

Elementary Logic Second 2nd Edition Latest Edition

Elementary Logic Second 2nd Edition: An In-Depth Overview

Elementary Logic Second 2nd Edition is a widely recognized textbook designed to introduce students to the fundamental principles of logical reasoning. As a core resource in philosophy, mathematics, computer science, and critical thinking courses, this edition offers a comprehensive and accessible approach to understanding the essentials of logic. Its structured content, clear explanations, and practical exercises make it an invaluable tool for both beginners and those looking to deepen their understanding of logical concepts.

In this article, we will explore the key features of the **Elementary Logic Second 2nd Edition**, delve into its structure, examine its pedagogical approach, and highlight why it remains a popular choice among educators and students alike. Whether you are considering this textbook for academic use or simply want to understand its scope and benefits, this detailed overview aims to provide all the necessary information.

Overview of Elementary Logic Second 2nd Edition

Background and Publication Details

The **Elementary Logic Second 2nd Edition** is an updated version of a classic logic textbook that has been used for decades to introduce the foundational principles of logical reasoning. Published by reputable academic publishers, this edition reflects recent developments in logic and incorporates contemporary pedagogical techniques to enhance learning.

This edition typically features:

- Clear, concise explanations suitable for beginners
- Updated examples and exercises
- Expanded coverage of modern logic topics
- Supplementary online resources and practice tools

Target Audience

The textbook is primarily aimed at:

- Undergraduate students taking introductory logic courses
- High school students interested in formal reasoning
- Philosophy, mathematics, and computer science enthusiasts
- Educators seeking a comprehensive teaching resource

Its accessible language and structured approach make it suitable for diverse learning backgrounds, ensuring that students can grasp complex concepts without feeling overwhelmed.

Structure and Content of the Textbook

Core Topics Covered

The **Elementary Logic Second 2nd Edition** systematically covers essential areas of logic, including:

- Propositional Logic
 - Logical connectives
 - Truth tables
 - Logical equivalence
 - Validity and consistency
- Predicate Logic
 - Quantifiers
 - Predicates and arguments
 - Formal proofs
- Logical Fallacies and Argument Analysis
 - Common reasoning errors
 - Techniques for evaluating arguments
- Symbolic Logic and Formal Proofs

- Formal languages
 - Deductive systems
 - Proof strategies
-
- Applications of Logic
-
- Computer science algorithms
 - Philosophical reasoning
 - Mathematical proof techniques

This logical progression ensures students build a solid foundation before moving to more complex topics.

Pedagogical Approach

The textbook employs a variety of teaching strategies to facilitate understanding:

- Structured Lessons: Clear chapter divisions with specific learning objectives
- Illustrative Examples: Real-world and abstract examples to clarify abstract concepts
- Practice Exercises: End-of-chapter problems ranging from basic to challenging
- Summaries and Key Points: Concise recaps to reinforce learning
- Online Resources: Supplemental quizzes, flashcards, and interactive tools

This approach helps students actively engage with material, develop critical thinking skills, and master logical reasoning techniques.

Key Features and Benefits of the Second Edition

Enhanced Clarity and Accessibility

Compared to previous editions, the second edition of **Elementary Logic** emphasizes clarity, with simplified explanations and improved diagrams. This makes complex topics more digestible for beginners.

Updated Content and Examples

The second edition incorporates recent developments in logic, including modern applications in computer science and artificial intelligence. Examples are more diverse and relevant, helping

students connect theoretical concepts to practical scenarios.

Additional Practice and Assessment Tools

To support learning, this edition offers:

- Additional practice problems with detailed solutions
- Online quizzes for self-assessment
- Interactive exercises to reinforce understanding

Instructor Resources

Educators benefit from:

- Lecture slides
- Test banks
- Teaching guides

These resources facilitate effective classroom instruction and assessment.

Why Choose Elementary Logic Second 2nd Edition?

Comprehensive Coverage

This textbook covers all foundational aspects of logic necessary for academic progression. Its balanced approach combines theory, formal methods, and practical applications.

User-Friendly Design

The clear layout, visual aids, and structured exercises make it suitable for learners at various levels.

Relevance to Modern Disciplines

With examples drawn from computer science, philosophy, and mathematics, the book demonstrates the interdisciplinary importance of logic.

Positive Reviews and Adoption

Many educational institutions prefer this edition due to its effectiveness in improving students'

reasoning skills and its adaptability for different teaching contexts.

How to Maximize Learning from Elementary Logic Second 2nd Edition

- Engage actively with exercises: Practice problems help solidify understanding.
- Use supplementary online resources: Quizzes and interactive tools enhance retention.
- Form study groups: Collaborative learning can clarify complex topics.
- Regular revision: Revisit key concepts and summaries to reinforce knowledge.
- Seek instructor support: Clarify doubts during lectures or office hours.

Conclusion

The **Elementary Logic Second 2nd Edition** stands out as a comprehensive, user-friendly, and academically rigorous resource for anyone interested in learning the fundamentals of logical reasoning. Its well-structured content, modern examples, and supplementary tools make it an ideal choice for students, educators, and self-learners alike. Whether you are starting your journey into logic or seeking to refine your skills, this edition offers the tools and insights necessary to master the core principles of logical analysis, argumentation, and formal reasoning.

Investing in this textbook can significantly enhance your critical thinking capabilities, preparing you for advanced studies in philosophy, computer science, mathematics, and beyond. Embrace the logical foundation provided by **Elementary Logic Second 2nd Edition** and take a confident step toward sharpening your reasoning skills.

Elementary Logic Second 2nd Edition is a foundational textbook that has served countless students and educators in the realm of critical thinking and formal reasoning. As a significant update to its predecessor, this edition aims to clarify complex concepts, incorporate contemporary examples, and enhance pedagogical effectiveness. Whether you're a student approaching logic for the first time or an instructor seeking a comprehensive resource, understanding the strengths and nuances of Elementary Logic Second 2nd Edition can significantly impact your learning journey.

Introduction to Elementary Logic Second 2nd Edition

At its core, Elementary Logic Second 2nd Edition is designed to introduce the fundamental principles of logical reasoning, argument analysis, and the formal structures that underpin sound thinking. The book strikes a balance between theoretical rigor and accessible presentation, making it suitable for beginners while still offering depth for more advanced learners.

This edition builds upon the strengths of the original, updating content to reflect new pedagogical approaches and incorporating clearer explanations, improved exercises, and expanded coverage of

topics like propositional logic, predicate logic, and fallacies. The goal is to equip students with the skills to analyze arguments critically, recognize logical errors, and develop their own well-founded arguments.

Key Features of the Second Edition

- Clearer Explanations and Pedagogical Enhancements

One of the most praised aspects of Elementary Logic Second 2nd Edition is its commitment to clarity. The authors have revised explanations to make complex topics more digestible, often using real-world examples to illustrate abstract concepts. This helps students see the relevance of logic beyond the classroom.

- Expanded Coverage of Logical Systems

The second edition broadens its scope by including more comprehensive discussions on propositional logic, predicate logic, and their applications. It introduces new symbols, truth tables, and inference rules, giving students a more complete toolkit for formal reasoning.

- Improved Exercises and Practice Problems

To reinforce learning, the book offers a variety of exercises, from straightforward practice problems to more challenging puzzles. These are carefully designed to build skills incrementally and encourage active engagement with the material.

- Integration of Contemporary Examples

Recognizing the importance of contextual relevance, the authors incorporate examples from current events, popular culture, and everyday reasoning scenarios, making logic more approachable and relatable.

Core Topics Covered in the Book

Propositional Logic

Elementary Logic Second 2nd Edition dedicates significant space to propositional logic, covering:

- Logical connectives (and, or, not, if-then, if and only if)
- Truth tables and logical equivalences
- Validity and invalidity of arguments
- Methods of proof, including truth tables and natural deduction

Predicate Logic

Building on propositional logic, the book introduces predicate logic with topics such as:

- Quantifiers (universal and existential)
- Translating natural language statements into logical form
- Formal proofs involving quantifiers
- Limitations of propositional logic and the need for predicate logic

Fallacies and Argument Analysis

Critical thinking is emphasized through:

- Recognizing common logical fallacies
- Analyzing real-world arguments
- Developing skills to construct valid arguments

Additional Topics

- Set theory basics
- Logical equivalence and simplification
- Formal proof strategies
- Applications in computer science, mathematics, and philosophy

Pedagogical Approach and Teaching Strategies

Use of Visual Aids

The book employs diagrams, truth tables, and flowcharts to clarify reasoning steps. Visual learners benefit from these tools, which make abstract concepts more concrete.

Step-by-Step Problem Solving

Each new concept is introduced gradually, with worked examples that demonstrate the reasoning process. This scaffolding approach supports mastery before moving on to independent exercises.

End-of-Chapter Summaries and Review Questions

To consolidate understanding, each chapter concludes with summaries, key terms, and review questions, encouraging active recall and self-assessment.

Online Resources and Supplements

Many editions come with online quizzes, additional exercises, and instructor resources, enhancing the overall learning experience.

Advantages of Using Elementary Logic Second 2nd Edition

- Comprehensive yet accessible: Suitable for beginners without oversimplifying key ideas.
- Logical foundation: Prepares students for more advanced courses in philosophy, computer science, or mathematics.
- Skill development: Enhances critical thinking, analytical skills, and argumentative clarity.
- Real-world relevance: Connects logical principles to everyday reasoning and modern contexts.

Limitations and Considerations

While Elementary Logic Second 2nd Edition is highly regarded, some users note:

- The density of material can be challenging for absolute beginners; supplementary tutorials may be necessary.
- The formal focus might be intensive for students more interested in informal reasoning or philosophy.
- The pace of the book requires disciplined study to fully grasp all topics.

Final Thoughts: Is It Right for You?

Choosing the right textbook depends on your goals:

- For students new to logic: The clarity, structured approach, and practical exercises make this edition an excellent choice.
- For educators: Its comprehensive coverage and supplemental resources support diverse

teaching styles.

- For self-learners: The well-organized content and real-world examples can facilitate independent study.

In conclusion, Elementary Logic Second 2nd Edition stands out as a robust, user-friendly resource that effectively bridges theoretical principles with practical reasoning skills. Its updated content and pedagogical innovations ensure it remains relevant and valuable for anyone seeking to understand and apply the fundamentals of logic.

Embark on your logic journey with confidence?this edition provides the tools, clarity, and guidance to develop your critical thinking and reasoning abilities for academic, professional, and everyday success.

Question What are the main topics covered in 'Elementary Logic Second Edition'? The book covers propositional logic, categorical logic, syllogisms, truth tables, logical equivalence, quantifiers, and basic logical fallacies. Is 'Elementary Logic Second Edition' suitable for beginners? Yes, it is designed for beginners and provides a clear introduction to fundamental concepts of formal logic. Does the second edition include updated examples and exercises? Yes, the second edition features revised examples, additional exercises, and improved explanations to enhance understanding. Are there online resources or supplementary materials available for this textbook? Many editions offer online resources such as solution manuals, quizzes, and supplementary exercises to support learning. How does 'Elementary Logic Second Edition' compare to other logic textbooks? It is praised for its clear explanations, structured approach, and practical exercises, making it accessible compared to more advanced or technical texts. Can this book be used for self-study or only in classroom settings? The book is suitable for self-study due to its straightforward explanations and exercises, but it is also used in classroom courses. Does the second edition include chapters on symbolic logic and formal proofs? Yes, it covers symbolic logic, including formal proof techniques, to help students develop reasoning skills. What prerequisites are needed to understand 'Elementary Logic Second Edition'? Basic reading comprehension and familiarity with elementary mathematics are helpful, but no advanced background is required. Are solutions to exercises provided in the second edition? Solution manuals or answer keys are often available, either within the book or as supplementary materials, to assist students. Is 'Elementary Logic Second Edition' aligned with current logical theories and practices? Yes, it incorporates foundational and widely accepted logical principles, making it relevant for students studying logic today.

Related keywords: elementary logic, second edition, logic textbook, propositional logic, symbolic logic, logic exercises, logic principles, logic fundamentals, logic concepts, logic for beginners

ITS ELEMENTARY

its elementary: A Comprehensive Guide to Understanding Its Elementary Concepts

Understanding the fundamental principles behind any subject is crucial for mastering it. When it comes to the phrase "its elementary," we delve into the core or basic aspects of a particular topic, whether in science, mathematics, education, or other fields. This article aims to provide a detailed exploration of what "its elementary" entails across various disciplines, emphasizing its importance, core concepts, and applications.

Defining "Its Elementary"

What Does "Its Elementary" Mean?

The phrase "its elementary" typically refers to the most basic, fundamental, or foundational aspects of a subject. It emphasizes the core principles that serve as building blocks for more complex ideas or systems. Understanding these elementary components helps in grasping the overall structure and functioning of the subject matter.

For example:

- In mathematics, elementary concepts include numbers, addition, subtraction, and basic algebra.
- In physics, elementary particles such as quarks and leptons form the fundamental building blocks of matter.
- In education, elementary levels refer to the initial stages of learning, such as primary school education.

The Importance of Focusing on Elementary Concepts

Focusing on elementary concepts is essential because:

- It creates a strong foundation for advanced learning.
- It simplifies complex topics, making them more approachable.
- It enhances problem-solving skills by understanding core principles.
- It aids in clearer communication and teaching of the subject.

The Role of "Its Elementary" in Various Disciplines

Elementary in Mathematics

Mathematics is often considered the most structured discipline, with a clear hierarchy from

elementary to advanced topics.

Core Elementary Concepts in Mathematics:

- Numbers (natural, whole, integers, rational, irrational)
- Basic operations (addition, subtraction, multiplication, division)
- Fractions, decimals, and percentages
- Basic algebra (variables, simple equations)
- Geometry fundamentals (points, lines, angles, shapes)
- Basic data interpretation (graphs, charts)

Why Elementary Mathematics Matters:

- It forms the basis for higher mathematics such as calculus, linear algebra, and statistics.
- It develops critical thinking and logical reasoning.
- It is essential in everyday calculations and decision-making.

Elementary Particles in Physics

Physics explores the fundamental constituents of matter and energy. The term "elementary" here refers to particles that are not made up of smaller components.

Key Elementary Particles:

- Quarks (up, down, charm, strange, top, bottom)
- Leptons (electron, muon, tau, and neutrinos)
- Gauge bosons (photon, W and Z bosons, gluons)
- Higgs boson

Significance:

- These particles are the building blocks of all matter.
- Understanding them is key to explaining the universe's origin and behavior.

Elementary Education

In education, "elementary" pertains to the foundational level of learning, typically covering primary

school.

Features of Elementary Education:

- Focus on basic literacy, numeracy, and social skills.
- Curriculum includes language arts, mathematics, science, social studies, arts, and physical education.
- Emphasizes developmental skills such as critical thinking, creativity, and social interaction.

Importance:

- Sets the groundwork for lifelong learning.
- Promotes social and emotional development.
- Prepares students for secondary education and beyond.

Understanding "Its Elementary" Through Historical Perspectives

The Evolution of Elementary Concepts

Many fundamental ideas have evolved over centuries, shaping modern understanding.

Historical Milestones:

- The development of basic arithmetic in ancient civilizations like Mesopotamia and Egypt.
- Discovery of elementary particles in the 20th century, revolutionizing physics.
- The formalization of elementary education systems in the 19th and 20th centuries.

Case Study: The Atomic Theory

- Early atomic theory posited atoms as indivisible units.
- Modern physics revealed atoms contain elementary particles: protons, neutrons, electrons.
- Ongoing research continues to explore the fundamental nature of matter.

Applying "Its Elementary" in Practical Contexts

In Science and Technology

Understanding elementary principles drives innovation and problem-solving.

Examples:

- Developing new materials based on atomic and molecular elementary structures.
- Designing algorithms rooted in elementary mathematical logic.
- Creating educational tools that focus on elementary concepts to improve comprehension.

In Everyday Life

Elementary knowledge enables better decision-making and problem-solving.

Practical Tips:

- Master basic financial literacy (budgeting, saving).
- Understand elementary health principles (nutrition, hygiene).
- Use elementary critical thinking to evaluate information sources.

In Business and Economics

Fundamental economic principles guide strategic decisions.

Key Concepts:

- Supply and demand
- Cost-benefit analysis
- Market equilibrium

Applying these elementary ideas helps in making informed business choices and understanding market dynamics.

The Significance of Mastering "Its Elementary"

Building a Strong Foundation

Mastery of elementary concepts ensures a solid base for advanced learning and professional development.

Facilitating Innovation

Innovative ideas often stem from a deep understanding of elementary principles, allowing for creative problem-solving.

Enhancing Communication

Clear communication about elementary concepts fosters better collaboration and knowledge sharing across disciplines.

Conclusion: Embracing "Its Elementary" for Comprehensive Understanding

Understanding "its elementary" is vital across various fields, from science and mathematics to education and everyday life. By focusing on the core principles, learners and professionals can develop a robust foundation, enabling them to tackle complex topics with confidence and clarity. Whether exploring the universe's fundamental particles or mastering basic arithmetic, appreciating the importance of elementary concepts unlocks the pathway to deeper knowledge and innovation.

Key Takeaways:

- "Its elementary" emphasizes the importance of core principles in understanding complex subjects.
- Mastery of elementary concepts builds a foundation for advanced learning.
- Recognizing elementary components in various disciplines enhances problem-solving and decision-making.
- Continuous exploration of elementary ideas drives technological and scientific progress.

Embark on your journey to mastering "its elementary," and unlock the power of foundational knowledge to achieve greater understanding and success in your pursuits.

Its Elementary: A Deep Dive into the Foundations of a Remarkable Concept

In the world of innovation, education, and design, the phrase "its elementary" often signifies a foundational principle, a core idea, or a fundamental building block that underpins more complex systems. Whether in science, technology, education, or even philosophy, understanding what makes something "elementary" is crucial for grasping the bigger picture. In this article, we will explore the multifaceted nature of "its elementary," dissecting its meaning, applications, and implications across various domains.

Understanding the Concept of "Its Elementary"

Defining "Elementary": The Basics

At its core, "elementary" refers to something fundamental, simple, or basic. The term originates from the Latin *elementarius*, meaning "basic" or "preliminary." In everyday language, calling something elementary suggests that it is the first step in a hierarchy of understanding or development.

In academic and scientific contexts, "elementary" often pertains to:

- Elementary particles: The smallest known building blocks of matter, such as quarks and leptons.
- Elementary concepts: Basic ideas that form the foundation of more complex theories, such as addition in mathematics or Newton's laws in physics.
- Elementary education: The initial stage of formal schooling, typically covering reading, writing, and arithmetic.

Understanding these contexts helps us appreciate how "its elementary" serves as a descriptor for the most basic, yet essential, components of a system or idea.

The Significance of "Its Elementary" in Different Domains

1. Science and Physics

In physics, "elementary" takes on a precise meaning. Elementary particles are the fundamental constituents of the universe, with no known smaller components. The Standard Model of particle physics identifies such particles, including:

- Quarks (up, down, charm, strange, top, bottom)
- Leptons (electron, muon, tau, and their neutrinos)
- Gauge bosons (photon, W and Z bosons, gluons)

Why does this matter? Because understanding the elementary particles enables scientists to explain the universe's fundamental forces and structures. The pursuit of knowledge about these particles is ongoing, with experiments like those conducted at CERN pushing the boundaries of what is considered "elementary."

Implication: Recognizing what is elementary helps scientists build models that explain complex phenomena, from cosmology to condensed matter physics.

2. Education and Learning

In education, "elementary" pertains to the foundational skills and knowledge acquired at the beginning of formal schooling. The elementary level typically includes:

- Reading and writing
- Basic arithmetic (addition, subtraction, multiplication, division)
- Elementary science and social studies

Importance: These core skills are crucial because they serve as the building blocks for more advanced learning. Mastery of elementary concepts ensures students can understand and engage with more complex subjects later on.

Key features of elementary education:

- Emphasis on foundational skills
- Focus on developing critical thinking and problem-solving
- Use of age-appropriate teaching methods
- Building confidence and curiosity in learners

3. Mathematics and Logic

In mathematics, the term "elementary" often relates to fundamental operations and principles, such as:

- Elementary algebra: basic algebraic expressions and equations
- Elementary functions: linear, quadratic, and polynomial functions
- Elementary number theory: prime numbers, divisibility

Why is this relevant? Because these elementary concepts are the stepping stones to understanding advanced mathematical theories and applications, from calculus to cryptography.

4. Design and Engineering

In design and engineering, "elementary" refers to the fundamental components or principles, such as:

- Elementary circuits: basic electrical circuits composed of simple components like resistors, capacitors, and power sources
- Elementary particles in materials science: atoms and molecules that determine material properties

Understanding these elementary parts allows engineers to innovate and optimize complex systems, from electronic devices to structural designs.

Exploring "Its Elementary": A Closer Look at Its Components and Applications

1. The Building Blocks of Knowledge

The phrase "its elementary" can imply the core elements that define a system or idea. For example, in a technological product, the elementary components could include:

- Hardware modules
- Software algorithms
- User interface elements

Identifying these elementary parts is essential for troubleshooting, upgrading, or innovating within that system.

Application: Product designers often analyze the elementary components of their systems to improve efficiency, usability, or expand functionality.

2. The Role of "Its Elementary" in Innovation

Innovation often begins with understanding and manipulating the elementary parts of a system. For example:

- In software development, breaking down complex problems into elementary algorithms simplifies debugging and enhancement.
- In manufacturing, understanding elementary materials and their properties enables the creation of new composites or products.

Case study: Apple's success with the iPhone was partly due to a focus on elementary user interface elements and hardware components that could be seamlessly integrated for an intuitive user experience.

3. The Philosophical Perspective

From a philosophical standpoint, "its elementary" can refer to the most fundamental truths or principles that underpin reality or consciousness. Thinkers like Descartes and Kant have sought to identify elementary truths that form the basis of knowledge and existence.

Implication: Recognizing these elementary truths helps build philosophical frameworks that seek to understand human perception, morality, and the universe.

Advantages of Focusing on the Elementary

Understanding and emphasizing the elementary aspects of any system or idea offers several benefits:

- Clarity: Simplifies complex systems into manageable parts.
- Efficiency: Enables targeted improvements or troubleshooting.
- Innovation: Facilitates creative recombination of elementary parts to develop novel solutions.
- Educational value: Builds a solid foundation for learning and mastery.

Challenges and Considerations

While focusing on the elementary is valuable, it also presents challenges:

- Oversimplification: Risk of neglecting emergent properties that arise from complex interactions.
- Dynamic complexity: Elementary components may behave differently in various contexts, requiring nuanced understanding.
- Evolving knowledge: What is considered elementary today may be broken down further tomorrow with scientific progress.

Example: In physics, what was once considered elementary, such as atoms, has been further subdivided into subatomic particles, illustrating the evolving nature of elementary concepts.

Conclusion: The Power of Recognizing "Its Elementary"

The phrase "its elementary" encapsulates the importance of understanding the fundamental components that comprise larger systems, ideas, or phenomena. From the smallest particles in physics to the foundational skills in education, recognizing and mastering the elementary aspects is critical for progress, innovation, and comprehension.

By appreciating the role of elementary parts, we can approach complex challenges with clarity, precision, and confidence. Whether you're a scientist probing the building blocks of matter, an educator laying the groundwork for future learning, or an engineer designing a new device, focusing on "its elementary" remains a universal principle that drives discovery and development.

In essence, the pursuit of understanding "its elementary" is not just about simplifying but about uncovering the core truths that make everything possible. Embracing this perspective empowers us to build better systems, foster deeper knowledge, and ultimately, better understand the world around us.

Question What is the main theme of the phrase 'It's Elementary'? 'It's Elementary' is often associated with the idea that something is straightforward or simple to understand, frequently used in detective stories to indicate that a solution is obvious. In which popular media is the phrase 'It's Elementary' commonly used? The phrase is famously used in the Sherlock Holmes stories, especially by Dr. Watson, to emphasize that Holmes's deductions are obvious or simple once explained. Are there any recent trends or viral content related to 'It's Elementary'? Yes, 'It's Elementary' has been used in memes and social media posts to humorously highlight situations where the solution or answer is obvious, often in the context of problem-solving or detective themes. How has the phrase 'It's Elementary' been adapted in modern pop culture? It has been adapted in various TV shows, movies, and memes as a catchphrase to denote that something is simple or self-evident, sometimes parodying the detective genre or emphasizing clarity. Is 'It's Elementary' associated with any educational content or initiatives? While not primarily an educational phrase, it occasionally appears in contexts emphasizing basic or fundamental concepts, such as elementary education or foundational knowledge, often used humorously. What are some notable quotes or moments where 'It's Elementary' is used? A notable usage is in Sherlock Holmes stories, where Holmes often states, 'Elementary, my dear Watson,' to indicate that a deduction is obvious, which has become a popular cultural phrase.

Related keywords: elementary, basic, fundamental, simple, straightforward, foundational, introductory, core, essential, primary

Read the full article online: [its elementary](#)