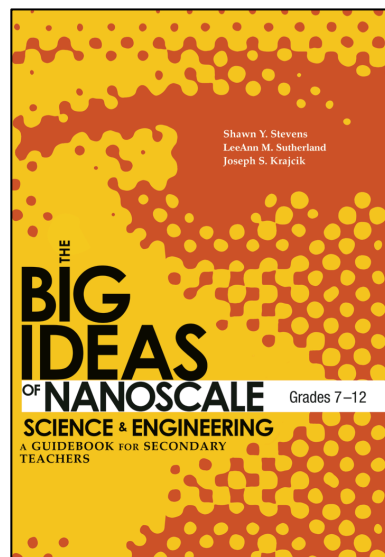


The Big Ideas of Nanoscale Science & Engineering, Grades 7–12: A Guidebook for Secondary Teachers

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Date Available: 6 July 2015
ISBN: 978 1 76001 097 3
Code/SKU: NST0973
RRP: \$21.95
Format/Page No.: A4, 208 pages
Year Level: 7–12, Teachers and Administrators
Focus Area: Classroom Practice and Direct Instruction, Professional Development
Key Learning Area: Mathematics, Science



Summary

Give the ability of nanoscience and nanotechnology to exploit the unique properties that matter exhibits at the nanoscale, the research resulting from these emerging fields is poised to dramatically affect everyday life. In fact, many widely used electronic, pharmaceutical, cosmetic and textile products already employ nanotechnology.

With the support of the National Science Foundation, scientists, educators, researchers and curriculum developers have achieved a rough consensus on what the key concepts – or “big ideas” – of nanoscience might be for middle years and secondary school science students:

- Size and Scale
- Structures of Matter
- Forces and Interactions
- Quantum Effects
- Size-Dependent Properties
- Self-Assembly
- Tools and Instrumentation
- Models and Simulations
- Science, Technology and Society

This volume provides in-depth discussions of each big idea. Nine additional chapters examine learning goals and how to reach them, students’ likely misconceptions and ideas for integrating nanoscale science and engineering with traditional science content.

An appreciation of nanoscience will help students understand fundamental science concepts across disciplines. Also, learning the enormous implications of the extremely tiny nanoscale phenomena will pique students’ interest in the study of 21st-century science and at the same time motivate them to learn traditional science.

Supporting Resources

- *Welcome to Nanoscience: Interdisciplinary Environmental Explorations, Grades 9–12* (NST1147)