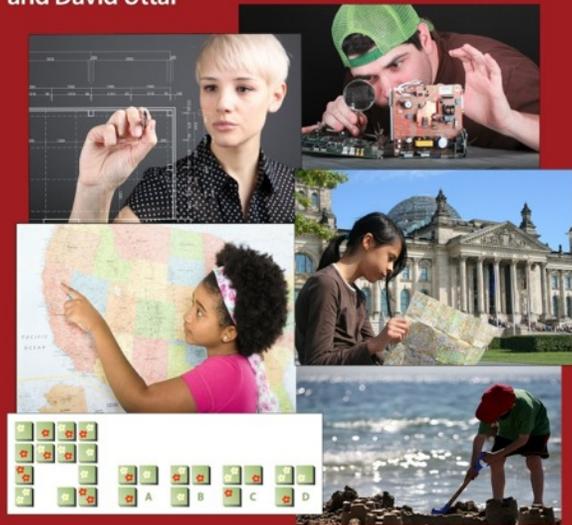


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# The People's Guide to Spatial Thinking

Diana Stuart Sinton

with Sarah Bednarz, Phil Gersmehl, Robert Kolvoord, and David Uttal



NATIONAL COUNCIL FOR GEOGRAPHIC EDUCATION

Learn about spatial thinking and why it should be an important component of every child's education.

## The Peoples Guide to Spatial Thinking A Foundation for Educational Success

**Author:** Diana Stuart Sinton  
with Sarah Bednarz, Phil Gersmehl, Robert Kolvoord, and David Uttal

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## The People's Guide to Spatial Thinking A Foundation for Educational Success

Throughout their lives, people think spatially in many diverse situations as they comprehend problems and seek solutions. *The People's Guide to Spatial Thinking*, the latest publication from the National Council for Geographic Education, defines spatial thinking for a broad audience, describes how it works, and shows why it should be an important component of every child's education.

Spatial thinking is a form of learning how to learn, a practice that involves an ability to visualize and interpret locations, positions, distances, and movements. The National Science Board has identified spatial thinking skills on par with quantitative and verbal reasoning skills in so far as success in science, technology, engineering and math (STEM) innovators can be identified. Spatial thinking is also fundamental to the knowledge, skills, and practices of geographers as they evaluate patterns and processes. The ability to interpret information through maps and graphs is neither intuitive nor automatic, but is an essential component of thinking and learning in the 21<sup>st</sup> century.

In this brief and accessible book, Diana Sinton and her fellow co-authors illustrate how spatial concepts help us think across the geographies of our life spaces, physical and social spaces, and intellectual space. *The People's Guide to Spatial Thinking* draws from a growing body of knowledge from the National Research Council and independent scholars and educators in the field.

### About the Authors:

**Diana Stuart Sinton** is a geographer who works for the University Consortium for Geographic Information Science. She likes to teach, read, write, and talk about GIS, geography education, and spatial thinking. Since the late 1990s, she has pursued these activities under direction and support from the National Science Foundation, the National Endowment for the Humanities, Esri, the W. M. Keck Foundation, the Andrew W. Mellon Foundation, the European Union, and several universities, including the University of Redlands. You can learn more about her professional experiences at [dianamaps.com](http://dianamaps.com) and [teachGIS.org](http://teachGIS.org).

**Sarah Witham Bednarz** is a professor of geography at Texas A&M University and a recovering high school teacher. She was part of the team that developed *Learning to Think Spatially* and co-chaired the Geography Education Research Committee for the Road Map for 21st Century Geography Education project. From 2005 to 2009, Sarah directed a K-12 project Advancing Geospatial Skills in Science and Social Science.

**Phil Gersmehl** grew up surrounded by teachers: both parents, a grandfather, every uncle, several cousins, wife, and father-in-law. After a PhD in geography from the University of Georgia, he taught at Concordia Teachers College, the University of Minnesota, and the City University of New York. His research focus has always been on the border between disciplines—between erosion-control engineering and the origin and propagation of error in resource GIS, between agricultural economics and behavioral psychology, and now between neuroscience, educational policy, and environmental modeling. Thanks in part to the New York subway system and a job that required a dozen 15-minute trips per week, standing on a train whose swaying precluded most other activities, he has read several thousand articles about spatial reasoning, in more than 300 journals in a dozen disciplines.

**Bob Kolvoord** is a professor of integrated science and technology at James Madison University, where he also serves as Interim Dean of the College of Integrated Science and Technology. His research focuses on use of geospatial technologies in K-12 classrooms and how students' spatial thinking skills develop as they use these tools. He is the co-creator of the Geospatial Semester and a co-author of three books on the use of GIS and remote sensing in decision making.

**David Uttal** is a professor of psychology and education at Northwestern University. His interests are in the relation between spatial ability and STEM education, the development of map-reading skills, and methods for enhancing spatial thinking.