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Nota di contenuto	1.Introduction -- Gateway into science -- Controversial idea -- AAAS position on method -- Science as a liberal art -- Benefits and challenges -- Personal experience -- Seven streams -- Historical and future outlook -- Summary -- Study questions -- 2.Four bold claims -- Rationality -- Truth -- Objectivity -- Realism -- Science and common sense -- Summary -- Study questions -- 3. Brief history of truth -- Most elemental question -- Aristotle -- Augustine -- Medieval scholars -- Modern scholars -- Water -- Summary -- Study questions -- 4.Science's contested rationality -- Science's auditors -- Elusive truth -- Theory-laden data -- Incommensurable paradigms -- Empty consensus -- Reactions from scientists -- AAAS posture -- Clear targets -- Summary -- Study questions -- 5.Science's presuppositions -- Historical perspective on presuppositions -- PEL model of full disclosure -- Implementation of presuppositions -- Contents note continued: Induction lost and regained -- Summary --

Study questions -- 10.Parsimony and efficiency -- Historical perspective on parsimony -- Preview of basic principles -- Curve fitting -- Crop yields -- Crime rates -- Explanation of accuracy gain -- Philosophical reflection -- Summary -- Study questions -- 11.Case studies -- Philosophy -- Electronic engineering -- Biochemistry and pharmacology -- Medicine -- Sociology -- Economics -- Law -- Discussion -- Study questions -- 12.Ethics and responsibilities -- Philosophical ethics -- Professional ethics -- Discussion -- Study questions -- 13.Science education -- Typical NOS concepts -- Better comprehension -- Greater adaptability -- Greater interest -- More realism -- Better researchers -- Better teachers -- Academic NOS concepts -- Summary -- Study questions -- 14.Conclusions -- Motion and rationality -- Summary of scientific method -- Exit questions. Contents note continued: Science's worldview forum -- Justification of knowledge claims -- Review of functions -- Summary -- Study questions -- 6.Science's powers and limits -- Rather obvious limitations -- The sciences and worldviews -- Empirical method in the humanities -- Individual experience and worldviews -- Logical roles and diagnoses -- Review of boundaries -- Personal rewards from science -- Summary -- Study questions -- 7.Deductive logic -- Deduction and induction -- Historical perspective on deduction -- Propositional logic -- Predicate logic -- Arithmetic -- Common fallacies -- Summary -- Study questions -- 8.Probability -- Probability concepts -- Four requirements -- Probability axioms -- Bayes's theorem -- Probability distributions -- Permutations and combinations -- Probability fallacies -- Summary -- Study questions -- 9.Inductive logic and statistics -- Historical perspective on induction -- Bayesian inference -- Frequentist inference -- Bayesian decision --

Sommario/riassunto

The fundamental principles of the scientific method are essential for enhancing perspective, increasing productivity, and stimulating innovation. These principles include deductive and inductive logic, probability, parsimony and hypothesis testing, as well as science's presuppositions, limitations, ethics and bold claims of rationality and truth. The examples and case studies drawn upon in this book span the physical, biological and social sciences; include applications in agriculture, engineering and medicine; and also explore science's interrelationships with disciplines in the humanities such as philosophy and law. 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.