Crystals have fascinated us for centuries with their beauty and symmetry, and have often been invested with magical powers. The development of X-ray diffraction heralded the scientific study of crystals, leading to an understanding of their atomic arrangements at a fundamental level. The new discipline—X-ray crystallography—has subsequently evolved into a formidable science that underpins many other scientific areas. Crystallography: A Very Short Introduction traces the history of crystallography and shows how the discoveries in this field have been applied to the creation of new and important materials, to drugs and pharmaceuticals, and to our understanding of genetics, cell biology, proteins, and viruses.

The Elements: A Very Short Introduction
Philip Ball

The Elements: A Very Short Introduction traces the history and cultural impact of the elements on humankind, and examines why people have long sought to identify the substances around them. Looking beyond the Periodic Table, our relationship with matter is examined, from the uncomplicated vision of the Greek philosophers who believed there were four elements — earth, air, fire, and water — to the work of modern–day scientists in creating elements such as hassium and meitnerium. This VSI is an exploration of the fundamental question: what is the world made from?

The Laws of Thermodynamics: A Very Short Introduction
Peter Atkins

The Laws of Thermodynamics: A Very Short Introduction explains how the laws of thermodynamics establish fundamental concepts such as temperature and heat, and the
nature of energy itself. From the sudden expansion of a cloud of gas or the cooling of a hot metal, to the unfolding of a thought in our minds and even the course of life itself, everything is governed by the four Laws of Thermodynamics. This VSI explains the basis and deeper implications of each law, introducing concepts such as entropy, free energy and absolute zero.

Molecules: A Very Short Introduction
Philip Ball

Molecules: A Very Short Introduction investigates the nature of molecules and how molecular structures and activities underlie the properties of materials and the processes of life. A living cell is like a city teeming with molecular inhabitants that move, communicate, cooperate, and compete. This VSI considers how a single fertilized egg can grow into a multi–celled Mozart, what makes spider's silk insoluble in the morning dew, and how our understanding and synthesis of molecules has led to exciting new areas of research into the development of molecular machines and powerful yet tiny molecular computers.

Graham Patrick

Organic chemistry is the chemistry of compounds of carbon. As well as being central to life, in the form of large molecules such as nucleic acids and proteins, organic compounds are essential to many areas of industry. Organic Chemistry: A Very Short Introduction covers the whole range of organic compounds and their roles. Beginning with the structures and properties of the basic groups of organic compounds, it goes on to consider organic compounds in the areas of pharmaceuticals, polymers, food and drink, petrochemicals, and nanotechnology. It explores how new materials, such as graphene, are opening up exciting new possibilities for applications, and also discusses the particular challenges of working with carbon compounds, many of which are colourless.

The Periodic Table: A Very Short Introduction
Eric R. Scerri

The periodic table of elements provides an arrangement of the chemical elements, ordered by their atomic number, electron configuration, and recurring chemical properties. The
Periodic Table: A Very Short Introduction considers what led to the table’s construction and shows how the deeper meaning of its structure gradually became apparent with the development of atomic theory and quantum mechanics, which underlies the behaviour of all of the elements and their compounds. This new edition celebrates the completion of the seventh period of the table, with the ratification and naming of elements 113, 115, 117, and 118 as nihonium, moscovium, tennessine, and oganesson, and incorporates recent advances in our understanding of the origin of the elements.

Physical Chemistry: A Very Short Introduction
Peter Atkins

With the development of a variety of exciting new areas of research involving computational chemistry, nano- and smart materials, and applications of the recently discovered graphene, there can be no doubt that physical chemistry is a vitally important field. It is also perceived as the most daunting branch of chemistry, being grounded in physics and mathematics and drawing on quantum mechanics, thermodynamics, and statistical thermodynamics. Physical Chemistry: A Very Short Introduction provides a non-technical insight into the central concepts of the field, and explains its relationship to other branches of chemistry, and its important contributions to our understanding of the natural world.

Chemistry: A Very Short Introduction
Peter Atkins

Chemistry: A Very Short Introduction encourages us to look at chemistry anew, through a chemist's eyes, in order to understand its central concepts and to see how it contributes towards our material comfort and to human culture. It shows how chemistry provides the infrastructure of our world, through the chemical industry, the fuels of heating, power generation, and transport, as well as the fabrics of our clothing and furnishings. By considering the remarkable achievements that chemistry has made, and examining its place between both physics and biology, this VSI presents a fascinating, clear, and rigorous exploration of the world of chemistry—its structure, core concepts, and exciting contributions to new cutting-edge technologies.

Water: A Very Short Introduction
John Finney
Water dominates the surface of Earth and is vital to life on our planet. It is a remarkable liquid that shows anomalous behaviour. Water: A Very Short Introduction introduces the science of water, and explores how the structure of water molecules gives rise to its physical and chemical properties. Considering water in all three of its states—ice, steam, and liquid—it explains the great importance of understanding its structure and behaviour for fields such as chemistry, astrophysics, and earth and environmental sciences. The role of water in biology is also described, and it concludes with a discussion of the outstanding controversies concerning water, and some of the ‘magical’ properties that have been claimed for it.