

Maps and Spatial Thinking

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Spatial Thinking

- Is not an innate or static ability, it requires practice
- It involves understanding location and movement of objects in space
- “The intuitive awareness of one’s surroundings and the objects in them”...
- “Spatial sense is necessary for understanding and appreciating the many of geometric aspects of our world” (OME, 2005, p. 9)

Maps and Spatial Thinking

- Using, reading, and creating maps can be a really effective way to apply spatial thinking skills in a practical sense
- As many experiences are becoming obsolete in the digital world, mapping is a critical tool to help students to build spatial thinking skills
- The use of maps can help students know their position in the real world

Supporting Spatial Thinking

- The "relationship between maps and the development of spatial cognition is reciprocal in nature". (Uttal, 2000)
- The skills of using and reading maps are not directly correlated with high levels of spatial reasoning, it takes experience and practice to become fluent working with maps



Importance of Spatial Thinking

The Ministry of Education (2014) points out that recent research indicates that spatial awareness is a better predictor of later academic success than math scores and verbal skills. Similarly, Mohan and Mohan (2013) highlight that spatial thinking is strongly correlated with math and science abilities, suggesting that students who develop strong spatial thinking skills are at an advantage.

What Research Tells Us?

- Piaget proposed a progression of spatial concepts that outline three different stages of development at which children are likely to begin thinking in spatial ways, topological, projective, and euclidean (Mohan and Mohan, 2013).
- Spatial thinking is to some degree a naturally developing concept. Mohan and Mohan (2013) highlight that already at age three children are beginning to show an understanding of spatial relationships through their use of positional language (on, between, around, beside or inside) with little to no explicit instruction on the topic
- Gersmehl and Gersmehl (2007) suggest that over time “humans have developed a surprisingly large number of distinct, often subtle, and occasionally complex ways of describing location” (p.181)
- Mooney (2013) suggests that when students are given the opportunity to create and use maps of their own environments they are able to use spatial thinking skills in a functional and personal way.
- Kris (2018) suggests that maps are an important aspect of spatial awareness, stating, “maps support spatial thinking by helping children visualize where objects, places, cities, and countries are in relation to one another. Quite literally, maps help them figure out their place in the world” (para 2).

Mapping Activity:

Step One: Draw a detailed map of your classroom.

Include: Doors, windows, and all significant furniture

Step Two: Pick a beginning and finishing point on your map, but do not label them.

Step Three: Give your map to a partner. Talk your partner through navigating their way across the classroom using only directional language from the start to end point.

- a) Describe the beginning point
- b) Give them step by step instruction on how to move through the room to end up at the finishing point

Step Four: Check to see if your partner ended up at the correct point.

- a) If they ended up at a different location, discuss why.
 - a. Did they begin at the wrong location?
 - b. Did they take a different route?
- *How did your direction language impact their understanding?

Step Five: Switch roles and complete the steps 2-4 again on the other person's map.

Curriculum Connections:

Grade One:

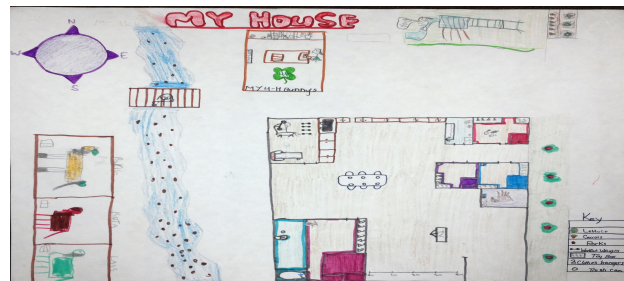
- (1) Describe the relative locations of objects or people using positional language
- (2) Describe the relative locations of objects on concrete maps that are created in the classroom

Grade Two:

- (1) Describe the relative locations and movement of objects on a map
- (2) Draw simple maps of familiar settings, and describe the relative locations of objects on the maps (OME, Mathematics, 2005).

Supporting Students:

- Create maps more than once allowing for additional opportunities to manipulate spaces and objects
- Make objects easy to change around (ex: sticky tack, magnets, Velcro)
- Use photos of "actual" objects rather than shapes to represent objects
- Discuss what areas/objects belong on the map (ie. Elements of a map)
- Have students compare different maps of the classroom



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