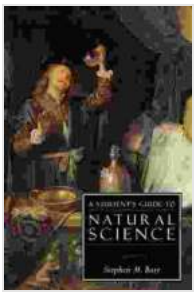
Student Guide to Natural Sciences: ISI Guides to the Major Disciplines



A Student's Guide to Natural Science (ISI Guides to the Major Disciplines) by Stephen M. Barr

4.2 out of 5

Language	: English
File size	: 1397 KB
Text-to-Speech	: Enabled
Screen Reader	: Supported
Enhanced typesetting	: Enabled
Word Wise	: Enabled
Print length	: 93 pages
Lending	: Enabled
X-Ray for textbooks	: Enabled

The natural sciences are a broad and diverse field of study that encompasses the study of the natural world. From the smallest subatomic particles to the largest galaxies, the natural sciences seek to understand the fundamental laws that govern the universe.

This guide provides a comprehensive overview of the natural sciences, covering the major disciplines of biology, chemistry, physics, and geology. Each section provides a brief to the discipline, its major subfields, and its key concepts. The guide also includes a list of resources for further study.

Biology

Biology is the study of life. Biologists seek to understand the structure, function, and development of living organisms, as well as the interactions between organisms and their environment.

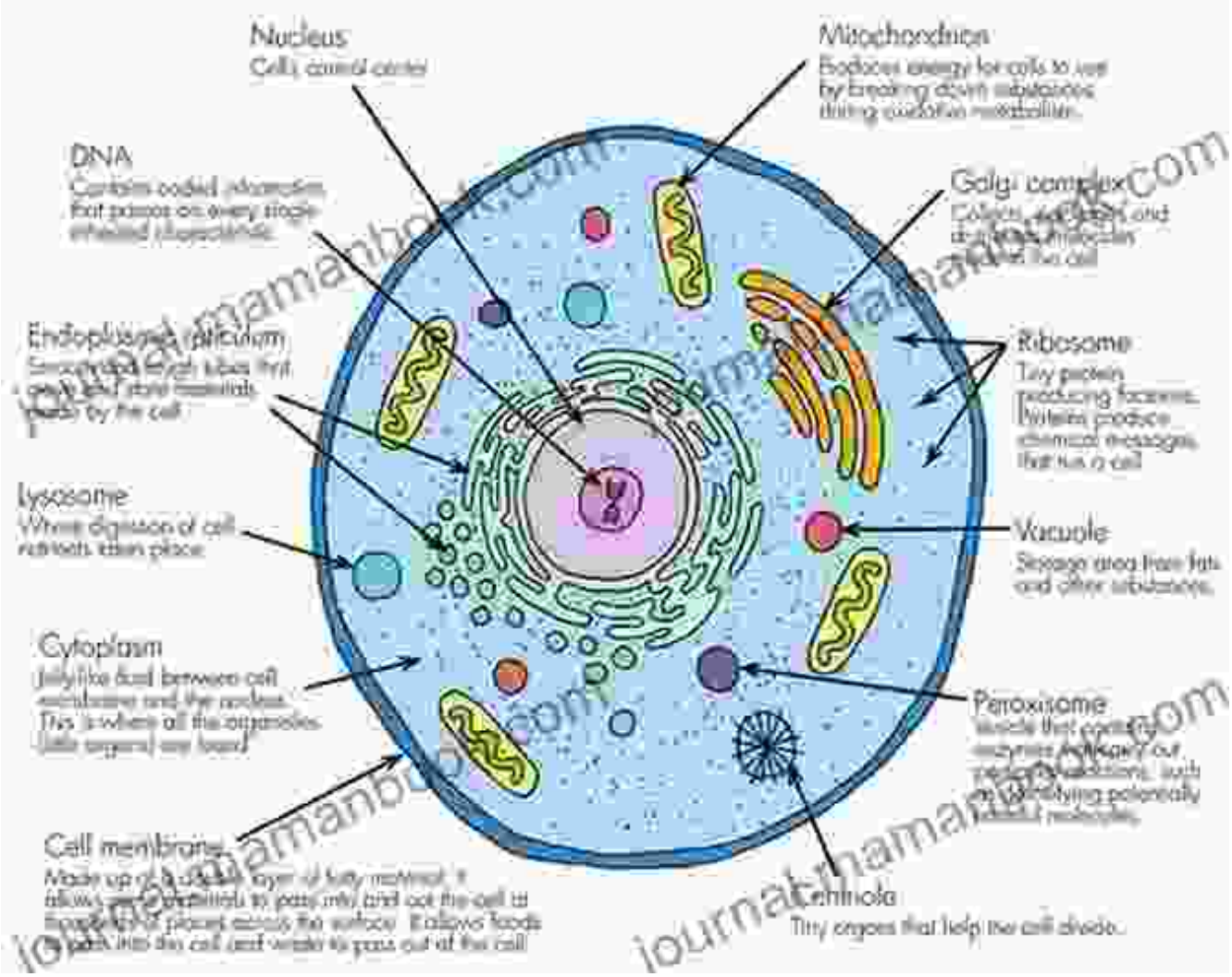
The major subfields of biology include:

- **Cell biology**: The study of the structure and function of cells, the basic unit of life.
- **Developmental biology**: The study of the development of organisms from a single cell to a complex multicellular organism.
- **Ecology**: The study of the interactions between organisms and their environment.
- **Evolutionary biology**: The study of the evolution of organisms over time.
- **Genetics**: The study of genes and heredity.
- **Molecular biology**: The study of the structure and function of molecules, particularly those that are involved in cellular processes.
- **Physiology**: The study of the function of organs and systems in living organisms.
- **Zoology**: The study of animals.

Key concepts in biology include:

- **Cell theory**: The theory that all living organisms are composed of cells.

- **Evolution**: The theory that all living organisms have evolved from a common ancestor over time.
- **Gene**: The unit of heredity that is passed down from parents to offspring.
- **Homeostasis**: The ability of an organism to maintain a stable internal environment despite changes in the external environment.
- **Photosynthesis**: The process by which plants use sunlight to convert carbon dioxide and water into glucose and oxygen.
- **Respiration**: The process by which organisms use oxygen to break down glucose and produce energy.



Resources for further study

- Khan Academy Biology
- Crash Course Biology
- edX Biology Courses
- Coursera Biology Courses
- Udacity School of Biology

Chemistry

Chemistry is the study of matter and its properties. Chemists seek to understand the composition, structure, and behavior of matter, as well as the changes that matter undergoes.

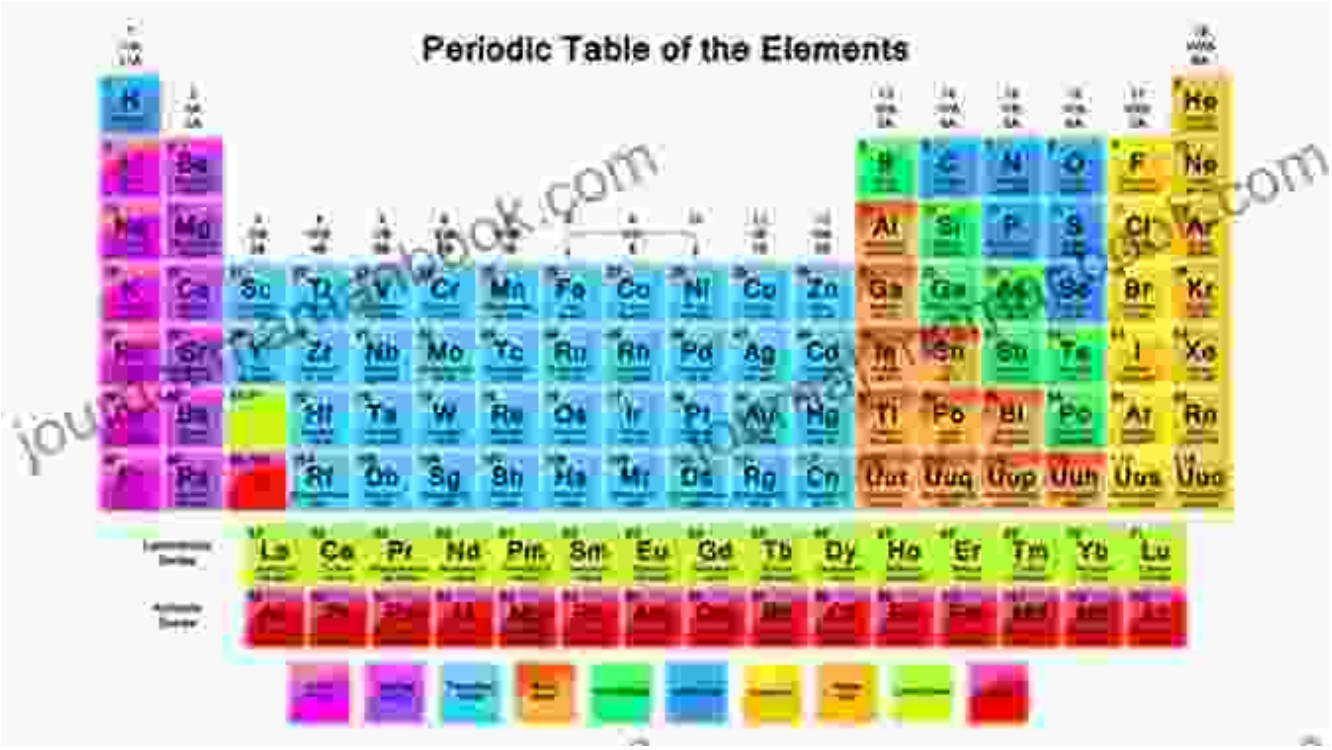
The major subfields of chemistry include:

- **Analytical chemistry**: The study of the composition and structure of matter.
- **Biochemistry**: The study of the chemical processes that occur in living organisms.
- **Inorganic chemistry**: The study of the elements and their compounds, excluding carbon-containing compounds.
- **Organic chemistry**: The study of carbon-containing compounds.
- **Physical chemistry**: The study of the physical properties of matter, such as its structure, energy, and reactivity.

Key concepts in chemistry include:

- **Atom**: The basic unit of matter, composed of protons, neutrons, and electrons.
- **Element**: A pure substance that is composed of only one type of atom.
- **Molecule**: A group of atoms that are held together by chemical bonds.
- **Chemical reaction**: A process in which one or more substances are transformed into one or more new substances.
- **Energy**: The ability to do work.

- **Equilibrium**: A state in which the forward and reverse reactions in a chemical reaction occur at the same rate.



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Physics

Physics is the study of matter and energy. Physicists seek to understand the fundamental laws that govern the universe, from the smallest subatomic particles to the largest galaxies.

The major subfields of physics include:

- **Astrophysics**: The study of the universe beyond the Earth's atmosphere.
- **Atomic physics**: The study of the structure and behavior of atoms.
- **Classical mechanics**: The study of the motion of objects under the influence of forces.
- **Electromagnetism**: The study of the interaction between electric and magnetic fields.
- **Nuclear physics**: The study of the structure and behavior of atomic nuclei.
- **Particle physics**: The study of the fundamental particles that make up matter.
- **Quantum mechanics**: The study of

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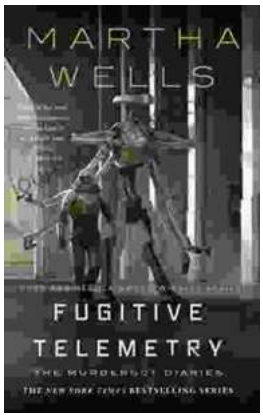

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