THE WAGNER FREE INSTITUTE OF SCIENCE

CHEMISTRY SERIES – FALL 2019
The Periodic Table of Elements
Professor Kevin Cannon

This course will meet at the **Charles Santore Branch of the Free Library**, located at 932 S. 7th Street (7th and Carpenter), Philadelphia, PA

Dates: 6 Mondays, October 21 - November 25, 2019
Time: Classes meet from 6:30 to 7:45 PM

No pre-registration required. Please register by completing a registration form at the class.

Course Description

2019 marks the 150th anniversary of the publication of one of the key documents in chemistry: the periodic table of the elements. Created in 1869 by the Russian chemist Dmitri Ivanovich Mendeleev, the periodic table enumerates the elements that compose the earth's substances and arranges them to reveal the underlying patterns in their properties. It has been cited as the most important concept in chemistry.

This course will discuss the development of the periodic table and the information it provides. After an introduction to the elements and atomic structure, the course will examine how the periodic table is used and provide a history of its conception and evolution.

Course Schedule – Classes begin at 6:30 PM

1. Monday, October 21, 2019 – A small matter of introduction
Since the periodic table is a chart of elements, this class will provide a brief review of elements and atomic structure to enable students to understand the sources of periodicity of the elements.

2. Monday, October 28, 2019 – A guide to reading the Periodic Table
Students will be introduced to the most common version of the periodic table and its organization of rows, columns, and blocks. This class will provide examples of how the periodic table is used to predict trends in elemental properties and chemical reactions.

3. Monday, November 4, 2019 – Recognition of periodicity and early efforts to categorize elements
Dmitrii Mendeleev is the champion of the periodical system, but he was not the first to develop it. The contributions of Lothar Meyer, Mendeleev, and others to periodic tables in the 19th century will be presented with a historical context of what scientists knew about elements as they debated alternative forms of the periodic table.

4. Monday, November 11, 2019 – Along came Quantum Mechanics
The acceptance and evolution of the periodic table to its current form was facilitated by the accelerated discovery of new elements, discoveries about atomic structure, and the formulation of quantum mechanics. This class will provide a brief historical review of these developments and their significance to the periodic table.

5. Monday, November 18, 2019 – Are we there yet?
Science is not stagnant. The periodic table changes as new elements are discovered. How are new elements discovered, verified, and named? Alternative forms of the periodic table have been proposed, and some of these will be examined along with their advantages and disadvantages.

6. Monday, November 25, 2019 – The answer is elemental
This class will include in an instructional, interactive game to advance learning and test students' knowledge of the periodic table of the elements.

Monday, December 2, 2019 – make-up class (if needed)

Recommended Readings

E.R. Scerri, *The Periodic Table*, Oxford University Press, New York, 2007.

M.D. Gordin, *A Well-Ordered Thing. Dmitrii Mendeleev and the Shadow of the Periodic Table*, Basic Books, New York, 2004.

J.W. van Spronsen, *The Periodic System of the Chemical Elements*, Elsevier Publishing Company, Amsterdam, 1969.

S. Kean, *The Disappearing Spoon: And Other True Tales of Madness, Love, and the History of the World from the Periodic Table of the Elements*, Little, Brown &Company, Boston, 2010.

About the Professor

Dr. Kevin Cannon is Professor of Chemistry at Penn State Abington and a Research Associate at Temple University. He has done chemical work in bomb-detection, car paint, oil spill remediation and natural product synthesis. He has an ongoing interest in the history of science, particularly 18th and 19th century science, which includes the development of the periodic table. He joined the Wagner's faculty in 2015.

The course is presented by the Wagner Free Institute of Science. Founded in 1855, the Wagner is dedicated to providing free science education. All classes are free and open to the public. To attend, please complete a registration/enrollment form at the class. For more information about the Wagner Free Institute of Science and its programs, please visit www.wagnerfreeinstitute.org or call 215-763-6529.