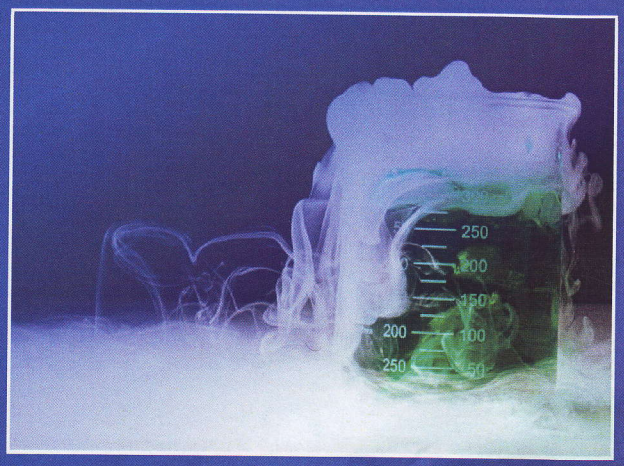
# CHEMISTRY STUDIES



ББК 81.2(Англ.)я73

*Печатается по рекомендации ученого совета факультета химии и решению редакционно-издательского совета РГПУ им. А. И. Герцена*

*Авторы-составители*: **Н. Л. Кузнецова, Л. В. Пантелеева, М. В. Селиванова**

*Рецензенты*: д-р филол. наук, проф. **Н. Ю. Зайцева** (РГПУ им. А. И. Герцена); канд. филол. наук, доц. **Е. М. Меркулова** (Санкт-Петербургская академия управления и экономики)

Chemistry Studies: Учебное пособие для студентов факультета химии / Н. Л. Кузнецова, Л. В. Пантелеева, М. В. Селиванова. — СПб.: Изд-во РГПУ им. А. И. Герцена, 2012. — 94 с.

ISBN 978–5–8064–1655–2

Пособие предназначено для организации аудиторной и самостоятельной работы студентов, специализирующихся в области химии. Оно способствует формированию навыков и умений профессиональной коммуникации на английском языке. Пособие построено на современных аутентичных текстах высокого уровня сложности.

Учебное пособие может быть использовано как для подготовки студентов факультета химии, обучающихся по программам дополнительной квалификации «Переводчик в сфере профессиональной коммуникации», так и для подготовки студентов-магистрантов.

**ББК 81.2(Англ.)я73**

**ISBN 978–5–8064–1655–2**



# Unit 1. SCIENTIFIC METHOD

## READING

***1. Read the text and say what a scientific method is based on.***

### Introduction to the Scientific Method

Science differs from other fields of study in the *method* that scientists use to acquire knowledge and the special significance of this knowledge. Scientific knowledge can be used to explain natural phenomena and, at times, to *predict* future events.

The ancient Greeks developed some powerful method of acquiring knowledge particularly in mathematics. The Greek approach was to start with certain basic assumptions or premises. Then, by the method known as *deduction,* certain conclusions must logically follow. For example, if $a = b$ and if $b = c$, then $a = c$. Deduction alone is not enough for obtaining scientific knowledge, however. The Greek philosopher Aristotle *assumed* four fundamental substances: air, earth, water, and fire. All other materials, he believed, were formed by combinations of these four elements. Chemists of several centuries ago (more often referred to as alchemists) tried, in vain, to apply the four-element idea to turn lead into gold. They failed for many reasons, one being that the four-element assumption was false.

The scientific method originated in the $17^{th}$ century with such people as Galileo, Francis Bacon, Robert Boyle, and Isaac Newton. The key to the method is to make no initial assumptions, but rather to make careful observations of natural phenomena. When enough observations have been made so that a pattern begins to emerge, one then formulates a generalization or natural law describing the phenomenon. **Natural laws** are concise statements, often in mathematical form, of the facts of nature. The process of observations leading to a general statement or natural law is called *induction.*

To verify a natural law, a scientist designs a controlled situation, an *experiment,* to see if conclusions deduced from the natural law agree with experimental results. We judge the success of a natural law by its ability to summarize observations and predict new phenomena. We should not think of a natural law as an *absolute* truth, however. Future experiments may require us to modify the law.

A **hypothesis** is a tentative explanation of a natural law. If a hypothesis survives testing by experiments, it is often referred to as a theory. We can use this term in a broader sense, though. A **theory** is a model or a way of looking at nature that can be used to explain natural laws and make further predictions about natural phenomena. When differing or conflicting theories are proposed, the one that is most successful in its predictions is generally chosen. Also, the