

# Basic Books in Science

## Science as a Creative Adventure of the Mind

– A Programme for Science Teaching on the Internet –

The Series “Basic Books in Science” is aimed at anyone, anywhere in the world, who wants to know about Science and the way it works and is prepared to start from nothing and work hard. All the books in the Series are being written by practising scientists and teachers who believe education is a basic human right that should be made freely available to everyone – irrespective of race, colour, or creed.

Basic Books in Science are available from

**The Pari Center for New Learning (Director Dr F. David Peat)** at  
<<http://www.paricenter.com>>

(Homepage entry ‘Basic Books in Science’)

and from

**The Learning Development Institute (President Dr Jan Visser)**  
at <<http://www.learndev.org>>

(Homepage entry ‘For the Love of Science’; or, in Spanish, ‘Por amor a la ciencia’).

The books may be downloaded free of charge from either site.

## BASIC BOOKS IN SCIENCE

### A Presentation of the Series

At the root of all human progress is education: the elimination of ignorance, superstition and prejudice and the promotion of understanding and awareness, both of others, and their needs, and of the world around us.

Learning about Science and its methodology is of key importance. For Science, along with all that has grown out of it (present-day medicine, technology, industry and all the rest), has changed the lives of all of us within the last century and continues to do so.

Yet, in many parts of the world, Science Education is in crisis. In the Developing Nations this is no doubt due to a severe shortage both of material facilities (schools, laboratories, equipment) and of well qualified science teachers. But even the ‘scientifically advanced’ societies are not without their problems: almost everywhere there seems to be a widespread disenchantment with science.

The ‘hard sciences’, such as Physics and Chemistry, which depend heavily on Mathematics, have been hardest hit as more and more students turn towards disciplines that depend mainly on verbal expression, excluding any kind of ‘mathematical’ argument. The symbolic languages used so widely these days in science are not learnt at an early age, as languages in the conventional sense are. A first aim of Basic Books in Science is to break through this linguistic barrier by showing how even the most abstract concepts can be explained and developed in simple everyday language.

Another reason for disenchantment with Science is undoubtedly its public image: it is no longer seen, by many, as a creative and cultural activity – but rather as something quite remote from other – more ‘human’ – pursuits. And even when the current achievements of Science (and more particularly Technology) are justly admired, the intellectual journey from the ‘roots’ to the present frontiers is widely regarded as quite beyond the capabilities of ordinary mortals.

In a world where the progress of humanity is increasingly dependent on the peaceful exploitation of science, this situation is no longer acceptable. We should try to bring an understanding of science and its methodology within the reach of everybody. Without such an understanding and a critical appreciation of what science can do, members of society are unable to play a part in shaping their destinies – destinies that will depend increasingly on

the progress of science and our awareness of where it is taking us.

There are many books *about* Science but few that start *at the beginning* and trace the development of scientific thought and methodology in a down-to-earth ‘hands on’ way. The aim of the Series “Basic Books in Science” is to make such a presentation freely available on the Internet.

Every book will be a small ‘module’ of Science, typically containing around 150 pages on a compact and well defined theme: the themes are in general trans-disciplinary, cutting across traditional boundaries, but are chosen to ensure maximum coherence within the Series. And each starts ‘from the very beginning’, assuming no previous knowledge of the area it covers, so as to be accessible to anyone who wants to know about that area and is prepared to start from nothing and work hard. The books are not intended to replace or compete with the many excellent school textbooks that may be available, but rather to enrich the reader’s understanding of each chosen field. The Series does not respect the concept of a rigid syllabus (‘traditional’ or ‘experimental’): each book aims at ‘quality science’ and will best be studied with help from experienced teachers, when it is available. But, by starting from the beginning, each will give a self-contained account of its selected field, not depending on constant reference to textbooks outside the Series. In that sense, Basic Books offer themselves for private study on a ‘teach-yourself’ basis. The accent is on *flexibility*, with the Series providing a ‘library’ for dipping into as the need arises.

Readers will usually be of pre-university age (14-19 years, say), but may also be adults whose knowledge of science is either completely lacking or long-forgotten. In anticipation of the fact that many will not be native English speakers, efforts have been made to keep linguistic requirements to a minimum<sup>1</sup>. The books are uploaded to the web as soon as they are written and are subject to constant updating.

The scope and structure of the Series will be clear from the titles (some still provisional) of the first ten Basic Books<sup>2</sup>:

Book 1. Number and symbols – from counting to abstract algebras\*

Book 2. Space – from Euclid to Einstein\*

Book 3. Relationships, change – and Mathematical Analysis\*

Book 4. Motion and mass – first steps into Physics\*

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<sup>1</sup>Translations are also envisaged and the first few books are already appearing in Spanish, as well as English; French and Arabic versions will follow

<sup>2</sup>Those marked with an asterisk are already available for downloading from the web

- Book 5. Atoms and molecules – the stuff of Chemistry\*
- Book 6. The planet we live on – starting on the Earth Sciences
- Book 7. The beginnings of life – from one cell to many
- Book 8. Life in the oceans, life on land
- Book 9. The evolution of living creatures – who were our ancestors?
- Book 10. More Physics. Electric charges and fields – Electromagnetism\*

Besides being ‘thematic’, the treatment is innovative, *not* following the traditional pattern with its insistence that Science is an essentially experimental discipline, absolutely dependent on the availability of well-equipped laboratories full of costly instruments. It can be argued that an *understanding* of science and scientific method can be obtained with little more than simple observations on the world around us – requiring, at most, improvised equipment. For example, large parts of Mathematics and Physics can be built up from nothing more than first notions about *counting* and *measuring*, together with a few very primitive observations, such as Galileo’s experiments with falling bodies. The rest is very largely **a creative adventure of the mind**, in which more and more is discovered just by *thinking* about what we know already.

Science is about **observing, thinking, understanding, and developing new ideas, new theories.**

Even though Science has its roots in observation and experiment (and the validity of any theory rests on the agreement of its predictions with observed ‘reality’) we have tried to stress the ‘theoretical’ aspect of much of Science because we find it appealing, beautiful and exciting and hope to share that excitement with others.

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