

Scientific method in brief / Hugh G. Gauch, Jr.

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Abstrak

The general principles of the scientific method, which are applicable across all of the sciences, are essential for perspective, productivity, and innovation. These principles include deductive and inductive logic, probability, parsimony, and hypothesis testing, as well as sciences presuppositions, limitations, ethics, and bold claims of rationality and truth. The implicit contrast is with specialized techniques confined to a given discipline, such as DNA sequencing in biology. Neither general principles nor specialized techniques can substitute for one another, but rather the winning combination for scientists is mastery of both. The purposes of this book are to enhance perspective on science by drawing insights from the humanities, and to increase productivity by fostering a deep understanding of the general principles of scientific method. The examples and case studies span the physical, biological, and social sciences; include applications in agriculture, engineering, and medicine; and also explore sciences interrelationships with disciplines in the humanities such as philosophy and law. This book engages a great diversity of viewpoints on science, both historical and contemporary, and responds by affirming sciences rationality. Informed by position papers on science from the American Association for the Advancement of Science, National Academy of Sciences, and National Science Foundation, this book aligns with a distinctively mainstream vision of science. It is an ideal resource for anyone undertaking a systematic study of scientific method for the first time, from undergraduates to professionals in both the sciences and the humanities.