

# “A” is for Aerial Maps and Art

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**The technology of satellite imagery** and remote sensing adds a new dimension to teaching and learning about maps with elementary school children. Just a click of the mouse brings into view some images of the world that could only be imagined a generation ago. For example, with Google Earth, a teacher can zoom in and locate schools, houses, football fields, or parking lots in the neighborhood.<sup>1</sup> MapQuest offers a similar “aerial image” with a zoom function.<sup>2</sup> Close-up aerial pictures of the school and neighborhood quickly catch the interest of young children and nurture their sense of wonder about where things are and how they got there.

At first thought, aerial imagery may seem too complicated to use as a teaching tool for mapping in elementary school. Yet aerial imagery is already a part of the pop culture. It is commonly incorporated into movies, videos, and television shows and certainly into the vast collection of games for the newest PlayStation. Skillful videogame players reorient themselves to new environments from various perspectives to follow animated characters who rapidly move through spatial dimensions. The sense of playfulness can extend through the lessons that use aerial imagery and art to increase geographic literacy among second-grade students. Such lessons can specifically address four Texas state learning standards for second-grade essential knowledge and skills: direction, distance, location, and symbols. Students are expected to be able to determine direction, measure distances, find locations, identify map symbols, understand characteristics of places, and describe

ways in which people have modified the environment.

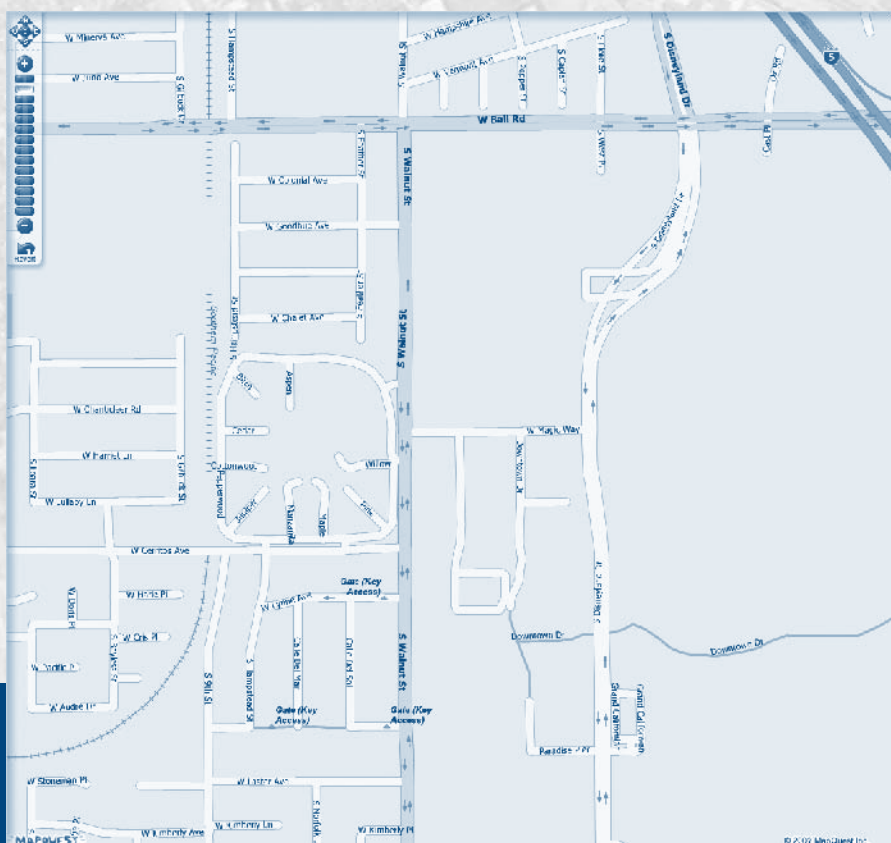
## The Team

We (a group of graduate students, and two university faculty members) developed this series of lessons to promote geographic literacy in collaboration with four elementary schools. We chose second grade classes because teachers at that level said they struggled to find time to teach geography during the year and saw that as a curricular need. They were not sure how to teach geography effectively and hoped that the project would enrich social studies content in second grade. The children had the reading and communication skills to be successful with the project, but were not time-constrained by state-mandated tests, which begin in

third grade. The collaboration consisted of a session with teachers and graduate students in the geography lab on campus, two visits to classrooms by faculty and graduate students, and a follow-up extension lesson planned by graduate students and classroom teachers. The following article describes the collaborations in the classrooms.

## Observing the Local Landscape

At a young age, children play with floor blocks and toy houses and buildings while they develop an understanding of their environment and learn to map out their thinking about new places.<sup>3</sup> Such play activities formed a basis for enhancing geographic literacy in our second grade students (approximately eight years old), but they did not prepare students to



### Street View

This MapQuest map of Disneyland in Southern California uses the “Street View” map format.

Courtesy MapQuest.com



observe their environment in an unusual way.

The best introduction to mapping a neighborhood community for a cartographer of any age comes from field observations. Walking around the school with a notepad in hand, and even going a couple blocks beyond, promotes observation and an understanding of location of objects on the landscape. Students sketched the front of the school, the bus loading zone, and a water tower in the distance. As teachers pointed out what was next to the bus zone, students practiced map skills of representing distance and direction as they added details to their sketches. A rough shape became a shorthand symbol for a particular object.

Students learned about cardinal directions by using their bodies as a focal point in the larger environment. Facing west, students could feel the warmth of an afternoon sun. Facing east, they could observe their shadows on the playground. These exercises added sensory awareness to reinforce the concept of directions.

### On the Floor

Back inside the classroom, the floor

became the site for learning about mapping, but instead of manipulating building blocks, we created a map of the primary streets around the neighborhood school using masking tape. Making the corners and extending the arterial streets activated tactile learning in some of the same ways that playing with floor blocks did. Kids scooted back and forth to align the streets, adding extra pieces of tape to form intersections with major highways. This process did not result in a map drawn perfectly to scale, but it did show that students were thinking about distance in terms of “near and far.”

We provided photos of sites in the neighborhood, rather than using cardboard boxes to represent buildings. Students negotiated with one another where to place photos on the floor map so that the map would be as accurate as possible. One student insisted, “The video store is on the other side of the street, across from Annie’s,” and she was right. Another explained, “You have to turn the other way to get to Sonic.” With a teacher’s leading questions, students continued to expand the map to include significant landmarks beyond the immediate school

neighborhood. One class added the local wildlife preservation center; another added the fairgrounds and the ranching heritage museum, placed correctly on the grid of streets.

### Learning about Aerial Perspective

Students’ rough maps were not ends in themselves, but a means to better understand the environment.<sup>4</sup> The next step challenged children to match the street-level photos on the floor map with a view of the same places taken from an aerial perspective. What does the school or a playground look like from a bird’s eye view? The key on a map often uses symbols that resemble objects from an aerial perspective. The school is a rectangle, a track is an oval, and a railroad looks like a rail with ties. Thinking about and drawing these symbols helped students think about the difference between a frontal view and an aerial view of an item.

Picture books also show children how things look from above. One of our favorites is *Madlenka* by Peter Sis.<sup>5</sup> Not only does it show Madlenka’s view as she goes down the fire escape of her apartment building to tell her friends that her tooth is loose, it also introduces readers to her multicultural neighborhood. Her trip around the block has a page with frontal views of all the stores facing various directions so as to create a border for the page. This is a common method that children use in their own drawings to solve the “problem of perspective;” they want to show all sides of an object at once. We have drawings from second-grade students that show the top of a car and full circles on the sides for all four of its wheels.

*Mirette on the High Wire* by Emily McCully is another picture book with an aerial view of a city as Mirette would see it: through the eyes of the tight rope acrobat performer.<sup>6</sup> *As the Crow Flies* by Gail Hartman continues to be a popular choice for showing perspectives, with



**Aerial View**  
This version of the Disneyland map shows the “Aerial View” format of the same location.

Courtesy MapQuest.com





the drawings from the views of different animals such as a crow, a rabbit, a horse, and an eagle.<sup>7</sup>

### One Square Mile

With the help of local geographers and the Center for Geospatial Technology,<sup>8</sup> we printed high resolution images (approximately 30 x 30 inches) that showed our neighborhood school centered in a one-mile square area. With this level of detail, children could locate bike racks, the playground, and individual homes. Students enthusiastically reported, “That’s my house. I know because there is a trampoline in the backyard.” Another student wondered, “When was this picture taken? It must have been before they started building the highway because there is not a crane on this side of the road.”

After observing the images and talking about ideas with the children, we brought out tempera paints, brushes, aprons, and large sheets of art paper. The process

of drawing and painting helps children clarify their own thinking and communicate their ideas to others. Young children instinctively use drawing in the same exploratory way that designers use sketching to “converse with themselves” when generating ideas.<sup>9</sup> We instructed students to point what they might see in their neighborhood or around their town using an aerial perspective.

### From Concrete to Abstract

We had studied Piaget’s work on cognitive development with children, so we did not expect eight-year-olds to understand clearly the abstract symbols or to represent the neighborhood from a consistent aerial perspective.<sup>10</sup> Yet, aerial imagery combines the abstract nature of maps with the concrete nature of photography and calls for a transition in skills. The students’ artwork with the tempera paints indeed showed the transitional developmental stage of children at this age. Some

drawings showed concrete thinking with a baseline of grass and a stylized house. Others included more abstract symbols, with aerial perspectives of the football field and the family feedlot with a fence and black cows. The mix of concrete and abstract thinking often was found within the same picture, as aerial views of parking lots were combined with side views of cars. The paintings encouraged children to work out their own spatial understandings of the aerial images.

The children were like geographers everywhere who compare what they see outside with representations on the maps. They use their own drawings to understand what they have observed and to interpret the landscape. The process encourages even young cartographers to seek solutions to geographic questions involving direction, distance, symbols, and location—the very skills they are expected to learn in second grade.

## A Changing Environment

Role playing an interview with a geographer about the changes that have taken place on the landscape during the past ten years activated students' creative thinking about their world. They recognized that their school had a whole new wing and asked, "Mr. Littrell, why did they change the school?" A short history lesson followed, as their teacher told about his days as an elementary school student at the same school 20 years ago.

Why were more children now coming to their school than were in attendance ten years ago? The answer was found by comparing an aerial image from ten years ago to the current image. In the newer image, students saw that there were many more houses and apartments in their neighborhood. There were more students. That relationship between people and the environment made sense to second grade students and engaged them in comparing images from contemporary and historical times.

Students saw changes on the landscape, and their questions revealed that they were sorting through the geographic questions: Where is it? Why is it there? One

student asked, "I can see the wading pool at the park in the older picture. Why is it not in the new image?" She learned that, over ten years, the vegetation had grown a lot, and now tree leaves shaded the pool, hiding it from above. Other students studied the older image, looking for "the new highway with the cranes" and found only a city street next to a railroad. The children discussed possible explanations and finally decided, "Construction workers took out the railroad and are building the new highway in the same place. People don't ride on trains any more." Children in a rural school might have added that trucks carry much of the cotton out of the region, using the new highways instead of the railroads. The regional airport seen in one of the images reminded children that people often fly commercially from the regional airport instead of riding a train. This kind of geographic inquiry was fun for kids and teachers; one question led to a network of answers and new questions.

## Looking Forward

The maps showed the landscape past and present, but we had not yet looked ahead with these future city planners, our students. When they graduate from high



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school ten years from now, what will they expect to see? After a lively brainstorming session, children used colored pencils and drawing paper to imagine how the landscape might change in the future. Again, pictures showed a wide range of understanding as students grappled with the concept of time. Story pictures ranged from a complex system of roadways, to high-rise buildings, to an invasion by aliens. The transitional developmental stages of the children were clearly represented in their work. They continued to work on geography skills as they tried to understand characteristics of places and show how people modify the environment.


### Beyond the Classroom

After the lessons had ended, teachers reported to us that students continued to notice things on the aerial view posters. They pointed out landmarks, explaining to siblings why the school has new classrooms or that the dirt road that used to be too narrow for dad's truck has been paved.

In addition to the printed aerial imagery, learners can compare paper maps with online screen images. With Google Earth, for example, students can type in a particular address in the "fly to" box and zoom in to their school or neighborhood. The teacher who is introducing the program can pause at different degrees of detail so that children can locate their region within the state, major cities, nearby communities, or agricultural areas. There is also a box to check that can add layers of interest such as roads or landmarks. Second-graders can certainly follow the highway from a rural area to the central city to apply their geographic knowledge of direction, location, and distance. Additional details for using online mapping are described in the pullout section of *Social Studies and the Young Learner* of January/February 2007.<sup>11</sup> Teachers will want to check out the resolution (degree of detail) for their local area, as it varies across the nation, before going online with students.

### Conclusion

We found that elementary school children could effectively use aerial imagery of a familiar neighborhood to develop geographic skills of determining direction, measuring distance, finding a location, and identifying map symbols. Student attention and interest was strong throughout this geography lesson, which combined interpreting aerial images, maps, and photographs; creating floor maps, role-playing, and painting. Children's sense of wonder and interest enticed them into using map skills to investigate the story of their neighborhoods with the aerial maps. The classroom teachers involved in the project planned to use the aerial image posters again with their new classes the next year.

When children explore their neighborhood by walking (or riding on their bikes, skateboards, or scooters), they begin to understand the spatial dimensions of the neighborhood—distance, direction, landmarks, elevation, and the relationships between places. Unfortunately, many children today probably do less of such on-the-ground exploration than their parents did when they were young. With geographic knowledge and skills learned or reinforced in the classroom, children can be better prepared to explore the wonders of their world. We found wisdom in the statement, "Like geographers everywhere, children learn as they observe, experience, and develop understandings of the nature of their world and their place in it."<sup>12</sup> Aerial images, now so easily obtained on the Internet, can be one of the effective tools for teaching the skills of geography in interesting ways.<sup>13</sup> 

### Notes

1. Google Earth: A 3D Interface to the Planet (data file), [earth.google.com](http://earth.google.com).
2. MapQuest, [www.mapquest.com](http://www.mapquest.com).
3. Lucy Sprague Mitchell. "Social Studies for Future Teachers," in N. Nager and E. Shapiro, eds., *Revisiting a Progressive Pedagogy: The Developmental-Interaction Approach* (Albany, NY: SUNY, 2000).
4. Melinda Schoenfeldt, "Geographic Literacy and Young Learners," *Educational Forum* 66 (fall, 2001): 26-31.
5. Peter Sis, *Madlenka* (New York: Frances Foster Books, 2000).

6. Emily McCully, *Mirette on the High Wire* (New York: G.P. Putnam, 1992).
7. Gail Hartmann, *As the Crow Flies* (New York: Simon & Schuster, 1993).
8. Center for Geospatial Technology, Texas Tech University, Lubbock, Texas, [gis.ttu.edu/center](http://gis.ttu.edu/center).
9. Angela Anning, "Drawing Out Ideas: Graphicacy and Young Children," *International Journal of Technology and Design Education* 7, no. 3 (1997): 219-239. (Revised online August 25, 2006 [www.springerlink.com](http://www.springerlink.com)).
10. Jean Piaget, *The Child's Conception of the World* (Totowa, NJ: Littlefield Adams, 1965).
11. Eui-kyung Shin and Marsha Alibrandi, "Online Interactive Mapping: Using Google Earth," *Social Studies and the Young Learner* 19, no. 3 (2007): P1-P4.
12. Schoenfeldt, 26-31.
13. The authors would like to thank second grade teachers for their participation in the project: Larry Littrell and Leslie Taylor (and Principal Karla Hankins) at Wester Elementary School in Lubbock, Texas; Tonia Stephenson and Amberlee Reed (and Principal David Pierce) at Arnett Elementary School in Lubbock; Deborah Beaty and Michelle Johnson at Idalou Elementary School (and Principal Southern Bush) in Idalou, Texas; and Robna Dulin and Mikella Windom (and Principal Rhonda Pierce) at Casey Elementary School in Wolfforth, Texas. We would also like to thank preservice teachers Amanda Cofield, Landa George, Lucinda Hammons, Amanda Marcott, Keri Richey, Cynthia Schuster, and Alicia Whisner.

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