

# Let's Make a Map

## The Developmental Stages of Children's Mapmaking

Eugene Geist

As children explore their environment, they walk and move through space, constructing a mental coordinate system to organize their world—in other words, they are making a mental map. Each time children turn or reference a landmark, they exercise their mental mapping ability, and each time children explain how to get from one place to another, they get better at building a two-dimensional representation of their world (Piaget, Inhelder, & Szeminska [1960] 2000).

Children's understanding of spatial relations is not simply a matter of accumulation or direct teaching about maps or mapping concepts. Children gain their understanding of this two-dimensional representation of space, which we will call a *mental map*, in a developmental sequence (Piaget, Inhelder, & Szeminska [1960] 2000). As with other developmental tasks, a stimulating environment is beneficial for learning about spatial relations. While children collect a lot of information about their surroundings through their journeys and exploration of their environment, learning to coordinate these landmarks and paths in and through space is complex. Children gradually construct a mental map with which they structure their understanding of space. In this article, the author uses Piaget's seminal work, *The Child's Conception of Geometry*, as a guide, having found that many of his observations of children's mapmaking were in line with Piaget's predictions.

### Developmental milestones in mapmaking

The maps children make can offer insights into how they develop their spatial reasoning, depicting how they think about their position in space and how they perceive



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everything around them to be connected. Children make errors not because they need more practice drawing maps but because they are mentally reconstructing the space around them in two dimensions. Their mental representations of their surroundings are still developing, so at this age they often make maps that differ from reality. Yet each time children make a map, either on paper or mentally, they reexamine their surroundings and may fix errors that they made on their previous representation of their world. Let's look at how children's spatial thinking develops.

### Limited spatial thinking

It takes time for children to develop the cognitive skills to recognize familiar places and the routes they take to get there. Children ages 18 months to 3 years old are usually too young to make maps. These young children

often show an abundance of egocentric thinking which can hinder their ability to make accurate representative maps. For example, in Piaget's study of children's mapmaking, one child believed his house was always going to be behind him, no matter what direction he was facing. Children this age are still in the very early stages of creating a mental understanding of how places relate in space (Piaget, Inhelder, & Szeminska [1960] 2000).

### Sensorimotor thinking

Children ages 3 to 5 can create drawings of maps that represent relationships between objects and places. However, children's descriptions of where these objects are and their routes to them do not always correspond with external reality. When making maps, children this age tend to focus on the sensorimotor activities they engaged in during a journey rather than on the objective route (Piaget, Inhelder, & Szeminska [1960] 2000). For example, a child may describe her map in motor terms by saying, "I walked a while and then turned and then walked some more and turned again." She may recall the place where she stopped to smell a flower or to observe a rock and consider it to be a significant part of the map, even if she doesn't know exactly where on the route it happened. The child thinks mainly about her movements, which is what she highlights when she draws her map.

Because preschoolers mostly focus on their own movements when getting from place to place, their maps are not typically based on landmarks (as most adults' maps are). To support children's ability to use landmarks in their mapmaking, teachers can take children out for neighborhood walks, point out landmarks, and discuss how to get back to the school from a certain location. As classes venture farther from the school, teachers can pick other landmarks to highlight.

### Subjective landmarks

Older preschool children have the ability to put two or more landmarks into a spatial relationship; however, this relationship is rarely based on objective reality (Piaget, Inhelder, & Szeminska [1960] 2000). A child will often pair landmarks that do not belong together because the child makes repeated journeys between them or because the landmarks are familiar or special to the child. The child uses his subjective construction of reality as the basis of the relationship (Piaget, Inhelder, & Szeminska [1960] 2000). A child may know that a



This map uses landmarks, like the pond and school building. A dotted line indicates the path taken.

certain spot is between home and school without being able to explain exactly where it falls along the route.

For example, Michael, age 4½, a child at Ohio University's Child Development Center (CDC), follows a particular route each day to get to and from school. One day construction forced his father to take an alternate route to school. When Michael asked his father why they were going this way, his father said it was the "scenic route." When Michael's class later created maps of the walk they often make from their classroom to the school garden, Michael included the scenic route in his map, even though it was far from the actual garden.

As teachers of young children, we could tell Michael the error he made and show him how to draw his map correctly. However, we know from Piaget's study of children's mapmaking that children get better at representing external reality with a two-dimensional map only through repeated exposure to mapmaking and by thinking about their surroundings as they explore their environment (Piaget, Inhelder, & Szeminska [1960] 2000). Through this interactive



process, children develop the ability to use landmarks to structure their journeys—a major achievement because adults invariably use landmarks when giving directions to others (Piaget, Inhelder, & Szeminska [1960] 2000). Adults might say, “Get off the highway at exit 23, and take a right on Main Street at the stop sign. Then go down Main Street for three blocks, and take a left at the light.” Children who use motor activity to give directions, however, would be more likely to say, “Go to the corner and then turn and walk a while, and then turn again and you are there!”

## Mapmaking activities using landmarks

Teachers in one CDC preschool classroom for children 4 and 5 years old would regularly take the class on walks around the school. During and after these walks, teachers encouraged children to represent the things they saw and how they got to certain locations. Teachers supported the children’s mental pictures of places and related landmarks by asking questions and encouraging them to talk about what they experienced. Children also shared their representations with the class. These representations took the form of drawings, maps, sculpture, and even dramatic play.

## Making spatial relationships in three dimensions

One group of children journeyed with a teacher to the Zebu Jungle—a small wooded area near the school—to document the area using a camera. They later referred to the photos to help them remember what they had seen, adding detail to their maps and sculptures. During the trip, some children were interested in using their senses to find, examine, and record items in the environment, such as a baby acorn and landmarks like “the W Tree.” Other children were content to explore through motor activities, such as climbing to the top of a hill and sliding down.

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Back in the classroom, some of the children wanted to recreate the Zebu Jungle using clay. The teachers helped them think about the Zebu Jungle by asking them about what they saw and how they got there. For example, the teacher asked, “Where was the pond?” and “How did we get there from here?” The children spent a lot of time considering how different aspects of the Zebu Jungle related to one another. They wondered, for example, where the W Tree should go in relation to the hill that was so much fun to slide down. Where should the baby acorn go? Making these types of decisions requires children to contemplate landmarks and spatial relationships, helps them strengthen their two-dimensional coordinate system (mapping), and provides opportunities to use landmarks to organize their spatial thinking (Piaget, Inhelder, & Szeminska [1960] 2000).

## Translating mental maps to paper

Whether a child is using a three-dimensional material, such as clay, or drawing a two-dimensional representation on paper, the mental process is the same. The child is thinking about his position in space and using a medium to represent his mental understanding. The teachers in the preschool classroom supported other activities to help children use landmarks in their maps. A few weeks after making

the clay representations, the teachers noticed children making treasure maps and decided to extend their curiosity about the exploration of maps through their discussions. One such discussion occurred during a class meeting when the teachers asked the children, “What do we use maps for?” Children’s responses ranged from “Maps show you where you need to go” to “I don’t like the smell of maps” to “You can fold them up and put them in your backpack, like Dora.”

After the meeting, three children—Blanca, Sergio, and Gerald—chose to work on “maps of the places we walk to.” Sergio focused on bricks. Ohio University contains many brick roads and buildings, so children typically see a lot of bricks on their walks. When drawing his map, Sergio decided to make bricks a landmark at the start of their walk, and he added a ghost to his map. This is probably not because he saw one but because it was something that was on his mind. Young children often include things that are interesting to them on their maps. Piaget, Inhelder, & Szeminska ([1960] 2000) reported how children often put a “sweet shop” near their home even when it is actually on the other side of town.

**Sergio:** I’m gonna draw bricks now.

**Blanca:** I have to draw lots of trees. There are lots of trees on that corner where we go to the nature trail.

**Sergio:** I’m gonna still draw bricks ‘cause there are lots and lots of bricks. I’m making a ghost because I’m scared of ghosts outside at night. I’m not scared of anything on our walks.

The teacher documented all of the children’s hard work in experience journals that they send home to the parents daily. Here’s one teacher’s entry describing the development of the children’s maps over several weeks:

They [the children] are beginning to translate their mental maps onto paper. The bricks are often part of our walks, and it seems as though these bricks might signify the beginning of a walk. If nothing else, they are a memorable part of the walk experience.

## Making maps in the moment using landmarks

When the teachers compared the children’s conversations to their maps, they realized that the children were beginning to translate their mental maps onto paper more accurately using objective landmarks.

## Supporting Mapmaking

It is important to note that, developmentally, children do not go through these mapmaking stages in just a couple of weeks. The examples in this article show a cross-section of children at varying levels of development and ability over time. However, the active learning environment that the teachers offered the children, along with opportunities to represent their thoughts on paper, helped them develop their use of landmarks and strengthen their spatial awareness. Here are suggestions for introducing maps in your classroom:

- Have children follow maps to get to destinations or to talk about places they have been. Look for maps in stores, in books, or on the Internet. They can be local, city, town, state, or national maps. They can even be maps the children make. As children orient themselves and translate what a map depicts to what they see on their daily journey, they will begin to construct a mental spatial awareness.
- Go for walks and take excursions often. Let children explore and learn about the environment around them. At the CDC there were special places the children liked to go to—the Zebu Jungle and the Time Tunnel are two mentioned in this article.
- Talk about what you are seeing on your journeys. Point out landmarks as you go. Ask children questions about what they see and what they like. Children will notice and remember important things, such as the bricks.
- Be sure to stop often and explore. Children incorporate a lot of sensorimotor knowledge into their maps. Find acorns and touch the tree bark that has an interesting look. Let children climb rocks or walk through fallen leaves. Ask them what they hear and smell. These actions and questions will help children remember that place.
- Encourage children to use landmarks they’ve seen on their explorations to describe where things are located (e.g., next to the big lamp post or near the pond). Ask children to think about where they touched the bumpy tree or smelled a skunk, where they found an acorn or heard a scary noise.
- Use relational words such as *before*, *after*, and *near* with children to describe where the experiences took place. Invite children to talk about their perceptions by making group maps where children have to discuss and agree on where to place things on the map.
- Provide opportunities for children to represent their spatial knowledge whenever possible. Whether this activity incorporates paper and crayons or modeling clay, when children represent their world in two or three dimensions, their minds reconstruct the reality of the place. Each time children make a map, their ability to do so accurately increases.





Some children used the sun as a landmark.

They then decided to put the children's mapmaking abilities into action and organized trips centered on locating landmarks and making maps as they walked.

The children carried markers and clipboards with paper to document their walk. As you can see, their maps were quite elaborate and included many landmarks the children felt were important. While the maps are not perfectly precise when weighed against objective reality, they do show that the children made significant progress in their mental maps and in discerning spatial relationships between landmarks. One of the teachers described the walk this way in an experience journal:

As we were walking, we stopped to draw landmarks and discussed their relationship to where we had been and where we were going. Many of the representations were quite accurate to objective reality as far as some of the turns that we made and on which side landmarks were located.

In a final example, children used landmarks to plan their trip to the Time Tunnel—a passageway under a busy road. It was special to them because it led to the river where they often went to observe geese and because they liked the way their voices echoed and sounded “weird.” As one of the children's favorite destinations, it was a prominent feature on their maps. All the children contributed to a group mapping activity as they decided which route to take. A teacher noted in a journal entry,

We have been working on maps for the last couple of weeks, challenging the children to draw maps of our school, classroom, the garden, and the walks we take, as well as other places. Today the children were engaged in active creation. Instead of asking them to create a map based on their mental maps, we created maps as we went along a path we have followed many times before. Equipped with paper, markers, and clipboards, Jaxon, Liam, Eleanor, and Keith set out to create a map as we took a walk. We sat down outside the school, talked about a destination, and unanimously decided to walk to the Time Tunnel. We began our maps by drawing the starting point—the Child Development Center. Then we set out for the Time Tunnel, stopping at various places to add details to our maps.

## Conclusion

The growth of spatial relations is not merely a matter of accumulation or direct teaching about maps or mapping concepts. Children collect a lot of information about their surroundings through their journeys and by exploring their environment. Gradually, children construct mental maps with which they structure their space. As children are exposed to new experiences and journeys, these maps evolve to better represent accurate relationships between landmarks.

As with many other concepts, this is a developmental process, and many similarities are apparent between maps drawn by children at certain ages. These stages in map development can help us understand how children think about their world. Teachers can support their construction of these concepts through mapping activities.

The importance of children's exploration of their environment goes beyond the obvious benefits of

physical activity and exposure to nature. As children walk, they are constructing a mental coordinate system. Each time children make a turn or reference a landmark, they are building their mapping ability, and each time children explain how to get from one place to another, they are constructing their two-dimensional coordinate system. So get out there and take children for mapmaking walks!

## Reference

Piaget, J., B. Inhelder, & A. Szeminska. [1960] 2000. *The Child's Conception of Geometry*. New York: Routledge.

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