In this section of *Resonance*, we invite readers to pose questions likely to be raised in a classroom situation. We may suggest strategies for dealing with them, or invite responses, or both. "Classroom" is equally a forum for raising broader issues and sharing personal experiences and viewpoints on matters related to teaching and learning science.

Christmas Tree Model of Periodic Table of Chemical Elements*

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Periodic table consists of elements arranged based on their atomic number to understand their properties. Many periodic table representations have been reported, but the position of hydrogen and f-block elements remains unclear. We report here a simple 'Christmas tree model' as an alternative to the modern periodic table.

Keywords
Periodic table, periodicity, tree model.

Introduction

Over a thousand representations of the periodic table of chemical elements are reported [1], each following a unique method to order the elements. The original idea of arranging elements was initiated by Dmitri Ivanovich Mendeleev [2] and his associates in 1869. The idea has undergone various changes over the past 150 years and has evolved into the modern periodic table [3]. In the modern periodic table, the elements are arranged according to the increasing order of atomic number in rows (periods) and columns (groups). With the help of the periodic table, one can easily understand the basic chemistry of elements, such as the number of

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energy levels (principle quantum number), their metallic or non-metallic nature, valence electrons of the main group elements, oxidation states, etc. However, the positions of hydrogen [1] and inner transition elements (f-block) in the periodic table remain unclear. In this article, we report an alternative method to represent the periodic table—in the form of a Christmas tree.

Christmas Tree Model

The model combines Zmaczynski's table, Bayley–Thomsen–Bohr periodic table formulated by Eric Scerri, and finally, the modern periodic table.

The model combines Zmaczynski's table [4], Bayley–Thomsen–Bohr periodic table formulated by Eric Scerri [5], and finally, the modern periodic table. In this model, the elements are arranged according to the increasing atomic number (like the modern periodic table). The table comprises seven rows (periods) represented as stars on the left side of the Christmas tree. Groups in the periodic table are differentiated using different colors for easy understanding (*Figure* 1). The s-block elements consist of alkali metals and alkaline earth metals, while the p-block elements comprise the boron group, carbon group, nitrogen group, chalcogens, and halogens. The f-block elements comprise lanthanides and actinides. The white line in this model indicates the diagonal line in the modern periodic table. The splits on the second, fourth, and sixth periods indicate the inclusion of p, d, and f sub-orbitals, respectively.

The above model provides a clear position of hydrogen over alkali metals and halogens. The model also accommodates inner transition elements (f-block). The vibrant colors decorating the Christmas tree provide distinct differentiation between groups and blocks of elements.

The above model provides a clear position of hydrogen over alkali metals and halogens. The model also accommodates inner transition elements (f-block). The vibrant colors decorating the Christmas tree provide distinct differentiation between groups and blocks of elements, making the model attractive and easy to understand for the students.

Conclusion

This model gives a proper position for hydrogen and accommodates f-block elements in the table. The Christmas tree model can be an alternate representation of the modern periodic table.

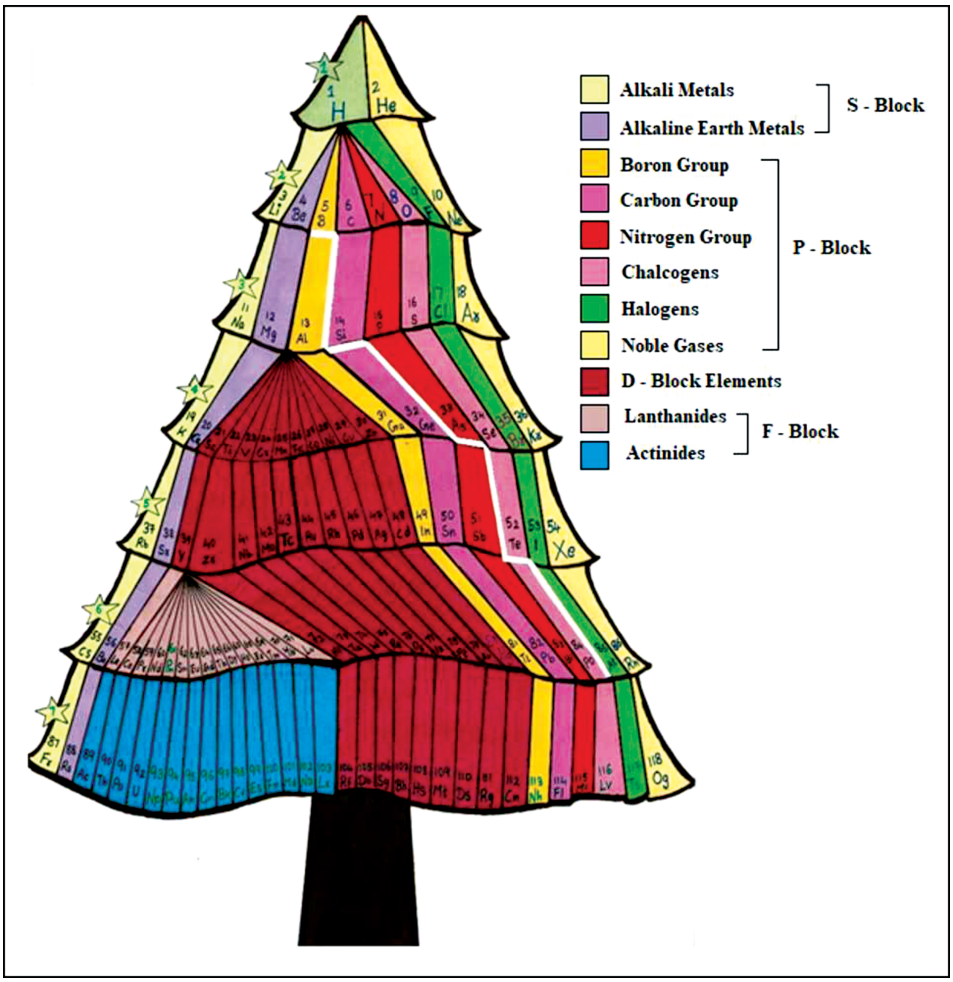

Figure 1. The Christmas tree model of periodic table of chemical elements.

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Suggested Reading

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