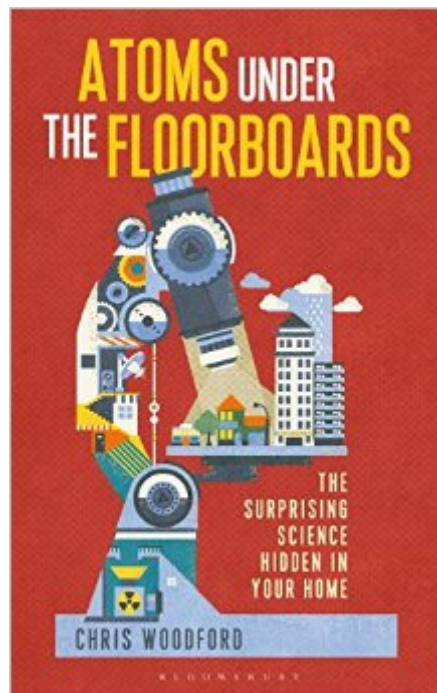


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# Atoms Under The Floorboards: The Surprising Science Hidden In Your Home



## Synopsis

Using the modern home as a springboard, *Atoms Under the Floorboards* presents the fascinating and surprising scientific explanations behind a variety of common (and often entertainingly mundane) household phenomena, from gurgling drains and squeaky floorboards to rubbery custard and shiny shoes. Packed with facts and fun, each chapter focuses on the objects and processes familiar in everyday life and slowly unpicks the science behind them. For example, the chapter on how buildings work introduces static and dynamic forces in explaining why buildings (and their foundations) don't sink into the ground and why skyscrapers don't blow over in strong winds. The chapter on bicycles explores how "a couple of more or less empty circles (better known as wheels) with a few flimsy bits of metal (spokes) stretched between them" are able to support your weight--and this leads into a discussion of compression, tension, and how gears work. After reading *Atoms Under the Floorboards*, you'll never look at everyday objects the same way again. A Physics World Top 10 Book, 2015.

## Book Information

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## Customer Reviews

I will admit that, as a hard-core science enthusiast, I found some of the earlier parts of this book to be rather boring - and that is simply because the author explains, albeit in crystal clear prose, some very elementary physics and chemistry, e.g., atoms, molecules, gravity, etc., etc., at the most basic level. However, as I read, a snippet of interesting information would occasionally appear "something that either I didn't know or never thought about. As I progressed through the book, the boring (to me) stuff gradually faded away and more and more absolutely fascinating

material was presented and very well explained - until I had difficulty putting the book down. In the book's eighteen chapters, the workings of quite a variety of things are scientifically explained: bicycles, automobiles, glue, glass, light bulbs, radio, heat, just to name a few. There are no equations (unfortunately for some) but just clear, captivating explanations. It became clear to me that the author's technique is to place all readers on as equal a footing as possible early on with the basics, i.e., what I found boring but what a non-science individual may find fascinating and necessary to get the most out of the book. Then, engaging scientific explanations are provided for a great many everyday phenomena - something that all can enjoy. Consequently, I believe that this book is fated for a very wide readership - from curious school kids to avid science buffs. I am certain that everyone has something to gain from reading this amazing book.

There's a reason for everything and everything is explainable. From bicycle wheels to dust on the bookshelf, everything has a story. Chris Woodford is the kind of person who has to understand everything inside out. I had a friend whose wife feared to bring anything home because she knew he would seize it and dismantle it and put it back together only after he was satisfied he understood exactly how it worked. Then maybe she could use it. I got the same feeling reading *Atoms Under the Floorboards*. Woodford has been this way all his life, and he relates stories from his childhood to prove it. It's very user friendly and entertaining. There are fascinating insights into things we take for granted (pretty much everything) like why our fingers wrinkle when soaked a long time, how self-cleaning windows do their thing, or how the three different types of glue work and their resulting advantages and problems. I also appreciated his description of atoms as nothing like the artwork we're used to seeing. They're more like a speck of dirt at center field in a stadium. He manages to avoid most of the math, replacing it with stories and illustrations that make the journey fascinating. He combines a childlike fascination with scientific curiosity. My favorite story concerns tea leaves and why they concentrate in the center of the cup instead of covering the entire bottom. The answer was provided in a scientific paper by a certain A. Einstein in 1926. Blissfully, there is an index in *Atoms Under the Floorboards*, so you can look at what's happening when you are faced with the issue at hand. David Wineberg

*Atoms Under the Floorboards: The Surprising Science Hidden in Your Home* by Chris Woodford - "Atoms Under the Floorboards" is a fun and engaging book that explores the science of everyday life. Popular science writer Chris Woodward takes the general public on a journey of the hidden science in one's home. This entertaining 336-page book includes the

following eighteen chapters: 1. Firm Foundations, 2. Upstairs, Downstairs, 3. Superheroics, 4. The Beauty of Bikes, 5. Car Crazy, 6. Sticky Stuff, 7. The Inside Story, 8. Amazing Glazing, 9. Saggy Sofas, Squeaky Floors, 10. Light Delights, 11. Radio Gaga, 12. Living by Numbers. 13. Blowing Hot and Cold, 14. Food Miles, 15. Stirring Stuff, 16. Water, Water, 17. Stain Games, and 18. Dressing to Impress.

**Positives:**

1. An entertaining and accessible book. Woodford keeps the science to a basic level.
2. A fun and fascinating topic, the science hidden in your home.
3. Woodford has a great command of the topic and he understands the targeted audience. His engaging style and the ability to convey complex topics in an accessible manner hits the mark.
4. Solid format. Eighteen chapters that cover a wide range of popular science topics hidden in your home. Each chapter begins with a series of questions that will be answered. The author also bold faces topics of interest and showcases subtopics in gray text boxes.
5. Effective use of diagrams to complement the narrative.
6. The book is full of interesting facts some that even debunk commonly held beliefs.
  - In fact, engineers have found that opening windows allows high-pressure, turbulent air to blast inside and increases the risk of the roof blowing off, making it more likely that the walls will collapse as well.
  - 7. A very good accessible chapter on energy.
    - There's a fixed amount of energy in the Universe and all we can do is trade it in a zero-sum game: every energy gain somewhere is exactly matched by an energy loss somewhere else.
    - 8. How the wheel works.
      - That's the hidden secret of how wheels work: they reduce friction by transferring it to the axles.
      - 9. The three main ways you use or lose energy when you cycle.
      - 10. Interesting chapter on cars.
        - The fundamental problem with cars is that a mere 15 per cent of the energy locked in petrol actually moves you down the road. The rest is wasted in various ways, including heat losses in the cylinders, frictional rubbing in the gears, the sound the engine makes, powering the electrical system and much more besides.
        - 11. A fascinating look at the stickiest and slipperiest things we're likely to encounter.
        - 12. So what makes one material different from another? Find out.
        - 13. A look at stainless steel.
          - Another big problem with iron is that it rusts very easily. One option is to paint it "over and over again in the case of a giant iron structure like the Forth Bridge. A better solution is to add some chromium to your iron-carbon mix, making the even more sophisticated alloy that we call stainless steel.
          - 14. An interesting look at glass.
            - While it's correct to say that glass is somewhere between a solid and a liquid, that doesn't mean it's still in the process of becoming a solid or will eventually solidify completely; it's as solid as it's ever going to get.
            - 15. The difference between elastic and plastic.
              - The word plastic means something more precise: flexible or changeable.
              - 16. An excellent chapter on light.
                - What is light? The short answer is

energy we can see. 17. A look at communications. The theory of radio came from playful Scottish physicist James Clerk Maxwell. Knitting electricity and magnetism together in four simple mathematical equations, he produced the first combined theory of electromagnetism in 1873. 18. The laws of thermodynamics. The Second Law of Thermodynamics rules it out. In its simplest form, it says that heat always flows from hot to cold, never the other way around (unless there's some kind of outside help). 19. Difference between heat energy and temperature. How can the water in a central heating system be dropping off heat in each room and yet still stay hot enough to deliver heat to the next room, the next and the next? It all comes back to water's high specific heat capacity: its amazing ability to retain heat thanks to all the molecules packed inside it. 20. Notes and further reading material suggestions provided.

Negatives:

1. Writing for laypersons always comes at a price. Lacks scientific depth but done so to reach general audiences.
2. The book is a little uneven some chapters are covered in more depth than others.
3. Some topics were left unaddressed. I would have added a chapter on the hidden dangers/safety in a home.

In summary, this was a fun and entertaining book to read. Woodford has a charming, innate curiosity (reminiscent of popular physicist Brian Cox) that drives him to ask questions about his environment and seeks answers to them. It lacks depth but it's an excellent book to give young adults and laypersons interested in basic science of everyday things. I recommend it!

Further recommendations:

- Rust by Jonathan Waldman,
- Stuff Matters by Mark Miodownik,
- Everyday Calculus by Oscar E. Fernandez,
- The Disappearing Spoon by Sam Kean,
- Science Matters by Robert M. Hazen
- Faraday, Maxwell, and the Electromagnetic Field by Nancy Forbes, and
- Tesla by W. Bernard Carlson.

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 Hidden Pictures: Under the Sea (Ultimate Hidden Pictures)  
 Atoms and Molecules (My Science Library, 4-5)  
 What Are Atoms? (Rookie Read-About Science (Paperback))  
 Hidden Christmas: The Surprising Truth Behind the Birth of Christ  
 The Allergy Solution: Unlock the Surprising, Hidden Truth about Why You Are Sick and How to Get Well  
 Why Information Grows: The Evolution of Order, from Atoms to Economies  
 Quantum Mechanics! The How's and Why's of Atoms and Molecules - Chemistry for Kids - Children's Chemistry Books  
 Amber's Atoms: The First Ten Elements of the Periodic Table  
 Physics of Atoms and Ions (Graduate Texts in Contemporary Physics)  
 Quantum Mechanics of One- And Two-Electron Atoms  
 Atoms and Molecules Interacting with Light: Atomic Physics for the Laser

Era Atoms in Molecules: A Quantum Theory (International Series of Monographs on Chemistry)  
Shocking Electrons: What a Second Grader Finds Interesting about Electrons, Atoms, and  
Molecules Come as You Are: The Surprising New Science that Will Transform Your Sex Life Home  
Staging for Profit: How to Start and Grow a Six Figure Home Staging Business in 7 Days or Less  
OR Secrets of Home Stagers Revealed So Anyone Can Start a Home Based Business and  
Succeed Live Your Life Insurance: Surprising Strategies to Build Lifelong Prosperity with Your  
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