

# Extreme Science: From Nano to Galactic

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## Summary

From microbes to mammoths, dinosaurs to diatoms, molecules to stars, the very large and the very small fascinate students. Capitalise on that interest and help your middle and high school biology, Earth science, chemistry, physics and mathematics students develop quantitative evaluation with *Extreme Science*. Authors Gail Jones, Amy Taylor and Michael Falvo offer a detailed look at types of scale, measurement, powers of ten, estimation and models of scale, surface area to volume relationships, limits to size and behaviours at different scales.

Scaling conceptions are one of the four recommended unifying themes in the AAAS *Benchmarks for Science Literacy*. A knowledge of scaling will serve as a solid framework for students to anchor further learning and allow them to make cross-curricular connections between seemingly disparate topics.

The investigations in this book are designed to help students develop a comprehensive and flexible sense of scale through experiences with the quantitative units and tools of science. Investigations build on research that has documented how people learn scale. To aid in comprehension, *Extreme Science* uses the BSCS 5Es to illustrate each topic. The activities help students learn to invent scales, develop benchmarks and apply body rulers (estimating using fingers, arms or pacing off distances). In so doing, students will come to understand scale on an intrinsic level and will appreciate that no problem is too big or too little to be scaleable. Comprehending scale at the largest and smallest levels is where a quantitative understanding of the world begins.

## Other Resources

- *The Big Ideas of Nanoscale Science & Engineering, Grades 7–12: A Guidebook for Secondary Teachers* (NST0973)
- *Proficiency Scales for Science Standards: A Framework for Science Instruction and Assessment* (MRL7378)