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How Many Blocks to the Empire State Building? : An Original Story

Enakshi Bose

How many blocks to the Empire State Building?
an Original Story

by

Enakshi Bose

Mentor: Lisa Von Drasek, MLIS

Submitted in partial fulfillment of the requirements
For the degree of Masters of Science in Education
Bank Street College of Education
July 2001

Abstract

How many blocks to the Empire State Building?
an Original Story for Children

by Enakshi Bose

"How many blocks to the Empire State Building?" is an original work of children's literature written for eight and nine-year-olds (grades three and four). Composed of photographs of New York City taken in the spring of 2001, the book takes readers on a mathematical journey through notable sights in northern and midtown Manhattan on the way to the Empire State Building. Mapping skills are addressed as readers estimate how much farther the main character needs to travel and in which direction she needs to go. In addition, to extend and challenge the reader, most sights contain short math problems, or "snippets."

Along with the story, this study includes a rationale supporting the developmental appropriateness of the book's content for the intended audience; an annotated bibliography of related literature for both children and professionals; and suggestions for using the book in the context of a social studies unit. The sections comprising the rationale are a child development study, an examination of how the book addresses national, state, and city standards in mathematics and social studies, and support of the book's format as a picture book for older children. The book depicts New York City in an unique light for child readers by providing math snippets mixed with social studies facts. Color photographs add to the aesthetic enjoyment of the text.

Author's Note

I would like to thank those people who encouraged me to persevere through this project.

- I thank my parents, Nirmal and Chandra Bose, for starting me on the path to reading and teaching over twenty years ago. With a father who is an author and a mother with a masters in education, my destiny was set with this project!

- I thank my sister, Meena, and brother-in-law, Colin, for giving me advice and providing many crucial study breaks throughout the term.

- I thank Mike Smith for introducing me to so many facets of New York City, and constantly encouraging me to explore.

- I thank my mentor, Lisa Von Drasek, for her supportive comments and her high standards, which empowered me to create a work of which I am truly proud.

- I thank my friends and fellow Teacher Recruitment Initiative cohort members for keeping the dream of being excellent students and teachers alive.

- And most of all, I thank my students from the 2000-2001 Class 4-408 of P.S. 98 Shorackappock Elementary School in Inwood, Manhattan, for motivating me to do my best as their teacher. This book is dedicated to them.

Enakshi Bose

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I. How Many Blocks to the Empire State Building?

How many blocks to the Empire State Building?

By Enakshi Bose

2001, Published by Enakshi Bose

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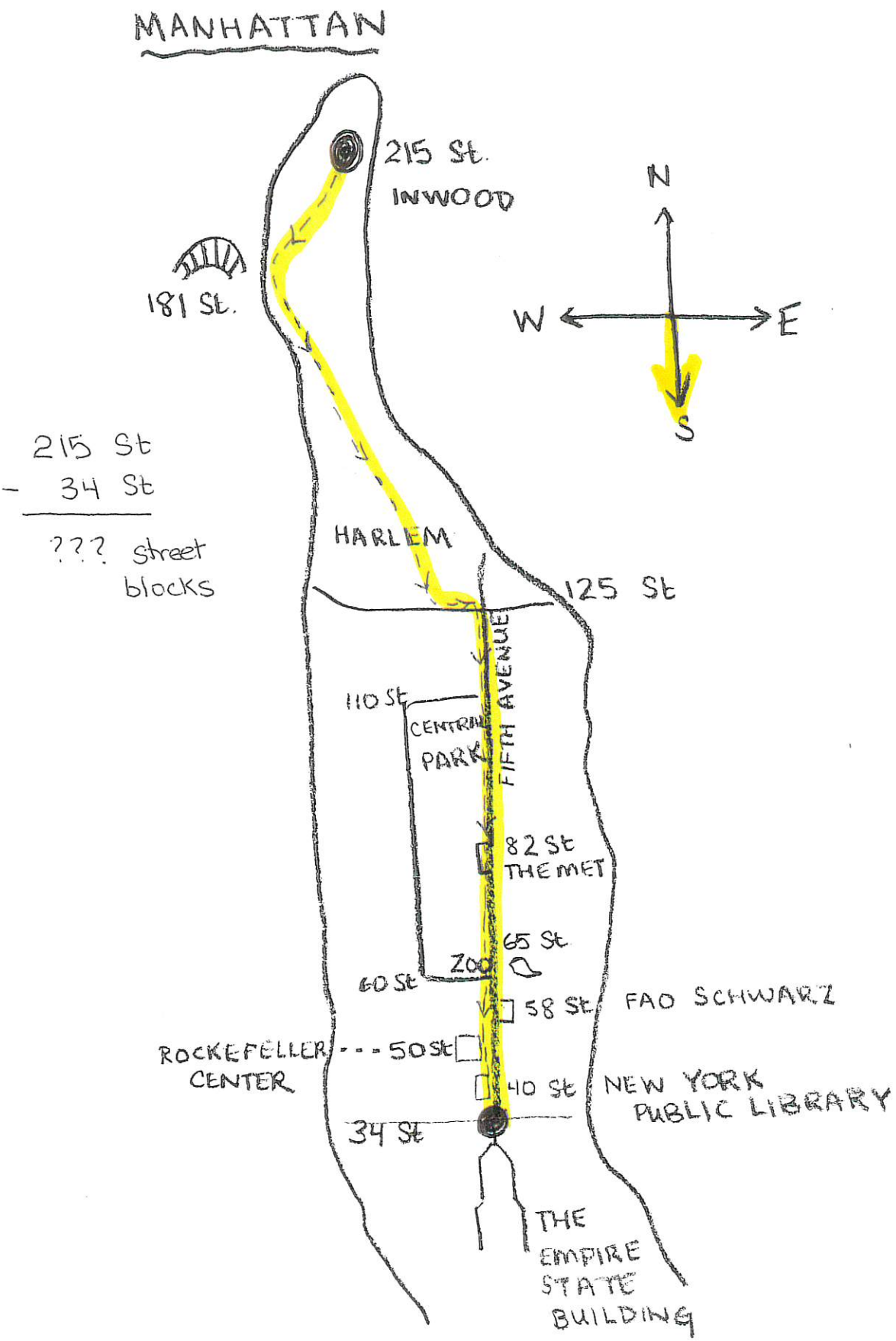
July 2001

Maps: Enakshi Bose
Photos: Enakshi Bose

Reviewed by Lisa Von Drasek, MLIS, Children's Librarian,
Bank Street College Library

In New York, buildings tower over each other to touch the sky. One building really stands out – the Empire State Building.

I can even see it from the subway station at 215th Street.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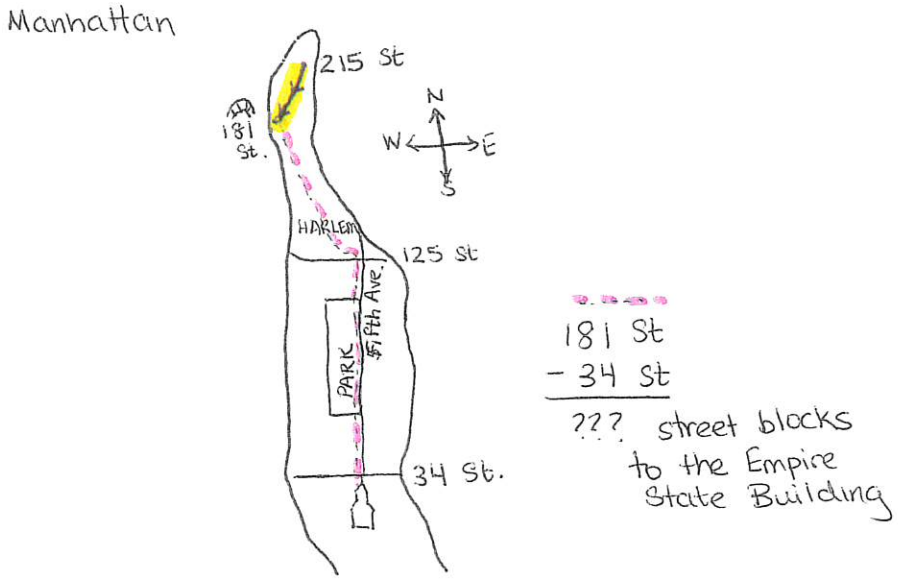
FAO SCHWARZ
ROCKEFELLER CENTER
50 St
40 St
NEW YORK PUBLIC LIBRARY
34 St
THE EMPIRE STATE BUILDING

How many blocks am I from the Empire State Building? How can I get there?

A map can help me.

I can use a map to find where I need to go, how I need to get there, and how far away it is.

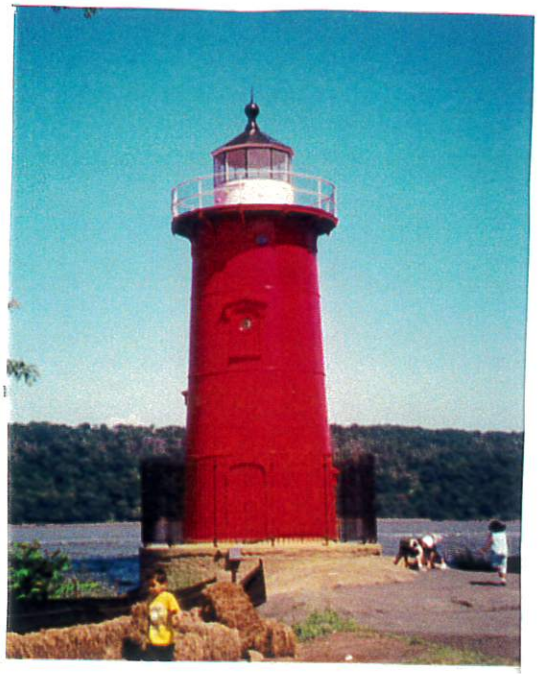
It's 8:30 in the morning. I'd better get started on my trip.



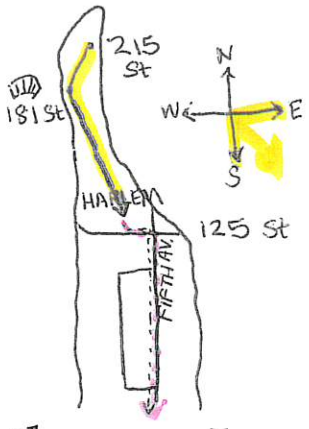
Going south on the subway, I stop at 181st Street to see the Little Red Lighthouse under the George Washington Bridge. Before the bridge was built, the lighthouse would guide ships to Manhattan.

I can still see the Empire State Building. Now how many blocks am I from the Empire State Building?

Have you ever read *The Little Red Lighthouse and the Great Gray Bridge*, *by H. H. Swift? Can you guess what it's about?*



A tour of the Apollo Theater costs $8 on weekdays and $10 on weekends. How much money will I need to spend on Wednesday to take my mom, brother, and me? Will $25 be enough?



From the lighthouse I need to go south and east to get to the Empire State Building.

On my way, I pass through Harlem, one of the most famous African-American neighborhoods in the United States. Here, 125th Street is called Martin Luther King, Jr. Boulevard. At the Apollo Theater, musicians like Duke Ellington and Ella Fitzgerald performed.

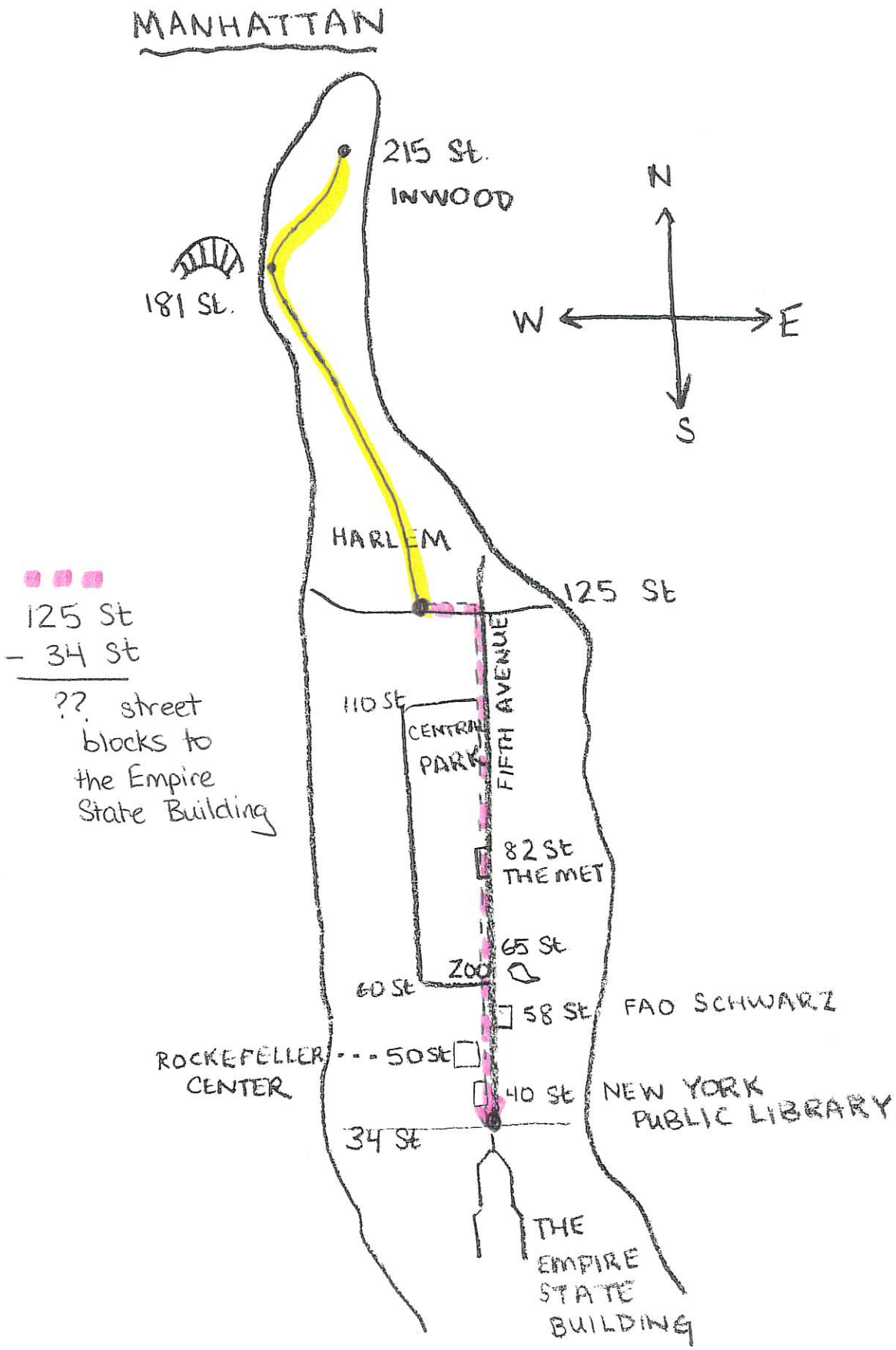
From Martin Luther King, Jr. Boulevard, the tip of the Empire State Building rises between the other tall buildings.

Now, at 125th Street, how many blocks am I from the Empire State Building?

In which direction do I need to go to get to 34th Street and Fifth Avenue?

I think it will be easier to go right down Fifth Avenue.

It's 9:30 now. If I can walk one block in two minutes, how much time will it take for me to get to the Empire State Building?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40 St
NEW YORK PUBLIC LIBRARY
34 St
THE EMPIRE STATE BUILDING


& BUSES
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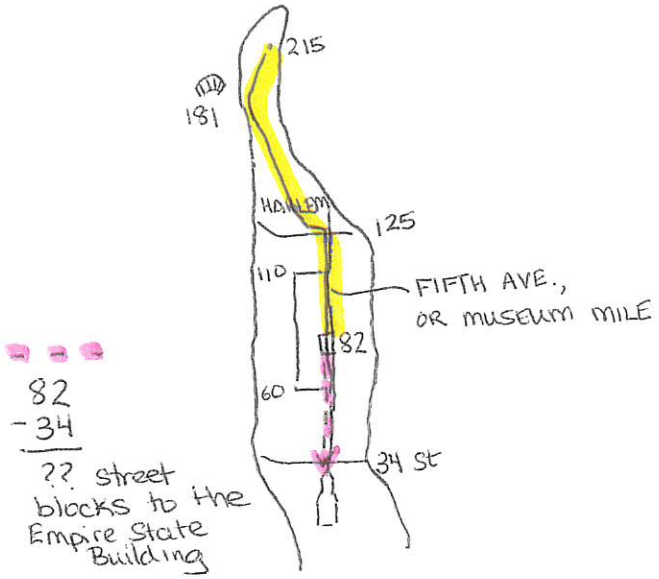
ONE WAY
ONE WAY
NO PARKING


Vermeer
the Delft School
The Treasury of Basel Cathedral



From 104th Street to 74th Street, Fifth Avenue's nickname is Museum Mile.

At 82nd Street, I am in front of the Metropolitan Museum of Art. The Met takes up 4 whole city blocks and has over 230 galleries with art from lots of countries, like Spain, France, Egypt, Greece, and other places, too.

How many more blocks to the Empire State Building?

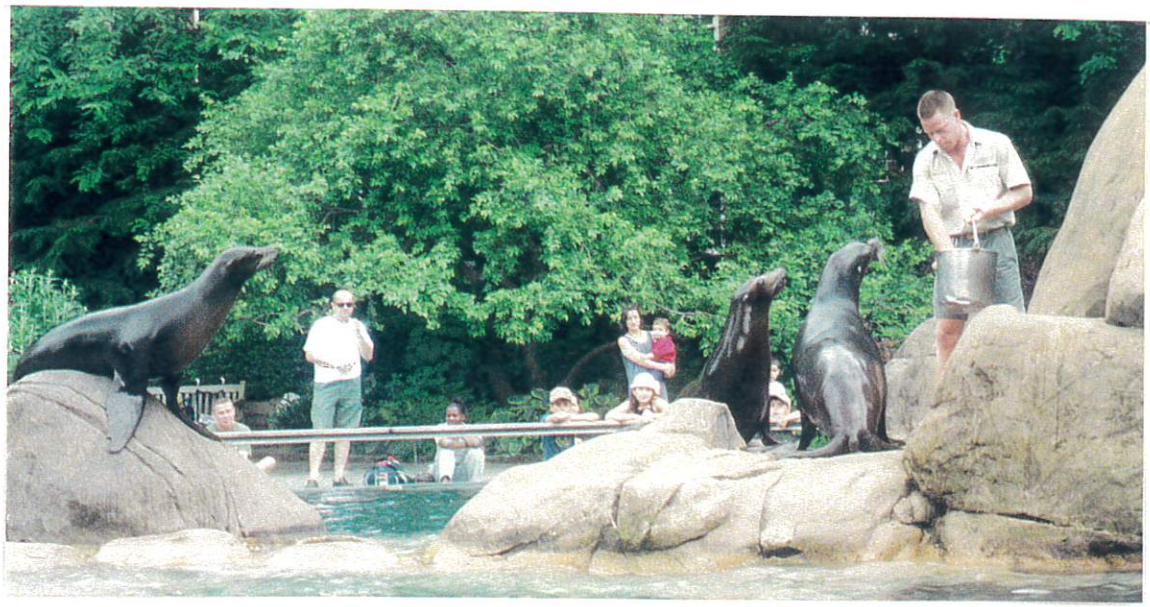
Right behind the Met is the biggest open space in Manhattan: Central Park.

The park runs north to south from 110th Street to 60th Street. From 82nd Street I have to walk 22 blocks to reach the bottom of the park.

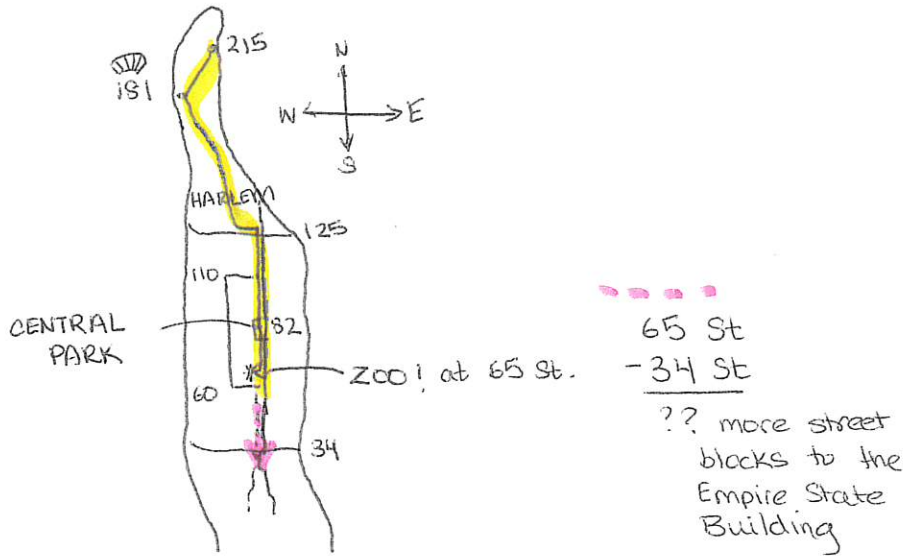
I'd better get a snack.

My mom gave me $5.

Is there enough for me to share with my brother if we both want ice cream bars?



The three sea lions eat at 11:30, 2:00, and 4:00. At each feeding they each eat at least five whole fish. (I was counting.) To feed the three sea lions, how many fish do the zookeepers need every day?

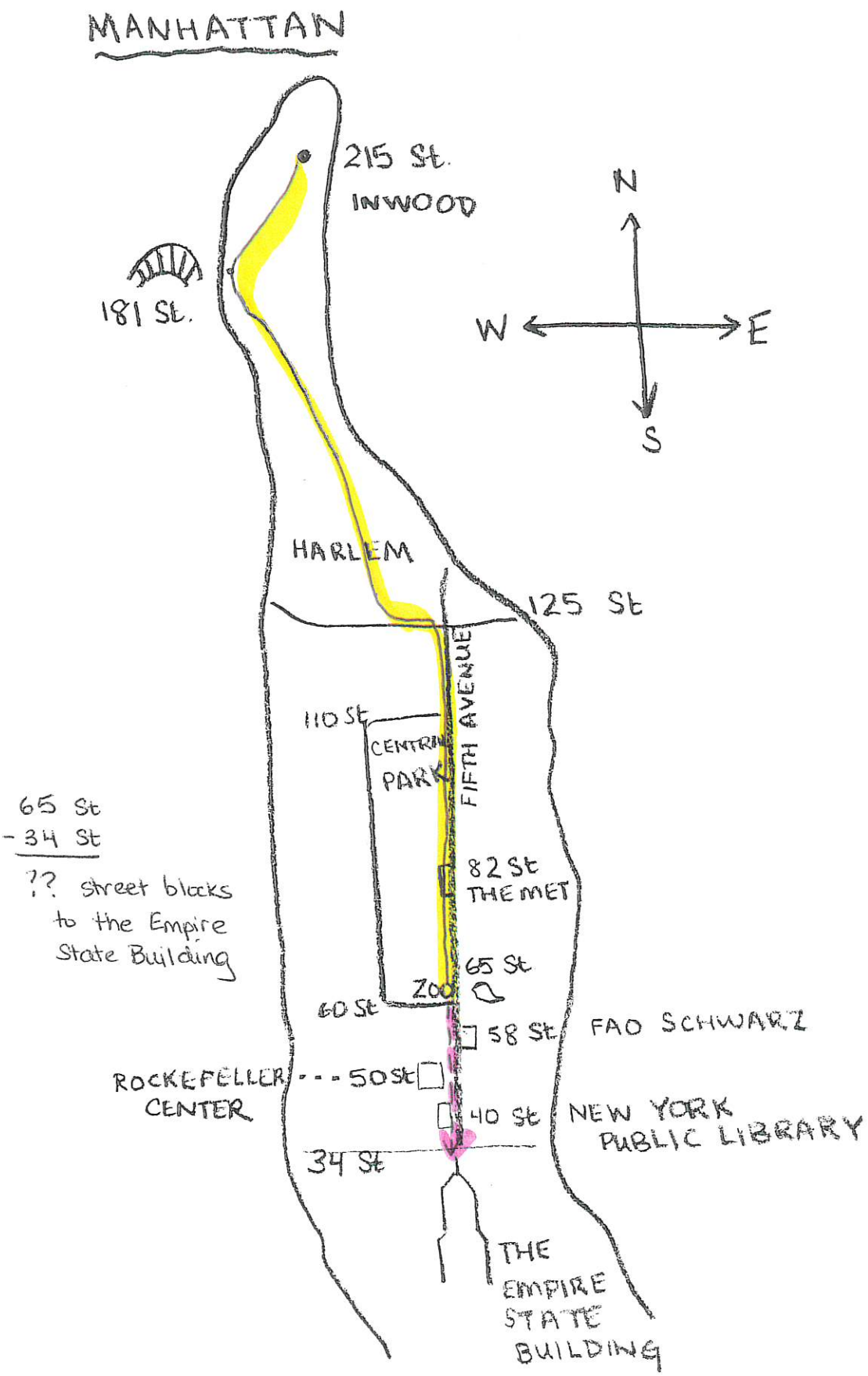


The oldest zoo in America is at the southeast corner of the park, between 65th and 66th Street: the Central Park Wildlife Center.

I am just in time for the sea lion feeding at 11:30 A.M. I watch the sea lions eat and play for half an hour.

From the zoo, how many blocks to the Empire State Building?

If I'm still walking one block in two minutes, and I leave the zoo at noon, when will I get there?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PUBLIC LIBRARY
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EMPIRE
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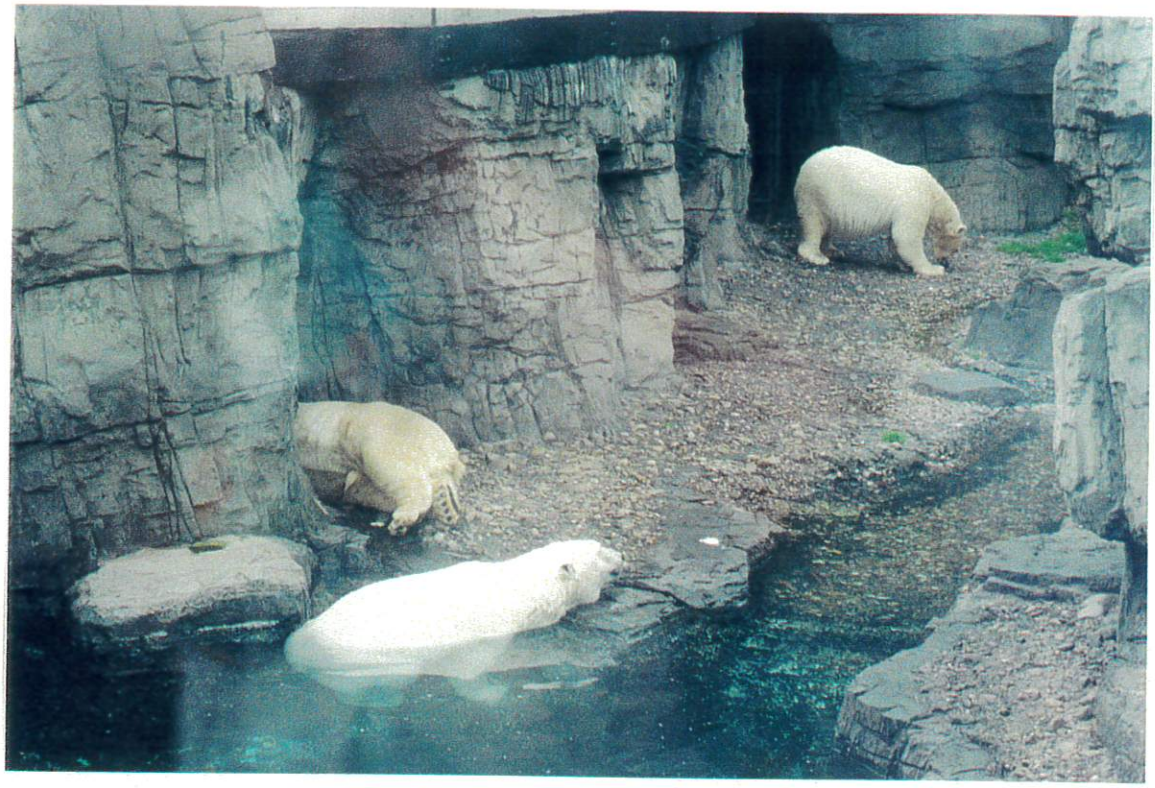
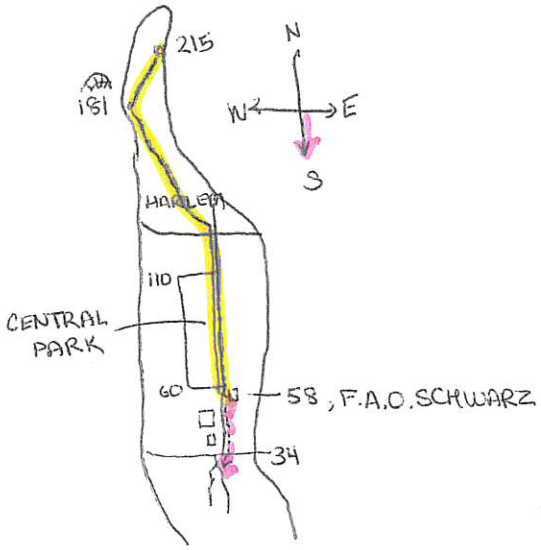


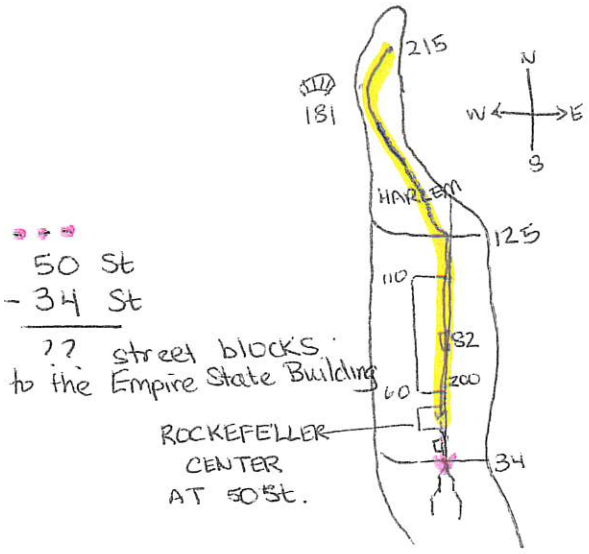
Each stuffed animal polar bear costs $5.95. Can I buy three if I have $15?



I leave the zoo without a polar bear. But I can get a toy bear at F.A.O. Schwarz, the huge toy store on 58th Street and Fifth Avenue.

Am I north, south, east, or west of Central Park?

Which way should I go now?



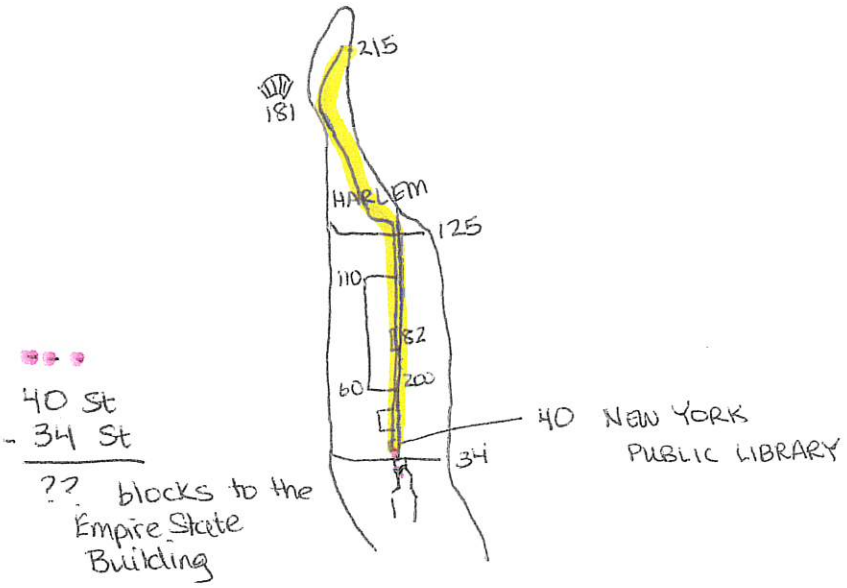
I go south, down 5th Avenue. The street numbers are getting smaller.

At 50th Street, I stop to check out Rockefeller Center.

How many *more* blocks to the Empire State Building?

There is a special spider exhibit in Rockefeller Center. Three giant spiders are on display.

How many giant spider legs are in Rockefeller Center?



On Fifth Avenue, I pass the New York Public Library at 40th Street.

I stop to pat the stone lions, named "Patience" and "Fortitude," guarding the library and all its six million books and three million pictures!

How *close* am I to the Empire State Building?

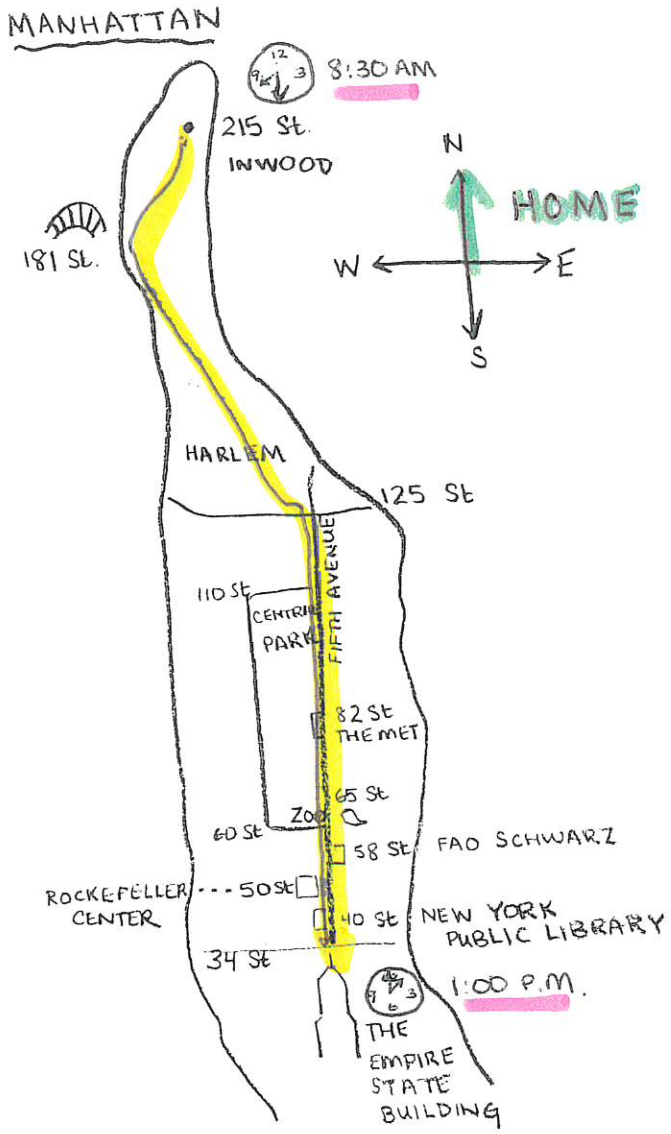
If there are 1,500 books on each shelf at the New York Public Library, how many shelves must there be to hold all six million books?


EMPIRE STATE

Finally, I'm here!

The building is 1, 250 feet above the street. I can barely see the top.

How far have I come from 215th Street?



It's 1:00 in the afternoon. How long has it taken me to reach the Empire State Building?

Which direction do I need to go in to get back home?

While I'm here, I can go up to the 86th Floor Observatory Deck to see the city. the guide says today I can see for 25 miles.

From the deck, I can look north to see Central Park and the George Washington Bridge.

And if I look up, I see the tip of the Empire State Building, on the 102nd Floor.

And I can look downtown. I see the tallest buildings in New York: the Twin Towers of the World Trade Center.

I wonder…

How many blocks to the World Trade Center?

Answers to the math and map problems...

Page 7 — I'm on 215th Street, and I want to go to 34th Street. I can subtract to find how many street blocks I need to go. 215 - 34 = 181 street blocks.

Page 8 — I've moved to 181st Street. To find how many blocks I need to go, I can subtract: 181 - 34 = 147 street blocks.

Page 10 — On a Wednesday, each ticket costs $8, so three tickets will cost $24 ($8 x 3 = $24, or $8 + $8 + $8) for my mother, brother, and me. $25 will be enough.

Page 12 — 125 - 34 = 91 street blocks. To get to 34th Street and Fifth Avenue, I will need to walk east and then south on Fifth Avenue.

If I can walk one block in two minutes, 91 blocks will take 91 x 2 = 182 minutes. It will take me 182 minutes, or three hours and 2 minutes, to get to the Empire State Building. Three hours from 9:30 is 12:30.

Page 15 — From 82nd Street, I need to walk 82 - 34 = 48 more street blocks.

Page 17 — Ice cream bars cost $2.50 each. Two ice cream bars will cost $5, so I do have enough money for me and my brother.

Page 18 — Every feeding, three sea lions eat 5 fish each, for a total of 3 x 5 = 15 fish. If there are three feedings everyday, the zookeepers need 15 x 3 = 45 fish.

Page 20 — The zoo is at 65th Street. I need to walk 65 - 34 = 31 more street blocks. If I walk one block every two minutes, it will take me 31 x 2 = 62 minutes to reach the Empire State Building. If I leave the zoo at noon, I should get there around 1:02 PM.

Page 22 — Each bear costs $5.95, which I can round to $6. If I would get three bears I would pay at least $6 x 3 = $18 (not including tax), so with only $15 I do not have enough money.

Page 23 — I am south and east of Central Park. I need to continue going south.

Page 24 — 50 - 34 = 16 street blocks more to go!

Page 25 — Each spider has 8 legs, so three spiders will have 8 + 8 + 8 (or 8 x 3) = 24 legs.

Page 26 — At 40th Street, I am 40 - 34 = 6 street blocks away.

Page 27 — If each shelf holds 1,500 books, we will need 4,000 shelves to hold 6,000,000 books. (6,000,000 divided by 1, 500 = 4, 000)

Pages 29 and 30 — From 215th Street, I traveled 181 blocks to reach the Empire State Building. I left at 8:30 and arrived 4 ½ hours later, at 1:00. To go back home, I need to travel north.

II. Rationale

A. Introduction

As a fourth grade teacher in a high-need urban public elementary school, in which state and city standardized tests are at the forefront of most lessons, the need for educational literature that captivates children's imagination and expands a sense of the world outside of the classroom became very apparent. In the school where I work, 92.6% of students qualify for the free lunch program. The school functions at 105% utilization capacity; in other words, it is overcrowded. Only 31% of third and fourth graders met state and city standards in English Language Arts, and only 37% in Mathematics during the 1999-2000 school year. I teach in a predominantly Latino community, and ties to home cultures in the Dominican Republic, Puerto Rico, and Mexico are strong, but awareness of the communities and history of New York City is weak. Because they live in this community and because New York is the content matter for state tests, it is imperative that New York be featured in lessons in an engaging manner. The situation is similar for mathematics.

Developing the engaging manner for teaching content areas like mathematics social studies and developing background knowledge is the challenge. My students were not familiar with much of New York City south of Dyckman-200th Street; their sense of their city was incomplete. Mathematics was taught primarily as simple arithmetic and number facts problems. As I taught mathematics throughout the year, I observed my students actively engaged by logic problems; by using pictures, blocks, and numbers to explain their thinking; and by mathematical discoveries. I also witnessed their unbridled enthusiasm when we went on field trips around New York City. Social studies discussions became animated with references to excursions. It became clear that a picture

book for older children about New York City, with a mathematical twist, would engage my students, challenging their brains and introducing them to new images. As an educator, I aligned this book with national, state, and city standards as well as with the developmental stages of the intended readers.

B. Addressing the Social Studies Standards

In New York City, most elementary school social studies curriculum use the city communities and neighborhoods as means to explore the five social studies content learning standards: the History of the United States and New York, World History, Geography, Economics, and Civics, Citizenship, and Government (NYSED, *Social Studies Resource Guide Part IV: Standards*).

> In the grade two social studies program, students explore rural, urban, and suburban communities, concentrating on communities in the United States. The student's own community can serve as an example for studying about and understanding other communities. ... Students continue to learn how to locate places on maps and how different communities are influenced by geographic and environmental factors (Social Studies Resource Guide, Scope and Sequence, 5).

In grade three students learn about communities throughout the world. In grade four, the program builds on connections between the geography and the history of New York State and the United States, with a focus on Native Americans, the European colonization, and the new nation's industrial growth and expansion.

Within the study of history, mapping communities and understanding geography's connection to history are key skills and concepts. The Community School District 6 Social Studies Teacher's Guide states, "Maps are used to impart information in a concise, pictorial form. The legend and its symbols provide the key to understanding and interpreting maps" (CSD 6, 1). A performance goal for students is "to evaluate maps and

globes for uses and limitations ... [and] estimate distances on a map using a bar scale" (CSD 6, 1). Students are also expected to use directions from a compass rose to navigate. Skills assessments include determining in which direction one would travel to go to certain places, like from Harlem to Inwood. The curriculum's premise is that "the growth of New York City is studied through use of readings and maps..." (CSD 6, 37).

The emphasis on mapping and using neighborhood communities as a jumping point for social studies discussions meets state and city standards. The New York State Social Studies Standard Three states

> Geography: Students will use a variety of intellectual skills to demonstrate their understanding of the geography of the interdependent world in which we live – local, national, and global, including the distribution of people, places, and environments over the Earth's surface (NYSED, *Social Studies Resource Guide: Part IV*, 10).

In measurable performance goals, elementary students are expected

> to be able to identify a variety of sources of information: tables, graphs, charts, diagrams; maps, globes, atlases, vocabulary; visuals, field trips, artifacts; listening; observing" (NYSED, *Social Studies Resource Guide: Part I.1*, 12).

There is no widespread state or city curriculum guide that suggests ways to use New York City explorations to direct content studies. Rather, such guides are distributed on a local or district basis, or may be the initiative of a few teachers, and may not be reflective of the new standards. *The City as History*, a social studies curriculum written as part of the Learning Through the Expanded Arts Program in 1981, encourages teachers to "use the resources in their community to enrich the study of American history. ... By using the historical, natural, and artistic resources of New York City, American history will take on a broader and deeper meaning" (Crawford, 4). In reality, however, such programs are often set aside as literacy and mathematics (and the corresponding tests) take

precedence over social studies. Too often social studies lessons are confined to workbooks and reading texts rather than engaging experiences connecting maps, symbols, and words, with real people, places, and events.

In the literature canon, some picture books attempt to make maps more meaningful to children by showing the relationships between mapped spaces. Barbara Rinkoff's 1965 nonfiction picture book *A map is a picture* introduces different types of maps, starting with the fantastical treasure maps of pirates from folk lore and leading to maps of cities, states, countries, and the world. Through road maps Rinkoff refers to scales and distance, although for a young reader, the business of the picture, with the many intersecting roads and the complex labels may make tracing distances more difficult. In 1967, Dorothy Rhodes introduces the many symbols involved with travel, such as freeway, intersection, and traffic signs, in her book *How to read a city map*. Both the aforementioned books review geography skills, but are no longer in print. More recently, in the 1990s, Harvey Weiss, Barbara Taylor, and Joan Sweeney are just a few of many authors who are writing mapping books that use pictures to make the subject more child-friendly. In Joan Sweeney's *Me on the map*, a little girl traces maps from one of her room, to her house, to her neighborhood, to her place in the universe. Each place builds on the places before it, making clear associations between the character and the world at large. Harvey Weiss's 1991 *Maps*, written for upper elementary students, addresses concepts including scale, distance, and topography. Barbara Taylor's colorful *Be your own map expert* depicts grids, globes, projects, among other terms, and includes activities for the reader to try. While children's literature may be addressing mapping, or the history of New York City,

few books link the two subjects. Filling this gap could enhance the teaching of social studies.

A contributor to *The City as History* curriculum, funded by a grant from the National Endowment for the Humanities in 1981, Esther Rosenfeld, best described the importance of relating history to geographic landmarks and maps in order to enhance student learning:

> My approach to teaching social studies is to help the children gain an awareness of the continuity of history through a series of direct encounters that involve multi-sensory experiences. Young children need to know that the New York of today didn't just happen. ... For young children, an exploration of a city of the size and diversity of New York cannot be done exclusively through a textbook approach. Children need to explore through touch, smell, taste, talk to people, and compare. They need to involve themselves physically in this exploration. ... They need to walk through the narrow alleyways and winding streets common to the lower Manhattan area and compare that to the grid plan designed for the rest of the city. ... They need to do all this in order to understand how a city grows ... (Crawford, 5).

How many blocks to the Empire State Building? attempts to address this need with its factual social studies content about areas in New York City and its reliance on maps as a means for readers to locate starting points and destinations.

C. Addressing the Mathematics Standards

A picture book with mathematical content or references can improve a child reader's sense of mathematics in the world by allowing them to construct meaningful math-related experiences outside of traditional text book contexts. Research supports including contexts outside of school settings to contribute to mathematical understanding in the real world. "Children construct their own knowledge. ... To help children learn mathematics, teachers must be aware of how the children have constructed mathematics from their

experiences both in and out of school" (Reys et. al, 4). Math educators at the National Council of Teachers of Mathematics (NCTM) assert that the emphasis on providing children with problem contexts to solve supports the natural curiosity of children. "Posing problems comes naturally to young children: I wonder how long it would take to count to a million? How many soda cans would it take to fill the school building? Teachers and parents can foster this inclination by helping students make mathematical problems from their worlds" (NCTM, 53). It falls upon educators to provide this enhanced setting.

> Mathematics should be a living, exciting activity for children. It can give children a tool for solving real problems and a way for looking at, and communicating about, their world that adds understanding and insight (Welchman-Tischler, 1).

With the new learning standards in place for mathematics at city, state, and national levels, a correlation between this story's content and the standards is clearly defined. "The standards emphasize ... applying mathematics over mathematics computation; spending less time on rote drill and more time on problem solving. ... Rote learning of basic facts is better taught after the student has acquired purpose for these facts, not before students are allowed to do mathematics" (Braddon, 3). In this book, the map skills necessary to understand the distances involved include scale conversions, which in turn support a multiplication and addition non-drill-based review. I attempted to address both processes and content standards in the writing of this story.

Skills or processes standards focus on mathematical skills that can be applied to a variety of problems across the breadth of mathematics. Using different problem solving

strategies is one such process skill. The NCTM standard states that students should be able

> to solve problems that arise in mathematics and in other contexts; [and] apply and adapt a variety of appropriate strategies to solve problems" (NCTM, 402).

Math problems popping up on a trip through a city include estimating distances and time traveled. Other math problems may arise simply in a non-mathematical context, such as a museum. This meets the NCTM Connections standard, which states that students should

> understand how mathematical ideas interconnect and build on one another to produce a coherent whole (NCTM, 402).

Reading maps involves many mathematical ideas, from understanding directions to predicting distances to converting scales to estimating travel times. In this setting children are encouraged to "recognize and apply mathematics in contexts outside of mathematics" (NCTM, 402).

Geometry and measurement standards on both national and local levels include mapping skills. The NCTM Geometry standard expects students to be able

> to specify locations and describe spatial relationships using coordinate geometry and other representational systems (NCTM, 164);
>
> [and]
>
> to describe location and movement using common language and geometric vocabulary; make and use coordinate systems to specify locations and to describe paths; and find the distance between points along horizontal and vertical lines of a coordinate system (NCTM, 164).

New York City's Performance Standards state these goals more succinctly. Standard Two addresses mapping:

> M2c: Use simple two dimensional coordinate systems to find locations on a map ...

[and]

> M2k: Use scales in maps and scale drawings" (Board of Education of the City of New York,16).

An example of standard setting work involves locating a point from another given point by knowing the distance apart and using a map's scale and compass directions (BoE/NYC,18). The NCTM Measurement Standard expects students

> to understand measurable attributes of objects and the units, systems, and processes of measurement [and] apply appropriate techniques, tools, and formulas to determine measurements" (NCTM, 398).

Performance objectives for students in grades three to five include understanding

(1) "that measurements are approximations;"
(2) "how differences in units affect precision;" and
(3) "how to "select and use benchmarks to estimate measurements" (NCTM, 398).

The measurement and geometrical processes emphasized in this story are used daily by students, even in the familiar context of wondering, "What is the distance from my house to the school?"

Finally, to perform the calculations associated with scale and measurement, children are using number operations, thus meeting the Number and Number Operations Standard:

> Understand meanings of operations and how they relate to one another ... [and] compute fluently and make reasonable estimates (NCTM, 148).

To solve distance problems and map scale conversions, students use relationships between operations (such as multiplication being a series of addition tasks) to solve problems.

For teachers, the NCTM charges them with a responsibility through the Teaching Principle: "Effective mathematics teaching requires understanding what students know

and need to learn and then challenging and supporting them to learn it well" (NCTM, 370). One way in which to provide this challenge is through literature.

> "Mathematics is a communication tool that works directly with the skill of reading and allows the student to use and understand data found in all school subjects and to interpret the logic and patterns found in those subjects. Reading and mathematics skills must go hand in hand for the student to become a successful learner" (Braddon et. al., 3).

Not only does literature provide a context for math problems, but it also conserves instructional time by connecting various disciplines. "Interdisciplinary studies not only save time but also add to children's insight into all curriculum areas involved – the whole is greater than the sum of the parts" (Welchman-Tischler, 1).

D. Addressing the Development of Eight and Nine Year Olds

Middle childhood, approximately ages seven to ten, is characterized by increased cognitive abilities that developmental psychologists have described in various thinking and learning state theories. Noted Swiss psychologist Jean Piaget described the cognitive abilities associated with middle childhood as the ability to perform "concrete operations." In Piaget's lexicon, an operation is "an internalized (mental) action that is coordinated with other mental actions as part of a logical system" (Cole and Cole, 485). The operations are described as "concrete" because "they relate directly to tangible objects and thoughts about objects" (Cole and Cole, 485). As concrete operations become more familiar, the physical world becomes more predictable because children understand certain physical attributes of objects, such as size, density, length, and number. Furthermore, children are more organized and flexible in problem solving; they can retrace their steps mentally (Cole and Cole, 494).

Other researchers have developed learning theories related to mathematics that suggest to teachers how to expand their students' zone of "proximal development," a term developed by Lev Vygotsky to describe learning activities and experiences that not only review previous concepts and skills, but also extend the range of abilities (Reys et. al., 11). Jerome Bruner asserts that as cognitive processes become more advanced, children become more comfortable with iconic and symbolic representations. They are "involved with pictorial and /or verbal information based on the real world," and some are able to manipulate symbols (Reys et. al., 12). This stage follows the enactive stage, during which the child generally needs to interact directly with objects in the physical world. In middle childhood, children in general are able to move from the physical blocks to the pictorial representations of problems. Zoltan Dienes described these levels of mathematical learning as "representation" and "symbolization," in which "images and pictures are used to provide a representation," which may then be extended to language or mathematical symbols (Reys et. al, 12).

As children become more comfortable with pictorial representations and symbols, their ability to solve problems logically also improves. According to Siegler (Cole and Cole, 496), one developmental feature that might enhance problem solving is the child's growing ability to pick out the most important features of the task and form representations to use in reasoning. Other changes that contribute to the development of strategic thinking (Cole and Cole, 497) include the acquisition of new strategies, changes in frequency of use of existing strategies, changes in speed of executing strategies, changes in accuracy, changes in the degree to which strategies are used automatically, and changes in the range of situations in which each strategy can be applied. Finally,

memory increases, including an increase in capacity, knowledge, and span provide children with easily accessible tools to use to solve problems.

Books aimed towards middle childhood readers in grades two to five can approach operations beyond addition. "Students entering grade three should have a good grasp of, and much experience with, additive reasoning. ... In grades three to five, multiplicative reasoning should become a focus. Multiplicative reasoning is more than just doing multiplication or division. It is about understanding situations in which multiplication or division is an appropriate operation" (NCTM, 143-144). Again, even in emphasizing a skill, the process of reasoning is supported by encouraging students to choose appropriate methods to solve problems.

> They [fourth graders] find it [mathematics] practical and believe that what they are learning is important. If the mathematics studied in grades 3-5 is interesting and understandable, the increasingly sophisticated mathematical ideas at this level can maintain students' engagement and enthusiasm. But if their learning becomes a process of simply mimicking and memorizing, they can soon begin to lose interest (NCTM, 143).

The necessity of teaching math in a manner that challenges and extends intellectual development is clearly apparent. In my experience as a classroom teacher, the monotony of the recent test-taking skills lessons can dissuade students from enjoying and interacting with real mathematics. Literature can be a great asset to break this monotony. In the middle of test preparation, I once read Jon Scieszka and Lane Smith's *Math Curse* to my fourth grade students. After one reading, they wanted to reread the story and solve the math problems, thus we reviewed several concepts without needing to return to the textbook. "Books ... provide a low-key, non-threatening avenue for the exploration of various mathematical ideas" (Whitin, *School Library Journal*, 1992).

Of course, understanding what middle childhood readers like to read is essential to writing a book that will captivate their attention and challenge their thinking. "The reading habit may be a sometime thing. There are distractions that compete with books. Kids of this age group are preoccupied with more physical and social pursuits. ... Eights and nines have a great appetite for trying out new experiences and trying themselves out in new situations" (Oppenheim et. al., 179). Hopefully this story, basically a record of a trip through a well-known city, provides the context of new situations as it explores the different regions of the city. The photographs and map illustrations accompanying each site make the visualization of such a journey even easier.

E. The Form: What Experiences do Picture Books Offer Readers?

> These [picture books] are books in which images and ideas join to form a unique whole. In the best picture books, the illustrations extend and enhance the written text, providing the reader with an aesthetic experience that is more than the sum of the book's parts (Huck, 168).

Just as mathematics, when linked with other disciplines, can lend to an experience more complete than the individual subjects, picture books enhance the reading experience at all ages. Picture books can appeal to older readers as much as they do to emerging readers. Variety in content, meaning, and vocabulary can make a picture book more challenging for more experienced readers. "The brevity of text in picture books does not eliminate the necessity for some kind of plot, some action or tension, the quality most likely to keep us reading" (Lukens, 53).

Picture books can provide support for developing readers without being babyish. "For some eights and nines the business of learning to read has been such a struggle that books may be regarded as more 'required' than 'desired.' ...Librarians report that

parents at this stage often urge their young readers to select something longer, more challenging, and 'less babyish.' While many kids themselves take pride in their growing skill and select 'real books with chapter,' such selections often end up going home and back to the library unread" (Oppenheim et. al., 182). Teachers must adjust their recommended books lists to suit the variety of readers within their classrooms. The focus of reading standards on content and comprehension over decoding indicates that "longer and harder is not necessarily better" (Oppenheim et. al., 212).

Children's literature often provides a key to unlocking interest in a variety of subjects. A good story can impact learning far more than a textbook. "When history is presented in this way [story form], embedded in the framework of a good story, then kids can connect with the past in meaningful ways" (Oppenheim et. al., 192). Books also appeal to the curious nature of children. For example, "Many eights and nines are fascinated with strange-but-true facts" (Oppenheim et. al., 207), making information books all the more popular.

Picture books include an additional feature that engages and appeals: the visual images. "One of the basic functions of illustrations is to clarify and extend the text" (Huck, 514). Drawings and photographs can make complicated ideas more understandable. In addition, "in our media-conscious society, both children and adults have become more visually oriented, more likely to expect pictures in magazines, newspapers, and other print materials" (Huck, 503).

Mathematicians and readers agree on the effect picture books have on introducing and clarifying math concepts.

> Picture books also provide an opportunity to show math concepts visually. Such support is important to early-level instruction. ... Many children are visual learners, too. Books that show how math works in carefully constructed diagrams and illustrations can help them understand specific concepts better than purely verbal or numerical explanations (Murphy, 122).
>
> The more abstract the topic, the more important it is that pictures help children "see" explanations. ... Mapping concepts, for instance, are often hard for children to grasp, so it is especially important that they be illustrated clearly ... (Huck, 514).

Picture books provide a means to engage children in mathematics in a setting that encourages using pictorial representations to solve problems, tasks children in middle childhood are generally ready to attempt. In relation to the standards, the picture book setting further emphasizes the connections between math and the world. "Through interactions with literature, children discover math and enjoy solving math problems in everyday situations. They discover that it is a natural part of life and not something that is tricky or difficult" (Lowe and Matthew, 58).

III. Children's Response to the Literature

After completing a working draft with accompanying photographs and researching the child development specific to eight and nine year olds as well as the learning standards the book seeks to meet, it was time to share the story with children. My purpose in doing so was to learn from the book's intended audience what worked well. Of children as literary critics, Huck wrote, "They know that a well-written nonfiction book somehow does not sound the same as an encyclopedia essay, and they enjoy the difference" (Huck, 513). The children's responses shaped revisions of the book. The first reading took place in a fourth grade summer school classroom in Inwood, at the school where I teach during the year. The second reading happened by chance, when I encountered a former student and her mother on the subway platform at 215th Street and she asked to see the book.

The children's reaction to the book after their summer school teacher read it aloud was positive and constructive.

- "I think it's like a mystery, like an activity book."
- "It's not just a social studies book, it's a math book."
- "Did you have fun?"
- "The book was a lot long. It was interesting. I liked going to see how little, medium, and big it [the Empire State Building] got as we got closer – the size."

The students expressed interest in perspective and noticed how it became easier to see the Empire State Building as the story moved downtown.

- "When we get to 42nd, or 59th Street, it will be bigger because we'll be closer."

The student who made this observation had a sister who worked near the Empire State Building, so she felt familiar with the area. Her personal connection to the places engaged her attention, and she kept track of which street the narrator was on and where

the narrator was going next. She even had another suggestion for how to estimate distances: "You could count the train stops."

Without prompting, the children met state language arts standards by noticing text-to-text connections between *How many blocks to the Empire State Building?* and other published books in the canon. In particular, students recalled Jon Scieszka and Lane Smith's *Math Curse*:

- "It's just like the story you read, Ms. Bose – *Math Curse*, with lots of math."
- "In *Math Curse* it says think about everything as math and then think about everything as science. Here math is everywhere."
- "This is like a math book! I need scrap paper."

As the teacher read aloud the story, I observed the children's verbal reactions as well as their body language. The book offered many entry points for readers to become engaged. I noticed that one student paid attention during the reading, with his eyes intent upon the book and the pictures, but would play with his pencil and draw on his desk when the teacher reviewed the math. Perhaps for this non-math-inclined student, the read aloud itself and the sharing of the pictures was the most important part of the experience. Another student propped her head on her hands for most of the reading, but perked up alert when she heard a multiplication problem in the question, "How long will it take if it takes me two minutes to walk each block?" Two students argued about the expected time of arrival at the Empire State Building, each trying to convince the other that his answer was right. In the end, they worked out the problem together.

When I conceived the idea to write a picture book about New York City, part of my motivation stemmed from my own experience with students who were unfamiliar with

the city outside of their own neighborhood. During this reading, I witnessed that lack of prior knowledge about the city. When the teacher inquired, "Why do you think Fifth Avenue's called Museum Mile?" the students had a difficult time answering, in part due to a lack of exposure to these museums. Upon seeing the New York Public Library, one student responded, "Well, I've been to Barnes and Noble." When they encountered a familiar sight, the children were surprised:

- "There's the George Washington."
- "The Bridge?"
- "Yes, what we see everyday."

Introducing new and accessible places to the children supports learning about the city and meeting social studies standards. In the words of a second grade teacher, "This could be a curriculum unit. We could go to all these places." The children also noticed this avenue for learning:

- "We've been to some of those places."
- "It's kinda like interesting. You can learn from places you haven't even been to."

I approached this reading with some questions I hoped the children would answer. I was curious whether they thought I needed to provide answers to the problems, and if so, where? I also wondered whether they would be as engaged by the photographs as I was. Finally, I questioned whether they would prefer to read this book aloud or individually and whether they would actually try to solve the math problems. Our conversation during and after the reading answered my questions and gave me suggestions for revisions. Most students preferred hearing the book read aloud by the teacher: "If the teacher's

doing math, this could be her lesson." When asked whether they would solve the problems on their own, the children responded, "Yes, because it's good practice." The students suggested including the answers somewhere in the text, but were divided over whether to place answers at the end of the book or at the bottom of every page. In looking at the related literature, I opted to include the answers at the back of the book, as Greg Tang did in *The grapes of math*. In terms of the photographs, the children avidly gazed at each picture, and made suggestions for more pictures taken on clearer days. They hypothesized that sometimes it was difficult to find the Empire State Building because "It was foggy." They also requested more information about each picture, in part because the teacher did not read all the photo captions. The teacher suggested having a big book for a whole class reading so that the pictures are more clearly visible or having multiple copies for a shared reading.

Later, the chance encounter with a former student provided the opportunity to observe an individual student interacting with the book. As she leafed through the book, she noticed, "Ms. Bose, this is like an adventure story. You had a lot of adventures." In a voice marking her surprise, she also recognized, "This is like a math book." Although she did look at both the pictures and maps carefully, she did not do the math at the time, explaining, "I need scrap paper." She also read the text from page to page, including the math snippet captions that were not part of the narrative. This led me to distinguish the captions from the rest of the text by italicizing the font, reducing the font size, and enclosing the caption text in a box.. Most stirring, however, was the student's interaction with her mother as she shared the book. The mother spoke no English, but could engage in the reading with her daughter by looking at the pictures, pointing to places she

recognized, and telling more about those sites. In this instance, the photographs provide a means for connections between the parents and their children. The student recognized the uniqueness of being able to share the book with her mother, and suggested that I include answers either on the last page or at the bottom of each page so that "if kids are doing it and their parents can't check the answers, the kids can check themselves."

Suggestions for sharing the book with children

> It is important that books used for problem solving be read first for pleasure and enjoyment. Students need opportunities to experience the books aesthetically (Lowe and Matthew, 59).

Teachers can enhance the read aloud experience of *How many blocks to the Empire State Building?* by taking care not to disrupt the storytelling part of the book. During the reading in the summer school classroom, the teacher stopped at each point to ask the children to solve the problems; perhaps they could solve the problems after reading the story once, so that they can enjoy the story on its own. Also, the students were seated at their desks, which meant the teacher needed to walk around showing the pictures to every child. This also broke up the narrative voice. In order to maintain continuity while making sure that all children can see the pictures, it may be helpful to read the book in a meeting area, where the children are assembled close together and can solve the problems on chart paper or an easel. To meet the needs of the students, the teacher took the time to rephrase questions as well, asking not only "How many blocks do I have to go?" but also "How many blocks have I gone so far?" These questions support interpreting the math problems contained within the text.

The sharing of the story also prompted extensions after reading the story. Once the narrator reached the Empire State Building, the students determined she would need to go north to return home. This led to a debate over which subway lines she could use to return to northern Manhattan. Studying the subway map and planning her return trip would extend the mapping concepts from the story to real applications. The students also expressed an interest in learning more about the sites, so a teacher might want to have some New York City resources at hand following the reading. More curricular extensions are suggested in the following section.

As teachers read this book, they should keep the following in mind:

> Storybooks must have a good story that students will enjoy listening to, they must make sense, and they must be fun. Activity books must engage children in experimenting with number concepts as well as encourage multiple interpretations and explorations. They must intrigue children, inform them, and entertain them as they learn math concepts (Lowe and Matthew, 58).

IV. Using the Book in an Interdisciplinary Curriculum

Teachers may use *How many blocks to the Empire State Building?* as a stepping-stone to more extensive social studies explorations. An obvious extension would be to conduct field trips based on the book's journey, culminating with a trip to the Empire State Building. In addition, based on the children's interests and needs, teachers can use different entry points to bring children into the study of New York City, its history, and its place in the state. For example, to reach kinesthetic learners, the class could recreate the walking tour of New York City within the classroom. Student groups would be responsible for recreating elements of specific sights, such as masks or pictures of animals at the zoo, or murals of the view from the top of the Empire State Building. Or, while studying the writing process, the students could create and publish their own book around their neighborhood; for example, *How many steps to school*? could trace children's steps from their different streets in the neighborhood, converging at the school. For children in the upper elementary grades, in which New York state is the focus, students might publish a book like *How many steps to New York City?* from different regions in the state.

By composing and creating new stories, teachers can provide new points for their students to become active participants in learning both about the geography and the history of New York City and New York state. In the course of the research for this project, I found that most guide books of the city written specifically for children (Lerangis's *A kid's guide to New York City* and Lovett's *Kidding around New York City: A young person's guide to the* city) were outdated, published in the late 1980s. A class project throughout the year could involve creating an updated guidebook, written for children by children, about places to see in New York City. Students could use other

travel books as the framework for including the necessary elements for visitors to the city, including maps, famous attractions, tours through the different neighborhoods and boroughs, and contact information. Such a project involves students by allowing them to apply constantly what they learn through research they deem necessary, based on the class-generate description of the project.

Of course, the possibilities for curriculum extensions are infinite, depending on the teacher and the class. Hopefully such projects will release social studies from the book into real life and real experiences.

V. Personal Reflections

From the 86th Floor Observatory Deck at the Empire State Building, as I viewed New York City and the surrounding areas clearly for 25 miles, I realized why I took on this project. From the Statue of Liberty to the George Washington Bridge, one can see so much of the history of New York City from one of its tallest buildings. As I looked at the Twin Towers of the World Trade Center, I remembered what a second grade student once said: "They're called the Twin Towers because they're almost the same, except for the pole at the top of one." Children have a natural fascination for their city, and are willing to correct their impressions constantly with new information, provided they can experience the information and not just be told. This book, with its emphasis on maps and journeys, offers a way to experience information in a different way from the standard lecture.

I particularly enjoyed my forays around New York City as I took photographs for this collection. As a relatively new "New Yorker," this study showed me a new side of the city as I traced my way south from the school where I teach on 212th Street to the Empire State Building on 34th Street. I felt as if I were making this journey for the students in my school who do not know Manhattan south of Dyckman Street. Subway and bus maps and routes took on a whole new meaning as I trekked around the city with my roaming camera. Creating the math snippets convinced me as an educator that there is a story problem for every story or event and in finding that connection one can see math everywhere.

The most difficult part of this independent study was composing the book. In order to maintain the exploratory spirit of the book, I longed to be the roving photographer, but to compose a lucid story, I had to leave the pictures and return to the narrative text. Initially

I felt that I had so much information and so many pictures (over fifty) that I had to include it all. The process of choosing some sights and eliminating others was very difficult. After one disastrous draft, I realized I had to move the story along. "Tempo – the rate of speed at which the story moves – is such an elusive element that it is often overlooked by the beginning writer. It is, however, basic to the successful communication of the author's idea" (Lewis, 133). Facts and pictures proved so cumbersome that the story slowed to the point when it seemed the reader would never reach the Empire State Building. "For the nine-year-old reader, the writer must whittle out an instrument that will move rapidly … he watches his words and weeds out those that choke up the story's vitality and impede its tempo" (Lewis, 133). To move forward, I put the photos aside and drew a map of Manhattan. I then traced my journey from 215th Street to the Empire State Building, limiting myself to no more than ten sights. Next, I revisited my rationale, and considered the goals I hoped the book would meet, such as reviewing map skills. I wrote the text, limiting myself to a few sentences per page. Finally, I was able to bring the pictures back to my book. While taking the photographs suited the creative energy of the project, I learned that in children's books, the story is the most crucial element, and I experienced the writing process in full force as I drafted, revised, proofread, edited, and finally published.

VI. Something About the Author

Enakshi Bose is a fourth grade teacher at P.S. 98 in Inwood, Manhattan. She has only lived in New York City for two years, and was thrilled to visit the Empire State Building on a day with 25 mile visibility. Her next project, after exploring Manhattan, will be to explore the other boroughs in the city. She enjoys reading, playing dominoes, and cooking Indian food. She is very grateful to Jon Scieszka and Lane Smith for sparking her students' interest in reading.

VII. Annotated Bibliography for Children and Professionals

Annotated Bibliography for Children

Math

> Children's literature can help learners value mathematics. It is through books that children see people using mathematics for a variety of purposes... It is stories... that help children to see mathematics not as an abstract system of meaningless symbols, but as a useful tool for solving problems and making decisions. In this way children's literature restores a meaningful context to mathematical learning (Whitin, School Library Journal, 1992).

The following selections are just a sample of the children's literature available for connections to mathematics curriculum. I have attempted to include those books that offer valuable, standards-based, mathematical experiences as well as enjoyable picture book encounters.

Logical Reasoning

Base, Graeme. *The eleventh hour: A curious mystery.* Penguin Books, 1988. Picture book, ages 7-10.

> Horace the Elephant is hosting a party, but someone has eaten all the food! The verses of the story (quatrains with rhyming couplets) introduce the characters and the action, but a frame of one of the pictures warns, "Drawing conclusions from sketchy clues may lead you astray. So sharpen your eyes and your wit - get the point?!" To solve the mystery, use logic and clues from each intricate illustration to figure out who was the thief. Readers must use careful observation and logical reasoning, including process of elimination, to solve the mystery.

Birch, David. *The king's chessboard.* Illustrated by Devis Grebu. Dial Books for Young Readers, 1988. Picture book, ages 7-10. A Notable Children's Trade Book in the Field of Social Studies and Outstanding Science Trade Book for Children.

> The King of Deccan would like to reward his wise man for good service. But the wise man makes an unusual request: every day, for each square a chessboard, he wants twice the number of grains as on the square before, for 64 days. How much rice does the King owe? How many grains of rice are in a pound? Will the King be able to pay the wise man his reward? Children will enjoy exploring the pattern of doubling in this familiar Indian folktale illustrated with full-color watercolor, black ink, and colored pencil artwork. The watercolors create a soft image of a sandy, mystical land.

Burns, Marilyn. *Math for smarty pants.* Illustrated by Martha Weston. The Yolla Bolly Press, 1982. Nonfiction, ages 10-12.

Through puzzles, black and white cartoon illustrations, and activities, readers are encouraged to explore ways to be smart in math other than being familiar with arithmetic. The chapters on games and logical puzzles especially support the mathematician intimidated by numbers. The book is text-heavy, and therefore intended for older elementary or middle school students.

Burns, Marilyn. *The book of think (or how to solve a problem twice your size).* Illustrated by Martha Weston. The Yolla Bolly Press, 1976. Nonfiction, ages 10-12. In print (paperback).

This book coaches readers to think in new ways, through puzzles and activities. Black and white cartoon-like illustrations with captions to explain the mathematical processes introduce strategies such as working backwards. The text is easy to follow and guides readers to approach problems in different ways.

Measurement and Geometry

Adler, David. *How tall, how short, how faraway.* Illustrated by Nancy Tobin. Holiday House, 1997. Picture book, ages 7-9.

Through text and art, Adler and Tobin provide an overview of the origins of measurement, from they systems in ancient Egypt and Rome to the contemporary customary and metric systems. The illustrations, with bold colors and creative designs, including carefully rendered rulers, superimpose cartoon figures against rulers, grids, and other measurement tools. The text is easy to follow, and children are encouraged to try using nonstandard units, such as Egyptian cubits and palms or Roman paces, to measure lengths, heights, and distances.

Leedy, Loreen. *Measuring Penny.* Henry Holt and Company, 1997. Picture book, ages 7-9.

Lisa's next big homework project is to measure something as many ways as she can, using both standard units, like inches, and nonstandard units, like paper clips. Lisa decides to measure her dog Penny - from the length of Penny's nose to the height of her jump to the amount of food she eats. Leedy introduces not only the skill of measuring but also of comparing, so that each measurement has a concrete representation. Carefully captioned acrylic illustrations of recognizable figures with easy-to-grasp visual comparisons help develop the math concepts. Lisa, Penny, and the reader have fun as they learn to measure. Readers may also compare Lisa to her dogs. Is she close in size to an eight or nine year old, or is she not drawn to scale?

Myller, Rolf. *How big is a foot?* Dell Yearling, 1962 (copyright renewed 1990). A Children's Book Council Best Science Book. Picture book, ages 7-9 (read aloud for ages 6-7).

There once lived a king who decided to present his queen with a bed as a birthday gift. An apprentice carpenter is hired, but he faces one challenge: since beds have not yet been invented, how big is a bed? The apprentice must figure out how to make a bed that fits a queen. The mathematical concept of using standard units for measurement is introduced in this short tale, accompanied with comical character sketches in red, black, and white of the king, the queen, the apprentice, and the bed.

Neuschwander, Cindy. *Sir Cumference and the first Round Table: A math adventure.* Illustrated by Wayne Geehan. Charlesbridge, 1997. Picture book, ages 9-12.

King Arthur of Camelot has two problems: neighbors from the north are threatening war, and the table at which the king and his knights sit is not conducive to conversation. Sir Cumference and his wife Lady Di of Ameter take on the challenge to build a better table with room for every knight to sit and be heard. Through geometric manipulations Sir Cumference and Lady Di search for the perfect shape for a table. The acrylic paint illustrations and text on a background of parchment create the fanciful sense of a time long gone, while clear diagrams reinforce the math concepts of shape. Younger children will appreciate the manipulation of shapes, and may want to cut out the shapes, while older children will recognize the geometric concepts of the circle, including diameter, radius, and circumference.

Pinczes, Elinor. *Inchworm and a half.* Illustrated by Randall Enos. Houghton-Mifflin, 2001. Picture book, ages 6-8.

Follow the inchworm who "nibbles and measures" in the garden and learn how to measure smaller items with the help of worms who measure fractional parts. The book introduces the concepts of the whole and the fractional part (halves, thirds, and quarters). The story's popular rhyme format lend it to being read aloud, and may appeal to a young audience. Colorful linocuts personalize the worms with long eyelashes and goofy expressions, and the objects are bright and cheerful, such as the vivid red tomato. The worms, though, are not to scale in relation to each other, which can make the illustrations confusing. By the same author of the popular *One Hundred Hungry Ants* and *A Remainder of One.*

Estimation

Murphy, Stuart J. *Betcha!* Illustrated by S. D. Schindler. Harper Collins, 1997. Picture book, ages 7-9.

Follow two boys on their way to enter a contest to guess the correct number of jelly beans in a jar. On their way to the store, the boys challenge each other to figure out problems like how many people are on the bus or how many cars are on the road. One boy counts while the other uses estimation. Which method is faster? Which is more accurate? The illustrations include simple diagrams that complement the dialogue and reveal the estimation strategy in each scenario.

Nolan, Helen. *How much, how many, how far, how heavy, how long, how tall is 1,000?* Illustrated by Tracy Walker. Kids Can Press, 1995. Picture book, ages 7-10.

This number book explores counting not through an additive operation of ones, but through different representations of amounts of one number: 1,000. Depending on what objects are being counted, the same number, one thousand, can visually seem bigger or smaller. Through the vivid watercolor and colored pencil illustrations, ranging from 1000 yellow dandelions to 1000 French fries, readers develop a picture of what a thousand can look like, although the illustrations do not support the actual counting of 1000. Short sentences allow the reader to focus on the math concept. Once the counting concept of big numbers has been introduced, this book would support size comparisons and a more abstract understanding of 1000.

Other Math Picture Books

Atherlay, Sara. *Math in the bath (and other fun places, too!).* Illustrated by Megan Halsey. Simon and Schuster Books for Young Readers, 1995. Ages 5-7.

Not written with a particular math concept in mind, *Math in the bath* attempts to introduce readers to a more math-friendly world by showing how math is in everyday experiences, from counting the steps to school to learning rhythms in music to finding patterns in flags in Social Studies. Children could respond to this book by writing their own books about when they encounter math in their lives. The illustrations – gouache, gesso, pastels, and colored pencils on watercolor paper – follow the adventures of the narrator seeking math in all corners of her world.

Nagda, Ann Whitehead, and Bickel, Cindy. *Learning to graph from a baby tiger.* Photographs by the Denver Zoological Foundation, Inc. Henry Holt and Company, 2000. Nonfiction picture book, ages 8-10. Recommended by the Bank Street School for Children Children's Book Committee.

Through picture, circle, bar, and line graphs readers can follow the growth of T.J., a Siberian tiger cub at the Denver Zoo. Each graph is accompanied with an simple description identifying the parts of each graph, including labels and keys. The description of T.J.'s life is also accompanied by number facts, including weight, age, and amount of food consumed daily and weekly. The story also addresses the issue of family death when T.J.'s mother dies of cancer. The graphs and text guide readers to draw conclusions and make comparisons about the growth of T.J., thus addressing mathematical reasoning standards. The many color photographs of T.J. from birth to adulthood create a tender portrait of the tiger cub.

Scieszka, Jon. *Math Curse.* Illustrated by Lane Smith. Viking, 1995. Picture book, ages 9-11. An ALA Notable Book and ALA Best Books for Young Adults.

After Mrs. Fibonacci announces that everything can be a math problem, the narrator begins to have problems of her own. Readers follow the day of the math curse, encountering problems of grouping, patterns, geometry, and arithmetic. Each page offers more puns, plays on words, and math-possessed illustrations riddled with numbers, fractions, diagrams, graphs, and other math objects. The textured paintings evoke a sense of modern art, and the text in varied types heightens the anxiety felt by the main character as she succumbs to the math curse!

Tang, Greg. *The grapes of math: Mind-stretching math riddles*. Illustrated by Harry Briggs. Scholastic Press, 2001. Picture book, ages 7-9.

With rhyming riddles that hint at math strategies through visual portrayals, children are encouraged to move on from counting to explore other problem solving strategies, including grouping. The grouping includes mathematical concepts of making tens, which are easier to count, making arrays, and introducing multiplication. The brightly colored illustrations, generated by computer, offer children vivid visual aids to solve the math riddles.

Wells, Robert. *What's faster than a speeding cheetah?* Albert Whitman and Company, 1997. Picture book, ages 7-10.

Explore and compare a cheetah to a falcon, a falcon to an airplane, an airplane to a meteoroid using charts and graphs. How long would it take a cheetah to travel from the earth to the moon? Longer than an ostrich? A conversational tone relaying humorous details (written in hand lettering) about the animals and other moving objects is as engaging as the horizontal and vertical layout illustrations of acrylic and ink artwork. Older students will be challenged by the mathematical conversions and relationships between distance, speed and time.

Maps

Visual images enhance the understanding and interpreting of maps. The following list includes recent books addressing map skills in the picture book format, with visuals and text going hand in hand.

Hartman, Gail. *As the crow flies: A first book of maps*. Illustrated by Harvey Stevenson. Aladdin Paperbacks, 1991.

This book maps the paths in the lives of an eagle, rabbit, crow, horse, and gull, from mountain to farm to city, from skyscrapers to harbors to islands. Each illustration, a combination of pen and ink sketches and watercolor washes, displays the journey each animal makes in the form of a map, marking landmarks and paths. The book ends with a big map that combines the smaller sites together, showing how each place, each habitat, is connected and interdependent. For a

class project, children may map their own paths and then create a larger map that incorporates the individual sites.

Knowlton, Jack. *Maps and globes*. Illustrated by Harriett Barton. Thomas Y. Crowell, 1985. A Reading Rainbow Book.

Knowlton traces the history of cartography, from Babylonian baked clay tablets to Chinese silk screens to modern day navigation charts and political maps. He discusses the historical change in map making when the globe was invented because the earth was proven to be round. Mapping vocabulary such as the cardinal directions, hemispheres, and continents are introduced, as well as latitude, longitude, elevation, depth, and the different types of maps. Readers will understand that scales reduce the land to a size that fits the paper, and clear directions indicate how to find distances on maps. Bright, full-color half- and full-page illustrations, with every figure outlined in heavy black, accompany the text.

Sweeney, Joan. *Me on the map.* Illustrated by Annette Cable. Crown Publishers, Inc., 1996. Picture book, ages 7-10.

This book traces placement, geography, from a room in a house to a street to the universe. Each place includes a map that shows the site within its larger context or surrounding. The format is repetitious, thus helping build the idea of places within other settings and the hierarchy of information. Easy to read text corresponds to bright illustrations using colored pencils, with the occasional watercolor or airbrush. In each illustration, the child points to a diagram or map of the scene being described, to guide the reader.

Taylor, Barbara. *Be your own map expert.* Illustrated by Brett Breckon. Sterling Publishing Company: 1994. Nonfiction book, ages 8-10.

This full-color illustration packed guide map concepts, from scale to girds to projections, with activities readers can try on their own. Brief paragraphs about the history of mapmaking as well as map making today, including pictures from space and computer-generated maps, place the skills and concepts explained in the context of the applications of maps. A glossary is an easy reference for new vocabulary.

Walters, Virginia. *Are we there yet, Daddy?* Illustrated by S.D. Schindler. Viking, 1999. Picture book, ages 4-8.

Written by a kindergarten teacher to reinforce counting by tens and map skills, this book traces the car trip of Daddy, Son, and Betsy the Dog to Grandmother's house. The refrain of both father and son ("Are we there yet?" and "Just look at the map, Son, then you will know, we have 10 miles to go!") is familiar, not just from its repetition, but from its basis in real life. Younger children will appreciate the repetition, which invites participation during read alouds, while older children will enjoy following the map of the trip and the review of counting by 10. Most children will identify with the boredom of a car trip, while adult readers will

empathize with the parents. The map of the route, displayed on each double-page spread in an inset box, and the watercolor illustrations of each place help readers keep track of where the characters are and have been.

Weiss, Harvey. *Maps: Getting from here to there.* Houghton Mifflin Company, 1991. Nonfiction book, ages 8-10. A NCSS-CBC Notable Children's Trade Book in the Field of Social Studies.

Weiss introduces direction, scale, and symbols in maps, before addressing more advanced mapping concepts such as latitude and longitude. Embedded in the text are activities for readers to try, and the book culminates with a "Make your own map" guide. The illustrations, black pen and ink drawings on a white or tan backdrop add to the historical context presented about maps.

New York City

In New York, the city and its varied communities provide a fascinating backdrop for explorations in history, from early days to the industrial revolution to the present day.

Nonfiction

Avakian, Monique and Carter Smith III. *A historical album of New York.* Millbrook Press, 1993. Nonfiction, ages 9-11.

This book traces the history of New York, from its early Native American population to its waves of immigrants to the busy city it is today. Both land (New York's position as a harbor) and people contributed growth of the city, and both are recognized. A gazetteer at the end provides quick facts, including land area, bodies of water, climate, and the state flag, seal, and motto.

Doherty, Craig A. and Katherine M. *Building America: The Empire State Building.* Photographs of Lewis W. Hine. Blackbirch Press, 1998. Nonfiction, ages 9-11.

Understand the story of the Empire State Building, one of the best-known architectural landmarks of New York City, from the components that make up the structure to the actual construction to the builders, architects, and constructors directing the project. Photographs capture the efforts to build the structure, and the authors' consultation with an employee of the Empire State Building Company confirms the veracity of the book.

New York City: A photographic celebration. Courage Books (An imprint of Running Press), 1998. Nonfiction with photographs, ages

More than 100 photographs capture images of New York City, from the bustling crowds to the noisy streets, from east to west and uptown to downtown, from park to skyscraper. Photographed sights include the Statue of Liberty, the World Trade Center, The Empire State Building, Times Square, Central Park, and Rockefeller

Center. Select quotations from renowned New Yorkers compliment the vivid photographs of life in the Big Apple.

Fiction

Collier, Bryan. *Uptown.* Henry Holt and Company, 2000. Picture book, ages 6-9.
Too often Harlem is overlooked as authors depict midtown Manhattan and its famous attractions. In this visually appealing book, with watercolor and collage illustrations, the author/artist explores the sights in Harlem through the eyes of a young boy, from the brownstones to shopping on 125th Street to entering a barbershop. The boy's view of Harlem culminates with a performance by the Boys Choir of Harlem, with the sun setting over the Hudson River. Readers are invited to explore the sights, sounds, and moods of Uptown, of Harlem, New York

High, Linda Oatman. *Under New York.* Illustrated by Robert Rayevsky. Holiday House, 2001. Picture book, ages 6-9.
Underneath the ground of New York City, another world exists: one of "whizzing" and "clattering" trains, jazz musicians, and people having fun. Each page is divided in half horizontally, a mix of photos with ink sketches, to depict the worlds of New York City above and below ground, including representations of the Village Vanguard, the Oyster Bar, and the subway. The "underground city" below the city resonates with life, as shown in the mixed media illustrations that mix urban grays, greens, and browns with heavy black outlines to capture the steadily beating heart of the city. Five lines of rhythmic text, beginning with the words "Under New York," accompany each scene.

Jakobsen, Kathy. *My New York.* Little, Brown and Company, 1993. Picture book, ages 6-9.
Readers tour a child's favorite places in New York through a letter from Becky to a friend who is coming to visit from the Midwest. The child's perspective balances the topics, with personal interests like the Chelsea flea market countering the attention to famous attractions like the Empire State Building. Even the sea lions at the Central Park Zoo receive a mention. Jakobsen, an acclaimed folk artist whose paintings are at the Museum of American Folk Art and the Smithsonian, illustrates from several perspectives. For instance, she paints the Empire State Building from both the street angle and the panoramic view seen from the top. Bright attractive forms and figures mingle on each page, and Becky is easy to find, dressed in the same pink clothes in every seen. Endpaper maps of lower to mid Manhattan give readers the chance to trace the journey described in the informal, chatty letter.

Macaulay, David. *Unbuilding.* Houghton-Mifflin, 1980. Fiction, ages 9-12.
It took less than eighteen months for builders to construct the Empire State Building. But what would need to happen if someone wanted to dismantle the entire building and re-erect it in an Arabian desert? David Macauley explores the

challenge of dismantling the Empire State Building in this book, emphasizing the precise timing and organization involved in such a task. The meticulous black and white pen and ink drawings reveal the inside and outside of one of New York's tallest skyscrapers.

Sis, Peter. *Madlenka.* Frances Foster Books, 2000. Picture book, ages 6-8.
Madlenka has a loose tooth, and as she takes a trip around the block in New York City, she encounters people from all over the world. As Madlenka meets the baker, the vendor, the ice-cream man, the greengrocer, and so forth, the reader follows her journey on a map of the block and learns about the home countries of each friend. Die-cut squares in each store window offer views of global far away places. In all scenes, Madlenka is riveting with her blonde hair, yellow boots, and yellow umbrella amidst the otherwise more subdued colors of the city. Madlenka's trip around the block captures a slice of the varied lives of the citizens of one of the busiest cities in the world.

Weitzman, Jacqueline Preiss. *You can't take a balloon into the Metropolitan Museum.* Illustrated by Rubin Preiss Glasser. Puffin Books, 1998. Picture book, ages 7-10.
In this no-words picture book life mirrors art as readers watch both a little girl's trip through the Metropolitan Museum of Art and a guard's hectic journey through the city as he chases the errant balloon. Each scene in the public arena with the guard mirrors the activity in a museum work of art that the little girl is observing. Illustrations, designed with a combination of black ink, watercolor washes, gouache, and colored pencils, take the reader through familiar New York sites, including the Central Park Zoo, The Plaza, and Lincoln Center. A list of the works of art reproduced from the Metropolitan Museum of Art is included.

Wiesner, David. *Sector 7.* Clarion Books, 1999. Picture book, ages 6-9. A Caldecott Honor book.
A boy, on a school trip to the Empire State Building, is taken by a friendly cloud with a red hat and scarf to see how clouds are shaped and made in Sector 7. The boy sees the cloud design chamber as well as the arrival/departure platform for the clouds before a cloud taxi takes him back to Manhattan (recognizable on a cloud map as Zone 321). After the boys visit, strange objects hover over the skies of New York City! The author visited the Empire State Building on a zero-visibility day to research this book, and his watercolor illustrations convey the sense of mist and magic near the top of one of the city's tallest skyscrapers.

Annotated Bibliography for Professionals

Math

Braddo, Kathryn L., Nancy J. Hall, and Dale Taylor. *Math through children's literature: Making the NCTM standards come alive.* Teacher Ideas Press, 1993.

This book offers suggestions for using books across the breadth of math lessons to teach both process and content skills across grade levels. The list of books includes out of print volumes, but the suggested activities may be adapted to suit other books as well.

Bresser, Rusty. *Math and literature.* Math Solutions Publications, 1995.

Geared for grades 4 to 6, Bresser uses books as springboards to math lessons. Bresser includes books lessons, vignettes of classroom activities, and samples of student work for twenty children's books, including Ann Tompert's *Grandfather Tang's Story* and David Birch's *The King's Chessboard.* The book list has a multicultural dimension as well.

Hiebert, James. *Making sense: Teaching and learning from mathematics with understanding.* Heinemann, 1997.

This book explores the developmental and learning issues that affect the teaching and understanding of mathematics through past and current research.

Neil, Marilyn. *Mathematics the write way: Activities for every elementary classroom.* Eye on Education, 1996.

Communicating mathematical ideas and understandings is the basis for national, state, and city standards. Neil discusses the forms writing may take in the math classroom, from math journals to problem solving reports, and includes a list of children's literature that may support writing about math. She also offers suggestions for the role of the teacher in structuring the lessons.

Principles and standards for school mathematics. National Council of Teachers of Mathematics, 2000.

This newly revised volume sets the example for state and local content and performance standards across the grade levels and across all mathematical strands. Samples of student work and activities that promote mathematical understanding illustrate the implications of each standard.

Reys, R.E., Lindquist, M.M., Lambdin, D.V., Smith, N.K., and M. N. Suydam. *Helping children learn mathematics.* 6th ed. John Wiley and Sons, Inc.: 2001.

An introduction discussing how children learn mathematics prefaces activities across math concept areas, from place value and number to probability and statistics. The focus at the beginning on meeting children's needs and creating various tools for assessments, from rubrics to portfolios, will help guide classroom math lessons.

Satariano, Patricia. *Storytime Mathtime: Math explorations in children's literature.* Dale Seymour Publications, 1994.

This teacher sourcebook for grades 1 to 3 provides suggestions for extending discussions of popular story books like Vera Williams' *Cherries and Cherry Pits* and Pat Hutchins' *The Doorbell Rang* to further math explorations through hands-on experiences and cooperative learning. Explorations delve into number, geometry, logic, problem solving, patterns, and other math content areas. Blackline masters included.

Welchman-Tischler, Rosamond. (1992). *How to use children's literature to teach mathematics*. Reston, VA: The National Council of Teachers of Mathematics, Inc.

Using literature across grades K-6 can provide contexts for learning skills such as using manipulatives and concepts, from fractions and symmetry to number patterns and graphing. For each children's book, a summary is included as well as suggestions for specific age groups and follow up activities that involve cooperative learning, whole class discussion, and communication through speaking and writing. Blackline masters included.

Whitin, David J. and Sandra Wilde. *Read any good math lately?: Children's books for mathematical learning, K-6.* Heinemann, 1992.

One of the first resources for connecting math and children's literature, *Read Any Good Math Lately?* Acquaints readers with children's books of all genres, from fiction and nonfiction to poetry and folktales, to address math topics such as place value, arithmetic, and logical reasoning. Organized by math topic, extensive bibliographies of books for all ages are provided.

New York

Hine, Lewis W. *The Empire State Building*. Prestel, 1998. Most photography by Lewis Hine, courtesy of the Empire State Building Archive at the Avery Architectural and Fine Arts Library, Columbia University in the City of New York.

For more detailed background information on the Empire State Building, Lewis Hine's documentary photos taken during the construction of the Empire State Building offer an expansive look at the history of the great building that dominates the New York cityscape today. Black and white pictures show labor battling steel to erect the mammoth skyscraper. In all photos the indomitable presence of the building is shown in the context of the human endeavor. The faces of men, dangling from beams, swinging from cables, or even just taking a break with the rival Chrysler Building in the background, capture the determination of the architects and builders. The photos are accompanied by an introductory essay by Freddy Langer.

If teachers are considering implementing one of the suggested curriculum projects, in which the class creates a guide book for children about New York City, the following resources, out-of-print but still available in some libraries, including the Bank Street College Library, may be useful.

Lerangis, Peter. *A kid's guide to New York City.* Gulliver Books, 1988. Illustrations and maps by Richard E. Brown. Ages 8-10.

This travel guide for children includes calendars, safety tips, facts, and space for a travel diary for visitors to New York City. The book discusses attractions from the South Street Seaport to Rockefeller Center, with activities including crossword puzzles. For teachers, the suggested activities are still useful, including "Draw your favorite piece of art" after museum visits. Another project could involves students checking which parts of the book are still "true" and which are outdated.

Lovett, Sarah. *Kidding around New York City: A young person's guide to the city.* John Muir Publications, 1989. Illustrations by Sally Blackmore. Ages 8-10.

Kidding around New York City explores different neighborhoods, from Lower Manhattan to Little Italy to Rockefeller Center, in a manner geared towards the young traveler. Maps and historical facts are mixed with suggestions of where to eat, shop, or visit.

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