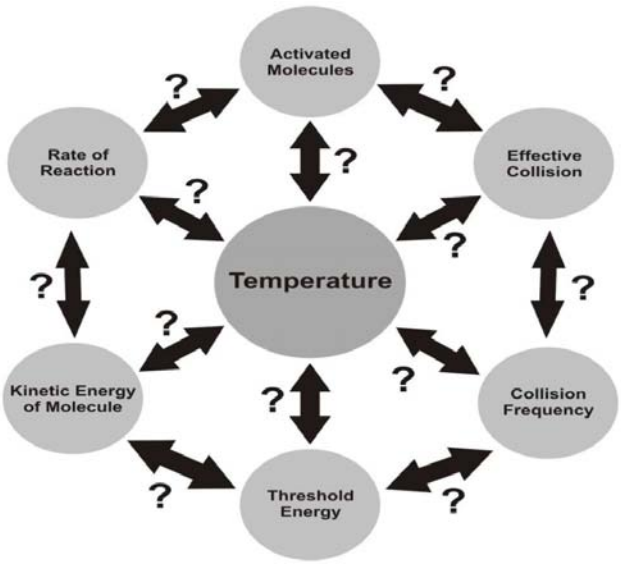

Figure 2: **SD-0**

POSSIBLE LINKAGES OF DIFFERENT FACTORS OF THERMODYNAMICS

The key role of temperature in chemical kinetics can be explained as the increase in temperature causes the more effective collision between molecules. Effective collision is possible only when reacting molecules acquire threshold energy. So the Figure (2) (SD-0) can be modified into Figure (3) i.e., SD-1.

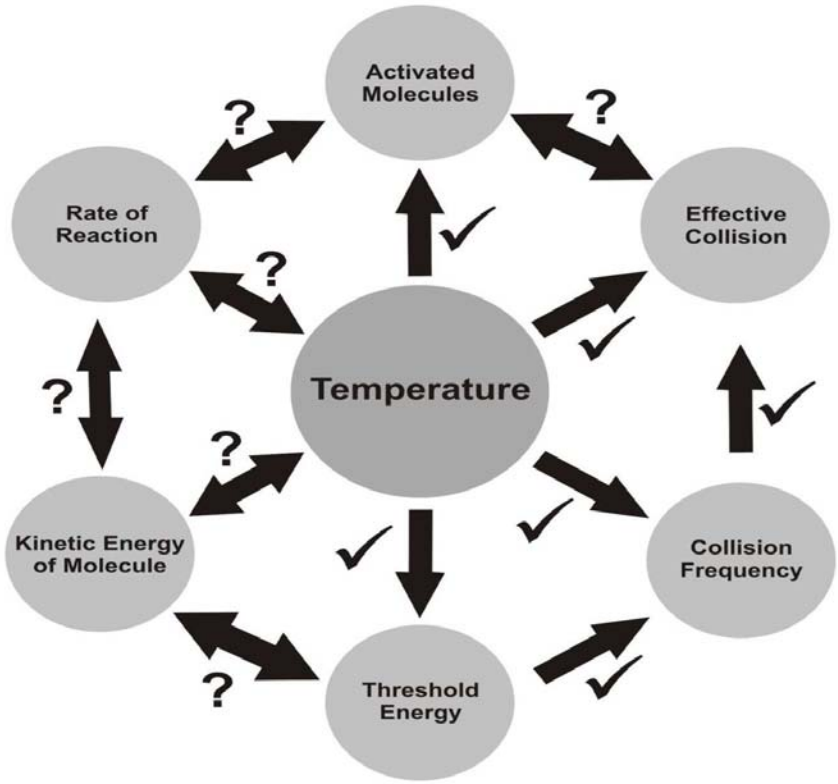

Figure 3: **SD-1**

A close look at Figure(3) reveals that still there are some interlinkages which have to be answered through discussion between the tutor and tutees. At this stage correlations developed through this discussion help to develop an improved systemic diagram. Hence Figure(3) transformed into Figure(4) i.e.,SD-2.

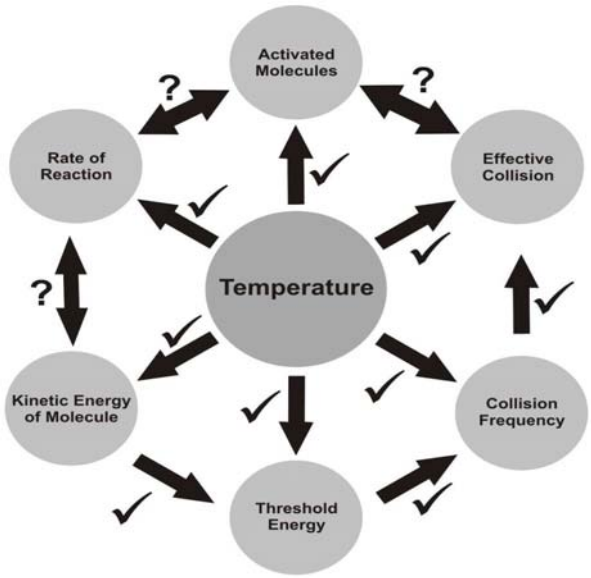

Figure 4: **SD-2**

Reaction rate gets promoted as the activated molecules collide with each other. Therefore at this step collision theory has to be brought in focus. Step by step discussion on remaining factors can then open some newer doors of knowledge. Accordingly Figure (4) i.e., SD-3, can be changed into SD-f, as shown in figure (5).

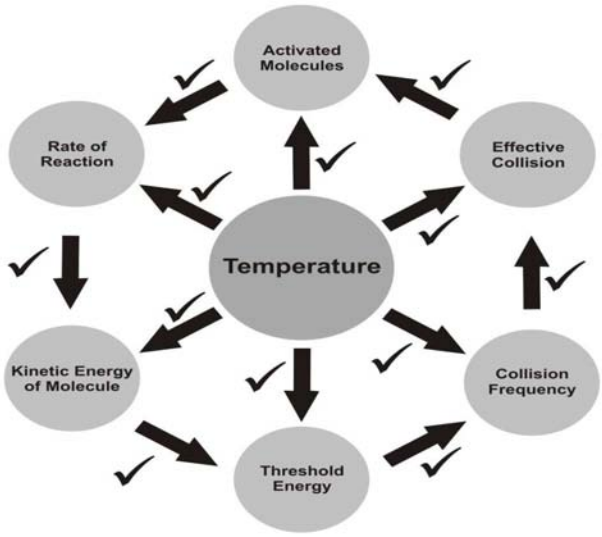

Figure 5: **SD-3**

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