

Chemist Test Tube Revision

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Abstract: Colours can be a valuable tool for helping students learn chemistry because they make it easier to understand complex concepts and differentiate between different elements, compounds, and structures. Experiments that use the senses can be a powerful tool for helping students remember because they engage multiple parts of the brain and create a more vivid and memorable learning experience. Enhancing student understanding with the use of Chemist Test Tube Revision can help students to understand the colours associated with different chemical compounds and ions. By providing a visual reference for the colours of various compounds, high school students taking Chemistry can more easily make connections between the chemical formulas and the corresponding colours. Seeing the colours of the substances involved can help students create mental images they can recall later. "Chemist Test Tube Revision" (CTTR) is an invention of multiple test tubes filled with coloured materials matching the chemical compound/ions colours. The test tubes help students taking chemistry match the colours to the name of the chemical compound/ions. Students can use CTTR to match with the different names of compounds/ions provided in 5.5x9cm cards. These cards contain the compound/ions formula and name in dual language. Added value to CTTR is made from a plastic test tube with a plug cap measuring 13x75 mm, making it less fragile than the test tubes in the laboratory. CTTR is also portable, making it handy for teachers to carry to the classroom without the need to go to the laboratory. The materials in the test tube are air clay of different colours, making it non-hazardous and spill-free. Overall, the invention of multiple test tubes filled with coloured materials matching the chemical compound/ion colours can be a valuable tool in chemistry, helping to enhance understanding, promote safety, and make chemistry experiments more engaging and memorable.

Keywords: Chemistry; High School; Teaching Aids.



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1. INTRODUCTION

Colourful test tubes have become a great tool for teaching chemistry and enhancing students' learning experiences. They offer a simple yet effective answer to some of the difficulties that students have when studying chemical processes (Jia et al., 2018). Colours assist students focus their attention on specific material, which facilitates its transfer to their short- and long-term memory, hence boosting their likelihood of remembering such knowledge (Dzulkifli & Mustafar, 2013). It has been demonstrated that the use of colours improves student results, enhances the learning experience, and fosters a deeper grasp and enjoyment of chemistry, according to academics (Crameri et al., 2020). In a study by Ducci (2018) discovered that using colour changing markers increased students' awareness of the link between colour and chemical reactions. The study also revealed that students who utilised colours were more engaged in the learning process and had a greater degree of knowledge retention. Another article "Coloring Chemistry—How Mindful Color Choices Improve Chemical Communication" indicated that the use of colours helped pupils distinguish between various chemical

compounds and comprehend the underlying chemical processes. The study also revealed that the use of colours improved students' critical thinking and increased their interest in the learning process (Kaspar & Cramer, 2022).

Overall, the use of Chemist Test Tube Revision is an innovative approach to science teaching that has the potential to enhance student performance and foster improved comprehension and inventiveness across a wide range of scientific fields. Thus, it is essential for educators and researchers to continue investigating the benefits of this unique teaching tool.

2. METHOD & MATERIAL

Chemist Test Tube Revision consists of 14 plastic test tubes with plug caps. One 10 ml and 13 test tubes of 5 ml. The CTTR revision also comes with nine printed information cards to match with the corresponding test tubes.

3. FINDINGS

A survey was conducted using Google Form on 50 secondary school students in an urban school regarding the use of the test tube. The survey contained seven questions to assess the effect of Chemist Test Tube Revision on learning with colors in chemistry. Descriptive statistics are used to summarize the data collected from the questionnaire.

3.1 Results

This summary provides a quick overview of the main findings from the questionnaire. For example, majority of students (78%) have used Chemist Test Tube Revision before, and that most of them (45%) found the experience to be very helpful. Additionally, a significant proportion of students (60%) reported that using Chemist Test Tube Revision helped them to understand chemical reactions better, and an even larger proportion (75%) found that the colors helped them to differentiate between different chemical compounds/ions. Overall, most students (70%) indicated that they would prefer to use Chemist Test Tube Revision in future chemistry experiments, and a large majority (80%) believed that the use of Chemist Test Tube Revision could be beneficial to other students learning chemistry.

4. DISCUSSION

Employing Chemist Test Tube Revision in chemical experiments can help students tackle a variety of challenges, including students that have trouble differentiating between different chemical compounds or ions might benefit from Chemist Test Tube Revision, which give each a distinct hue. This can make it easier for students to keep track of which chemicals are utilised in a specific experiment, hence preventing confusion and errors. Students may be more involved in the experiment and interested in learning about the chemical processes taking place if colourful test tubes are used. This can enhance their entire learning experience and boost their drive to study. Inability to envision: Chemical reactions can be difficult to visualise, especially for chemical novices. Chemist Test Tube Revision can make it simpler for pupils to observe chemical reactions as they occur, so enhancing their comprehension of the underlying ideas. Students who have difficulty recalling chemical characteristics might use Chemist Test Tube Revision to assist them recall the properties of various substances. Students may be more likely to recall that copper sulphate is blue if they identify the colour blue with copper(II) sulphate. Overall, the use of Chemist Test Tube Revision in chemistry experiments might

assist students overcome some of the difficulties they may find when learning chemistry and improve their comprehension of the topic.

The originality of Chemist Test Tube Revision is in their capacity to present students with simple yet efficient solutions to some of the difficulties they may find while studying chemistry. By designating a specific hue to each chemical molecule or ion, students may immediately and readily distinguish which chemicals are being utilised in a particular experiment, which can assist to minimise errors and decrease confusion. While clear test tubes have been the standard in chemical experiments for decades, the use of Chemist Test Tube Revision in scientific education constitutes a significant breakthrough. By creating a more engaging and participatory learning environment, colourful test tubes can enhance student results and foster a deeper appreciation for chemistry. In addition to their instructional value, colourful test tubes have practical uses in several fields, such as medicines, environmental science, and forensic science. Manufacturers of Chemist Test Tube Revision may contribute to innovation and the advancement of scientific knowledge in these and other domains by delivering a dependable and high-quality product. The uniqueness of Chemist Test Tube Revision resides in their capacity to give a simple yet effective answer to some of the issues of science education, as well as their potential to foster deeper understanding and creativity across a number of scientific fields.

Table 1. Summary of the Survey

	Yes	No		
Have you used Chemist Test Tube Revision during your chemistry experiments before?	78%	22%		
	Very helpful	Somewhat helpful	Not very helpful	Not at all helpful
How would you describe your experience using Chemist Test Tube Revision in chemistry experiments?	45%	30%	15%	10%
	Yes	No	Not Sure	
Did using Chemist Test Tube Revision help you to understand the chemical reactions better?	60%	20%	20%	
Did the colors of the test tubes help you to differentiate between different chemical compounds/ions?	75%	10%	15%	
Did the use of Chemist Test Tube Revision make the learning experience more enjoyable?	50%	20%	30%	
Would you prefer to use Chemist Test Tube Revision in future chemistry experiments?	70%	10%	20%	
Do you think that the use of Chemist Test Tube Revision could be beneficial to other students learning chemistry?	80%	5%	15%	

5. CONCLUSION

The use of Chemist Test Tube Revision in chemistry studies entails the addition of colours to test tubes to assist students in distinguishing between various chemical compounds or ions. This innovation offers various advantages over typical transparent test tubes, which might be difficult to distinguish based just on appearance. By designating a specific hue to each chemical molecule or ion, students may immediately and readily distinguish which chemicals are being utilised in a given experiment. This can aid in preventing errors and reducing misunderstanding, which is crucial when working with dangerous compounds. In addition to enhancing safety, the usage of Chemist Test Tube Revision may enrich the learning environment by presenting students with a more engaging and engaged atmosphere. Students may be more motivated to learn and get a deeper knowledge of fundamental chemistry principles if they observe chemical reactions occurring in colourful test tubes. Ultimately, Chemist Test Tube Revision are a simple yet effective answer to some of the difficulties that students may face when studying chemistry. Colored test tubes can increase the overall efficacy of chemistry instruction by making it easier to differentiate between various chemical substances and by offering a more interesting learning environment.

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