

Carrom Board Game as Pedagogical Model to Know Rutherford Atomic Model

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Abstract: *The use of popular game as pedagogical model helps in understanding the Rutherford atomic model well. Rutherford's atomic model can be studied by using carrom board as pedagogical model. The concept of rebound, striking of the discs in carrom board game encourages in understanding concepts of Rutherford atomic model.*

Keywords: Rutherford atomic model, Carrom board, Rebound, Reflection, Game, Pedagogical model

I. INTRODUCTION

Pedagogy¹ is a method of teaching a topic in classroom so that students can understand the concept very well. Different pedagogical techniques including streaming video², performing drama³, developing models⁴ or playing games⁵ etc., commonly used to teach concepts in education. There are number of concepts or experiments in science stream can be well understood by selecting appropriate pedagogical technique.⁶⁻⁹

Carrom board game is popular in Asian countries.¹⁰ It contains striker which hits discs. The red coloured queen disc placed at the centre of carrom board.¹¹⁻¹³ Discs of black and white are arranged alternate around queen centre of board.¹³ Rutherford atomic model¹⁴ is taught by using different methods like drawing actual diagram on blackboard, showing you-tube videos or making model using card paper etc. Rutherford atomic model is important in understanding the nature of atom therefore its importance in science is always accounted.

About Carrom Board Game

In carrom board, players strike discs using striker.¹⁰ Players hit discs using striker directly, to sink discs easily into pockets. Sometimes players select the option of rebounding and sinking discs into pockets. Selection of suitable angle to hit the disc to sink discs into pocket is important in game. As a part of the game, the striker hits the discs and discs get dispersed on board. Sometime due to strong hitting, the striker directly jumps outside the board. So carrom board game is mainly based on rebounding, reflection by certain angle and sinking of discs.¹¹⁻¹³ The carrom board game is shown below¹⁴.

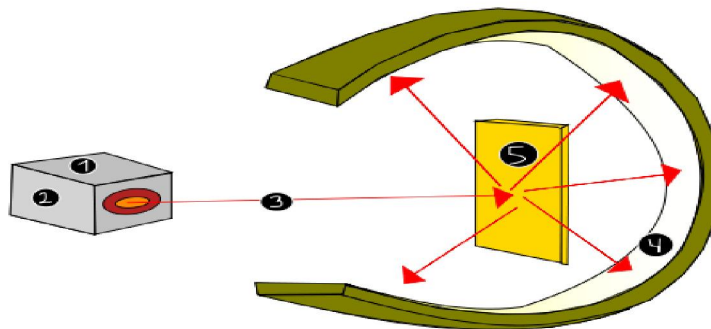


About Rutherford Atomic Model:

In the case of the Rutherford atomic model is based on scattering of alpha particles¹⁵. A thin gold foil is made to strike with alpha particles. Due to this bombardment, some alpha particles gets deflected, some get rebound while some pass without any deflection.

Based on this scientist Rutherford concluded that, the space inside an atom is vacant. All the positive charge is located in a very small space. Deflection of alpha particles due to presence of tiny particles which are electrons.

The Rutherford atomic model is shown below¹⁶



Carrom board game as pedagogical model:

In current work we have selected carrom board game as a pedagogical model to understand the Rutherford atomic model.

Remarkable Similarities:

As a part of teaching Rutherford atomic model similarities with carrom board games were noted. The concept of rebound of discs coincides with complete reflection of alpha particles from nucleus where positive charge exists in thin gold sheets.

The deflection of discs on the carrom surface matches exactly with deflection of alpha particles due to tiny particles nearby atoms which were discovered as electrons. The striker jumping outside or strike inside carrom board without touching any discs on the board is similar to that of passing an alpha particle without any deflection. In some cases the striker does not hit the discs leaving discs untouched similarly some alpha particles pass without getting deflected or most of the atoms space is empty. The red coloured queen disc is at centre on carrom board coincides with centre of atom as concluded in Rutherford atomic model. No doubt that carrom board is in two dimensional and Rutherford experiment is three dimensional in nature.

II. CONCLUSION

After teaching the topic in class at first year of undergraduate level of BSc Chemistry students, the topic was well understood to students. The ability of students to reproduce the Rutherford atomic model was increased. The carrom board game helps in remembering and recalling the concepts of Rutherford atomic model very well. The concept of rebounding, deflection or no deflection helps in understanding the Rutherford atomic model.

Hence carrom board game can be a new pedagogical model to understand the Rutherford atomic model.

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