MAP IT! WITH YOUNG CHILDREN

How do young children learn to read and interpret maps? How can you best support that learning?

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By Christina Riska, National Geographic Education

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If a map of the world shows the United States in pink, do you think it is literally a pink country? You may not, but believe it or not, this is a common misconception for kids ages 3 to 6.

As adults, maps—whether print or digital—are a part of our everyday lives. But how do we first learn to read and interpret them? And what common mistakes do we make along the way? The answers to these questions have implications across subject areas. So whether you teach English language arts, science, or social studies, it’s critical to understand how children first develop these spatial skills.

Spatial thinking is arguably one of the most important ways of thinking for a child to develop as he or she grows. All individuals, to greater or lesser extents, use this type of thinking as they interact with the world around them. It’s a
unique way of thinking about the world and interacting within the world.

Spatial thinking involves visualizing, interpreting, and reasoning using location, place, distance, direction, relationships, movement, and change in space. Children need to learn not just spatial concepts and skills, but also spatial language. The benefits are enormous. A student who has acquired robust spatial-thinking skills and language is at a distinct advantage in our increasingly global and technologically interconnected society.

To illustrate how children’s spatial-thinking skills develop across the elementary grades, below is an example of just one spatial concept—map symbols—at different developmental stages.

**Grades preK-1 (ages 3 to 6)**

At this stage, children are learning and working with letters and numbers, so it makes sense that they are also able to begin the process of learning spatial and geographic symbols. However, understanding that maps use symbols to represent referents in the world is a difficult concept for young children. Some children may understand that concrete symbols represent an object or place in the real world, but it depends on how recognizable the icon is to the child.

Abstract, unrelated symbols, large numbers of symbols, or complexity of symbols are not understood well at these ages. Even though 5- to 6-year-olds show they understand a mapmaker’s intent when choosing a symbol to represent a referent, they still focus on aesthetic qualities that “match” that referent. For example, if given the choice between red or green symbols to represent fire trucks, the red will be more “matched” in the child’s mind, even if
he or she is told that the green is a symbol for fire trucks.

Challenges

Students may confuse symbols with real-world referents, based on things like color. They may focus on color similarities and get confused when color does not match their ideas for the referent. Interpreting a map with the U.S. represented as a pink country as literally being a pink country is one example of this. They may also focus on size or scale issues and get confused if a symbol does not match their ideas about the size of the referent.

Grades 2-4 (ages 7 to 9)

By age 9, children are starting to better understand symbols, but many 7- and 8-year-olds still focus on aesthetic qualities like color when looking at map symbols. Iconic symbols make sense to 7- and 8-year-olds (e.g., a pine tree representing a park or forest), but abstract symbols are still difficult until a child reaches about age 9. During this transition from iconic real-world symbols to abstract symbols, students will benefit from explicit guidance on what symbols mean and from your modeling of how to read maps and how symbols are developed and used. To support this developmental stage, have students construct maps collaboratively and use discussion to reason about their decision-making when choosing certain elements, such as symbols, on maps.

Challenges

Students continue to face the same challenges as younger children, although fewer students at this age make errors the same as younger children's. They continue to struggle with any abstract symbols and do better with iconic
symbols until about age 9.

**Grades 5-6+ (ages 10 and older)**

Nine to ten-year-olds consistently show they understand that symbols do not always “look like” the referent, but can stand for the referent. They have a much better grasp of these types of relationships and rarely get sidetracked by aesthetic qualities like color.

In these grades, elementary-age and preadolescent children are able to use maps with different symbol systems. These symbol systems may include color and abstractions, different projections, and different themes. Sixth graders usually perform equally well on tasks that use abstract symbols (e.g., points, lines, and polygons) as they do on tasks that use real-world symbols (e.g., giraffes, roads, areas of a park), so both abstract and real-world symbols can be used at this grade level.

**Challenges**

Some students may still get sidetracked by color and other aesthetic issues, such as always thinking blue means water because it often does on maps. To prevent struggles, abstract symbols should be included in map keys and reviewed before a mapping activity begins to remind students of the nature of symbols in mapmaking.

**Conclusion**
Providing children with opportunities for learning how to think spatially is critical. Direct instruction is important in order to make sure children have a solid understanding of spatial relationships, or "mental maps." A strong foundation in spatial thinking and vocabulary will serve as a framework throughout their lives, creating the "hooks" needed to truly process, understand, and navigate the world. Opportunities should align with their conceptual understanding and you should be aware of possible misconceptions.

View the media carousel above for information about developing other spatial concepts with children in Grades preK-5+, and the implications for the types of materials you should use with your students. Learning experiences designed with research on spatial-concept development at their core support children in developing increasingly robust spatial-thinking skills.

No matter what you teach, do you see all the possibilities for using this with your students?

This article first appeared in the National Geographic Education blog and was adapted from the report, Spatial Thinking About Maps: Development of Concepts and Skills Across the Early Years. Read the executive summary or the full report to find out more.

For specific activities that address the spatial thinking abilities of young children and developmental appropriateness, visit our Map Skills for Elementary Students collection.

Vocabulary
<table>
<thead>
<tr>
<th>Term</th>
<th>Part of Speech</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>map</td>
<td>noun</td>
<td>symbolic representation of selected characteristics of a place, usually drawn on a flat surface.</td>
</tr>
<tr>
<td>map skills</td>
<td>noun</td>
<td>skills for reading and interpreting maps, from learning basic map conventions to analyzing and comprehending maps to address higher-order goals.</td>
</tr>
<tr>
<td>spatial thinking</td>
<td>noun</td>
<td>collection of learned skills including the elements of concepts of space, tools of representation, and processes of reasoning.</td>
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</table>

**Instructional Content**
- National Geographic: Collection—Map Skills for Elementary Students

**Interactives**
- National Geographic: Educational Games

**Maps**
- National Geographic: State Tabletop Maps
- National Geographic: Maps of Familiar Places

**Reference**
- National Geographic Report: Spatial Thinking About Maps—Development of Concepts and Skills Across the Early Years

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