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Making Sense: Reflections on Developing a Social Studies Curriculum for Five- and Six-year-olds

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Making Sense

Reflections on Developing a Social Studies Curriculum for Five- and Six-year-olds

by

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of the degree of Master of Science in Education

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ABSTRACT

**Making Sense:
Reflections on Developing a Social Studies Curriculum for Five- and Six-year-olds**

By Anne Tobias

This paper is a reflection on the writing of a social studies curriculum for five- and six-year-olds—a study of a neighborhood construction site. It examines the way in which one teacher's commitment to offering children meaningful content evolved into the formulation of her educational philosophy, as influenced by such progressive educators as John Dewey, Lucy Sprague Mitchell, and Caroline Pratt.

Part One of the thesis is divided into three major sections. The first consists of a developmental overview of five- and six-year-olds. The second describes the connections between understandings of basic child development, understandings of a particular group of children, and the selection of a subject for study. It also outlines the rich scope of knowledge that a construction site holds out for exploration and offers a perspective on how kindergartners absorb and process that knowledge. The third section examines the relationship between methodology—specific acts of teaching curriculum—and educational philosophy. It details one teacher's philosophy of education as a rationale that supports her development of curriculum. Part Two of the thesis provides the complete curriculum guide for the study of a neighborhood construction site. Part One, a framework for developing curriculum, and Part Two, the curriculum guide, are designed as discrete yet related documents.

Throughout, this thesis considers how teaching and learning can be relevant to the grown-ups and children working together in school every day.

For my parents, Tobi and Irwin,
for my husband, Dean,
and for my daughters, Lili and Sara...
invisibly present in every written word.

For my advisor, Sal...
patient, encouraging, insightful.

For my colleague and friend, Naomi...
willing to listen, question, and laugh.

And with gratitude toward Harriet Cuffaro, who understands

“...the searching of teachers for coherence in their work, their desire to refine the connections between the *what* and *what for* of teaching so that teaching makes sense not only to those with whom they work but also to self” (*Experimenting with the World*, pp. 10-11).

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PART ONE

A Framework for Curriculum Development

PROLOGUE: Asking a Question

Here is a true story.

A child, somewhere between five and six years old, is climbing the stairs. He has just left his grown-up in the school yard and has joined the straggling, halting, shifting line of kindergartners toiling upward toward the classroom. Left, right, left, right. Stop, wait. Moving again. Left, right. And then—suddenly—the summit has been achieved. A doorway gives access from stairwell to hall, and the classroom lies directly ahead. There, in that threshold, the child comes to a stand-still and tilts his face upward, catching the eyes of his teacher. He has a question: “Why do we come to school every day?”

Other truths: This child smiles at school a lot. This child has friends. This child commits himself with eagerness and creativity to his work and play.

And one more truth: I am that teacher. And, on that day, I had no answer.

He may have asked the essential question: What is school for?

This question has, over time, provided fertile soil for educational thinkers. In *Experience and Education*, John Dewey (1938/1997), a progressive original, proposed a humanist view of education. He described human beings—feeling, wondering, thinking, reacting in the world—as ready learners, equipped with the “native capacities” of “common sense and power of judgment” that allow them “the precious gift of ability to learn from the experiences they have” (pp. 48-49). Dewey went on to guide teachers in their efforts to discriminate between educative and mis-educative experiences in building a framework for real and lasting learning in their classrooms.

Supported by Dewey’s progressive-education fundamentals, Lucy Sprague Mitchell (1934/2001) forged her own definitions that delineated the concept of school. In

Young Geographers, she writes of the “modern school,” which “asserts that children grow in mental maturity from the very beginning by the active process of discovering relationships and regards the school essentially as a laboratory where such discoveries may be made” (p. 5). Children, argues Mitchell, learn by thinking—relating facts and, as a result, creating new understandings. The facts and ideas that are available to young children derive from the experiences they have in interaction with their immediate environment, the “here and now” (p. 14). Mitchell contends, “Children are born into the world full of discrete sensations, experiences, and at once begin the marvelous process of relating these experiences, one to another. The learning process is essentially the same, literally from the cradle to the grave” (p. 5). In this light, curriculum for young children—the daily round of teaching and learning—will spring from the dynamic exploration and articulation of the children’s direct life experiences.

Also a progressive visionary, Caroline Pratt (1948/1970) cast aside the educational methods of traditional schools, with the sharp accusation that such methods were wasteful of children. In her book *I Learn From Children*, Pratt chronicles the way in which, over time, she built her own school, making concrete her visions of how children learn and how—in response—teachers should teach. Like Dewey, Pratt believed that human beings, from birth, possessed an innate desire and ability to learn, and went on to focus on play as the central mode of learning for children. Seeing, making, touching, doing, immersed in first-hand experiences with materials and excursions, fueled by their own curiosity about themselves and their immediate surroundings, the children in the earliest years of Pratt’s school framed their own purposes supported by their teacher. Five-year-old Michael, for instance, was building with blocks. “Michael was so deeply

absorbed, so purposeful in his construction,” writes Pratt, “that he might have been a scientist working out an experiment in a laboratory.... With blocks to help him, he was using all his mental powers, reasoning out relationships—the relation of the delivery wagon to the store, the coal cart loaded from the barge in the river and carrying its load to the home—and he was drawing conclusions. He was learning to think” (p. 30).

I began creating the following construction-site study (see “Part Two: A Curriculum Guide,” p. 62) in the direct wake of one kindergartner’s piercing question, so that the building of curriculum became for me a philosophical quest. Along the way, striving for meaningful ways to offer content, I found myself concurrently considering and constructing my own educational values, greatly influenced by the signposts erected by the pioneering progressive educators of the past. The end product then is, for me, more than a series of related activities. It is my own means of making sense of teaching and learning, of defining for myself the purposes of school and the nature of education.

WHO: Thinking About Development

For obviously the contention that children can be geographers must take into account the nature of both geography and children.

—Lucy Sprague Mitchell, *Young Geographers*, p. 3

For a curriculum to make sense to a child, it will necessarily relate to that child's developmental reality. What is it like to be a child of five going on six years old? What is the nature of that child's thought processes? What is the landscape of that child's inner emotional domain? How does a child of this age approach her/his surrounding environment of people, materials, and situations? How does this child make her/his presence known in the world? These questions will have two kinds of answers: those with a broader developmental perspective and those with the personal perspective of a particular child. In this light, any discussion of the typical kindergartner will be subject to the very real variations presented by very real children in every classroom. Curriculum needs to respond to both a typical developmental description of children of a certain age and to actual children. Advance preparations for a study will be shaped by the broader developmental framework, with a consciousness of the more spontaneous adaptations that might occur as planned activities coincide with unique learners in the classroom.

My own always-evolving understanding of children who are five going on six years old is the product of various sources: child-development theorists, classroom teachers who have described their experiences in print or in conversation, my own experiences in the classroom, and my own experiences as a mother. My graduate studies have introduced me to theorists whose insights into the growth of children have indelibly

shaped my own perceptions. First and most prominently among them, Jean Piaget (1896-1980) influences the way I think about children and cognition.

In Piagetian terms, the thought processes of a kindergartner are preoperational. A child of five or six has taken an important step beyond the sensori-motor stage (birth through age two), in which s/he interacted directly, spontaneously, and physically with the environment and received information primarily through the senses. William Crain (2000) has described this as the period in which “babies organize their physical action schemes...for dealing with the immediate world” (p. 113). Piaget contends that, as cognition matures, children between the ages of two and seven begin the gradual and crucial development of the ability to use mental operations to stand in for action in the world. They “learn to think—to use symbols and internal images” (Crain, 2000, p. 113). Of course, five- and six-year-olds continue to learn through their senses—doing, touching, looking, hearing, tasting—gathering information first-hand and then using their minds to process all that has been experienced (Cohen, 1972, pp. 66-67). But, as Piaget scholar Ed Labinowicz (1980) writes, “The [preoperational] child no longer needs to act out all situations externally. Actions become more internal as the child is increasingly able to represent an object or event with a mental image or a word” (p. 67).

Achieving the capacity for representation—the mental ability to have one thing stand in for another—marks a radical new dimension of thought. From this point on, a child can make use of symbolism, can “depart from fixed connotations and...move in a universe of ‘as if’ meanings and representations” (Biber, 1951/1984, p. 192). A busy, active early childhood classroom will reveal the steady stream of symbolic functioning that pours from the children’s work and play. In one corner, hollow blocks are arranged

in the shape of a dog house. In another, unit blocks rise in a sturdy vertical tower, joyfully declared to be “the Empire State Building.” During outdoor play, three children gallop by neighing, having transformed themselves into a frisky herd of horses.

Back inside the classroom, children pound, roll, and pinch clay, summoning trees, tunnels, and bridges from the shapeless pliable material. They draw, using line and shape to create designs and representational forms that effectively convey their “mental representations to others” (Labinowicz, 1980, p. 113). And throughout every activity, every routine, every transition, language abounds—words and words and more words that give form to thought and definition to action. Indeed, language growth for children who are five going on six years old is rapid, with marked gains in speech fluency, vocabulary, complexity of sentence structure, mastery of basic grammatical rules, and the pragmatics of verbal interactions (Bredenkamp & Copple, 1997, p. 109; Elkind, 1994, p. 63; Labinowicz, 1980, p. 114).

In a broad sense, these acts of symbolism allow children modes of self-expression, ways in which to know, articulate, and begin to understand the self. During the preoperational period, children are increasingly able to tell about their inner experience through spoken words, the movement language of dramatic play, and their engagement with a range of unstructured materials. At school, each individual child exists in the context of the group, so that play, offered and understood in symbolic terms, journeys beyond a solitary, self-centered realm into the “impact and enrichment” offered by the social world, where “the testing of one’s knowledge and feelings...may occur in interaction with the reality and feelings of others” (Cuffaro, 1996, p. 82). Work in the symbolic plane also allows the children to experiment with and reconfigure their

understanding of their physical environment. Grappling with the realities of their internal and external lives, children use symbolic means to play out their first-hand experiences of being and acting in the world. As described by Mitchell (1934/2001), the symbolic play of young children is “a reliving of experiences” (p. 13). And Harriet Cuffaro (1996) extends this idea:

One of the most profound means available to children for constructing and reconstructing, formulating and reformulating knowledge is through play. It is a means for synthesis and integration in that it brings together the child’s concept of reality with the inner world of fantasies and feelings. Play may be seen as the child’s substitute for adult musing, contemplation, hypothesizing, meandering among ideas and experiences. Play is the visible language of childhood wherein we see and hear the total child functioning.... (p. 75)

Children at play reveal their active, ongoing use of the symbolic mode. Further, the realization at the root of symbolism—that one thing can stand in for another—paves the way for mastery of the key symbol systems of literacy and numeracy, a paramount and monumental task in the preoperational period. For the word *cat* is nothing more than an arbitrary set of graphic shapes. Its power lies in that fact that it represents a tangible animal, with fur, claws, and a swishing tail. In order to tackle the skills of reading and writing, the mind must accept that letters and words stand in for real things and happenings in the real world. Only then do these two-dimensional shapes carry meaning and the potential for the communication of meaning to others. Cuffaro (1996) argues that the use of symbolism in dramatic play and work with blocks functions as a precursor to the symbolic requirements of literacy and numeracy, affording the child “time to try and to test skills and opportunities to use symbols in self-directed activities in order to get the *feel* of the process. The child must have the chance to function on an *as if* level, to understand that one thing may stand for another” (p. 84).

The same holds for the written system of mathematical signs and symbols, the arbitrary “social knowledge,” in Piagetian terms, that represents the “underlying idea of number [that] belongs to logico-mathematical knowledge,” which can only be gained through direct experiences with concrete objects in relationship to one another (Kamii, 1982, p. 14). Many, though not all, five-year-olds seem ready to embark upon the symbolic leaps that will eventually propel them from experiments with the concrete materials of the environment toward the intellectual abstractions of academic tasks presented in elementary school. They display a burgeoning interest in the concepts of number and quantity as well as matching and classifying activities, and they count with successively more reliable one-to-one correspondence (Bredekamp & Copple, 1997, p. 113). Among other preliteracy skills, they begin to identify letters of the alphabet and make efforts to write (David & Dombro, 1992, p. 32). Glimpsed along the trajectory of cognitive development—from the time that children primarily “handle, throw, taste, hear, see, and smell [their environment], to the time that they organize it into generalizations and abstractions”—the power of the ability to symbolize becomes increasingly profound, for it makes possible the sophisticated, increasingly internal mental operations necessary for high-level thought (Mitchell, 1934/2001, p. 13).

In addition to the emergence of the capacity for symbolism, preoperational thought is marked by the following distinguishing characteristics:

- *Egocentrism*, the tendency to focus on one’s own point of view (Bredekamp & Copple, 1997, p. 112);
- *Centration*, the tendency to focus on one element or characteristic of a situation or object (Bredekamp & Copple, 1997, p. 112);
- *Irreversibility*, the inability to think backwards through a sequence (Labinowicz, 1980, p. 73);

- *Perception-bound understandings*, the tendency to base reasoning on the way things look or appear, which, along with centration and irreversibility, contributes to the *inability to conserve* (David & Dombro, 1992, p. 31; Crain, 2000, p. 121);
- *Concreteness*, “the tendency...to focus on the tangible, observable aspects of objects” (Bredekamp & Copple, 1997, p. 113);
- *Transductive reasoning*, the tendency to relate the particular to the particular (Bredekamp & Copple, 1997, p. 113);
- *Magical thinking*, the belief that one’s own thoughts and wishes have the power to make something happen (Elkind, 1994, p. 59);
- *Animism*, the tendency to project life onto inanimate objects (Cohen, Stern, & Balaban, 1997, p. 121);
- *Moral heteronomy*, a strict adherence to rules created by adults and an understanding of right and wrong as based on objective outcomes, how authorities would respond (Crain, 2000, p. 127; Cole & Cole, 2001, p. 562);
- *Egocentric sense of social justice*, a primary focus on gratifying the self when considering how to divide resources and distribute rewards fairly, although beginning to justify decisions by referring to arbitrary characteristics (Cole & Cole, 2001, pp. 564-565).

The descriptions of Piaget and others of the preoperational thinker have served as a helpful reference point as I watch and listen to the young children in my classroom.

They provide a way for me to organize the content of my daily observations. At the same time, I am leery of an implied comparison of this as-yet-immature level of thinking with the thought potential that will come with further physiological and experiential maturation. As Crain (2000) points out, Piaget has been criticized for the negative cast of his explication of the thinking of young children, for becoming “so concerned with comparing preoperational thought to adult logic that he...focus[ed] on its deficiencies” (p. 145).

Yet Piaget’s achievement—and, Crain contends, the root of his motivating impulse—was his ability to clarify distinctions, to illuminate the ways in which “preoperational thought is not so much inferior to adult logic as it is a qualitatively different way of viewing the world” (Crain, 2000, p. 145). Considered in a comparative vein, young children’s thinking can be judged “unsystematic and illogical” (Crain, 2000,

p. 113). But embraced for its unique characteristics, the same thinking appears to soar. Teachers and those who live with children find endless wonder rather than a sense of limits in the thinking of the young. Unbound by adult forms of logic and reality, children are free to think allusively, weaving by means of association and incidental metaphor a world of endless possibilities that exists in a necessary and symbiotic relationship to the world as it really is.

Karen Gallas (1995), in her inquiry into the teaching of science, looks deeply into this kind of imaginative sense-making, recognizing that children try to “make associations between different kinds of knowledge” as they construct new understandings—“theoretical maps” of the ways in which the world works (pp. 49 & 55). As Gallas listened to children talk about science topics, she unearthed the “rich and creative stories of explanation that each child had so naturally, and naively, constructed” (p. 67). She found that children draw upon their store of known facts and fit those facts into their developing theories, which are derived in an overarching spirit of imagination, curiosity, and wonder (pp. 101-102). As the first- and second-graders in her class talked together about science, Gallas became highly conscious of their use of analogy and metaphor, “creative devices [that] often push the children’s thinking to new levels of sophistication and reasoning” (p. 46).

This is what such flexible, associative thinking sounded like in a kindergarten in which children had second-hand information about the then-recent Hurricane Katrina and close experience with the disaster of the World Trade Center buildings’ collapse:

Sounds of a siren curl up through the air and into the classroom. Erica listens attentively for a second and says, “Did you hear about the earthquake, the hurricane?” Carl responds that it was “just a little earthquake” and his brother slept through it. Then he offers, “One of my

cousins heard a gun. My grandpa has a gun. He uses it for hunting and stuff.” “Dragons?” interjects another child. “No, just bears,” answers Carl. The talk revolves around bears for a moment, until Vera asks the group, “Did you hear about the World Trade Center?” She goes on to tell a detailed story about how her brother was at school [the school these children currently attend] when the airplanes crashed into the building and he heard it. Vera assures the group that she was okay and that her brother “ran to Daddy.” Having listened intently, other children now speak up: “People died,” “Some people didn’t die,” “There were bad guys in the airplane.”

These children, thinking out loud, were fluidly relating a small body of known facts (sirens, emergencies, Hurricane Katrina, guns, September 11)—what they concretely “knew” about—with their vivid emotional response to the larger issues of danger and safety. The thinking was not logical from an adult standpoint but made intuitive sense. In writing about the content of young children’s dramatic play, Barbara Biber (1951/1984) points to its emotional coherence, noting the extent to which “feeling can transform thought” (p. 191).

Indeed, the thought processes of preoperational children, distinguished by the features enumerated previously, can be considered in interplay with the children’s emotional and physical states of being. Writing about five-year-olds, Dorothy Cohen (1972) has observed that “the demands of the body for movement and the impelling motivation of emotions carry greater force than do the mind and its logic” and that “the way in which feeling colors perception at this stage of childhood reflects a certain confusion about inner and outer reality” (pp. 59 & 65). Young children are keenly affected by the strength of their own emotions and seem to transition quickly from one emotion to another (David & Dombro, 1992, p. 31). They are also tuned in to an emotionally based view of the world. Recently, a four-year-old girl stood in the shade of an arching tree, declaring that her classmates should not drop the tree’s shed twigs down

the hole of a nearby grate. The tree, she insisted, would feel bad. Heinz Werner (1890-1964) explored young children's tendency to react this way, to display their physiognomic perception of the world. He maintained that children are "lacking clear self/environment boundaries, [and thus] perceive the whole world as full of life and emotion.... [They] quite naturally experience the inanimate world in terms of the same forces and emotions that they feel within themselves" (Crain, 2000, p. 95).

Other child-development experts describe the equally relevant physical experience of the five-year-old. As Sandra Curtis (1982) explains: "[A]ll fundamental movement patterns [walking, running, jumping, kicking, throwing, catching] emerge by age five," and "during the fourth and fifth years, more complex movement patterns occur, as well as rapid increases in speed and strength" (pp. 7 & 8). Bolstered by a lower center of gravity due to changes in body proportion, a high activity level, and a "new grace and coordination," the typical kindergartner seems to have reached a motoric apex (Bredekamp & Copple, 1997, p. 101; Elkind, 1994, pp. 34 & 84). Let loose in the school yard, a class of five-going-on-six-year-olds will run with gleeful abandon, careen and flip across the monkey bars, and jump from tantalizing heights. Cohen (1972) writes, "Fives are so pleased with themselves over their powers that they often set up physical obstacles to conquer just so they can enjoy their bodily competency all the better" (p. 52). Fine-motor skills have also come together, allowing children functional ability—and an associated sense of independence—with writing implements, tools, puzzles, and manipulatives, as well as the numerous zippers, buttons, snaps, and strings that routinely present themselves in everyday life (Bredekamp & Copple, 1997, p. 105).

So here is the whole child, who intertwines thought, feeling, and action as s/he interacts with the world. But the world, of course, is full of other people, and for kindergartners, the social realm is enticing, fulfilling, and often perplexing. It is a landscape beyond the sure perimeters of home and family and beyond the still-strong exigencies of egocentrism. As Cohen (1972) notes, “Fives are hungry for friends” and have “an honestly expressed need for children to play with (along with a real shortage of techniques)...” (p. 60). Interacting with peers, kindergartners begin to develop increasingly successful strategies for cooperative play, such as sharing and taking turns (Bredekamp & Copple, 1997, p. 117; David & Dombro, 1992, p. 33). They also exhibit empathy and an emerging sensitivity to the feelings of others (Bredekamp & Copple, 1997, p. 117).

These behaviors indicate the incremental advancement of the ability to consider others’ viewpoints and serve to help sustain cooperative play over lengthening periods of time. Still, fives are new to the complex vagaries of peer social interactions and often need adult support and guidance (Bredekamp & Copple, 1997, p. 115). And, as committed as a five-year-old may be to entering the peer group, a strong impulse for autonomy clearly informs daily behavior bolstered by newly mastered physical and cognitive competencies and by a rapidly growing sense of self, in terms of identity as well as ability (Elkind, 1994, p. 86). Cohen (1972) states that “to the children, five is power and strength, to be tested and expressed with as full a measure of autonomy as they dare take” (p. 50).

The impact of social interactions extends beyond the child’s honing of interpersonal skills. Cognition itself is shaped by the social context in which it develops.

Lev Semenovich Vygotsky (1896-1934), who educators most often associate with the concept of the zone of proximal development, insisted that cognitive development could only be understood within its larger social-historical context. Contending that “the growth of the mind is strongly influenced by...the sign systems the culture provides,” he illuminated the ways in which the sign systems, such as language, are “cultural tools” that children acquire through their social interactions with others (Crain, 2000, pp. 219 & 239).

The influence of social context on cognition can be understood from a Piagetian perspective as well, which describes the growth of cognition as occurring when a child interacts with her/his environment and constructs understandings based on first-hand experience (Crain, 2000, p. 114). This active putting together of mental structures happens, regularly, in a group setting. So when a child builds concepts, “her initial ideas may be challenged, confirmed, elaborated on, or altered by subsequent interactions with peers, older children, or adults” (Bredekamp & Copple, 1997, p. 114). The following interaction occurred between two girls, between four and five years old, as they worked to place plastic alphabet letters on a magnetic board:

Alice has been putting letters together to create a list of family names: *DANIEL, ALICE, MOMMY*. Lela is working on the same board, near the top, and has spelled out *NOLELA*. There is space between the girls’ work. Alice turns to Lela and asks companionably, “What are you spelling?” She gets no verbal response and returns to her search for letters. Then she looks at Lela again, saying, “If I attach this [Lela’s words] to this [her own words], what will it spell?” Alice answers her own question by confidently reading all the words out loud: “No, Lela. Daniel, Alice, Mommy.” When she is done, Lela says with recognition, “Oh, you attached it.” And Alice responds, “It’s connected.” She and Lela then lean over the board and work together to move *NOLELA* down so that it comes to rest at the top of Alice’s list.

Operating in tandem, the girls solidified their understanding of what it means to attach or connect two separate entities and what it means to use letters to spell orally understood words. They confirmed what they knew through interactive language and the concrete manipulation of materials. Their social interaction had strong cognitive implications.

As interested as children of five often become in relationships with peers, they continue to function in close coordination with seminal adults, members of their family and their teachers. Born dependent, children rely on the care and experience of grown-ups and only gradually assume the power and responsibilities that come with autonomy. Dorothy Cohen, Virginia Stern, and Nancy Balaban (1997) point to the “struggle” implicit in this “drive to independence,” explaining that “while they are breaking the bonds, children continue to need adults, not only for physical sustenance, affection, and understanding but for moral support...” (p. 97).

Five-year-olds may experience conflicting emotions as they interact with adults. For on one side, they seem to understand parents and teachers as “all-powerful and all-knowing” and to look toward these formidable figures for approval (Elkind, 1994, p. 52; David & Dombro, 1992, p. 30). They also tend to respect the rules set by adults (Oesterreich, Holt, & Karas, 1999, p. 229). Yet the impulse toward autonomy is indefatigable, and kindergartners keenly want to make their own decisions, even when that choice challenges the adults in their lives (Oesterreich, Holt, & Karas, 1999, p. 229). In the following anecdote, a teacher can be seen deftly making room for a child’s volition within the limitations set by a prescribed classroom routine:

Amelia has finished her snack and comes to the rug to read with the other children just before work time. Her teacher tells her that it is already time to clean up books in preparation for making work-time choices. In protest, Amelia starts to cry, and her voice takes on a whiney cast. Before her

emotional state escalates, the teacher suggests that Amelia take a book into the block area. Tears checked, Amelia promptly chooses a book and sits in the block area, quietly turning pages. Moments later, she returns to the meeting area and, putting her book on the shelf, announces to the teacher, “I looked at it. That was quick.”

A child’s daily social interactions with peers and adults can be seen as a potent context that necessarily has an impact on that child’s multi-faceted development. Indeed, children are inseparable from a host of contexts, including school setting, neighborhood, and—perhaps most significantly—the social, cultural, religious, and economic realities of their family group. These ecological layers exist concurrently and have the potential to inform one another and/or come into conflict. Researchers who view child development through an ecological lens suggest the numerous sociocultural influences at play in any single real-life experience—from the more immediate micro level of home, school, and family through the more abstract macro level of a particular culture’s overarching values (Cole & Cole, 2001, pp. 18-19). Maturing cognitively, emotionally, physically, socially, children grow over time, with that growth shaped by their place in the world.

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How do the real children that teachers meet in the classroom coincide with the attempts that child-development thinkers have made to identify and categorize the defining developmental constituents of their nature? Ideas about children are illuminating yet static. A unique child acting in the world will animate those ideas, expressing them, contradicting them, reinforcing them, and calling them into question at every turn with the unpredictable force that comes with individuality. Numerous educators have written

about individual children they have known. Their descriptions, rather more than the acknowledged tenets of child-development theory, strike close to the heart of early childhood. In the portraits that follow, exquisitely observant educators write about young children, with precise insight into the particular that suggests revelations about the age.

- Vivian Paley (1981) gives this vignette about Wally, once a member of her kindergarten class:

“We have three 12s in this room,” Wally said one day. “A round 12, a long 12, and a short 12.” Everyone at his table looked at him expectantly. “The round 12 is the boss of the clock, the long 12 is on the ruler, and the short 12 is on the calendar.”

“Why is the 12 on the calendar a short 12?” I asked.

“Me and Eddie measured it. It’s really a five. It comes out five on the ruler.”

“You mean it’s five inches from the edge of the calendar?”

“Right. It’s a five.” Wally stared thoughtfully at the clock. “I’m like the boss of March because my birthday is March 12. The 12 is on the top of the clock.” (p. 102)

- Cohen (1972) tells of two boys well-launched into a moment of dramatic play:

Down on all fours..., the two were hissing at each other and making clawing, scratching movements, until one of the children suddenly stopped short and peered somewhat anxiously at his fellow dinosaur. “Then you’ll change back to yourself, O.K.?” he queried. (p. 56)

- Cuffaro (1995) recorded the following exchange between a group of kindergartners who were using blocks to build an island community in the ocean. It was the third day of block work based on this motivating idea.

Steven: It’s not fair. I don’t have any customers. No one buys my fish. Everybody is catching their own fish.

Yvonne: We don’t need your store. We have the ocean. The fish are right there.

Steven: But I have the fish store.

Yvonne: But nobody NEEDS it!!

With this basic exchange on economics, Steven announced, “I’m going to build a weather station.” (p. 88)

- Pratt (1948/1970) recalls watching a six-year-old at solitary play in his room, a vision that helped her clarify her understanding of the means and purposes of educating young children.

On this occasion I found the floor covered with a miniature railroad system. He was building with blocks, toys, odd paper boxes, and any material he could find. Some of it was obviously salvaged from the wastepaper basket. As I watched him push his freight train onto a siding while a fast express roared by to stop at a station where lines of passengers and automobiles were waiting, as I listened to the unceasing accompaniment of happy noises in realistic imitation of train whistles and bells and automobile horns—it seemed to me that this child had discovered an activity more satisfying to him than anything I had ever seen offered to children.... [H]e was setting down his understanding of the way things worked, the relationships of facts to each other, the causes and effects, the purposes and function. This was thinking, this was learning. (p. 19)

- In their guide to observing and recording in the classroom, Cohen et al. (1997) offer this record of a conversation between two five-year-olds:

Stewart: You’re always hitting me. I’m not playing with you any more.

Ronnie: Are you sorry when you hit me?

Stewart: Yes, but I’m not playing space creatures with you.

Ronnie: But you said yesterday you’d play space creatures with me, and that’s today.

Stewart: I didn’t mean today. This isn’t the tomorrow I meant. I meant another tomorrow. (p. 150)

- And, fulfilling a task set by a graduate course, I recorded the following, part of an episode in the dramatic play area of a kindergarten.

Four boys are at play. Two are talking on cell phones. One is typing on a computer keyboard. One briefly tries out the bathroom scale. Mark has been pretending that he is going with the other children to a scary movie. When Joe walks over to the scale, Mark comes alongside him and says, “Let me see how old you are.” He then helps Joe onto the scale, looks at it, and says, with enthusiasm, “Wow, you’re just the right amount for the movie!”

What the children say and what the children do, every moment of the day, gives us clues to who the children are—how they think, what they feel, how they perceive the animate and inanimate world, how they understand themselves. Watching and listening to children over time allows for the construction of a general developmental picture checked and balanced by innumerable images of real children in real situations. And a close review of the broad perspective in conjunction with the particular lends depth and nuance to an understanding of the age.

* * * *

There is the feeling, in a kindergarten, of ascendancy. Having arrived at the height of the early childhood years, the children seem to exult in their prowess, a consolidation of the rapid growth—physical, cognitive, emotional, social—that has occurred since infancy. They can run, jump, hop, skip, swing, kick, and climb. They can talk up a blue streak, informing, explaining, questioning, complaining, demanding, describing, arguing, and joking. They can construct towers from blocks, airplanes from wood scraps, animals from clay, and dramatic scenarios from the limitless invisible pools of their imagination. They can draw, using line and form to map their thoughts and feelings. They are increasingly capable of self-control. They can make friends and keep them.

The moment is emergent. The sense of power is pure. “Look, I can do it!” the five-year-old shouts, and then steps out into the world.

WHAT: Choosing Content

What avail is it to win prescribed amounts of information...if in the process the individual loses his own soul...?

—John Dewey, *Experience and Education*, p. 49

An understanding of children—a particular age, a diverse set of individuals—must serve as a contextual guide for teachers in their selection of content. *What* is studied depends critically on *who* is doing the studying. Dewey (1938/1997) challenges teachers to develop curriculum that is responsive to learners, that expresses and has the power to elaborate something essential about the individuals who will come in contact with it. Content offered “in isolation,” presented for absorption as information that is inherently valuable regardless of specific individuals and their current objective conditions, will be “so disconnected from the rest of experience that it is not available under the actual conditions of life” (p. 48).

Curricular decisions with educative potential will only start when a teacher takes on “the responsibility for understanding the needs and capacities of the individuals who are learning at a given time” (Dewey, 1938/1997, pp. 45-46). For the individual is the immutable factor in Dewey’s concept of interaction—the ongoing transaction between the individual and her/his surrounding conditions that comprises every experience. The environment, however, “lies to some extent within the possibility of regulation by the educator” (p. 45). Coming to know the children as they are in that moment, then setting to work to shape the environment, teachers can make decisions about content that will have relevance for children.

Progressive educators of the past have crusaded for this kind of curricular relevance, for content and methodology that align powerfully with children in terms of their cognitive, physical, and social/emotional development, in terms of their driving interests, and in terms of the defining characteristics of their life experience. Mitchell (1934/2001), propounding the study of geography, writes in praise of schools that have “boldly declared that in curriculum planning the dominating logic should be of the children’s experiences and not of the subject matter, and that their environment furnishes a field for explorations and discoveries” (p. 8). Fully committed to matching learning to children’s developmental qualities, Mitchell, in *Young Geographers*, created a chart that identifies for successive ages, babyhood through middle childhood, a range of geographic thinking and expressive methods, with the associated implications for curriculum.

Having made innumerable observations of children as they instinctively interacted with their environment, Mitchell (1934/2001) came to define “intake” and “outgo” as two integrated components of learning (p. 13). Readily absorbing information, sensations, and images through first-hand experiences, children then express these experiences through play and work with materials, coming to new understandings in the process. By organizing a series of regular local trips, carefully calibrated explorations of the “here and now,” teachers could, Mitchell argued, provide an essential form of intake, one that encouraged children to “grow in the capacity to discover relationships—to think” (p. 14). As envisioned by Mitchell, such trips were to “become the basis of the curriculum in the younger years” (p. 13).

Insisting on relevance, Mitchell unswervingly related content to the very nature of children—their immediate concerns and capabilities, their natural proclivities for

learning. Pratt (1948/1970), operating in a similar mindset, added a particular emphasis on the ways in which resonance between content and learners formed the wellspring for intrinsic motivation. In Pratt's conception, children were to be introduced to knowledge they were specifically hungry for. For example, when the seven-year-olds in her school began work on the building of a semi-permanent play city, Pratt found that "it lent itself readily to the introduction of reading, writing, and arithmetic in ways closely bound to their central project, so that the mastery of these tools need not become an end in itself but could always have an immediate usefulness" (p. 83). Here is Dewey's (1938/1997) maxim again: content in context rather than content in isolation; learning that makes sense to the learner, which fuels the desire to learn. In fact, Dewey might contend that a teacher's dissemination of actual content is less important than her/his ability to inspire in children the "desire to go on learning" (p. 48).

As educators, Mitchell and Pratt beheld children and responded with curriculum. Shaping content to reflect both developmental and individual nuances, to ride the crest of children's inspired contact with the world, they exhibited a faith in children rarely seen in schools today. In Pratt's (1948/1970) words, every child has a primary "urge to learn with a purpose, purpose that is immediate, practical, and within the scope of a child to understand," and will be inspired to learn "by knowledge gained with his own eyes and ears, questions asked by him about things *he* wants to know, answers found by him within the limits of his own ability to find and understand them" (pp. 10 & 32).

Understand children, said Dewey. Observe and be responsive to children, said Mitchell. Trust children, said Pratt. These thoughts—the exhortation of countless progressive educators—thrummed with steady persistence in my mind as I set out to

create a unit of study. A study of what? was the first question, a question I was determined to examine in its developmental context. So I considered what I knew about five-year-olds, about their newly expanding worldview, about their intoxicating sense of power. Then I thought about Mitchell's indisputable argument for trips. And then came the morning, early in a school year, during which Jasper sat with me on a small couch in the kindergarten classroom and cried for his mother, a drenching torrent of tears. He had turned his head away from the activity of his busy classmates. Looking out the window, in a pause between wails, he said a sudden word, "Crane." Indeed, there was a crane, its impossibly long neck rearing up from a gaping earthy hole. "Yes, a crane," I said, and we looked together in the gathering calm of that moment.

That was the beginning. The beginning of my many observations of the construction site across the street from school. The beginning of my series of conversations with construction workers. The beginning of my research into the process of skyscraper construction. Gathering information, I grew increasingly sure that the study of a neighborhood construction site would be relevant to the kindergarten children for whom it was intended. There were so many ways in which it intersected with who they were and where they were. The study began to make sense.

For the kindergarten-age child, the smaller experiential spheres of self and family are beginning to widen. With the child's increased desire for interaction with peers, friends are made (and often unmade and then made again), bringing with them original information and perspectives, a whole different there out there. Increased socialization gives egocentrism its first true challenge. Kindergarten itself offers school as an alternate

environment to home, with variations on expectations for behavior and the proposition of new and specific tasks to be accomplished.

In these ways, five-year-olds are moving outward—from self, from family, from home. Mitchell (1934/2001) proposed regular local trips for children ages four to seven, “when the children have mastered the relationships in their immediate home environment sufficiently to widen their explorations, but are not yet mature enough, experienced enough, have not yet a large enough store of images to carry on investigations in situations which are not immediately before them” (p. 13-14). The construction site across the street from school, viewable through the classroom windows, offered the children in my kindergarten class the next nearby horizon.

As I wandered the lower Manhattan neighborhood of the school, snug up against the bank of the Hudson River, a contextual plane beyond that of early childhood development became apparent—a context of place, a context of sight and sound. For the site next to school was not the only evidence of active construction. Many blocks were punctuated by the demise and rebirth of buildings. Cement trucks spinning their viscous liquid innards; workers with hard hats, thickened hands, and spattered shoes; rumbling noises, banging noises, and buzzing noises—all these were part of the sensory landscape of the local area. This is where these children lived, part and parcel of their everyday experience. Everywhere, in various stages of progress, buildings were rising from rubble.

And here lies another context, the unseen context of the psyche. The children in this kindergarten knew with the directness borne of close experience that towers can topple. For in their collapse, the World Trade Center buildings, so near to this school, proved that steel and glass are illusory in their strength, that they can be reduced in an

unimaginable moment to rough debris and an endless, insidious coating of dust. Yet dirt and rock are cleared away, new holes are dug, steel is placed vertically and horizontally. Devastation and reconstruction, both are part of the psychological and emotional terrain for those who inhabit this section of Manhattan. In this way, for the children of the area, the construction process possibly exists in more than one dimension. It is the daily reality of hauling and digging and drilling; it is the subliminal balm of renewal.

Construction work comprises many features of specific interest to children of five and six, offering what Dewey (1938/1997) termed “an immediate aspect of agreeableness” (p. 27). Countless children stop and stare at the sight of the great machines, mesmerized by their size, their strength, their noise. Gouging with huge metal teeth, the excavator opens up the earth. Turning and rumbling, the cement truck spews forth a roiling river that turns to rock. And the crane levitates leaden loads, sailing them across the sky. Seen through the eyes of a child, these machines take on a life of their own. Modern incarnations of fairy-tale monsters, they roar, gnash, reach, and grasp. Both destructive and constructive, they hold the power to alter the landscape. The power of the machines is emblematic. For, at age five, the children are bursting with a newly consolidated and freshly optimistic sense of their own powers. They can jump and run. They can explain and argue. They can, like the machines and the staunch people who run them, make an altering mark in the world.

Construction workers themselves, the human forces that activate and toil alongside the machines, also fascinate. These are grown-ups the children can relate to: grown-ups who are ceaselessly on the move—pounding, sweeping, yanking; grown-ups who create real things—a giant hole, a metal cage, a concrete wall; grown-ups who get

dirty when they work. Construction workers engage in the kind of activity that children intuitively understand. They are competent in ways that children admire and seek to emulate.

So much work in the modern world exists as an abstraction to children, “a world of end-products with the functioning causes largely concealed” (Mitchell, 1934/2001, p. 6). Playing office, for instance, children will answer phones and type feverishly on a computer keyboard, oblivious to the ways in which these actions affect people and materials. But the process of erecting a building is different. At the construction site, people manipulate metal and rock, earth and concrete. Machines heave impossible burdens. Measurements are taken; problems are solved. A structure gradually grows. Construction work reiterates and exponentially magnifies the making and doing of the children’s own spontaneous play, replete with tangible achievements. Transposed to an awesome scale, it is the digging in the sandbox, the hammering of nails into wood, the pounding of clay, the building with blocks. It is working with one’s own hands. It is the dramatic creation of something from nothing. It is power and transformation. It is real.

These are the seminal connections. Watching the construction process, children are able to make sense of the work because it aligns so closely with who they are, where they live, and their current interests. Yet the study of construction goes even further, unendingly rich in possibilities for discovery. For example, the primary knowledge to be gained is a basic understanding of how a tall building is made, from digging and reinforcing the foundation, to creating the light, tall skeletal structure, to applying the outer “skin” of masonry and glass, to outfitting and finishing the interior for use. Related areas of information immediately suggest themselves. Some fall under the heading of

structural engineering. What is a foundation? How is it made and how does it function to stabilize a building? Why create a steel framework? How does this material arranged in this configuration allow for the soaring height of a skyscraper? Are all buildings made this way? Examining the relationship between form and function at the structural level paves the way for an enticing glimpse of the forces of physics at work in the everyday world.

As the creation of the structure unfolds incrementally before the children's eyes, the use of building materials becomes significant. During the making of the foundation, small fleets of trucks churn and deliver great volumes of cement. Flatbed trucks bring huge, long bundles of steel reinforcement bars. Later stages in building require different materials, for instance, steel beams and the strong fasteners that connect them for the frame and then perhaps glass and/or aluminum panels for the outer walls. The finishing of the interior might herald the arrival of such materials as plasterboard and paint, among others. Throughout the process of construction, each material used has been chosen for its particular properties. Children can begin to grasp the ways in which the physical realities of various materials inform their ultimate use, whether that use is functional or decorative. And they will be able to associate some of this understanding with their own constructive work with unstructured materials in the classroom, from blocks to clay to paper, string, wire, and tape.

Refocusing from the construction site itself to the area in which it is situated, the study can invite a wider look at the children's neighborhood. Any change in the surrounding environment—especially such a dramatic change as the erection of a tall building—provides a compelling contrast to the existing environment and leads to

questions about the environment itself. What are the more constant characteristics of the neighborhood? Why is this new feature of the neighborhood being constructed? What other buildings are in the area? Who makes use of the buildings and how do they use them? Why do people choose to change their environment in particular ways? Why do people need this new building? Mitchell (1934/2001) holds issues of the environment as primary in the education of children. She writes: "Since children's experiences begin in the immediate communities in which they are brought up and since these communities are functioning in terms of the present-day culture, it is the school's job to begin with the children's own environment, whatever or wherever it may be" (p. 8).

Widening the scope of inquiry invites another relevant question: What makes a building a building? Identifying similarities between neighborhood buildings, children can solidify their concept of what a building is. It has, for example, floors and ceilings, and walls punctuated by doors and windows. Contemplation of similarity necessarily leads to discovery of difference. For not all buildings are the same height or width or color. Buildings are made out of different kinds of materials. Buildings are built by people for different uses, for living, for working, for storage, for recreation. Again, form and function come into play, as children discover that buildings meant to be used in a particular way are built in a particular way.

The vital connection between people (their needs, their purposes) and the physical aspects of their environment can be extended in a look at the myriad tools used in construction work. As children watch at the site, construction workers shovel and sweep, they hammer and saw, they drill and weld metal, making sparks fly. Some of the tools are relatively simple and wielded by hand, easily recognizable in their counterparts found in

the home or classroom. Others are motorized and do their powerful work both quickly and loudly. Every tool has a specific use, as does every great construction vehicle, suggesting a broader contemplation of the ways in which people have shaped tools and machines of all kinds to make their work easier and more efficient, and to make their final constructions larger and more sturdy. Born into a world dependent on machines of all kinds, from power tools to cranes, from dishwashers to computers, children can think about the machines of the construction site and add complexity to their understanding of what a machine is and why people use them.

Despite the eye-catching machines of the trade, the work of real people is at the heart of construction. Construction workers are people with knowledge and skill, people with expert understandings of structural engineering, of the properties of materials, of the environment, of the form and function of buildings, of machinery. Children are eager to be knowers. They often absorb and retain facts with alacrity, for instance, the names of all the dinosaurs, along with detailed descriptions of how they looked, what they ate, and how they attacked and defended against attack. Children know things and feel powerful, perhaps sensing knowledge as a key to being successful in the world. Studying the construction site, children can revel in the multitude of specifics to be known: the names of the different vehicles and the jobs they do, the terms for the different kinds of work and the different kinds of workers, the words of action that describe the work. And while children will certainly admire the construction workers they observe and meet for their physical accomplishments at the site, they will be equally in awe of their deep “funds of knowledge,” similar to the “historically accumulated and culturally developed bodies of

knowledge and skills” that Luis C. Moll, Cathy Amanti, Deborah Neff, and Norma Gonzalez (1992) revealed in Mexican households in Tucson, Arizona (p. 133).

The construction workers are also real people, with families, with personalities, with other lives. Able to meet and talk with some of the workers, both at the site and in the classroom, children can become acquainted with the human force that propels construction work. They can begin to differentiate between the distinctly different jobs that people do on the site: surveying, security, iron work, cement work, crane operation, coordination and planning. They can hear about what the jobs feel like to do: exciting, tiring, scary, fulfilling. Making human connections, children will tap in to broader human issues—autonomy and interdependence, cooperation, communication, responsibility, courage—the very issues at constant and dynamic play in the daily communal life of the classroom.

In all these ways, a study of a construction site can offer children access to information that is relevant to their lives—developmentally contextualized content. Yet the thought processes by which children absorb knowledge become as significant to a curriculum as the amount of knowledge absorbed. For curriculum is not only about *what* is to be known, but about *how* children come to know, how they make sense of information and integrate it into their current understandings of the workings of the world. In this sense, the experiential opportunities that comprise a study (trips, books and discussions, art and movement activities, opportunities for dramatic play, for example) can be considered in terms of the ways in which they activate and expand cognitive functioning, with an understanding of cognition along a developmental continuum.

As Cohen et al. (1997) point out, children are fueled by the “biological need to find out,” satisfying their innate curiosity through sensory tactics, but honing mental processes as well in their “search for physical and social meaning” (p. 119). At each stage of development, the thinking put in service of finding things out will express different features. For five- and six-year-olds, who are preoperational in Piagetian terms, these features will include, for example, egocentrism, centration, and concrete thinking. Within this context, the children can be seen at work on strengthening some basic skills of intellectual functioning: observation and its related cognitive counterpart, critical reflection. They are learning to look with focus and then assimilate new understandings through such mental processes as categorizing, comparing, summarizing, predicting, questioning, and (eventually) inferring.

Of course, for young children, these mental quests come in active forms. Trips to the construction site provide a cogent example. Full of intriguing sights, sounds, and smells, these local excursions invite the practice of observation. The children eagerly use their eyes, ears, and even noses to learn about the people, machinery, materials, and environment involved in construction work. The skill of observation serves as the basis for inquiry; it is an essential springboard for learning in all domains. In emphasizing the value of focused looking, listening, smelling, hearing, and touching, a teacher can help open the environment for autonomous discovery, allowing children to take the lead in their pursuit of the knowledge that feeds and challenges their growing understandings of themselves and the world.

As Mitchell (1934/2001) declares, “there is not only an ‘intake’ but an active ‘outgo’” (p. 13). Having gained information through close observation of the construction

site, the children will need time, space, and appropriate materials for the further work of processing new knowledge. They will need to engage in “play which is constructive and leads through progressive stages of relationship-thinking” (p. 16). Such play and work in the classroom will take many forms. Some activities will involve the use of unstructured materials (blocks or sand, paint or clay, paper or cardboard), often closely attended by dramatic play scenarios. Recreating and reliving recent experiences by these means, children incorporate new understandings with previously held theories. They also explore and experiment, plan and form purposes, practicing a self-motivated, thoughtful approach to work that will facilitate many different forms of effective learning in the future. In essence, opportunities for such play and work shape what Dewey (1938/1997) called “attitudes that are emotional and intellectual,” habits of mind that will “prepare a person for later experiences of a deeper and more expansive quality” (pp. 35 & 47).

Beyond the use of unstructured materials, children can be offered a variety of activities that will emphasize a variety of thinking skills. Consider the follow-up to a trip. The seemingly simple act of recording observations—with pictures or words, in charts or graphs—has rich mental consequences. For these visual forms of mental recollection will solidify the children’s personal connections with and support their mental organization of recently acquired material. The reading of a related book and the ensuing discussion will allow children to consolidate the sensory impressions received during the trip and will provide a language-rich format for questions, explanations, comparisons, and new insights.

Some thinking skills may be particularly related to domains such as science or math. For instance, when, in the study, the children create a cement-like material from

flour, salt, and water, they are measuring and counting. They are following a sequence. They are watching a liquid turn to a solid over time. They are considering and predicting an outcome, and they are recording data. When they explore the buildings they live in, they are collecting and recording data, categorizing, counting, and comparing information with others. Other activities may highlight the skill of transferring knowledge to a new situation, as when the children attempt to solve the problem of moving a heavy object (just like the construction workers) or that of providing a stable foundation for a cardboard tube.

Sometimes the children will be practicing thinking in terms of organization and follow-through, as when they create their own small-scale imaginary buildings from unstructured materials. Here they are being asked to think before they act, to create a feasible plan and then see an idea through to completion. On a small scale, this puts into practice Dewey's (1938/1997) concept of freedom, the "power to frame purposes and to execute or carry into effect purposes so framed" (p. 67). Yet other activities will need to embrace the natural and essential links between physicality and cognition for young children. Five- and six-year-olds will often learn kinetically, becoming the rumbling, roaming construction vehicles or wobbling on one foot and feeling the consequence of a weak foundation.

Curriculum based on a construction site can also tap in to the emergent capacity for symbolism so actively being cultivated by children of five and six. Poised on the near edge of literacy, five- and six-year-olds are beginning to uncover the symbolic mysteries of the alphabet, both graphic and auditory. They are beginning to identify letters and the ways in which letters are grouped together to form words, and—most marvelous—to

realize that printed words hold real messages of great consequence. *Caution*, cries out one sign at the site. *Keep back*, declares another. *Post no bills*, states a third.

Environmental print abounds, offering children innumerable opportunities for exploring the symbol system of print. Other symbol systems will become apparent as well. The children may notice, for instance, the use of color, how red, yellow, and orange often declare danger. Construction workers who visit the classroom may show the variety of nonverbal gestures they use at the site in order to coordinate their work. And, then, the children can be given opportunities to make their own signs with letters and colors, to play a movement game using communicative body language—to apply their growing awareness of symbolism in the world around them to daily living in their own world at school.

Naturally, all of these activities—whether related to movement or literacy, science or math—bear a fundamental relationship to life at the construction site, using diverse modes that serve a variety of learners and engaging a variety of cognitive processes to flesh out emerging concepts. And, in the end, each activity can be evaluated by the teacher in terms of the specific ways in which it invites children to think, to exercise their new understandings on an active, tangible plane.

Curriculum exists on many levels, as it relates to development, as it relates to knowledge, as it relates to cognition. There is also, at the heart of any study, a body of concepts—broad ideas relevant to a person’s daily contact with the world. For example, a study of a construction site and the building it creates will illuminate such concepts as use of the environment, growth and change over time, planning and process, form and function, and commonality and diversity. It will also touch on basic concepts of

humanity, such as interdependence, cooperation, communication, and responsibility. Yet nowhere in the study are these concepts specifically taught. Rather, they inhabit the mind of the teacher, whose awareness on this conceptual level represents a capacity to know the potential of the curricular material and to offer children immediate, concrete activities that illustrate the abstract concepts. In this view, conceptual learning extends along a continuum, with repeated exposure to real-life examples building, over time, understanding.

At this point, I find my reflection on choosing content shifting course, from a consideration of children and their interaction with learning situations to a consideration of teachers and the ways their thinking has an impact on children's experience. For as much as content must make sense to the children, it must hold resonance for a teacher. Having examined construction work in preparation for creating this study, I now discover the ways in which it engages my imagination. I am able to see construction as a metaphor.

Early in my research for this study, I engaged a worker at the site in conversation. He explained a number of technical points, and then he spoke of pride. He told me how it feels to lay steel and see a building soar. And now, when I look at buildings, I find they have come alive, no longer just functional structures, but monuments to human work and human achievement. For the act of construction is a declaration of self, the making of a tangible mark in the world. This vein of thought brings me back to my work with children, leading me to ask, How do I recognize the endeavor and the laying out of self that goes into what children construct in the classroom? How do I acknowledge a child's sense of pride and achievement? Ultimately, all this swirling thought begins to coalesce

into an educational goal. I am coming to realize that I have the intention of creating a classroom in which all children are busy building themselves through accomplishments that they see as important in the world. To be truly relevant to children, curriculum will contain this too.

HOW and WHY: Offering Opportunities

Connecting the visible with the invisible of teaching, meant connecting the *what* of curriculum with the *what for* of curriculum.

—Harriet Cuffaro, *Experimenting with the World*, p. 6

It was easy to become convinced that the busy, noisy, exciting construction site across the street held relevance for the group of five- and six-year-olds I was coming to know. Much harder was the task that came next—developing a series of activities that would allow the children to access what was to be known about construction, both conceptually and specifically. Writing up these activities, my thinking ranged widely, as I considered how to organize opportunities for first-hand experiences, how to tap in to children’s use of materials, how to incorporate different styles of learning, how to make connections with children’s growing skills in language and literacy, math and science, as well as basic reasoning, and how to honor the emotional and physical realities of early childhood.

I thought about the links between how children acquire information and how they process that information through work and play. I dreamed of the child who would “gather his facts and relate them for himself, to ask his own questions and find his own answers” (Pratt, 1948/1970, p. 10). In the end, I was searching for a conscientious methodology—a means for turning a body of information into opportunities for self-discovered knowing, authentic portals through which these kindergartners might connect with the world.

During this process, I asked myself: What were the pertinent, accessible features of the construction site? How could children come into contact most immediately with

construction? With what materials could children express and extend their engagement with the subject matter? Each question required that I make methodological choices in the form of myriad small, yet significant decisions: how to introduce a trip, how to plan and explain the procedure of a movement exercise, how to order the study's sequence of activities, how to illuminate information through materials available in the classroom.

I found that with every choice I made (every decision to present or explore information in this format rather than that format, in this order rather than that order), I was asking myself what I believed—about children, about teaching, about learning and knowing. I was asking myself to define a point of reference from which each choice derived integrity. I wanted to be able to say, “I did it this way because....”

In this sense, methodology (*how* a teacher brings concepts and information into the classroom) is the essential link between Cuffaro's “*what* of curriculum” and her “*what for.*” *What* a teacher contributes visibly in the classroom—the actual activities and opportunities s/he offers, the tangible arrangement of the environment, the verbalized limits s/he sets—and *how* these various curricular elements are delivered will necessarily reveal the invisible: that teacher's internal, deeply personal system of values from which all else stems. Cuffaro (1995) links teaching to self this way:

Teaching is a way of being who we are and a place where in our actions we make manifest what we believe and value. Teaching is a way of rehearsing and trying identity, of creating and discovering self. In teaching, self is constantly elicited, always on call, responding. There is an alertness required, an alertness to understand each situation, the meaning and possibilities of the present moment, an alertness that throws us back to self, to our reason-making. (p. 99)

My study of a construction site is both a piece of curriculum and a personal statement about teaching and learning. Every activity is upheld by my unspoken, hard-

won, continually evolving educational framework, by “a declaration of the self who has constructed the framework, the person who sees from a particular perspective” (p. 11). What follows is an attempt to make the invisible visible, to reveal aspects of my philosophical framework and the ways in which they support my curriculum by providing a rationale.

A Philosophy of Education

- **I believe in developmentally oriented curriculum.**

In order for a curriculum to make sense to the children who come in contact with it, every aspect must relate in fundamental ways to their stage of development—the ways they think and communicate, the ways they interact (physically and emotionally) with people and their environment, the nature of their interests, and the tenor of their concerns. The centrality of human development as a consideration for teachers surfaces in Bank Street’s developmental-interaction approach, in which “developmental refers to the patterns of growth and ways of understanding and responding that characterize children and adults as they mature” (Shapiro & Mitchell, 1992, p. 16). If “the individual...is what he is at a given time,” then teaching will mean understanding each child in her/his place on the developmental continuum and creating curriculum that responds appropriately to those ways of being in and making sense of the world (Dewey, 1938/1997, p. 45).

Mitchell (1934/2001), in *Young Geographers*, gives a clear example of how a teacher might attune curriculum, in terms of content and in terms of methodology, to

child development. She presents a chart that aligns developmental stages (described in terms of age, “interest drives,” “orientation” in the world, and “tools and children’s methods of expression”) with “curriculum implications” (pp. 10-12). Such research and thinking allowed Mitchell to develop a nuanced plan for the geographic education of children, a plan that appears to be exquisitely responsive to the developmental elaboration that takes place in children as they live over time in the world. The form the curriculum takes becomes a reflection of child development.

Just as curriculum can be honed to match a developmental stage, it must also be a vehicle that allows for and supports continued developmental growth in all areas. In defining his concept of continuity, Dewey (1938/1997) equated the truly educative experience with growing. He stated: “In a certain sense every experience should do something to prepare a person for later experiences of a deeper and more expansive quality. That is the very meaning of growth, continuity, reconstruction of experience” (p. 47). Ideally, teaching conceives of experience in the Deweyan frame, as a “moving force” (p. 38). In this light, curriculum is the offering of opportunities for experience in which children recognize themselves *and* reach for the next level of maturity, as thinkers and as doers, as individuals and as members of a group.

In creating my study of a neighborhood construction site, I strove to honor the developmental reality of the five- and six-year-olds in my classroom. This was expressed initially, and most powerfully, in the selection of the subject matter itself with a recognition of the resonance it held for my group (see “What: Choosing Content,” p. 21). But it also informed the kind of books and poetry I chose, my conscious inclusion of activities in which children could explore concepts with their bodies or with concrete

materials, and my decision to pursue the use of unstructured materials as a resource for processing information. With reference to Mitchell (1934/2001), I devised a series of trips, followed by significant visitors to the classroom, to deliver essential “immediate experiences” in a format readily accessible to kindergartners, so ready for “exploring the ‘here and now’” (p. 14). In addition, the activities allow for a range of social interaction (individual, small-group, and whole-group work) and emphasize both the framing of purposes and the solving of problems. At every stage, I tried to keep the children in mind, both in terms of their immediate engagement and their potential growth.

- **I believe in curriculum that is responsive to individual children.**

“Keeping the children in mind” means more than a developmentally responsive curriculum. It also means a curriculum that sees beyond a child as a member of her/his age group to a child who reacts in idiosyncratic ways in the world. This belief has led me to make curriculum featuring both work with unstructured materials and play. As described more fully below, such open-ended opportunities naturally allow children to express the fullness of themselves even as they interact with and assimilate new information provided by the teacher. Building and playing in the block area, constructing machines out of recycled materials, or even figuring out how to move a heavy box—each activity relates in a specific way to the subject of construction. Yet each gives a child the opportunity to frame her/his own purposes. Here is Dewey’s (1938/1997) concept of freedom. For a person is free in a Deweyan sense if s/he is able to exert individual intelligence—rigorous mental methods—to shape experience by planning for action.

While children will react in individual ways to pieces of curriculum offered by a teacher, a teacher must also be on the alert for how those individual reactions might shape the curriculum, taking it in unexpected directions. Dewey (1938/1997) discusses a factor he calls “desire,” that organic, untempered thrust of imagination that is the seed of any idea (p. 67). When teachers are aware of the desires of children in this sense, and help them use intelligence to transform their desires into purposes, a curriculum arises that has relevance to specific children, and to the ways they function individually and as a unique group. Dewey notes, “In an *educational* scheme, the occurrence of a desire and impulse...is an occasion and a demand for the formation of a plan and method of activity” (p. 71). Children must be present in their own education.

Cuffaro (1995) writes thoughtfully about the ways in which “children, along with the adults with whom they work, are curriculum creators” (p. 45). She parses out the separate yet symbiotic roles of teachers and children as curriculum comes to life in the classroom:

The child’s entry is personal, vital, and qualitative, derived from his or her experience and immediate concerns.... Teachers...become the link that bridges the personal world of the child and the larger, ordered world of categories, of impersonal facts and laws, and logical classifications. With our broader perspective and experience and our panoramic view of the educational undertaking—a perspective impossible for the child—we create the means for bridging and connecting. We do so through opportunities for experience that we offer—space, materials, time, and our genuine attention. (pp. 46-47)

Classrooms are busy places. So much is going on in any one moment that teachers need a system of looking and listening—a way “to see a child...in terms of his own horizons,” a way of giving “genuine attention”—if they hope to capture the child-driven currents that might inform curriculum and contribute to its relevance to the children

(Pratt, 1948/1970, p. 8). Cohen et al. (1997) have written that “an important part of teachers’ professional responsibility lies in their role as researchers in their own classrooms” and suggest that objective observation and recording techniques “will show a fairly full and realistic picture of one living, breathing child, responding to life in a unique way, interacting with people and materials, and functioning at his own stage of maturity and growth” (p. 7). To that end, I have included a commitment to observation and recording at the start of my study, including the use of anecdotal records, checklists, and photographs. And in so doing, I am opening up my curriculum to the ways that children, in all their individuality, will lead it in trajectories beyond those inscribed on the written page.

- **I believe that children learn when the curriculum has relevance to their lives.**

This belief is, essentially, a summation of the two that come before it. Yet I state it again, standing alone, because it defines for me the crux of teaching and learning: making sense. Relevance is about connections, about how curriculum must intersect with children in terms of development, in terms of individuality—and in terms of the reality of being alive in the world.

As such, relevance carries a humanist stance to education. It brings us back to Dewey (1938/1997), to his optimistic belief in human beings as ready learners endowed with “the precious gift of ability to learn from the experiences they have” (pp. 48-49). Relevance insists that curriculum will acknowledge this humanity at the center of learning, understanding that for information to be absorbed, it must speak to human experience. For information offered “in isolation,” as Dewey writes, will be “so

disconnected from the rest of experience that it is not available under the actual conditions of life” (p. 48).

And relevance is personal. It is dynamic. It is the root of intrinsic motivation, the spark that inspires children to engage in their work. In this sense, relevance respects that a child has, innately, “the urge to learn with a purpose, purpose that is immediate, practical, and within the scope of a child to understand” and that “children learn eagerly and well when they have need of the knowledge...” (Pratt, 1948/1970, p. 10 & p. 51).

Relevance helps answer the *why* of coming to school every day.

- **I believe in taking time to learn.**

Cuffaro (1995) reminds us that “for children time is fluid, its flow accentuated or eased by inner states” (p. 40). So often in both school and family life, children confront abstract, seemingly arbitrary time markers. *It’s time to do this, it’s time to do that*—these phrases are inexplicable dams in the flow of living in the moment that, in child terms, simply gives way to the next moment and the next. In her work with second-graders, Ellen Schwartz (1994) observed, “We tend to rush students through a timetable drawn from a curriculum guide or scope and sequence chart, not from observation of their own working and thinking rhythms” (p. 374).

For teachers of younger children, the daily schedule lays out its own demarcations of time. Teachers, of course, can appreciate the philosophical integrity of routines and schedules as they fulfill young children’s need for predictability, for food and rest, for creating manageable containers for time in its unending flow. Yet teachers can also actively protect the ways in which children conceive of and experience the passage of

time if “included in our thinking is the time children need to frame their own questions as they seek understanding of self and world” (Cuffaro, 1995, p. 41). This means shaping the schedule to allow for time to think through active doing, time to offer ideas, time to ask those questions, and time for the fallow moments of just being.

Mitchell (1934/2001), in her arguments for the “laboratory method” of education, gave a defense of such child-oriented time. If learning was to be, in her words, “the active process of discovering relationships,” then it was a process that occurred over time, composed of time for first-hand contact with a subject area, time for wondering, time for experimentation, and time for synthesizing these interconnected experiences of activity and thought and emerging with new discoveries (pp. 4 & 5). So it was with the six-year-old who Pratt (1948/1970) watched at play in his room at home and who inspired her to recreate such conditions for learning in her school.

Mitchell reminds us that thinking is a process that occurs over time. And, with reference to Dewey, Cuffaro (1995) writes in a similar vein, “The realization of potential requires movement: the activity of interaction and the passage of time...” (p. 40). Seen in this light, time is essential to learning—especially to the learning of young children, who take in and make sense of information through their direct interaction with the concrete materials, people, and physical spaces of their environment.

My curriculum acknowledges time in two ways. The first lies in my decision to extend the study over seven months. In part, I chose that length because the subject matter demands it. The real-time construction process at the site was discernible yet incremental; only months of observation and consideration would leave an understandable impression of the changes that were occurring over time. Also,

construction is a many faceted subject. A long study allows for a look from many angles—from machinery to people to materials to the forms and functions of buildings. Concurrently, I tried to build time into the activities themselves, honoring the time it takes for young children to process information in the active ways that are meaningful to them. Taking trips, listening to books and poems, generating questions, making drawings and cardboard constructions, playing out themes in the block area, moving their bodies and using their voices—children have the chance in this study to become true knowers about their subject, to live with it in the classroom as they were living with it in their lives in the neighborhood outside of school.

- **I believe that children learn by making and playing.**

As teachers think about the use of time to facilitate children's process in learning, they necessarily strive to understand and appreciate the nature of that process. Early progressive educators were adamant on this subject: Work with materials and dramatic play constitute young children's primary, native form of learning. Mitchell (1934/2001) terms such learning "outgo," the stage of the educational process that takes place after the "intake" of direct experience from fieldwork (p. 13). During "outgo," children are involved in "reliving their first-hand experiences, in working out the relationships in various source materials, and in free expression through various media," and, she continues, "Kindergarten and first graders express themselves through play. Not play which is merely a pastime, but play which is constructive and leads through progressive stages of relationship-thinking" (p. 16).

Of a like mind, Pratt (1948/1970) declares, “Childhood’s work is learning, and it is in his play...that the child works at his job” (p. 7). She set out to change the nature of school based on her conception of how children naturally educate themselves. Her observations of children involved in self-selected activities convinced Pratt that children learn through the dynamic processes of seeing, touching, doing, and making. They were learning through lived experience and play. As Biber (1951/1984) points out, there are numerous forms of play: the exuberant movement expressed outdoors, the creative vocal combinations of sounds and rhythms, the manipulation of physical materials, and, of course, the world-within-world of dramatic play (p. 188).

Making things is, certainly, a key strand of play. Children use materials—paper, cardboard, and tape; fabric and glue; wire and beads; wood and nails; blocks, sand, and clay—to construct tangible, often three-dimensional products. These are sometimes representations of what children have had contact with in the world. One child uses paper, tape, and yarn, and says, with excitement, “A kite!” Another pushes and prods clay until it becomes a mountainous track for an imaginary train. A group of children line up blocks end to end, angle and layer them until a zoo comes into existence. Biber (1951/1984) notes that “the child, in his playful remaking of the world around him, lays the cornerstone of his feeling about himself in relation to that world” (p. 188). At other times, the products have to do with children’s aesthetic, physical, and emotional responses to materials, as well as with the “pleasure and satisfaction in what one’s hands can make of the physical world” (p. 188). One child pounds and pokes the mound of clay for the sheer muscular feedback she receives and the power implicit in having made impressions in a malleable material. Another is mesmerized by the way the strips of

colored paper accumulate under his fingers in vibrant, contrasting, unending horizontal rows.

According to Sara Smilansky (1990), each of these is a “constructive play activity in which the child strives to accomplish a goal or to create a product according to a plan” (p. 23). She goes on to note that, with constructive play, “satisfaction is derived from the qualities of the materials themselves; their properties determine what the child does with them” (p. 23). Art teacher Lois Lord (1958), in her book on collage and construction, celebrates the intrinsic attraction children have for making their own creations from materials. She writes of the richness of children’s processes in this work: their selection and organization of materials, their responses to the tactile and visual features of materials, their ability to recognize beauty, their understanding of design and spatial relationships, their functional fine-motor abilities, their means for solving structural problems, and their capacity for invention. “Watching the child closely,” Lord writes, “we observe that he puts whole-hearted effort into these spontaneous creations, deriving from them deeply felt satisfaction” (p. 10). Constructive play surfaces often in my study and in different variations—in the making of machines and buildings, in the work with blocks and sand, and in the exploration of the ways materials can be manipulated to achieve structure in three dimensions.

Dramatic play is another, central play form of childhood. “Here,” writes Biber (1951/1984), “the child can take flight. He need no longer be a child. He can make himself over.... He can re-create the world not only as he really experiences it but even in the strange aspects that symbolize some of his deepest wishes and fears” (pp. 188-189). This is the place in which the child draws upon her/his real interactions in the world

and—with an accompanying sense of power—remakes them, turning them over and inside out, adding individual emotional context, contrasting other children’s input, finding out where s/he fits in the outer world’s scheme. It is the process—physical, intellectual, emotional—of deep internalization of information. It is thinking. It is understanding. It is growth. It is learning. I have made room for dramatic play throughout my construction-site study, with attention to time and props in the dramatic play area, to work in the block area, and to work at the sand table.

Making and playing are intertwined. As Cuffaro (1996) notes, with reference to block work, “children must *do* and *make* in order for play to commence” (p. 79). Children will build elaborate structures with blocks (a castle, a house and garage, a fleet of boats) and then introduce wooden people and animals that dramatize the scene with action and dialogue. Or they will nail two pieces of wood perpendicularly on opposite sides of a rectangular base and begin to launch the suddenly existent plane into the air. Cuffaro’s description of a child at play with blocks illuminates the connection:

The child creates an object—the structure—and endows it in imagination with representations and reflections of her or his experiences, fantasies, information. The structure is then a tangible representation to the child of personal ideas and feelings and, in this symbolic form, then serves as a stimulus for expanding activity and imaginings. It becomes, for the child, a tangible point of reference for questioning and contemplation, activities that would be difficult without connection with the concrete. (p. 77)

Observing my group of kindergartners in the dramatic play area, I felt the fullness of how play illuminated, challenged, and expanded their experience of being in the world. Two children in this particular group had built a rectangular structure out of hollow blocks, meant to be “home,” thoroughly domesticated with babies and dishes. Another child spun out the theme of going to a scary movie. As the two play scenarios developed

and collided, I discovered a great deal about children's perceptions—of safety and danger, of the adult worlds of work and recreation, and of the seminal divide between home and all else that lies beyond. In play, the children were imaginatively drawing from the sameness and variety of their lived experiences and from their emotional responses to those experiences. Symbolically, through blocks and role-playing, each child was “project[ing] his own pattern of the world into the play and, in so doing, bring[ing] the real world closer to himself” (Biber, 1951/1984, p. 189).

Creating the construction-site study, I made a conscious attempt for a balance between first-hand experience and ways of reliving that experience in the classroom through making and playing. My purpose is to give children “an opportunity to selectively and independently rehearse their experience, to reproduce symbolically the physical and ideational relationships of their ongoing encounters” (Biber, 1951/1984, p. 194). Repeated trips to the site, each with a different focus, provide direct ways for children to acquire information. Equally important, activities in the classroom provide time and space for children to process that information, whether through experiments with movement or construction materials, through books and photographs, through drawings and discussions, or through work in the block area, at the sand table, or in dramatic play. These are the routes I propose for learning about construction, knowing that children have always found making and playing to be effective means for understanding and ordering their world.

- **I believe in the use of unstructured materials.**

In order to facilitate play as learning, a teacher will need to attend to the materials available for play. Pioneering progressive educators weighed in heavily on this subject—proposing and defending the use of materials in the classroom that connected directly with the ways in which children really learn. Pratt (1948/1970), for example, avidly searched for appropriate, child-oriented learning materials, for “something so flexible, so *adaptable*, that children could use it without guidance or control”; she “wanted to see them re-create on their own level the life about them” (p. 27). Materials on Pratt’s list included crayons and paper, scissors and paste, as well as wooden blocks. Writing of Pratt’s educational experiments, Biber (1951/1984) has said, “[I]t was essential that the child be offered concrete but highly adaptable materials with which to ‘play’ his way toward understanding.... What was provided for play had the quality of openness and universality; specificity of meaning was endowed by what the child projected” (p. 194). In devising her geography curriculum, Mitchell (1934/2001) calls for the use of “free or raw materials which can take the impress of the user,” materials that can be adapted to the child’s purposes (p. 16).

Later progressive educators continued both research and reflection on the topic of unstructured materials and their role in children’s learning. Cuffaro (1995) writes, “Unstructured materials and open-ended activities resemble in nature the person as described by Dewey—potentiality, possibility, and realization through interaction” (p. 38). Cuffaro’s (1996) thinking about the uses of blocks in the classroom amplifies this statement. For, using blocks, children enter into an active relationship with a material that, “having no predetermined identity other than its physical state of smoothness, hardness, and shape, is a blank on which or with which the child makes his or her

impact” (p. 79). Growth in understanding occurs during the interaction of child and material, when “the child is able to make certain connections: (1) between self and knowledge, by filtering new knowns through the backlog of experience; and (2) within self, through the imaginative activities that help to bring together feelings, fantasies, and reality” (p. 87). Concrete materials, adaptable in response to the thoughts, feelings, lived experiences, and physical capabilities of the individual child, imbue that child with a sense of power and control and offer an intuitive means by which to learn.

Still other educators point to the ways in which unstructured materials contribute to a young child’s emergent and essential capacity for symbolic thought. According to Cohen (1972), materials such as paints, clay, and blocks are “symbolizing forms that are close to [children’s] action style,” their need to act physically on concrete materials (p. 90). Existing as a nonverbal format, unstructured materials help “children to make the transition from dependency on concrete experience (touching, tasting, smelling as a way of getting to know reality) to the use of symbolic representation as a way of further clarifying it” (p. 91). Over time, such repeated practice with symbolization through materials solidifies more abstract symbolization processes, such as the use of language (oral and written), the use of mathematical symbols, and the use of purely mental operations (Cohen, 1972, pp. 92-93; Cohen et al., 1997, p. 36; Cuffaro, 1996, pp. 84-86; Smilansky, 1990, pp. 35-36).

As children strive to know themselves and their world, they can use paper and crayons, clay, blocks, paint, and more to “externalize impressions and feelings, develop muscles and skills, grow in powers of reasoning and logic” (Cohen et al., 1997, p. 38). Fueled by a child’s imagination, unstructured materials put the child at the center of

her/his own learning. In my study of a construction site, I rely with certainty on the profound uses children make of unstructured materials. Activities take place in the block area, at the sand table, with paper and crayons, and with various recycled materials put to constructive use. Other connections with content could easily be made through children's expressive interactions with paint and clay, and with open-ended wood-working. These are the means by which young children can create an integral, flexible, increasingly complex dialogue with their subject—the construction site.

- **I believe that a teacher, in tandem with the children s/he teaches, strives to make meaning possible for self and others.**

Thinking so much about children, content, and materials leads inevitably to thinking about the role of teachers. Again I find myself influenced by progressive educators and the ways in which they conceived of the teacher. For Dewey (1938/1997), the teacher has responsibilities to both the individual learners and the learning environment. He charges teachers with coming to a deep understanding of the learner at a specific moment in time and with deciding how to shape the environment so that educative experiences—experiences that lead to the learner's continuing potential for growth—have the possibility of taking place.

Both teachers and learners contribute to the ultimate nature of such experiences, with teachers as the mature players. Dewey (1938/1997) writes that teachers should be “intelligently aware of the capacities, needs, and past experiences of those under instruction, and...to allow the suggestion made [by the teacher or the environment] to develop into a plan and project by means of the further suggestions contributed and

organized into a whole by the members of the group. The plan...is a co-operative enterprise..." (pp. 71-72). Considering Dewey and his view of teachers, Cuffaro (1995) notes, "[W]hat Dewey asks is our continued growth, reflection, intelligence, imagination, and the risk-taking and responsibility involved in creating both curriculum and our teaching self" (pp. 99-100).

Mitchell (1934/2001) viewed the teacher as both researcher and organizer of opportunities. If deciding to set out on a geographic investigation—of school, of neighborhood—with children, a teacher should begin by directly finding everything out herself. "She does not gather information to become an encyclopedia, a peripatetic textbook," writes Mitchell. "She gathers this information in order to place the children in strategic positions for making explorations, in order to plan trips which will lead to significant discoveries..." (pp. 15-16). Mitchell also expected a teacher to be a keen observer—to "watch with all her senses" the ways in which children interacted with incoming information and the varied aspects of children's intellectual and expressive work with materials in the classroom (p. 16). This kind of keen looking had two related goals: gauging the children's growth in "relationship-thinking" and, with that in mind, devising the next logical curricular step (p. 16).

For Pratt (1948/1970), buoyed in her complete faith that "the child's own play-work was to be his learning method," children were central in all ways (p. 32). Teachers organized and provided the materials for the environment, they arranged for local trips, they observed and reacted to the children's work. But these roles were responsive to the original impulses, lived experiences, questions, and continuing research of the children, who framed their own purposes as they went about learning. In her account of the early

years of her school, Pratt gives this description of the ideal teacher, not an interfering adult but one who is essential, powerful, and wise in the ways of children:

It was she who must make the day-by-day, even the moment-by-moment decisions which added up to a teaching method. She who must learn about her subjects—the children—by working with them; she who must frame her curriculum around their changing needs as they developed, both individually and in the group. She who must know how to act quickly in a specific situation. She who must deal each day with such questions as how far we shall push our ideas of order on the children...; what kind of information they need, and when and how it should be offered to them.

And she it was who met the deeper problems of the child, the problems of emotion and behavior.... (pp. 60-61)

As Pratt intimates, a conception of how children learn leads to a conception of how teachers teach. If children are to be at the center of their own learning, then what is the teacher's role in that learning? Cuffaro (1996), writing about block work in the classroom, offers words that aptly help define that role. Teachers are providers of space, time, and materials. Teachers are guides, "bringing to the children's awareness factors that might be considered and offering the opportunity for discovery through direct experience"; teachers are catalysts, "raising questions that [are] related to the children's activities"; teachers are synthesizers, able to "lead children to finding connections in their knowledge of reality and in their re-creation of it in dramatic play" (p. 90). In all these roles, teachers are responsive and responsible to the children with whom they work. They frame and present information. They make decisions and solve problems. They support children and create well-reasoned limits for them. They use imagination, intelligence, and intuition on a daily basis.

I chose to teach after having done other kinds of work because of the primacy of teaching, its basis in the making of human connections in order to further the experience of being human and living in the world. I believe that, in teaching, it is possible to create

meaning for self and others. Yet that act is never independent. It occurs within the complexly and continually evolving relationship with the children one teaches. Cuffaro (1996) writes this defining truth: “What is required of the teacher is that self-awareness and sensitivity toward others be exercised and refined and that minds be kept open not only to the activities of children but also to their vision and originality” (p. 92). In the end, it is this attunement to the children that creates our best teaching selves and offers the most essential opportunities to expand human experience.

The beliefs listed here are a start, “a vision and purposefulness in doing” (Cuffaro, 1995, p. 11). They are something to work with and something to work on in my continuing practice. I think they will help me grow to know why teachers and children come to school every day.

EPILOGUE: Making Sense

I tried to connect the *how*, *what*, *where*, and *when* questions...to the more fundamental question: *why*?

—Harriet Cuffaro, *Experimenting with the World*, p. 6

Through reading, writing, talking with teachers, and working with children, I have strived to examine the *who*, *what*, and *how* of curriculum. Along the way, other things have happened as well: a search for a definition of myself as a teacher and a growing recognition of the ways in which the practical and philosophical strands of teaching intertwine. My journey, on all these fronts, has progressed. So it is time to return to the child with the essential question: Why do we come to school every day?

I am now ready to live with this as a question rather than feeling impelled to provide its answer. For if I ask it of myself regularly as I interact with children at school, I will be insisting that my teaching come ever closer to satisfying the question's underlying plea for human relevance. How does school—the myriad instances, planned and unplanned, of teaching and learning—align with what it means for each unique child to be alive in this world? No static set of words will provide a sufficient or useful answer. Rather, the question is a catalyst, capable of sparking original acts of teaching that reflect an examined set of values—both educational and humanistic.

Cuffaro (1995) has written:

...it is essential in teaching that practice be grounded in a consciously held, critically examined philosophical framework created by the teacher. A philosophy of education represents the choices, values, knowledge, and beliefs of teachers as well as their aspirations, intentions, and aims. It serves to guide and inspire and contributes to determining the detail of the everyday life in the classroom. (p. 1)

The writing of curriculum, along with its enactment in the classroom, naturally provides a space for teachers to articulate their individual educational philosophies. Making independent decisions about what to teach and how to teach it—in the context of who will be doing the learning and where the learning is taking place—can coalesce over time, through repeated experience and regular reflection, into a set of values. Teaching upheld by such a framework offers a degree of depth and clarity that makes possible for the learner meaningful, human connections with curriculum. Seen in this light, coming to school begins to make sense.

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PART TWO

A Curriculum Guide

Note: The material in this curriculum guide that prefaces the study itself (pp. 65-90) represents foundational ideas subsequently developed in Part One of this thesis. Part One, a framework for developing curriculum, and Part Two, the curriculum guide, are designed as discrete yet related documents.

A Social Studies Curriculum for children ages five and six

Study of a Neighborhood Construction Site



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INTRODUCTION FOR TEACHERS

All my life I have fought against formula. Once you have set down a formula, you are imprisoned by it.... I would not be talked into marking out any blueprints for education....

—Caroline Pratt, *I Learn from Children*, p. 56

There is always the danger that, written down, a curriculum will be taken at its word—as a step-by-step formula for teaching. The study I developed captures my ideas about a construction site in relationship to a particular group of kindergartners going to school in a specific area of a busy city. Consigning my ideas to print, I created for myself a curricular road map important for thoughtful teaching. It was a way to flesh out an ordered mental life for the study before it assumed its realistic transactional life in a classroom full of children. But how are other teachers to make use of the series of activities I have developed?

In the broadest sense, my study can be construed as an invitation for teachers to investigate their own environment in all its richness. Mitchell (1934/2001) described the teacher who “gathers this information in order to place the children in strategic positions for making explorations,...in order to use her environment as a laboratory” (p. 16). Trying to be that teacher, I stepped out of my classroom into the school’s shared territory with the real world and discovered a wealth of possibilities for social studies. The immediate neighborhood abounded with people and with the clear evidence of their driving needs and desires. Exercising, traveling, shopping, going to work, going home, playing, and eating—people were actively using bikes and buses, ground-floor stores and multilevel buildings, parks and restaurants. They were playing out facets of daily living

that offer resonant potential for curricular focus. The next-door construction site was but one of many intriguing neighborhood happenings.

More specifically, my study points to the power and depth of construction as a content subject. Teachers with access to a local construction site—whether the building of a skyscraper or the repair of a sidewalk—may be inspired to consider the many layers of readily available information it represents, about construction techniques, about use of materials, about machines, about workers, and about the basic concepts of form and function that underlie all aspects of the physical world. The ways a teacher will decide to frame that information will reflect her/his response to a set of unique situations, which may be described by a basic set of questions: Who are the children in your classroom, developmentally, individually, and as a group? What is the nature of your school, its internal and external environment? What are the specific features of the available construction site? What are your core educational goals and values? In all their individuality, the answers to questions such as these begin to define the *who*, *where*, and *what* that ultimately shape the *how* and *why* of any curriculum. I hope that the paths taken by my imagination as it tangled with the subject of construction in a particular place, at a particular time, with a particular group of children will suggest similarly exciting, and personal, journeys for others.

Inevitably a teacher's expansive, illuminating thinking about a content subject will need to succumb to the nitty-gritty details of implementation. In creating a study about a construction site, I found myself grappling with issues of scope and sequence as well as of logistics. What I developed represents, in the end, what made sense to me. Valuing time, I chose to attempt a broad scope for the study, one that allowed for

repeated trips of shifting focus, that honored the significant yet often incremental changes taking place over weeks at the site, and that accommodated the idea of construction from many angles (environmental, mechanical, material, and human). Valuing process, I put into place activities that created ample space for children to both encounter and interpret information, working it out on many planes (imaginative, intellectual, physical, and sensory).

In developing the sequence, I tried, reminded by Dewey, to avoid presenting information in isolation, although a degree of arbitrary decision-making necessarily creeps in to the process of curriculum development. I made the choice, for instance, to introduce subcategories of construction work (machines, people, use of materials, structural engineering concepts, danger and safety, etc.) on a monthly basis, knowing that response and input from the children always holds the potential to reshape such a neat plan. Less arbitrary was my conscious placement of activities in related groups—for instance, a trip to the site in which the children see the machines up close followed by their construction of machines from recycled materials, or a scientific exploration of the function of a foundation coming just before a movement exercise that attends to the same concept. And throughout, I used the reading and making of books as well as the regular use of unstructured materials as steady, insistent currents driving the study forward. The whole represents my attempt to make construction come alive in the classroom. This process will look different for different teachers in different classrooms.

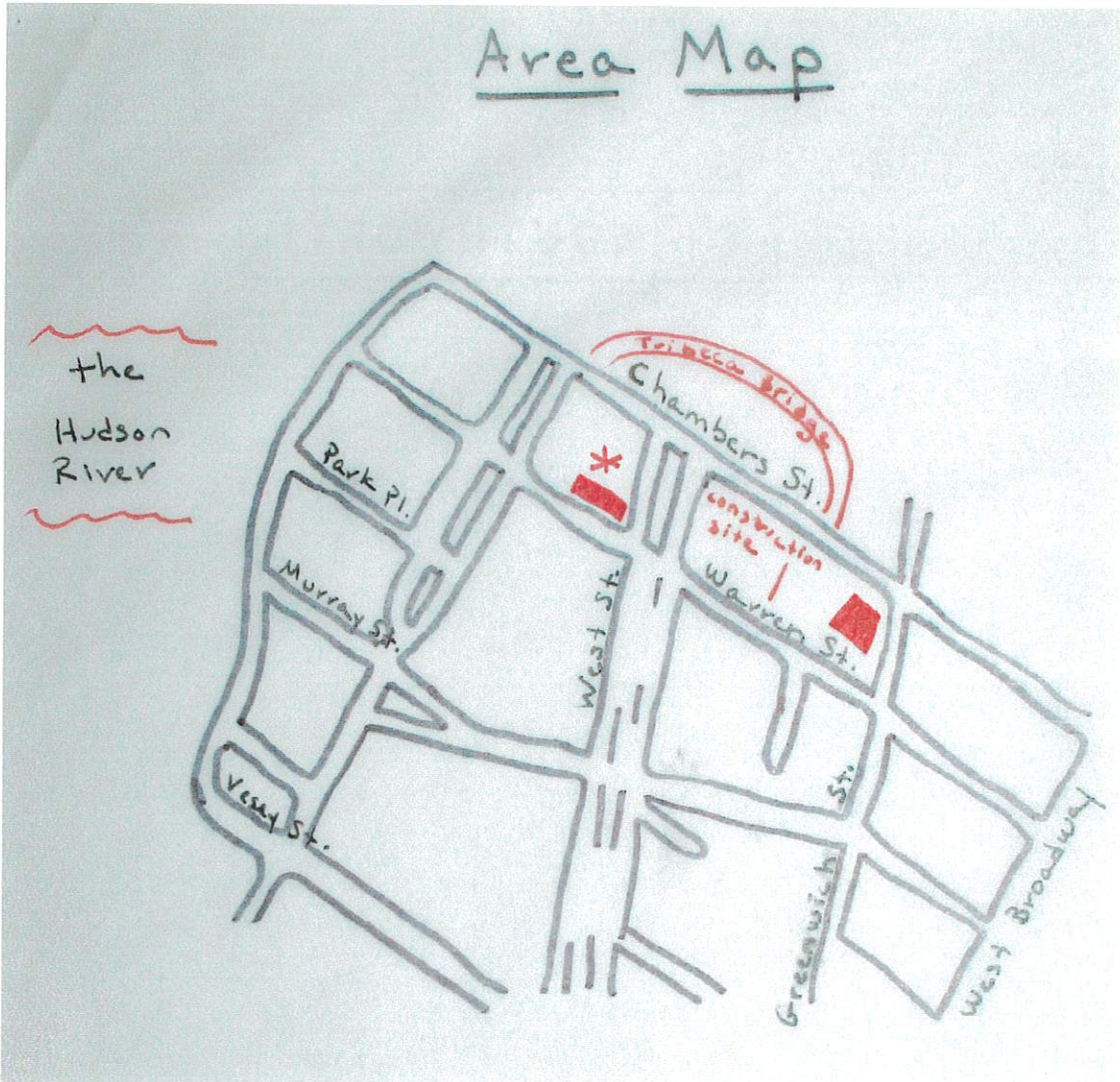
The success of any instance of teaching often lies in the details. My ideas for activities had to succumb to the discipline of planning in all its minutiae. To this end, I created a template for each activity that includes: a title, a general description, a list of

logistical preparations for teachers, a list of preparatory activities that take place with children, and possibilities for related follow-up. For art, science, and movement activities, I have also included a list of necessary materials as well as suggestions for work-time preparations and procedures. For books to be read aloud, I have generated possible questions for discussion. And for work in the block area, I have offered ideas for guiding questions in addition to related reading. These plans are an organized place to start. Actual use of such curricular offerings in the classroom—coming into contact with specific children and their families as well as specific construction workers, their phase of work, and their daily schedules—will invite the unexpected and wonderful transformations that make imaginative flexibility a requirement for teaching.

Despite the specificity of the activities in their written form, each may be adapted by teachers to suit particular situations—the needs of individual children and unique groups, the nature of school culture, the features of the immediate local environment, the personal preferences of teaching styles and philosophical frameworks. A teacher of six- and seven-year-olds might extend the activities in terms of literacy and numeracy to reflect the growing understandings for this age in these areas. Class books might contain more extensive writing, for instance, and science and math activities might be shaped to emphasize the children's increasingly sophisticated sense of number and operations, measurement, data gathering and analysis, and flexible problem-solving. Older children's more refined and stronger motor abilities will affect the process and product of both art and movement activities. In addition, as children increase their ability to self-regulate, group discussions have the potential to last longer, retain focus, and become more

probing. The activities I have included in my study of construction can be reshaped to accommodate the abilities and interests of this slightly older age group.

Once embarked upon a study of construction, a teacher may find the curricular horizon to be limitless and the curricular focus to be acutely responsive to the children who come in contact with it. Reviewing my own study, I would be inclined to add a visit from an architect, with attendant activities and books that might illuminate the nature of the work that goes into planning and designing buildings. Other teachers and children might become captivated by comparing types of buildings and find the need to plan more extensive trips to areas that are slightly farther afield. Still others might choose to pursue the ways in which services such as gas, water, and electricity enter buildings. My hope is that the study I created is the catalyst for adventure.



* the school

CONTEXT

The curriculum that follows was developed with reference to an inclusion kindergarten class in a public elementary school in lower Manhattan. Situated near the World Trade Center site, the school is bordered by a busy highway on its east side and by the wide expanse of the Hudson River only two blocks to the west. The five floors of the school sit directly below a towering apartment building, one of the many buildings in the immediate vicinity, both commercial and residential, that make an attempt to scrape the sky. Hemmed in by these steel, glass, and brick behemoths, the school must also withstand the onslaught of vehicular traffic, which rushes and roars in a constant current past the playground—a river again, reconceived in terms of the city. On the sidewalks surrounding the school, people are in motion too, walking, running, zipping on bicycles, pressing ever forward, disregarding the here for what will come next and next and next. Going to and coming home from school, the children take in the urban beat of the neighborhood. They are both jostled and propelled by the movement. They are both battered and enlivened by the sound. They are both assaulted and made curious by the smells. They are both compressed and enlarged with awe by the magnitude of the structures that dominate the land and the sky.

Old and new vie for prominence in this section of lower Manhattan. Modest and elegant, five-story brick buildings with distinctive decorative details abut more recently erected constructions. Thrusting upward, these modern buildings project their sleek, flat seemingly air-brushed facades into the visual landscape, hinting at both anonymity and perfection. Many of the high-rises are self-proclaimed luxury residences, some for rent, some for sale. The stores of the neighborhood run the gamut from low- to high-end, with

McDonald's not a stone's throw from a pristine wine merchant. Delis and restaurants abound. At regular intervals, empty storefronts stare out, waiting, dumb and blank, for a new identity.

The human contingent of this bustling neighborhood takes a variety of forms: office workers of differing levels of maturity and chic, young-adult students, and families with children of all ages. There are a number of schools in the area—elementary schools, a middle school (housed in my school), Stuyvesant High School, and the Borough of Manhattan Community College, which lies in close proximity to the Tribeca Performing Arts Center. Children can be found playing at the Washington Market Park playground at the corner of Chambers and Greenwich streets, where a farmer's market makes regular and well-attended appearances. But the most delightful escape from the predominant congestion of the neighborhood lies to the west, where the grassy fields, playgrounds, and manicured paths of Rockefeller Park jut out over the Hudson River. Here, tall buildings and traffic give way to the immeasurable height and width of the blue-gray sky, to the massive depth and breadth of the moving water, to the mystery and adventure of the gliding boats, to the freedom of the wheeling seagulls and their wild raucous cries.

Most of the children at the school live in this immediate neighborhood. Typical of the school population as a whole, the children in the kindergarten class in which I am a student teacher come from predominantly middle- to upper-income families. According to the most recent Department of Education school report, 15.2% of students in this school are eligible for free lunch, compared to 73.9% in elementary schools citywide (DOE website). In my class, three-fifths of the children are white, about one-fifth might be categorized as mixed ethnicity, and about one-fifth of the children are Asian. The

school report cited above shows this ethnic breakdown for the school in its entirety: approximately 55% white, 22% Asian, 13% Hispanic, and 10% black (DOE website). The age range in my class is wide, with nine children awaiting their fifth birthday in the months from September through December and three children about to turn six early in the new year. The children attend school from 8:30 a.m. to 3:00 p.m.

Called a CTT (collaborative team teaching) class, this kindergarten is run by two teachers, one for general education and the other for special education, and mixes children with special needs with their typically developing peers. Of the twenty-five children, ten receive services from school-based providers and one is in the process of being evaluated for extra support. The nature and severity of the children's special needs vary from year to year. In my class, children are pulled out for such services as speech, occupational therapy, physical therapy, counseling, art therapy, and English language learning. Two children stand out in the class, one for his impulsivity and attentional difficulties, and another for his significant language and motor difficulties. The latter child has a one-to-one paraprofessional with him throughout the day. In the school as a whole, out of 419 students, 354 receive general education and 65 receive special education (DOE website). The school is fully accessible and has one CTT class on every grade level except pre-kindergarten.

Well-regarded both in the neighborhood and in teaching circles, this school has the look and feel of a high-functioning educational institution. The building is new (constructed in the late 1990s) and boasts an art room, a science room, a spacious library, a large gymnasium, a computer lab, a dance studio, an auditorium with theatrical lighting, and a bright cafeteria. The hallways, festooned with children's work, are wide, airy, and

clean; the reasonably sized classrooms are comfortable and well-equipped, in terms of both furniture and materials. Parents are involved in school life. They serve as fundraisers, as class parents, and as extra hands in the classroom, the cafeteria, the science room, the library, and on field trips. Parents in my classroom, for example, send in snacks for the class, make new play dough on a weekly basis, and play literacy games with the children during reading workshop.

Although a typical day has its moments of chaos—the yard often seems to be seething with moving bodies at drop-off, pick-up, and recess—the overall atmosphere is that of a well-oiled machine, in which many parts thrust and recede, meshing and passing without a hitch. In my class, order prevails. Rules and explicit directions, schedules and procedures guide the children’s classroom life. To differing degrees the children rebel against and comply with these constraints, which parcel out the day in segments and seem to honor accountable product and behavior over the murkier, messier, less-controlled process that often accompanies significant learning.

Yet the teachers value inquiry as well. They ask the children questions and make space for the children to ask their own questions. They listen, often intently, as the children speak. They observe the children in an attempt to know them as individuals. They respond to their needs and consider their interests. The classroom is a cheerful and busy place, with steady interaction between children and between teachers and children. As such, it expresses the school’s stated philosophy, which describes children as “individuals with specific strengths and needs” and charges teachers with designing learning experiences that offer the children a chance to acquire knowledge through active engagement with materials and the larger environment (DOE website).

Staff collegiality stands out as a significant feature of the culture of this school. The four kindergarten teachers meet consistently once a week, giving one another practical, emotional, and professional support. Teachers greet teachers warmly in the hallway on a daily basis. And the administration provides ongoing staff development. In the two months of my placement, the teachers attended a weekend curriculum planning meeting, as well as after-school meetings two times per month that covered such topics as the on-premises academic support staff and the introduction of art therapy to the array of available school-based services.

Central to my experience as a student teacher in this placement has been, of course, my work and play with the children in my class. In a general sense, they express the excitements and dilemmas, the curiosities, competencies, and energies of the age. Still self-focused, each child brings her/his most personal experiences to school, and each child seems inextricable from her/his most immediate context—home and family. School broadens the children's social horizons and, in so doing, highlights the intricate oppositions of friendship and rivalry, cooperation and discord, empathy and jealousy. Branching out into the world brings new intellectual horizons as well. The children in my class are investigators who want to know how things work, and they have the sense that everything they see has an explanation behind it. Many have attained a level of linguistic sophistication that allows them to explain, compare, argue, describe, and wonder as they both express what they already understand and strive to integrate new understandings. Indeed, the children are almost ceaselessly active, mentally and physically—naturally accompanying their thinking with moving and doing, whether they are indoors or out. On the playground they often take risks: running full tilt, jumping with bravado off the

highest level of the climbing structure, swooping across the monkey bars despite the disappointments engendered by the inevitable effects of gravity. Dorothy H. Cohen (1972) writes, “[T]o the children, five is power and strength, to be tested and expressed with as full a measure of autonomy as they dare take” (p. 50).

Despite the developmental similarities, the children reveal their individual differences all the time. Some can cope with the demands on their attention, some cannot. Some can write their names and draw representationally, some cannot. Some can share, some cannot. Some can express their thoughts with precise, grammatical language, some cannot. Some are shy. Some are bossy. Some are compliant. Some are resistant. Some meet the teachers’ expectations with success. Some meet them with failure until expectations are revised. Marked by a significant number of children with strong and individual wills, the class still lacks a certain cohesion, as if egocentrism has not yet been swayed by the potentially seductive power of shared purpose.

Rationale and goals: A study of a neighborhood construction site

To be situated within a larger social studies curriculum that considers the neighborhood surrounding the school, I have created a study that focuses on the active construction site on West Street directly across from the school. Indeed, there is a tremendous amount of ongoing construction in the immediate vicinity, which would allow for the study’s re-creation another year. Preceded only by a general neighborhood walk, this study would launch the curriculum and might conceivably run from September through March. I imagine the study followed by one that explores the Hudson River,

giving the children a sense of the contrasting features of their neighborhood—those constructed by people and those imposed by the natural world.

A study of a construction site holds much that will resonate with the children in my class. On an almost subliminal level lies the concept of rebuilding. The rebirth of a solid, tall, seemingly impervious structure from a pit of dirt and rubble is a psychological touchstone for these children, who still tell stories (embroidered with both the specificity of personal experience and the fantasy of vivid imagination) about the fall of the World Trade Center towers. On a more mundane level, the neighborhood is pocked by construction sites at various stages of completion, making the workers, the machines, the noise, and the rhythms of activity a common experience for the children. This would allow them as a group to bring to the study what they already know and to take a steadier leap to what they do not yet know.

The children will also connect with the construction site on a personal level as it expresses their strivings for doing and making, for strength and achievement. Even a quick glimpse into the site reveals wonders, sensorial and magnificent: a enormous pile of damply fragrant dirt; yellow machines scraping and dumping, lifting and hauling, rumbling and rolling; people in the garb of hard work who rake and shovel and heave and hammer, using their bodies to change the lay of the land. Here are the fascinating machines that the children love, with wheels, pulleys, and reaching, grasping metal extremities. Here are the amazing human beings who build with their hands and their tools. Here everything is of an awesome scale. This is the sandbox at the playground magnified beyond belief, and the children will recognize themselves as they watch and

consider what happens at the site. For they too are attempting to become forceful and competent, to discover the ways in which they can make an impact on the world.

I have a number of broad goals for this study. In terms of content, I would like the study to elaborate and extend the children's current understandings of work at a construction site. This will include concepts about how buildings are made, the specific jobs performed by people and machines, and an appreciation of the intricate coordination required for safe and timely progress. In terms of method, I would like to create a dynamic relationship between what Lucy Sprague Mitchell (1934/2001) has called "intake" and "outgo," meeting the individual strengths and needs of the children with a variety of entry points for new information (trips, visitors to the classroom, books) and a variety of modes for the re-expression and contemplation of that information, including discussion, drawing, building with blocks, working with sand, clay, and water, and the making of sound and movement. I would also like to establish within this "outgo" connections to other curricular areas (science, math, literacy, the arts).

Engaged in the experiences offered by this study, the children will hone their skills of observation, reflection, and expression of ideas. And I hope that the balance of individual and group work that I offer through this study will inspire the sense of common purpose that can foster community. For, as Harriet Cuffaro (1995) writes, "It is in doing together, in the sharing of hopes and aspirations, in participating toward a common end that communities are created and sustained.... Society and community do not carry themselves; they are maintained and changed by collective and individual action" (p. 26).

References for context

Books

Cohen, D. (1972). *The learning child: Guidelines for parents and teachers*. New York: Schocken Books.

Cuffaro, H. (1995). *Experimenting with the world: John Dewey and the early childhood classroom*. New York: Teachers College Press.

Mitchell, L. (1934/2001). *Young geographers: How they explore the world and how they map the world*. New York: Bank Street College of Education.

Website

www.nycenet.edu This is the website for the Department of Education (DOE). The statistics and information on the school's philosophy quoted in this paper were obtained from the school's page on this website.



CURRICULUM AND VALUES

Beginning work on this study, I set out to explore content and logistics. What was going on at the construction site right across from school? What used to be there? What were the workers building? Would the human and mechanic activities of the site be of interest to the children? Would first-hand experiences of the site be available? Could we develop a relationship with the people who worked there? And, quick, what could I teach myself about skyscrapers and how they are built?

After this initial flurry of inquiries and the resulting influx of information, my thinking took a new turn. Yes, the study was doable and likely to be engaging for the children. But how was I to shape the material—the conceptual and the concrete information—into a cogent organic form that would allow the children their own individual routes of discovery? This question has become the basis for my understanding of what it means to develop curriculum. For it has pushed me to see the ways in which my making of curriculum is inseparable from what I know so far about how children develop (physically, socially, emotionally, cognitively, linguistically, morally), from my nascent discrimination of the variations in children's needs and abilities, and from my most basic beliefs about what it means to teach and what it means to learn.

For me, the creation of this study has had two outcomes. First, I have used it to propose a means by which a diverse, active group of five- and six-year-olds can elaborate their understanding of their neighborhood. Second, I have used it, somewhat less consciously, to make a statement about what I think is important in a classroom. Looking through the study, I find my values everywhere: my desire to preserve space and time for sustained exploration, my respect for process, my growing awareness of the dynamic

tension between autonomous individuals and the living fabric of a community, and my commitment to the belief that children construct their knowledge of themselves and their world. And looking through the study some more, I see visions of what I think it means to teach—to guide, to support, to be observant and aware, to be clear and organized, to be informed, to be flexible, to be open-ended, to be mindful of difference, to offer challenges, to hold up expectations, and to celebrate achievements.



USE OF UNSTRUCTURED MATERIALS

I consider the children's classroom work with unstructured materials an integral part of this study. During their daily work time, the children will be gradually introduced to unit blocks, hollow blocks, sand, water, clay, and paint, though not simultaneously, for obvious logistical reasons. They will also find paper and cardboard in various forms, wire and string, tape and glue, staplers, scissors, and hole punchers. They may sometimes find paper clips and fasteners or rubber bands of different sizes. For writing and drawing, there will be crayons, different kinds of markers, and oil pastels. And mid-way through the study, wood-working will be introduced. The children must experience themselves as people who can make things—the process and the product a potent expression of their own thinking and imagination. This is, to my mind, both an essential educational goal and an implicit link to the subject of the following study: construction.

The children's ongoing exploration of unstructured materials will be punctuated by more focused activities. They will be asked, during the course of the study, to use these materials to flesh out their emerging understandings. Block building, for instance, will start the year unguided, but as the months pass, I will introduce a brief pre-building meeting. The children, then, can begin to plan before they build and to incorporate any intriguing information from their study of the construction site. In addition, the children will grapple with the concept of a building's foundation by experimenting with the ways in which they can make various materials (including themselves) stand up straight and sturdy. They will also be asked to think about what components define the concept of a building, looking at their own homes as a reference and expressing what they discover through drawings and the use of cardboard, tape, and other construction materials.

The use of unstructured materials as a base for learning in this study represents my conscious attempt to accommodate a variety of learning styles. Such materials invite children's individual response rather than dictating specific forms of use. They meet each child right where that child is at that moment. I have also planned for a range of means by which children can express their understandings, from drawing to block building, from talking to moving, from dramatic play to the creation of graphs and maps. And I have been careful to design various group sizes, knowing that some children are more comfortable in small groups or pairs, some children like to work alone, and some children thrive in the lively atmosphere of the whole group.

Ideas for ongoing experiences with materials and tools

Note: tools and accessories to be added gradually after initial exploration of materials

Sand/water table

- Small cups
- Shovels, rakes, scoops
- Spatulas
- Cardboard or plastic tubes
- Rocks, small sticks
- Corks
- Popsicle sticks
- Funnels
- Clear plastic bottles
- Clear plastic bags
- Later: plastic construction trucks, cones

Clay

- Clay boards
- Rollers
- Tools for poking, scraping
- Wire, straws, sticks for building up with clay as base

Dramatic play

- Large hollow blocks
- Paper, pencils, clipboards
- Cones
- Clothes: hard hats, orange vests, heavy gloves
- Tool belts, toy hand tools, real tools (level, ruler, T square)

Block building

- Wooden people
- Wooden or plastic construction trucks
- Paper, pencils, tape, string, wire, scissors nearby for signs and decorations or the creation of pulleys and other moving parts
- Cardboard rolls, flat cardboard
- Fabric scraps, especially red, orange, yellow
- Examples of guiding questions for planful building
 - What will the building at the construction site look like when it's done? What will it be used for?
 - Today we are going to build up. How will you make a sturdy bottom for your building so that it doesn't tip over?
 - Try to find a way to make a building as tall as your waist. Tell a friend how you did it.
 - Who works at the construction site? What do the different workers do?
 - What does the crane do? How does it help the workers?
 - How is the construction site dangerous? How do the workers stay safe?
 - Why do the construction workers need to work together? How do they work together?

Wood-working

- Work bench
- Hammers (8 oz. or 10 oz.)
- Saws
- Planks of soft wood
- Nails
- Rulers
- T squares
- Pencils
- Paper for planning

Note: In this study, the children begin working with wood in December, allowing them to practice basic skills and explore ideas for construction within this medium before the culminating wood-working project in March.

Observation and recording

After the initial offering of materials, my ongoing observations will help shape the progression of the children's work with unstructured materials.

Anecdotal records

I will regularly observe the children during work time and take narrative notes on their activity.

Checklists

I will use checklists to keep track of children's developing skills—physical, cognitive, social, and linguistic (see appendix A).

Photography

I will take digital photographs regularly as the children work in the classroom, taking note of their comments about their own work. These photographs and comments will be preserved in a binder in the classroom, and the children will have the opportunity to share their work processes and ideas at meeting time by referring to the photographs in the binder.

Photography will also be used to reveal the progress of construction at the site over time. Taken weekly, photographs would document, for instance, the gradual diminution of a huge pile of dirt and the steady spread of the concrete floor from one side of the site to the other.

BACKGROUND FOR CONTENT

From our classroom, we look directly out onto the construction site and watch the impossibly tall crane reach up and up and up into the sky. From the playground, we can see the blue boards that enclose the site and the fleet of cement trucks, ready and waiting. Coming to and going from school, children and teachers will encounter dump trucks, an excavator, and many construction workers, identifiable by their hard hats, their tool belts, their heavy shoes, their dusty, dirt-soiled clothes. Rumbling, clanking, and buzzing often fill the air. Workers periodically wave orange flags to stop pedestrians on the sidewalks that flank the site as cement is transferred in. The site—its workers, its big machines, its persistent activity—is a major feature of life in this neighborhood.

Taking up approximately half a city block, the site has West Street as its western boundary, with Chambers Street to the north and Warren Street to the south. On its eastern side, the site abuts another public elementary school, which takes up the other half of the block to Greenwich Street. Curious pedestrians watch the construction as it unfolds, peeking in through rectangular cut-outs in the blue wooden barriers or standing at the wide opening on West Street where a length of strong wire fencing allows for unobstructed observation. When the children make informal visits to the site, they will be able to stand here, taking turns in half groups, for a safe and panoramic view.

Looking in, here is what the children might see on any given day: An enormous yellow excavator squatting atop a mountain of brown dirt. A second excavator gouging the mountain with its toothed bucket. The crane, rising majestically above the rest, lifting and swinging, sailing weighty loads through the air as if gravity were inconsequential. Then the people, so little down there—consulting large pieces of paper, talking and

pointing, shoveling, spraying water, bending over a metal rod amidst a spray of bright, hot-looking sparks. Tools are everywhere, hand tools hanging from workers' belts, brooms and ladders, hoses and rakes. Hard hats dot the landscape; vivid orange cones and striped orange-and-white barricades stand alert and ready; signs are posted along the perimeter. This is a place of momentous action. This is a place of potential danger. This is a place of enormous industry, purpose, and progress. The energy is palpable.

According to workers at the site, the area under construction was previously a parking lot. Work began this past summer, when six excavators broke through the asphalt and dug fifty feet down, working in tandem with two hundred dump trucks. Because of sea level at this part of Manhattan, eight pumps are constantly at work, connected to large white pipes, a system that rids the site of water during the digging and the consequent erection of the building. As work continues, excavators scrape and scoop the gargantuan pile of unwanted dirt, loading fourteen dump trucks that make three trips a day to New Jersey.

While the dirt is gradually being hauled away, other construction workers are busy making the five-foot-thick concrete floor of the building and the fourteen-inch thick concrete basement walls, all reinforced by an intricate, crisscrossing grid of long steel bars. Concrete is mixed and poured in trucks just outside the site, and the crane lifts heavy funnels full of the viscous liquid and delivers them inside. Freshly poured concrete is covered as it hardens, and more steel bars poke up vertically through the floor, evidence of columns yet to be built.

People and machines are always in action at the site, working from seven o'clock in the morning to three-thirty in the afternoon, with overtime always a possibility. The

current workforce includes five foremen who are in charge of groups of five workers. Many presently at work are concrete laborers. Other workers operate the rigs: the excavators and the crane, which is the heart of much of the work done at the site. Ironworkers tie up the steel to reinforce the cement. Supervisors oversee all the work. This site has two female workers. One is an engineer, who does surveys to make sure everything is level. The other is a supervisor, who reads the blueprints for the building.

From the beginning of school in September through the projected culmination of this study in March, the children would have the opportunity to see the workers complete the foundation of the building, working right through the winter. Other buildings currently under construction in the immediate neighborhood will give the children some idea of the next phases of work—the creation of the skeletal upper structure that distributes the enormous weight of the building and of the building’s “outer skin.” In 2007, as first graders, the children will witness the finishing work and completion of the building, which will have taken one and half years. And they will have new neighbors, the people who come to live in apartments on the thirty floors of this well-appointed condominium residence.

Note: In obtaining the information recorded above, I had the pleasure of talking to four people who worked in various capacities at the site. Each was friendly, informative, and patient with my no-doubt-naïve questions. They assured me that a supervisor would be able to arrange for a trip to the site, probably half the class at a time. At that visit, the children would be able to observe the site, listen to a construction worker describe the activity, talk to the operator of an excavator while looking at his rig up close, and ask questions. The workers I spoke to also said that a person from the site would likely be available to visit the classroom, bringing examples of hand-held tools and other gear.

CONCEPTS, ORGANIZING IDEAS, SKILLS

Concepts

- Growth and change
- Process
- Use of environment
- Technology
- Planning (purpose)
- Form and function

- Commonality
- Diversity

- Interdependence
- Cooperation
- Communication
- Responsibility

Organizing ideas

- Buildings are made by people.
 - People design and plan before work begins.
 - Construction workers have different kinds of jobs.
 - Construction workers need to work together.

- People use tools to build buildings.
 - Some tools are manual. Some tools are mechanized.
 - Each tool has a specific purpose.

- People use special materials to build buildings.
 - Each material has properties that define its use.

- Construction work can be dangerous.
 - People use special procedures for staying safe.
 - Construction work requires courage.

- Tall buildings are built in a particular way.
 - A foundation helps hold a building up.
 - A strong, light framework allows for height.

- Buildings are made to be used by people.
 - All buildings are composed of walls, floors and ceilings, windows, doors....
 - People use buildings for different purposes.

Skills

- Thinking skills
 - Observing with many senses
 - Recording observations
 - Critical reflection, including categorizing, comparing, summarizing, predicting, questioning, inferring
 - Experimenting and exploring
 - Symbolizing
- Communication skills
 - Listening: attending to and grasping others' ideas
 - Speaking: formulating and expressing own ideas
 - Representing learning through diverse means: drawing, writing, moving, singing, use of unstructured materials, graphing
- Physical skills
 - Fine motor: writing, drawing, work with unstructured materials
 - Gross motor: block building, creative movement, large-scale construction
- Social/emotional skills
 - Interdependence: sharing, accepting difference, negotiating, cooperating, helping
 - Independence: competence, self-confidence

ACTIVITIES



SEPTEMBER*

OVERVIEW

Getting used to school, routines established

Exploration of the school neighborhood

First encounters with the construction site

Work with unstructured materials begins

***Note:** The monthly time markers in this study aligned with the pace, routines, and activities of this particular construction site during a specific phase of work. The timing of studies focused on different construction sites will respond to those unique conditions.

TRIP 1

Exploration of the school neighborhood

Description:

On this first trip, the children will make a brief tour of the neighborhood that directly surrounds their school. Using their eyes, their ears, and their noses, they will be encouraged to observe features both animate and inanimate, large and small. Major focal points will be the construction site, the Tribeca Bridge, and the Hudson River. The children will also no doubt notice cars and trucks, people and dogs, trees and birds, and buildings of all sizes.

We will travel as a group out the school's Chambers Street door. Then we will cross Chambers Street and go up the stairs of the Tribeca Bridge. We will stop in the middle of this enclosed bridge and look out. The children will be asked: What do you see? What do you hear? What do you smell? Grown-ups will record their responses. A teacher will show the children where we are on our big map.

We will then continue over the bridge and down the stairs. We will cross Chambers Street and walk south until we reach the wide observation area of the construction site. We will stop and observe our surroundings. The children will be asked: What do you see? What do you hear? What do you smell? Grown-ups will record their responses. A teacher will show the children where we are on our big map.

We will reverse our path, go back over the bridge, and then head west on Chambers Street. We will stop once for an observation (as detailed above) before we get to the river. We will continue into Rockefeller Park and sit on benches that overlook the Hudson River. Again, we will observe with all our senses. The children will rest and fill out their trip sheets. We will return to school and say good-bye and thank you to our chaperones.

Logistical preparations

- Invite family members to come on trip (see appendix B), need at least 4.
- Make note for chaperones describing nature of trip and their duties.
- Make a map of trip route (see appendix C).
- Make trip sheets (see appendix D) and staple to cardboards. Gather pencils.
- Gather notepads and pencils for teachers (4) and chaperones (4).

Preparatory activities

- **Show the children the map of our route.**
- **Explain how we will observe with our eyes, ears, and noses.** Give it a try in the classroom.
- **Talk about safe behavior on a trip.** Stay with and listen to your grown-up. Hold your partner's hand.
- **Introduce trip sheet.**

Go on the trip

Follow-up

- **Using notes taken by grown-ups, discuss with the children what they saw on the trip.** Record answers on a chart (see appendix E) divided into three categories: What we saw, what we heard, what we smelled.
- **Have each child pick one item from the chart to illustrate and cut out.** Children who are finished quickly can pick more items.
- **Have each child glue her/his illustration to an appropriate place on the big map of the trip route.** This may provoke a discussion of what we saw where.
- **Post the map in the classroom.**
- **Read *City Sounds*, by Craig Brown.** This book details Farmer Brown's trip to the city, in which he encounters trains, trucks, police officers, and other city features and the distinct noises they make. I will use it to make a connection with what we saw, heard, and smelled on our trip around the neighborhood.

TRIP 2

Informal visit to the construction site

Description:

This trip will replicate the form of the first trip, but give the children the chance to concentrate their observations on just the construction site.

We will travel as a group out the school's Chambers Street door and then cross Chambers Street. We will continue up and over the Tribeca Bridge, pausing for a moment to look from that height into the construction site. We will cross Chambers Street again and walk south to the wide observation area of the construction site.

As the children take turns looking into the site, half the class at a time, teachers will ask them: What do you see? What do you hear? What do you smell? The teachers will record the children's responses and show the children how what they see at the site has a location on the map.

We will travel back to school, reversing our route.

Logistical preparations

- Make map of construction site (see appendix F).
- Gather notepads and pencils for teachers (4).

Preparatory activities

- **Read Arnold Adoff's poem about skyscrapers** (see appendix G). This poem describes the heady feeling of looking up from the ground to the top of a skyscraper. I will read this to the children to provoke their thinking about what the workers might be building at the construction site. After reading the poem, I will ask the children what it feels like to them when they look up at skyscrapers.
- **Show the children the map of the construction site.**
- **Go over how we will observe with our eyes, ears, and noses.**
- **Talk about safe behavior on a trip.** Stay with and listen to your grown-up. Hold your partner's hand. Stand only where a grown-up tells you it is safe to stand.

Go on the trip

Follow-up

- **Using notes taken by grown-ups, discuss with the children what they observed at the construction site.** Record answers on a chart divided into three categories (see appendix E): What we saw, what we heard, what we smelled.
- **Ask the children what they have questions about.** Write down and post their responses. Use this as a basis for questions to ask on trip 3.
- **Have each child pick one item from the chart to illustrate and cut out.** Children who are finished quickly can pick more items.

- **Have each child glue her/his illustration to an appropriate place on the big map of the construction site.**
- **Post the map in the classroom.**

BOOK AND FOLLOW-UP DISCUSSIONS

Mike Mulligan and His Steam Shovel, by Virginia Lee Burton

Description:

This now-classic story infuses the facts of construction with deep humanity. I will read it at this point in the study so that the children can begin to give life to some of the concrete information they have just taken in. They may start thinking about why people use machines to do big work. They may absorb the feeling of Mike's commitment, persistence, and pride in his accomplishments and relate these qualities to the workers at the site. They may start to get a feel for what it takes to dig a hole for the foundation of a building. And they may begin to get curious about what kind of building will be made at the construction site they are studying.

I will read the book to the children and then pose the following questions for discussion. The questions will be asked over a series of meeting times. We may need to reread all or parts of the book. I will have several copies available in the classroom for the children to look at.

Questions for discussion

- What did you find that interested you in this book? Did anything in the book surprise you?
- What kind of work does Mike do with his steam shovel?
- Why does Mike Mulligan need a steam shovel for his work?
- How long did it take him to dig the hole? How long do you think it took the workers to dig the hole at the construction site?
- How is Mary Anne like the machines we have seen at the construction site? Is she different in any ways?
- How is Mike like the workers we have seen at the construction site? Is he different in any ways?
- Why did Mike need to dig the big hole? Why did the workers at the construction site need to dig a big hole?
- After Mike was done digging, the people built a town hall over his hole. What do you think will be built over the hole at the construction site?

OCTOBER

OVERVIEW

Major features of the construction site

Large machines

Work with unstructured materials continues

Accessories added to dramatic play area

Focus on work at sand table

Posting of photographs related to construction begins

Construction sites, machines, and workers

Posting of words related to construction begins

BOOK AND FOLLOW-UP DISCUSSIONS

Into the Sky, by Ryan Ann Hunter, illustrated by Edward Miller

Description:

This is the first work of nonfiction that I will read to the children during the course of this study. It may very well serve as a resource for some of the questions the children generate after their informal visit to the construction site (trip 2). I would like the children to become aware of the fact that there are many places to find information.

In addition, the clear text of this book gives a succinct and extremely basic overview of how skyscrapers are constructed—from foundation to steel skeleton to outer walls and windows. This will help children locate the current activity of the construction site within the larger scope of the building project. Suggesting that different skyscrapers in cities all over the world are built for different purposes, the book may also get children wondering about the near future: What kind of structure will be eventually rising above the foundation across the street?

I will read the book to the children and then refer to the list of questions about the construction site that the children have previously compiled. We will see if the book answers any of these. After that, I will pose the following questions for discussion. If necessary, the questions will be asked over a series of meeting times.

Questions for discussion

- Can anyone tell us about a tall building they know about in New York City?
- Does anyone live in a tall building? Can you tell us about your building?
- Why are tall buildings sometimes called skyscrapers?
- Why do construction workers dig a big hole before they build a tall building?
- What materials do construction workers use when they build a tall building?
- Why do people want to build tall buildings?

TRIP 3

Guided visit to the construction site

Description:

Following our usual route over the Tribeca Bridge, we will travel to the construction site for a pre-arranged meeting with a construction worker. Half the class will make sketches on trip sheets at the wide observation area on West Street, while the other half of the class meets with the worker on Warren Street, where an excavator sits at street level. The two groups will then switch.

The construction worker will be able to take the children to a safe observation area on the Warren Street side of the site. He will be able to describe what the workers are doing to make the foundation of the building: digging and clearing the big hole, mixing and pouring concrete, setting steel reinforcement bars in place, among other activities. He may be able to show the children an example of the plans that direct the work of the site. His own gear—heavy boots, hard hat, gloves, tool belt—will illustrate what construction workers routinely wear. The operator of the excavator will describe what he does with his machine and how the machine works.

The children will be able to ask questions from the list they created in the classroom. They will also have the opportunity to ask questions that have occurred to them during this visit. Teachers will record the content of the construction workers' presentations and the answers to the children's questions. Teachers and chaperones will also take photographs. We will need at least 25 photographs in order to complete the post-trip book.

We will travel back across the Tribeca Bridge to school.

Logistical preparations

- Invite family members to come on trip (see appendix H), need at least 6.
- Make note for chaperones describing nature of trip and their duties.
- Make trip sheets (see appendix I) and staple to cardboards. Gather pencils.
- Gather notepads and pencils for teachers (4) and chaperones (6).
- Prepare cameras.
- Remember to bring list of children's questions.

Preparatory activities

- **Preview what the children can expect on the trip.** Half the class sketching, half the class meeting the construction workers. Explain that we will listen to the workers first and ask our questions when they are done talking.
- **Talk about safe behavior on a trip.** Stay with and listen to your grown-up. Hold your partner's hand. Stand only where a grown-up tells you it is safe to stand.
- **Introduce trip sheet.**

Go on the trip

Follow-up

- **Compose a thank-you note** to the construction workers. Children will dictate the words and write their names. A teacher will deliver the note.
- **Add construction worker gear to dramatic play area.**
- **Offer opportunities for work at the sand table** to facilitate children's thinking about the digging, scooping, dumping, and pouring that is occurring at the construction site.
- **Show the children photographs from the trip.** Working with small groups, have the children dictate captions for the photographs (for example, "This is the excavator. It scoops up dirt," or "Construction workers have to wear hard hats"). Have the children put the photographs in a logical sequence. Bind the separate pages into a classroom book.
- **Read excerpts from "The Sky Scraper," by Lucy Sprague Mitchell** (see appendix J). While the entire text is beyond fives and sixes, the children would readily respond to selections, which can be lifted with integrity from the whole. Photographs of workers and construction machines from the site and from other sources could be used to accompany the text. The active language Mitchell uses evokes resonant images of the enormity and wonder involved in the task of constructing a tall building—the awesome scale, the powerful, almost animalistic machines, and the multitude of purposeful, competent workers. Reading from this story at this point in the study would allow the children to consolidate their impressions from their trip to the site and tug them forward in their thinking about the towering building that will eventually rise from the hole in the ground.

CONSTRUCTION WORK

Making machines

Description:

The children will work with small boxes, cardboard tubes, pre-cut pieces of corrugated cardboard, and paper scraps of different colors. They will also be offered plastic bottle tops and buttons. Gluing these components together, each child will create a machine. While the children will be inspired by the huge rigs they have been observing at the site, they do not need to replicate one of those. Their machines may possess capacities possible only in the imagination.

Materials

- Recycled cardboard boxes
- Cardboard tubes
- Corrugated cardboard
- Small scraps of colored construction paper
- Newspaper
- Glue
- Brushes and small containers

Logistical preparations

- Begin collecting recycled materials. Families can help by bringing in cardboard tubes from paper towels and toilet paper, as well as used cardboard boxes from cereal, toothpaste, soap, etc. Other useful recycled objects include plastic bottle tops, corks, plastic bread-bag fasteners, and the plastic cylindrical containers from film.
- Collect newspaper.

Preparatory activities

- **Introduce the concept.** Meet with the children to discuss machines. Discussion starters might include: What kinds of machines did you see at the construction site? What are they used for? Do you use any machines at home? What do you use them for? Do we use any machines at school? What do we use them for? What is a machine? Why do people use machines?
- **Explain the procedure.** With words, walk the children through the steps involved in the activity (see work-time procedures, below). Some children may do well with a chart posted near the materials that shows the procedure in pictures and a word or two.

Work-time preparations and procedures

- Children can work in small groups all on one day or in small groups over a number of days.
- Cover the table with newspaper. Cover the windowsill with newspaper (the finished machines will dry here).
- Pour glue into small containers.

- On the table, set out one container of glue and one brush for each child.
- Set out baskets of materials, grouped by type, on a surface near the table.
- Have the children choose three or four materials they would like to start with.
- Have the children sit at the table to glue their materials together. They can get up and choose a few more materials whenever they need to.
- When a child finishes, have her/him write out a name card and place the machine and the name card on the windowsill.

Follow-up

- **Have each child describe her/his machine to the class or a small group**, telling about where her/his machine would work (inside/outside), what it does, and why its functions are important.
- **Ask the children if they would like to use their machines in the block area**, if they are sturdy enough.
- **Take a picture of each completed machine.** Have each child dictate or write a caption for the photograph of her/his own machine. Bind the separate pages into a book for the classroom.
- **Read *Heavy Equipment*, by Jan Adkins.** This book describes the varying functions of different machines used for construction. The black-and-white drawings are precise, detailed, and elegant. Since the children have just explored the idea of machines through discussion and construction, I will introduce this book at this point to encourage them to integrate those understandings with the reality of the construction machines they have been observing at the site. This book will also prepare the children for the following sound and movement activity by giving them some ideas about the diverse types of construction machines. Because of the small format of the book, it might best be read to children in small groups.

SOUND AND MOVEMENT

Machines at work

Description:

The children will explore the action and noise of the construction machines using their bodies and voices. They will have the chance to work in partners and the whole group.

Logistical preparations

- Make a set of 12 cards (see appendix K), each with the picture and name of a construction machine (some will be repeated).

Preparatory activities

- **Read one or two poems** that describe the action and noise of construction machines. Examples include: *Construction*, by Lilian Moore; *The Power Shovel*, by Rowena Bennett; and *The Cement Mixer*, by Timothy Langley (see appendices L, M, and N). These poems will offer the children potent, dynamic, and sensorial images—a springboard for the physical and vocal interpretations of machines that the children will be asked to create. Tell the children that the poems use words to describe how construction machines move and make noise. Talk about some of these words. Then explain that the children will now use their own bodies and voices to describe the machines.
- **Explain the procedure for the activity** (outlined below).

Procedure

- Arrange the furniture so there is enough room for 25 children to move safely and comfortably.
- Divide the children into 11 pairs and one group of three.
- Let each group choose one card, which tells them the construction machine they will be.
- Tell the children to talk with their partners about how their machine moves and what sounds it makes.
- Tell the children to try out the movements and sounds with their bodies. Encourage them to practice small and soft, saving their big movements and sounds for later.
- Gather the children together and have each set of partners demonstrate their machine for the group, with one child making the movements and the other making the sounds. The children can then switch roles.
- Have the children who are not demonstrating guess what kind of machine it is.
- Then have children (carefully) make their noises and movements all together. A teacher will videotape this part of the activity.

Follow-up

- **Make a construction machine poem.** Wait a day or two, then show the children the videotape of this activity. Ask them to use words to describe some of the movements they made. Their answers might include: *big, up and down, swinging,*

rolling. Write the words they come up with on chart paper. Ask the children to give examples of some of the sounds they made. Write the sounds on chart paper. Using these words for actions and sounds, make a poem with the children that describes an important machine at the site (for instance, the crane or an excavator).

NOVEMBER

OVERVIEW

Use of materials at the construction site

Major features of construction site

Workers

Work with unstructured materials continues

Tools and accessories added

Posting of construction photographs and words continues

TRIP 4

Informal trip to the construction site to observe materials

Description:

For this trip, the class will be divided into two groups, each half visiting at different times or on different days.

Following our usual route, we will travel to the wide observation area on West Street. The children will look into the site with the specific purpose of discovering what materials the construction workers are using to make the foundation of the building. They will see concrete (liquid and solid), long and slender steel reinforcement bars, and wooden planks. They will also see dirt and water. A teacher will take notes on the children's observations.

We will schedule the trip to coincide with the operation of one of the many cement mixers that are stationed around the site—a routine occurrence. It is likely that a cement laborer would answer the children's spontaneous questions. A teacher will take pictures.

We will travel back across the Tribeca Bridge to school.

Logistical preparations

- Gather notepads and pencils for teachers (2).
- Prepare camera.

Preparatory activities

- **Preview what the children can expect on the trip.** Explain that they will be looking to see what kinds of materials the construction workers are using.
- **Talk about safe behavior on a trip.** Stay with and listen to your grown-up. Hold your partner's hand. Stand only where a grown-up tells you it is safe to stand.

Go on the trip

Follow-up

- **Discuss the children's observations of materials.** After both groups have visited the site, ask the children to identify the materials they discovered. Ask them if they have ideas about why these materials are used. Then, referring to the classroom binder that documents in photographs the children's work with unstructured materials, ask the children what materials they use when they make things in the classroom and how they use the different materials. Have examples of some of these materials (paper, cardboard, string, wire, masking tape, brass fasteners) ready and pass them around for the children to handle. Ask the children to use words to tell about the materials. Lead off with an example: "Paper is flat. I can fold it. I can rip it. I can cut it with scissors." This may lead to talk about the different physical properties of the materials (strong, light, bendable, sticky, etc.)

and may encourage the children to think about how the properties of a material inform its use.

SCIENCE AND MATH

Liquid to solid

Description:

Having just seen the cement mixers at work, the children will witness up close the transformation of a liquid to a solid. They will mix flour, water, and salt to form a thick liquid and, over the course of a few days, record the hardening process. Children will have the opportunity to compare the properties of concrete, observed at the site, with the related properties of the flour mixture.

Note: While this activity can be done with the whole class, as outlined in the procedure below, it can easily be adapted for smaller groups.

Materials

- Flour
- Salt
- Water
- 25 large popsicle sticks
- 25 small clear plastic cups
- 25 soup-size plastic spoons
- 15 small containers
- Newspaper
- Toothpicks

Logistical preparations

- Gather materials.
- Write out the recipe for the flour mixture on chart paper, using words, numbers, and pictures (see appendix O). Make smaller versions of this recipe on tent cards that will stand in the middle of each table of children.
- Invite family members to participate (see appendix P), need at least 2 or 3.

Preparatory activities

- **Introduce the concept.** Ask the children what they remember about seeing the cement mixers at work: What did the concrete look like when it came out of the mixer? How did the construction workers use it at the site? What did it look like once it was dry? Explain that the children will use flour, salt, and water to make a liquid that will also harden. Talk about the ways in which the flour mixture may remind the children of concrete.
- **Explain the procedure.** With words, walk the children through the steps involved in the activity (see work-time procedures, below). Refer to the written-out recipe. Have each child put her/his name on the side of a plastic cup.

Work-time preparations and procedures

- Make sure to start this activity at the beginning of the week, so the children can keep track of how long it takes the mixture to dry.

- Cover five tables with newspaper. Cover the windowsill with newspaper.
- For each table, prepare five popsicle sticks, five plastic cups, and five plastic spoons. Also prepare for each table three small containers, one each for flour, salt, and water.
- Seat the children (in smocks), five at each table. At least one adult will cover each table.
- Give each child a popsicle stick, a plastic cup with her/his name on it, and a plastic spoon.
- Bring the ingredients around one at a time, allowing each child to use her/his plastic spoon to scoop an accurate amount into her/his plastic cup.
- Children will mix the ingredients with a popsicle stick until they achieve the consistency of yogurt.
- Have the children carry their cups to the windowsill, where they will be left to dry.

Follow-up

- **Predict outcome and record data.** Ask the children to guess how long they think it will take for the flour mixture to harden. Ask how they will know when it is hard. Then have the children make a chart (see appendix Q) to keep track of the hardening process. They can label rows with *Day 1*, *Day 2*, *Day 3*, etc. Columns can be labeled *Wet* and *Dry*. A third column can be labeled *Notes*, which could be used to record children's observations ("It's still squishy," or "When I poke it, it moves," or "It's hard!"). Have groups of five, each group using a different color marker, make observations each day and record their data. The children can poke the flour mixture with toothpicks to test how hard it has become. At the end of each day, have the groups report to the whole class.
- **Extend the activity.** When the flour mixture has hardened completely, have the children cut away the plastic cups. Record their observations as they handle and examine the hardened forms.

SOLVING A PROBLEM

Moving an unwieldy object

Description:

Unwieldy packages are regularly delivered to schools. The following activity (based on a similar example in *Wally's Stories*, by Vivian Paley) is designed to take advantage of this occurrence and allow the children to work together to solve the problem of how to get such an object from one place to another. Doing this, the children may begin to make connections between their own efforts and those of the construction workers, whose work is so often defined by the enormous size and weight of their materials.

A delivery to the classroom (a large and/or heavy box containing supplies of clay, sand, or book orders, for instance) will be left in the middle of the meeting area. I will explain to the children that we need to move it out of our way. I will show them how hard it is for me to move it by myself. I will ask them if they have ideas that will solve this problem.

As ideas are raised, the children will have the opportunity to try them out. I may offer some suggestions, such as using rope, if the children's thinking has not gone in that direction. If the children have run out of ideas, I will suggest that we consult an expert, the custodian, since he often solves problems like this in his work and sometimes uses special tools to do so. The activity will conclude when we figure out how to move the box.

Follow-up

- **Extend the discussion.** Once the children have solved this problem, remind them of the large, heavy, and bulky materials the construction workers handle: huge funnels filled with liquid concrete, bundles of lengthy reinforcement bars, mountainous piles of dirt. Ask the children to describe how the construction workers move these unwieldy materials. The ensuing discussion may touch upon why people use machines and how people work together to get a job done.
- **Compose a thank-you note.** If the custodian has visited, have the children compose and deliver a message thanking him for his time and helpful ideas.

CLASSROOM VISIT

A construction worker

Description:

At this point in the study, the children will have watched construction workers from afar numerous times. They will also have met a few face to face. This visit will allow children to continue exploring what it is construction workers do as well as provoke them to consider a construction worker as a real, particular person.

Logistical preparations

- Arrange for a date and a time for the visit.
- Ask if the visitor might bring examples of gear, tools, and construction materials.
- Prepare the visitor. Explain that during the visit she/he can briefly describe to the children her/his work at the site and talk about the examples that have been brought to the classroom.

Preparatory activities

- **Tell the children that a construction worker will visit the classroom.**
- **Show the children photographs of construction workers** on the job during the construction of the Empire State Building (see appendices R, S, and T).
- **Read *Girders and Cranes: A Skyscraper Is Built*, by Lawrence Balterman.** This nonfiction book will give the children a feel for the people who are ultimately responsible for the imagining, planning, and construction of a tall building.
- **Generate a list of questions** the children have about construction workers in general and might have about this particular visitor. Based on their observations at the site and their reading, the children may ask about the different jobs construction workers have, how they stay safe, how they operate the big machines, and if they get to take breaks. About their visitor, they may wonder how she/he became a construction worker, what she/he does or does not like about the job, what a typical day is like, how she/he stays warm at the site in wintertime. Written on chart paper, these questions will serve as a guide during the construction worker's visit. The children are also likely to have spontaneous questions during the visit.

Follow-up

- **Compose a thank-you note to the visitor.** A teacher will take a small group of children to deliver the note to the site.
- **Read *Night Worker*, by Kate Banks.** This fictional account of a young boy who accompanies his father on a night shift at a construction site will flesh out the children's understanding of construction workers as real people with real families and lives.
- **Guide work in the block area** with questions posed before building begins. Questions might include: Who works at a construction site? What do different

workers do? Why do construction workers need to work together? How do they work together?

DECEMBER

OVERVIEW

What is a foundation?

Work with unstructured materials continues

Focused activities added

Posting of construction photographs and words continues

Practice of wood-working skills begins

Note: At this point in the study, the children will have the chance to concentrate on experimenting with their developing understandings of construction work and to integrate new ideas with previously held theories. The activities will emphasize outgo over intake.

WHAT IS A FOUNDATION?

An experiment with materials

Description:

The children will use cardboard tubes and an array of accompanying materials to expand their understanding of why buildings need a foundation.

Logistical preparations

- Collect 12 cardboard tubes from rolls of paper towels.
- Make enough play dough for 25 children.
- Gather other materials: sheets of aluminum foil, one-inch cubes.

Preparatory activities

- **Introduce the concept.** Remind the children that all fall the construction workers have been making the foundation for what will eventually be a very tall building. Ask the children to explain the work they have seen (removal of dirt from the big hole, mixing and pouring of concrete, placement of reinforcement bars, creation of base of columns). Ask the children if they have any ideas about why construction workers need to do so much work at the bottom of the building before anything is built above the ground.
- **Explain the procedure.** Show the children a cardboard tube. Stand it on its end and blow on it. Stand it on its end and flick it over. Talk about how easy it is to knock it over. Then tell the children that they will experiment with materials that may help them make the tube less tippy. Explain that their goal is to make the cardboard tube stand up on its end so strongly that it will not fall down.

Work-time preparations and procedures

- Prepare five tables with cardboard tubes, play dough, aluminum foil, and cubes. Keep materials in separate containers near but not on each table.
- Divide the children into partners: 11 pairs and one trio.
- Have the children sit at the five tables: six at each of three tables, four at another table, and three at the last table.
- Give each set of partners a cardboard tube. Encourage them to experiment with how easy it is to knock over, even with a little blown air.
- Then remind them that they are going to use the available materials to make the tube stand up so strongly that it will not fall down.
- Let the children choose materials, which can be used separately or in combination.
- When each set of partners has come up with a solution, have them call over a teacher, who will take a photograph of their upright tube and record their explanation of why it stands sturdily now.
- When all the children have finished, have six sets of partners get up and visit the work of the other six sets of partners, who will stay seated by their work and respond to any comments or questions. Then the children will switch roles.

Teachers may need to help children navigate the physical traffic pattern of this moment.

Follow-up

- **Make a book** from the photographs of the children's work and their comments. Read it to the children. Make it available in the classroom.
- **Read *The Busy Building Book*, by Sue Tarsky, illustrated by Alex Ayliffe.** Outlining how a tall building is made, from start to finish, this book uses a very brief text and numerous labels that will add to the children's growing vocabulary for construction work. It will reinforce the idea that the first important work at a construction site for a tall building is the creation of a foundation. The following pages in the book will remind children of all the work yet to come.

WHAT IS A FOUNDATION?

An experiment with movement

Description:

The children will use their own bodies to get a feel for how a sturdy base supports a vertical structure.

Preparatory activities

- **Explain the procedure** for the activity. Ask a child to stand on one leg and try to balance. Ask another child to try gently to tip the first child over. Then ask a child to stand with both feet tight together. Ask another child to try gently to tip this child over. Then ask a child to choose a position of her/his feet that will make her/him stand strong. Have that child call on others to try gently to tip her/him. Explain that they will repeat this activity in small groups and try to figure out what position of their legs and feet (wide or narrow stance, bent or straight legs) will make their bodies the most stable.
- **Talk about working together.** Tell the children that when they work in their groups, every child should have a chance to try a few positions and every child should have a chance to try gently to tip someone over.
- **Emphasize safety.** Remind the children that they need to be safe with each other's bodies. Give some examples of movements that are too rough.

Procedure

- Arrange the furniture so there is enough room for 25 children to move safely and comfortably.
- Divide the children into seven groups of three and one group of four.
- Let them take turns experimenting with different stances.
- Take pictures of the children at work.

Follow-up

- **Discuss the activity.** Have the children regroup in the meeting area. Ask for children to demonstrate some of the most stable stances they found. Ask the children what they notice about these stances or how they might describe their shape. Ask for children to demonstrate some of the tippiest stances they found. Ask the children what they notice about these stances or how they might describe their shape.
- **Post the photographs of the children at work on this exercise.**

WHAT IDEAS DO WE HAVE ABOUT BUILDING?

Focused use of unstructured materials

Description:

Children will have the chance to explore different materials with the goal of making a three-dimensional structure. Each group of materials will allow for that possibility, with the unique properties of each material posing unique challenges and possibilities. Suggested groups of materials are listed below, although there are many more that could be offered (see *Collage and Construction in School*, by Lois Lord). I have included notes on the groups of materials that I have had experience offering to the kindergarten class described in the context of this paper (see appendix U). As the children work with the materials, a teacher will take photographs of their constructions. These photographs will be used as a reference for an upcoming construction activity in which children will be asked specifically to make an imaginary building.

Groups of materials

- Corrugated cardboard precut into pieces (squares, rectangles, and triangles of varied dimensions) and strong masking tape; scraps of colored paper can be offered as well. Tools: scissors for cutting tape. Children are often inspired by these materials to build a three dimensional house-like structure, with walls and a roof. They must contend with the problem of using the tape to make a sturdy join at a 90-degree angle. Children tend to use the colored scraps for visual interest and detail. Children who struggle with fine-motor skills may need a teacher's assistance.
- Two colors of oak tag precut into pieces (squares, rectangles, and triangles of varied dimensions) and brass fasteners. Tools: hole punchers. Some children may have trouble using the hole puncher; substituting heavy colored construction paper for the oak tag will help. Many children will work flat with these materials, intrigued by the way that the brass fasteners allow them to create moving parts. A few children will discover that it is possible to make a three-dimensional construction by bending or folding the oak tag. A teacher can expect to give assistance with using the hole puncher and guiding the children to three-dimensional building.
- Corrugated cardboard precut into pieces (squares, rectangles, and triangles of varied dimensions) and pipe cleaners of varying lengths in a single color; scraps of tissue paper can be offered as well. No tools. This particular group of materials fascinates many children, who use it to build everything from hats to trains to snails to puppets to complex sculptural designs. The pipe cleaners can be slid into the holes that the corrugation offers, allowing the children to link the pieces of cardboard both securely and flexibly. Children will tear the tissue paper and poke it onto the wires, adding striking visual details. These materials require very little assistance from teachers, although some children may need guidance in figuring out how to attach the pipe cleaners to the cardboard.

- Medium-size rectangular pieces of corrugated cardboard, corks, and/or other similar-sized recycled objects, and glue. No tools. The cardboard is used as a base for the other materials.
- Wood planks and nails. Tools: hammers, saws, a wood-working bench. At this point in the study, all the children will begin to practice wood-working skills, in preparation for their participation in the culminating project.

GUIDED WORK IN THE BLOCK AREA

Description:

The children will work in small groups in the block area in response to questions and discussions that take place during a meeting prior to work. Examples are found below. A teacher will observe the building, and the children will periodically report to their classmates on the work they are doing in the block area.

Possible guiding questions

- What do you think the building at the construction site across the street will look like when it's done? What will it be used for?
- Today you are going to build up. How will you make a sturdy bottom for your building so that it doesn't tip over?
- Try to find a way to make a building as tall as your waist.

Related reading: *Up Goes the Skyscraper!*, by Gail Gibbons. With simplicity, precision, and charm, this book details the building of a skyscraper, telling about the people, the machines, and the nature of the work. It will support children as they consolidate their ideas about the construction of tall buildings. And the description Gibbons gives of a building's framework may inspire new kinds of structures in the block area.

JANUARY

OVERVIEW

Danger and safety at the construction site

Work with unstructured materials continues

Posting of construction photographs and words continues

Practice of wood-working skills continues

TRIP 5

Informal trip to the construction site to observe for danger and safety

Description:

As a whole class (and on a mild day), we will take our usual route to the construction site. Half the class will stop at the wide observation area on West Street. They will look for what might make construction work dangerous and evidence of how construction workers keep themselves safe. The other half the class will walk around the perimeter of the site, with the same focus for their observations. Then the two groups will switch. Teachers will take notes on the children's observations and take photographs of the physical evidence of safety precautions (barriers, cones, flags, protective gear worn by workers, as well as signs and symbols posted at the site).

Logistical preparations

- Gather notepads and pencils for teachers (4).
- Prepare cameras.

Preparatory activities

- **Discuss ideas about danger and safety.** On the day before the trip, ask the children if they have any ideas about how construction work might be dangerous. Then ask them if they can think of some ways that construction workers protect themselves. Record the children's responses on chart paper, categorizing them under the headings of *Danger* and *Safety* (see appendix V).
- **Preview what the children can expect on the trip.** On the day of the trip, explain that they will be looking for evidence of what makes construction work dangerous and how construction workers keep themselves safe. Review with the children the table of their ideas about danger and safety at the site.
- **Talk about safe behavior on a trip.** Stay with and listen to your grown-up. Hold your partner's hand. Stand only where a grown-up tells you it is safe to stand. Talk about how these are examples of how we think about safety as a class.

Go on the trip

Follow-up

- **Make a book.** Post the previously made danger/safety table and ask the children if they have any new ideas to add. It is likely that this discussion can add specificity to the children's pre-trip ideas. Then ask each child to draw, choosing as a subject either something that is dangerous at the site or something that keeps the construction workers safe. Teachers will record the children's descriptions of their drawings, and some children may want to write about their drawings. These words and drawings will be bound together into a classroom book about danger and safety at the construction site.
- **Prepare for the upcoming visit.** Tell the children a construction worker will visit the classroom to talk about safety procedures at the site. Ask the children to think of what they might want to ask the visitor. Record their questions.

BOOK AND FOLLOW-UP DISCUSSIONS AND ACTIVITIES

Signs, by Ron and Nancy Goor

Description:

This book of handsome photographs depicts numerous signs found in the environment: *stop*, *one way*, *exit*, and more. These visual images may guide the children to relate the specific information they have just encountered about danger and safety at the construction site to the more generalized use of precautionary and informational signs and symbols in their environments—both in their urban neighborhood and at their school.

I will show the children the photographs of signs posted at the construction site. Then I will read the book to the children and pose some of the following questions for discussion. In talking, the children may begin to contemplate the way in which outdoor signs make use of color and shape (with or without words) to communicate. My goal is to build on the children's emergent understanding of symbolism—the ways in which one thing can stand for another. For instance, the colors red, yellow, and orange often stand for caution. Furthermore, most children at this age will be on the verge of tackling the abstract symbol system of written language. The brief bold words on street and safety signs may connect with the children's thinking about how letters put together into groups stand for words that they can say and understand.

Questions for discussion

- What do you notice about the signs in the book?
- What kinds of signs did we see at the construction site?
- What kinds of signs do you see when you walk between school and home?
- Why do people use signs?
- What do you notice about the colors of the signs you see outdoors?
- What do you notice about the words on the signs you see outdoors?
- The outdoor signs send us messages. Describe a sign you know and explain its message. For instance, the traffic light turns red, and that tells the cars to stop. (Children may want to refer to the book or to the photographs taken at the construction site for specific examples of familiar signs.)
- Do we need to make signs for the classroom? Why? Tell about a sign you might make for our classroom. What colors would you use? What shape would it be? Would it have words? Where would you put it?

Follow-up

- **Point out sign-making materials** (colored paper, pencils and markers, scissors, and tape). Put some of these materials within easy reach of the block and dramatic play areas.
- **Take a walk around the school building.** In small groups, look for signs on the walls, such as *exit*, classroom numbers, and safety information. Children can bring blank paper stapled to cardboard and pencils to record the words they discover. During and after the trip, discuss what the words mean and ask the children for their ideas about why these words were posted in the school building.

Post the children's records of observed words near the block area in the classroom, where they might be used for reference in sign making during play.

CLASSROOM VISIT

A construction worker

Description:

This visit will allow children to hear first-hand about the issues of danger and safety at the construction site. The visitor will bring examples of items related to safety on the job (hard hat, heavy gloves, cone, flag, orange vest, goggles, first-aid kits). The visitor will discuss and demonstrate the kinds of nonverbal signals (sounds and gestures) that construction workers use to communicate at the site. The children will have a chance to ask the questions they have composed about danger and safety. A teacher will take photographs, making sure to record any nonverbal signals the construction worker demonstrates.

Logistical preparations

- Arrange for a date and a time for the visit.
- Ask if the visitor might bring examples of items related to safety at the site.
- Prepare the visitor. Explain that during the visit she/he can briefly describe to the children what is dangerous about her/his job and describe the ways she/he keeps safe. Ask her/him to consider signals used at the site—sounds and gestures.
- Post the children's list of questions about danger and safety at the construction site.

Preparatory activities

- **Remind the children that a construction worker will visit the classroom** to talk about danger and safety at the construction site.
- **Review the children's questions** for the visitor.

Follow-up

- **Compose a thank-you note with the children.** A teacher can take a small group to deliver it to the site.
- **Add accessories to the dramatic play area:** flags, small cones, orange vests, goggles.

SOUND AND MOVEMENT

Communicating without words

Description:

The children will create a set of nonverbal gestures that will tell other children how to move their bodies. During the game, one child will be the leader, using the repertory of nonverbal signals to guide the other children.

Preparatory activities

- **Create a set of nonverbal gestures** that will tell other children what to do with their bodies. Start the children off by giving them the example of a raised hand standing for *stop* and beckoning fingers standing for *go*. Have the children create physical signals for other dimensions of movement: *fast, slow, high, low*. They can also be encouraged to think up signals that guide behavior, such as gestures that tell others to *be careful* or *be quiet*. As the children become familiar with the game, they will no doubt add to this list.
- **Practice the gestures** with the children.
- **Explain the procedure** for the activity (outlined below).

Procedure

- Arrange the furniture so there is enough room for 25 children to move safely and comfortably.
- Ask for a volunteer to be the first leader. Explain that all children will have the chance to be the leader.
- Explain that the leader's job is to use the physical gestures already created to guide the movements of the other children. The leader may not use any words. Explain that the other children's job is to watch the leader and do whatever her/his gesture tells them to do. The children who are moving should not use any words either.
- Tell the children that they will start by walking at a medium pace around the room, keeping their eyes on the leader. The leader's gestures may guide them to speed up or slow down, to walk high (on their tiptoes) or low (crawl or slither). They must stop and go when they see those signals.
- Ask the leader and one other child to demonstrate the game.
- Tell the children they need to be careful of each other's bodies and use only safe movements. Ask children to give examples of movements that would not be safe.
- Begin the game. Let each leader have a turn that lasts for a few minutes. If the game is being played in a large space, the children can be split into two groups or more, each with a leader.

Follow-up

- **Discuss the activity.** Ask the children: What did it feel like not using words? What was it like to be the leader? What was it like to try to follow the leader? Ask the children if they want to add any new gestures for the next time they play.

- **Show the pictures taken of the visiting construction worker** demonstrating nonverbal signals. Ask the children to recall what these signals mean. Ask the children why they think construction workers use gestures to communicate with each other. Ask the children if they can think of any other times people communicate without words.

FEBRUARY

OVERVIEW

Buildings

Form and function

Diversity and commonality

What will the finished building at the site look like?

Work with unstructured materials continues

Posting of construction photographs and words continues

Practice of wood-working skills continues

TRIP 6

Neighborhood walk to look at buildings

Description:

On this last trip of the study, the children will take a walk in the neighborhood to look at buildings in their great variety—some tall and sleek, others of modest height and fine decorative detail; some for people to live in, others for people to work in. Stopping periodically along the trip route, the children will be asked to talk about the features of the buildings they see (these questions are outlined below). Their ideas and conversation may lead them toward two essential questions about form and function: What makes a building a building? What do people use buildings for?

We will travel as a whole group out the school's Warren Street door and walk west one block. We will then walk north one block, noticing the many tall apartment buildings in the vicinity, one still in the last stages of construction. When we reach Chambers Street, we will cross and head east, past the building that houses Stuyvesant High School. We will go over the Tribeca Bridge and continue east on Chambers Street, passing the Tribeca Performing Arts Center and the Borough of Manhattan Community College. We will cross Greenwich Street and walk south one block, taking note of the stores at the bottoms of buildings. At Warren Street, we will turn west and pass another elementary school on the way back to our own school building. Office buildings will also be in plain sight along the way.

As in the first two trips, we will refer to a map of our route during our walk. Teachers will record children's observations about the types of buildings they see and take pictures of buildings along the route.

Logistical preparations

- Make a map of trip route (see appendix W).
- Gather notepads and pencils for teachers (4).
- Prepare cameras.

Preparatory activities

- **Discuss city buildings.** One day before the trip, show the children photographs of buildings in lower Manhattan taken in the 1930s by Berenice Abbott (see appendices X, Y, and Z). Talk about how Manhattan is full of buildings—some tall, some short, some old, some recently made, and all very close together. Ask the children for their ideas about these questions: Why are there so many buildings in the city? What do people use buildings for? Post the photographs in the classroom.
- **Show the children the map of the trip route.**
- **Explain the purpose of this trip:** to find out about the different kinds of buildings in our neighborhood. Talk with the children about questions we will be asking as we walk: How tall are the buildings? (Do they have a lot of floors or few floors?) How wide are the buildings? (Does it take many or few steps to get

from one side of the building to the other?) What do the tops of the buildings look like? What are the buildings made of? What makes the buildings interesting or pleasing to look at? What are the buildings used for?

- **Talk about safe behavior on a trip.** Stay with and listen to your grown-up. Hold your partner's hand.

Go on the trip

Follow-up

- **Discuss the different kinds of buildings** the children saw on the trip. For each type of building, reiterate the questions that were asked on the trip about physical features and functions (see above). Create a chart to record the data (see appendix AA).
- **Have children draw with detail.** A day after the trip, show the children the photographs taken by teachers during the trip. Talk about the differing physical features of the buildings. Have each child think of a building she/he saw on the trip and make a drawing of that building. Remind the children to add detail: Is the building you are drawing very tall? Does it have lots of windows? What color is it? Is it fancy or plain? Some children may want to refer to the trip photographs to help them remember. Have the children make a label that tells what kind of building they have drawn (a school, an apartment building, an office building, etc.). Have each child cut out her/his illustration and place it with its label on an appropriate spot on the map of the trip route.
- **Post the map in the classroom.**

EXPLORING HOME

What makes a building a building?

Description:

Having just considered buildings in their variety, the children will now focus on a particular and intensely familiar building—the one in which they live. In the process, they will discover the ways in which buildings are the same.

This activity calls for family involvement and will be explained in a letter sent home with each child. Once a week, for three weeks, each child will take home a work sheet that guides the exploration of her/his own building. The data collected will be examined and analyzed in the classroom.

Note: If a family is unable to help a child with this activity, the child will work with a teacher and complete the work sheets by exploring the school building,

Logistical preparations

- Compose and distribute letter to families (see appendix BB).
- Create work sheets (see appendices CC, DD, and EE).
- Create graphs and charts (see appendices FF, GG, HH, and II).

Preparatory activity

- **Explain the activity.** Tell the children that they will be exploring the building in which they live. Show them the first work sheet and read it through. Explain that they will each take a work sheet home and complete it with a grown-up. Introduce each work sheet in this way.
- **Explore concepts.** Tell the children they will be thinking about whether their buildings are tall or short and wide or narrow. Remind the children of the buildings they saw in the neighborhood. Again show them the photographs taken during the trip of buildings that are relatively tall or short (have many or few floors) and wide or narrow (takes many or few steps to get from one side to the other). Then look with the children at structures that have been built in the block area. Ask which structures are tall and which are short. Ask which structures are wide and which are narrow. Continue these kinds of discussions as children build.

Follow-up

- **Work sheet 1 (building dimensions and materials)**
 - Have the children complete a graph that records data collected about physical dimensions: tall/short, wide/narrow.
 - Have the children complete a graph that records data collected about building materials.
 - Ask for a volunteer to show and talk about the picture she/he has drawn. Remind the child to add detail to her/his descriptions by talking about the answers to the questions on the work sheet. Ask for more volunteers: Is

anyone else's building like that? Does anyone live in a building different from that?

- **Work sheet 2 (doors)**
 - Have the children complete a graph that records data collected about the number of doors it takes to get from the street into their apartments.
 - Ask for volunteers to retell the story of how to get from the street into their apartments. Some children may need guidance to get succinctly from the beginning to the middle to the end of this story: Tell us about the first door you go through. How do you get to the front door of your apartment? Where do you end up when you are finally inside?
 - Ask children for their ideas about why buildings and apartments have doors. Record their ideas on chart paper.

- **Work sheet 3 (windows)**
 - Have the children complete a graph that records data collected about the number of windows in their apartments.
 - Ask for volunteers to describe what they can see from one of their windows.
 - Ask children for their ideas about why buildings and apartments have windows. Record their ideas on chart paper.

CONSTRUCTION WORK

Making buildings

Description:

The children will use previously introduced unstructured materials (see pp. 118-119) to make their own small buildings. They will be asked to consider both form and function, and they will make a plan on paper before they begin working three-dimensionally.

Logistical preparations

- Gather and organize unstructured materials.
- Make planning sheet (see appendix JJ).

Preparatory activities

- **Show the children a picture** of what the building being created at the construction site will look like when it is completed (see appendix KK). Talk about its features: tall and wide, made with metal and glass, made for people to live in, etc. Talk about how a person called an architect had to think up this building before construction began and then made plans (drawings and words that tell about the imagined building) for the construction workers to follow.
- **Explain the procedure.** Tell the children that they will use construction materials to make buildings from their own imaginations. Explain that they will plan first and then build.
- **Show the children a planning sheet.** Talk with the children about what they might consider before they build: What materials will you use? How tall will your building be? What shape will your building be? Will it be fancy or plain on the outside? What will the top look like? How many doors and windows will your building have? What would your building be used for?

Procedure (over the course of a week)

- Have the children record their ideas about their building on planning sheets, using pictures and words. A teacher will help with the words, when necessary.
- Have each child show a teacher her/his planning sheet and gather materials needed to start work.
- Check in with each child as she/he works. Ask questions that will encourage children to add detail to their work (see above). Allow children to work in small steps over the course of a week.

Follow-up

- **Make a book.** Have the children dictate or write about the process of making their buildings: What did they do first, in the middle, and last? Take a picture of each child's building. Make a book for the classroom that shows for each child's building the plan, a description of the process, and a photograph of the finished product. Read the book to the class.
- **Display the finished buildings.**

MARCH

OVERVIEW

Culmination: Planning and building a large structure*

***Note:** This wood-working project was originally developed by Rebecca Ryan, who generously allowed its inclusion in this thesis.

CULMINATION

Working together to make a structure

Description:

Over the course of the month, the children will construct a four-sided child-size wooden frame. With the goal of making a structure suitable for use in dramatic play, the children will consider necessary features: sturdiness, roominess, a way in and out, places to look in and out. They may also, as the project nears completion, decide to add special features, such as a cloth roof or cardboard panels for privacy.

The children will work in small groups assisted by teachers and family members. They will use wood-working tools and materials to assemble their structure. Teachers will document the process of building in photographs and compile these photographs into a book.

Families will be invited into the classroom to celebrate the completion of the structure. The teachers and children will use the book of photographs to tell their own story of construction.

The structure will remain a part of the dramatic play area for as long as it retains interest for the children.

Logistical preparations

- Compose and distribute a letter to families that describes the project and invites family members to come help the children work on the structure (see appendix LL).
- Gather materials called for in construction plan (see appendix MM).

Preparatory activities

- **Read *Building*, by Elisha Cooper.** Replete with details, both accurate and delightfully quirky, this book outlines the entire scope of the building process. Across its pages, an available site is transformed by plans, teams of tool-wielding (and very human) workers with myriad skills, and fleets of machines with myriad functions. Digging, hammering, sawing, hoisting, the workers create a very large something from a place where there was absolutely nothing. I will read this book to the children at this final point in the study to consolidate their understandings of construction as a process with a beginning, a long middle of many stages, and an end and to reiterate the human achievement that every building in the city ultimately represents. The book will also excite the children about the prospect of becoming builders of a large structure themselves.
- **Introduce the concept.** Extending the discussions that emanate from reading *Building*, remind the children of how much they have been thinking this year about the construction of buildings—how they are built, why they are built, who builds them, what kinds of tools help people build, and what materials buildings

are made from. Explain that they will now work together to make an indoor structure to play in.

- **Begin planning.** Tell the children that they will plan first and then build. Over several days, ask the children questions: Where in the classroom should we put the structure? How much of the floor space should it take up? How tall should it be? What materials could we practically use to make it strong? How will children get in and out? Will children want to be able to see out from the inside and in from the outside? What will children use the structure for when it is done?
- **Finalize the construction plan on paper,** allowing the children's answers to the above questions influence the plan as much as possible. Show the children the plan.

Construction work

- Teachers and parents work with children in small groups, offering guidance in sawing and hammering. The construction plan is used for reference.
- Teachers take pictures of the work process.

Celebration of the work

- **Preparations**
 - Choose a date and time and invite families to come to the classroom (see appendix NN).
 - Compile photographs of the work process into a book.
 - Organize the classroom to highlight the different ways the children have explored the idea of construction: post related graphs and charts, display the children's models of construction machines and imaginary buildings, fill a book shelf with class-made books.
 - Prepare light refreshments.
- **Celebration**
 - Children guide family members through the classroom, showing and talking about the work on display.
 - Teachers call children and family members to gather near the wooden structure. A teacher reads the book of photographs that tells about how it was built.
 - Light refreshments are served.

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Hudson-Knapp, N. Teacher, Bank Street School for Children, New York City, personal communication, Nov. 2005. Offered ideas about activities with construction materials.

Lord, L. (1958). *Collage and construction in school*. Worcester, MA: Davis Publications.

Paley, V. (1981). *Wally's stories: Conversations in the kindergarten*. Cambridge, MA: Harvard University Press.

Ryan, R. Teacher, Riverside Church Weekday School, New York City, personal communication, Nov. 2005. Offered guidelines for the culminating experience.

Simon, S., & Fauteux, N. (2003). *Let's try it out with towers and bridges*. New York: Simon & Schuster Books for Young Readers. Provides a series of simple experiments with readily available materials. Allows even very young children to grasp some basics of structural engineering (for example, how a foundation helps a building stand up).

Wood-o-rama. A lumber store located on the upper West Side of New York City. Personal communication with employee, Dec. 2005. Gave advice about size and type of wood for culminating project.

CHILDREN'S BOOKS

Fiction

Banks, K. (2000). *The night worker*. New York: Farrar Straus Giroux. A moving story about a young boy who accompanies his father to his job as a night-shift construction worker.

Brown, C. (1992). *City sounds*. New York: Greenwillow. Farmer Brown's trip to the city reveals urban music at every turn—honks and whistles, roars and clacks.

Burton, V. (1939). *Mike Mulligan and his steam shovel*. Boston: Houghton Mifflin. An engaging, human account of the digging of a foundation. Illuminates the dedication of the worker and the awesome power of his personable machine.

Mitchell, L. (1921/1948). The sky scraper. In *Here and now story book: Two- through seven-year-olds* (pp. 244-248). New York: E. P. Dutton & Company. An account—both precise and poetic—of the process of constructing a tall building, offering evocative images of the workers, the machines, and the growing structure within the context of a busy, burgeoning city.

Spinelli, E. (1993). *If you want to find golden*. Morton Grove, IL: Albert Whitman & Company. A walk around the neighborhood locates vibrant colors in familiar sights.

Nonfiction

Adkins, J. (1980). *Heavy equipment*. New York: Charles Scribner's Sons. While the text is beyond 5s/6s, children will be fascinated by the elegant and detailed black-and-white drawings that give an evocative visual account of the work of these powerful machines.

Balterman, L. (1991). *Girders and cranes: A skyscraper is built*. Morton Grove, IL: Albert Whitman & Company. In accessible language and striking photos, details the construction of a skyscraper, celebrating the people and machines involved in the process.

Cooper, E. (1999). *Building*. New York: Greenwillow. Delightful watercolor-and-pencil drawings illuminate the informative text that traces the process of creating a building from scratch and, in so doing, reveals both the technical and the human side of the story.

Cooper, J. (1991). *Skyscrapers: Man-made wonders*. Vero Beach, FL: Rourke Enterprises, Inc. Basic information about skyscrapers, how and why they are built.

Gibbons, G. (1986). *Up goes the skyscraper!* New York: Four Winds Press. Charming colorful drawings and a brief, precise text chart the progression of building and highlight the intricate interplay of people, machines, and materials.

Goor, R. & N. (1983). *Signs*. New York: Thomas Y. Crowell. A photographic essay depicting the signs that "are everywhere," such as *stop*, *one way*, and *exit*.

Hoban, T. (1997). *Construction zone*. New York: Greenwillow. Color photographs capture the power and reveal the latent beauty of construction machines, each of which is shown in full and partial detail and labeled with its name. The book's final pages give a brief description of the function of each machine.

Hoban, T. (1975). *Dig, drill, dump, fill*. New York: Greenwillow. An earlier, equally captivating black-and-white version of *Construction Zone*.

Kilby, D. (2003). *At a construction site*. Tonawanda, NY: Kids Can Press. Appealing acrylic paintings and succinct text depict construction machines in all their variety.

Liebman, D. (2003). *I want to be a builder*. Buffalo, NY: Firefly Books. Brief overview of the different skills and qualities of construction workers, male and female.

Hill, L. (2003). *Earthmovers*. Minneapolis: Lerner Publications Company. Simple text describes the form and function of various construction machines.

Hunter, R. (1998). *Into the sky*. New York: Scholastic. Clearly articulated information about how skyscrapers are built. Good match for 5s/6s.

Tarsky, S. (1997). *The busy building book*. New York: G.P. Putnam's Sons. Cheerful collage illustrations and a clear, minimal text (including numerous labels) describe the process of constructing a tall office building.

Poetry

Adoff, A. (1995). *Street music: City poems*. New York: HarperCollins.

Hopkins, L. (Ed.). (1987). *Click, rumble, roar: Poems about machines*. New York: Thomas Y. Crowell.

Hopkins, L. (Ed.). (1970). *The city spreads its wings*. New York: Franklin Watts.

Moore, L. (1969). *I thought I heard the city*. New York: Atheneum.

Yolen, J. (Ed.). (1996). *Sky scrape/city scape*. Pennsylvania: Wordsong Boyd Mills Press.

WEBSITES

www.bls.gov/oco/oco1009.htm

The website for the Bureau of Labor Statistics. Gives specific job descriptions for those working in the wide array of construction trades.

www.cement.org

The website for the Portland Cement Association. Gives clear descriptions of how cement and concrete are made. Click on "Cement & Concrete Basics." Used in this curriculum as a teacher resource.

www.greatbuildings.com

Provides wonderful images of the prominent skyscrapers of the city, for use in classroom.

www.kenkenikki.jp/special/e_index.html

An interactive website for children that clarifies how the big machines of the construction site work. Used in this curriculum as a teacher resource.

www.nypl.org/research/chss/spe/art/photo/hinex/empire/empire.html

A page on the website of the New York Public Library that provides stunning vintage photographs of the construction of the Empire State Building.

www.pbs.org/wgbh/buildingbig/skyscraper/

Offers information on structural engineering and facts about specific buildings in New York City and elsewhere.

www.science.howstuffworks.com/skyscraper.htm

Offers clear and detailed information about how tall buildings are constructed.

www.wirednewyork.com

A source for striking photographs of New York City's famous skyscrapers, for use in classroom.

APPENDICES

*Appendix A***USE OF UNSTRUCTURED MATERIALS: checklist/assessment****Name:****Date:****Materials:****Tools:****Manual skills:**

[Dependent on materials and tools offered. Might include assessment of the following skills. Check for evidence of relevant skills. Record examples.]

- Handling of scissors
- Handling of hole puncher
- Handling of tape
- Threading
- Twisting
- Folding
- Tearing

Notes:

Thinking skills:

[Check for evidence of the following skills. Record examples.]

- Problem-solving
- Planning
- Making connections, using images
- Explaining
- Flexibility
- Persistence

Notes:

Social/emotional skills:

[Check for evidence of the following skills. Record examples.]

- Cooperation
- Sharing of materials and/or ideas
- Empathy
- Helpfulness
- Interest in others' work

Notes:

Description of affect:

Language skills:

[Record examples of language used during work.]

- Private speech
- Conversation

*Appendix B***TRIP 1: Letter to families**

September

Dear families:

This year we will be studying the amazing activities at the construction site across the street from school. We will be observing and learning about the people who work there, the powerful machines, and the materials used to make a building. We will have the opportunity to visit the site a number of times during the fall and winter and to talk to the construction workers.

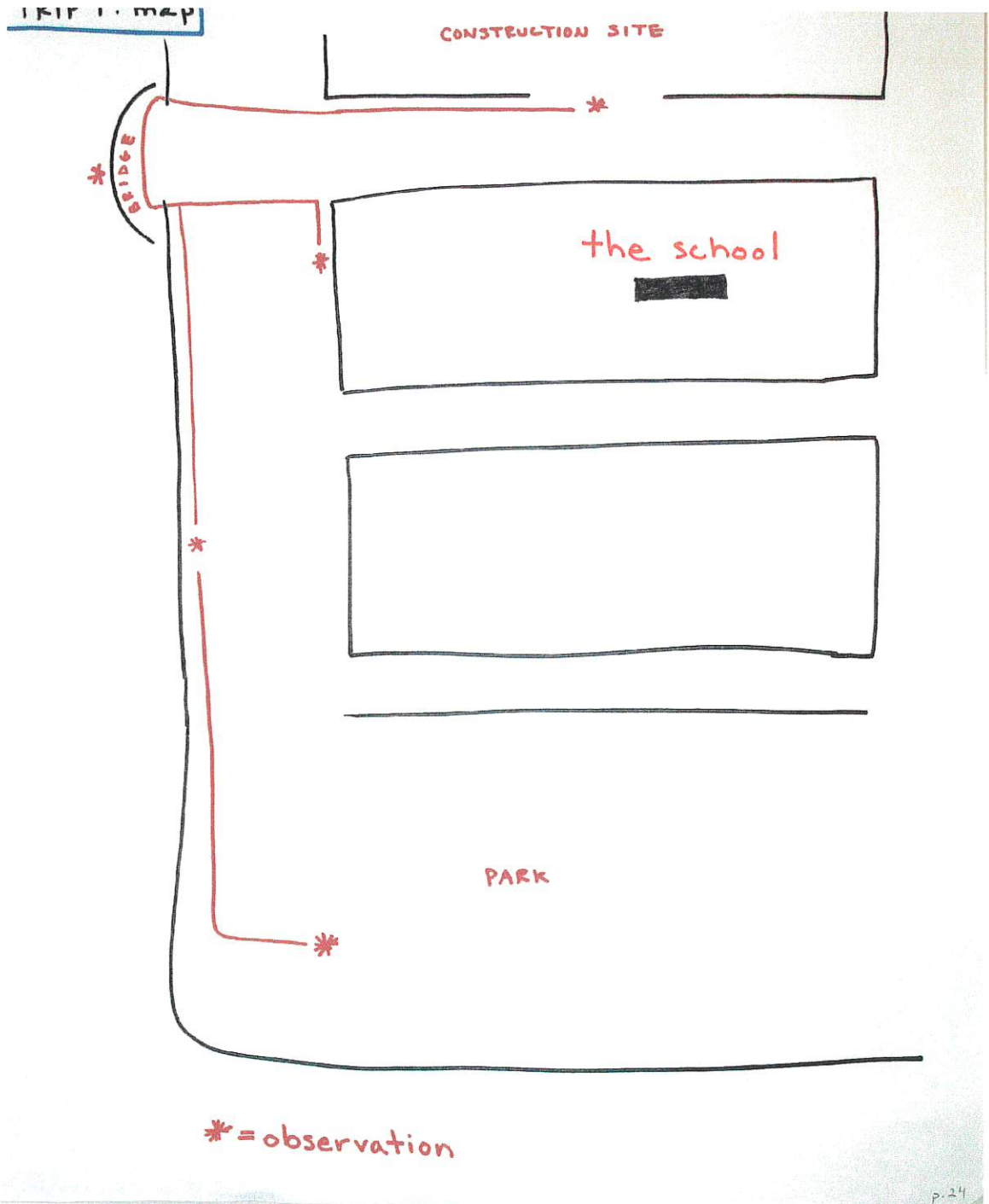
To begin this study, we will be taking a walk in the neighborhood to get a feel for its prominent features (including that huge, noisy, intriguing construction site!).

We are inviting family members to join us on our walk. It will take place on [date], starting at 9:00 a.m. and ending at about 10:00 a.m. Please let us know by [date] if you can come.

With warm regards,

Appendix C

TRIP 1: map

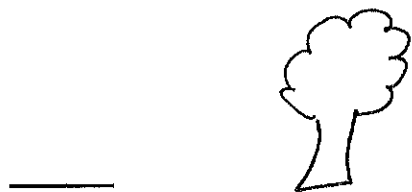


*Appendix D***TRIP 1: trip sheet**

What did you see?



car



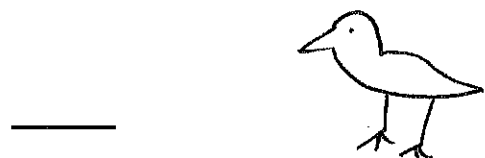
tree



person



building



bird



dog

Appendix E

TRIPS 1 & 2: chart

What we saw



What we heard

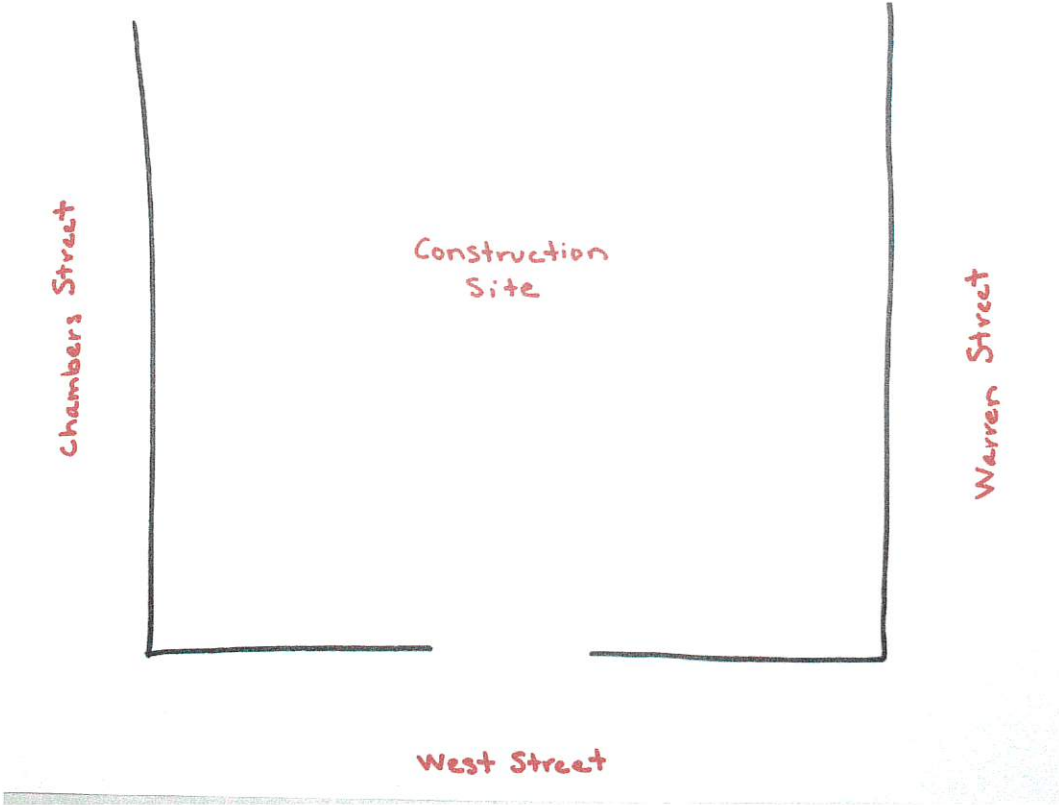


What we smelled



Appendix F

TRIP 2: map



*Appendix H***TRIP 3: Letter to families**

October

Dear families:

Thank you to all who were able to come with us on our neighborhood walk in September.

We are now planning our next trip—a guided observation of work at the site. Members of the construction team will meet us at the site to explain the activities of the workers and their machines. We will also get a close-up look at an excavator!

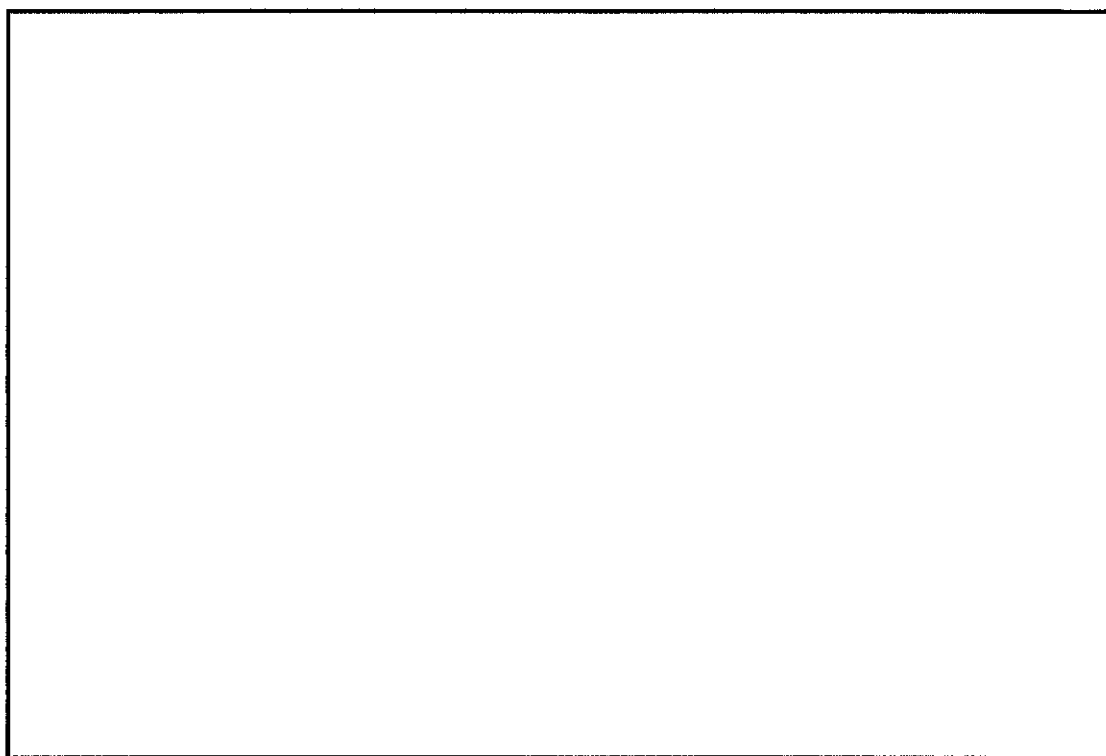
We hope that many of you will be able to join us for this exciting trip. It will take place on [date], starting at 9:00 a.m. and ending at about 10:30 a.m. Please let us know by [date] if you can come.

With warm regards,

*Appendix I***TRIP 3: trip sheet**

Tell about something you see at the construction site.

Use a picture, words, or both!



*Appendix J***TRIP 3: reading**

Once in an enormous city, men built an enormous building. Deep they built it, deep into the ground; high they built it, high into the air. Now that it is finished the men who walk about its feet forget how deep into the ground it reaches. But they can never forget how high into the blue it soars. Their necks ache when they throw back their heads to see to the top. For, of all the buildings in the world, this sky scraper is the highest....

Now this soaring sky scraper is the work of men—of many, many men. Its lofty tower was first thought of by the architect. With closed eyes he saw it, and with his well-trained fingers quickly he drew its outline...till all the plans were ready.

Then the sky scraper began to grow. The first men brought mighty machines with derricks and scoops. One hundred feet into the earth they dug. The gigantic mouths of the scoops gnawed at the rock and the clay. Huge hulks they clutched from this underworld, heaved up with enormous derricks and crashed out on the upper land. Deep they dug, deep into the ground till they found the firm bed-rock. With a network of steel they filled this terrific hole. Into the rasping, revolving mixers they poured tons of sand and cement and gravel which steadily flowed in a sluggish stream to strengthen the steel supports.

At last,—and that was an exciting day,—the great beams began to rise....

Story by story the sky scraper grew, a monstrous outline against the sky. And ever and ever as it grew, hissed the rivet and screamed the drill....

Imagined by those who planned and built by those who were skilled with their hands, in an enormous city men built this enormous building. Deep they built it, deep into the ground; high they built it, high into the air. And now they use this building built by them. The sky scraper houses ten thousand men and women....

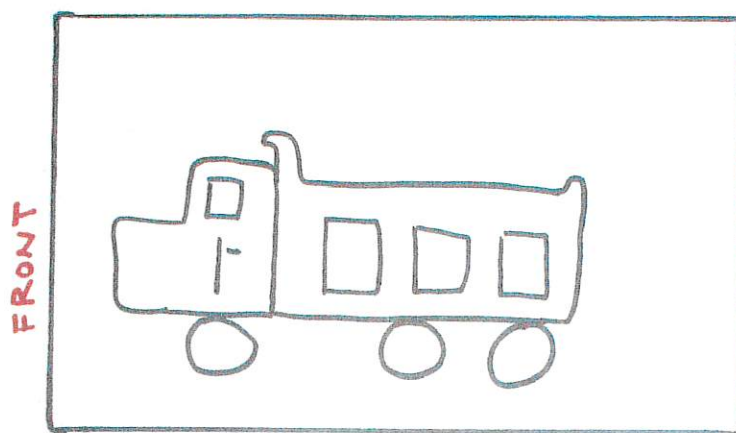
Now that it is finished, the men who walk about its feet forget how deep into the ground it reaches. But they can never forget how high into the blue it soars. Their necks ache when they throw back their heads to see to the top. For of all the buildings in the world this sky scraper is the highest.

Lucy Sprague Mitchell

From *The Sky Scraper* (excerpts), pp. 244-248.

Appendix K

SOUND and MOVEMENT: card



BACK

Dump truck

*Appendix L***SOUND AND MOVEMENT: poem 1****CONSTRUCTION**

The giant mouth
chews
rocks
spews them
and is back for
more.

The giant arm
swings up
with a girder
for
the fourteenth floor.

Down there,
a tiny man
is
telling them
where
to put a skyscraper.

Lilian Moore
from *I thought I heard the city*

*Appendix M***SOUND AND MOVEMENT: poem 2****THE POWER SHOVEL**

The power digger
Is much bigger
 Than the biggest beast I know.
He snorts and roars
Like the dinosaurs
 That lived long years ago.

He crouches low
 On his tractor paws
And scoops the dirt up
 With his jaws;
Then swings his long
 Stiff neck around
And spits it out
 Upon the ground.

Oh the power digger
Is much bigger
 Than the biggest beast I know.
He snorts and roars
Like the dinosaurs
 That lived long years ago.

Rowena Bennett
From *Click, Rumble, Roar* (Lee Bennett Hopkins, ed.)

*Appendix N***SOUND AND MOVEMENT: poem 3****THE CONCRETE MIXER**


Sand, shovel and shingle
Mortar,
Round mouth rattling,
Always being fed,
Always turning,
Spits out food,
Forever hungry.
Powerful,
Noisy,
A useful tool,
Three teeth.
Stark and ugly,
Silent
At day's end.

Timothy Langley
from *The City Spreads Its Wings* (Lee Bennett Hopkins, ed.)

*Appendix O***SCIENCE and MATH: recipe**

2 tablespoons **flour** 

$\frac{1}{2}$ tablespoon **salt** 

2 tablespoons **water**, more if needed 

Mix flour and salt in the cup. 

Add water and stir.  

The mixture should look like yogurt.

Let dry.

*Appendix P***SCIENCE AND MATH: letter to families**

November

Dear families:

Our study of the construction site has been going full blast. The children have visited the site a number of times, finding out all about it by observing and asking questions. To broaden our understanding of the process of constructing a building, we have been reading books and poems, making models of construction machines, and even using sound and movement to become machines ourselves!

We are now beginning to talk about the kinds of materials that are used to make a building. Just recently, we had the chance to see the cement mixers at work. Now we are going make a mixture in the classroom (using flour, water, and salt) that will change from a liquid to a solid, just like concrete.

We are inviting family members to help us with this interesting classroom activity. It will take place on [date], starting at 9:00 a.m. and ending at about 10:30 a.m. Please let us know by [date] if you can come.

With warm regards,

*Appendix Q***SCIENCE and MATH: chart**

	Wet	Dry	Notes
Day 1			
Day 2			
Day 3			
Day 4			
Day 5			

How many days will it take our flour mixture to dry?

Write your guess here:

From the New York Public Library website:
www.nypl.org/research/chss/spe/art/photo/hinex/empire/empire.html



CLASSROOM VISIT: photograph

Appendix R

*Appendix S***CLASSROOM VISIT: photograph**

From the New York Public Library website:

www.nypl.org/research/chss/spe/art/photo/hinex/empire/empire.html

*Appendix T***CLASSROOM VISIT: photograph**

From the New York Public Library website:

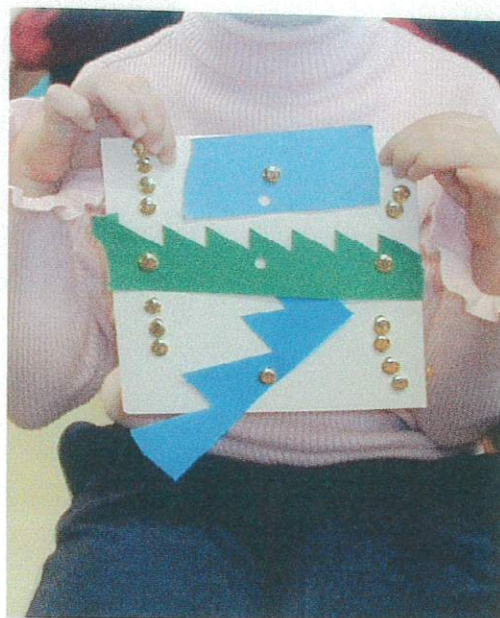
www.nypl.org/research/chss/spe/art/photo/hinex/empire/empire.html

Appendix U

WHAT IDEAS DO WE HAVE ABOUT BUILDINGS? Photographs



Cardboard and masking tape



Oak tag and brass fasteners



Cardboard, pipe cleaners, and tissue paper



Cardboard, pipe cleaners, and tissue paper

Appendix V

TRIP 5: chart

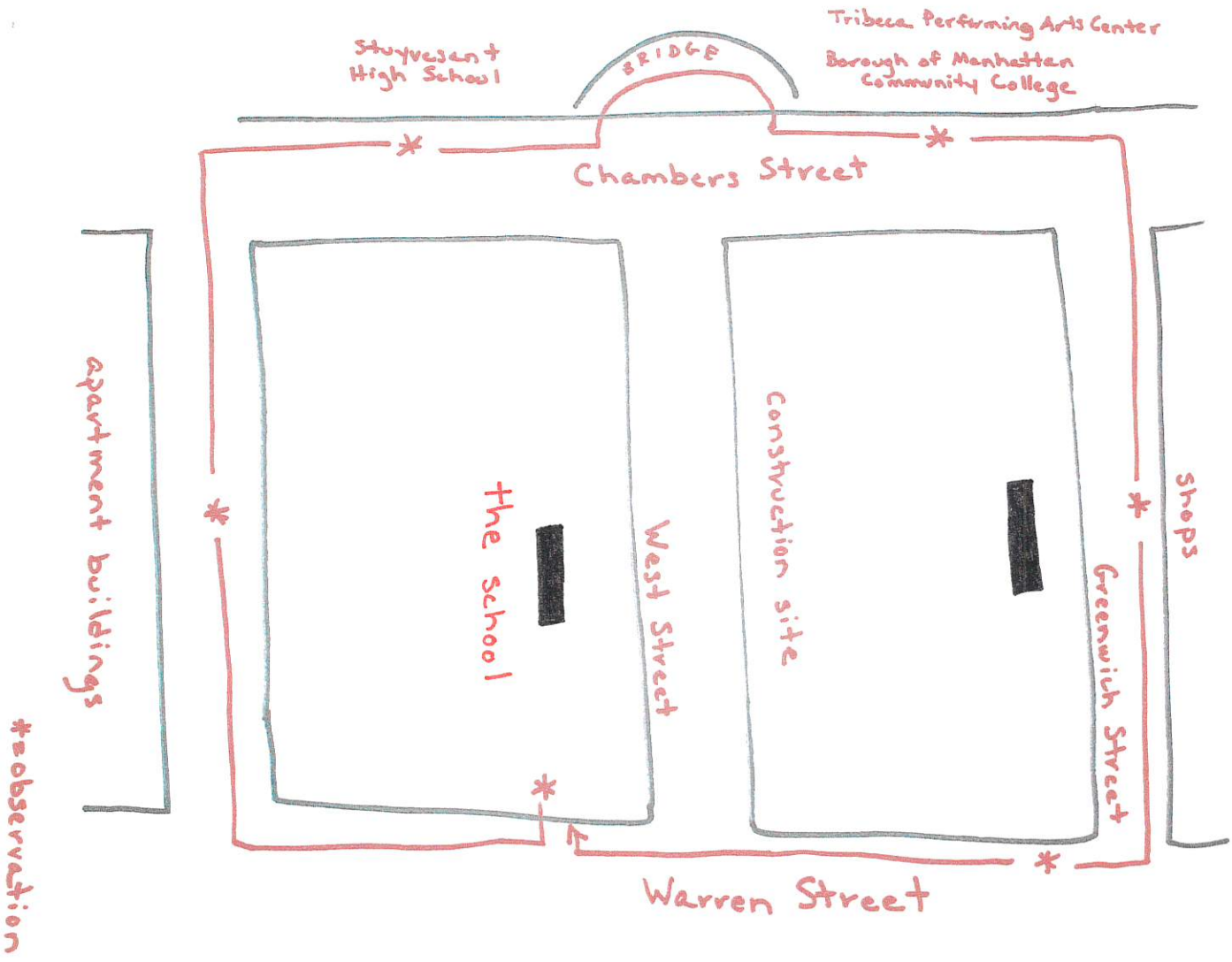
Danger

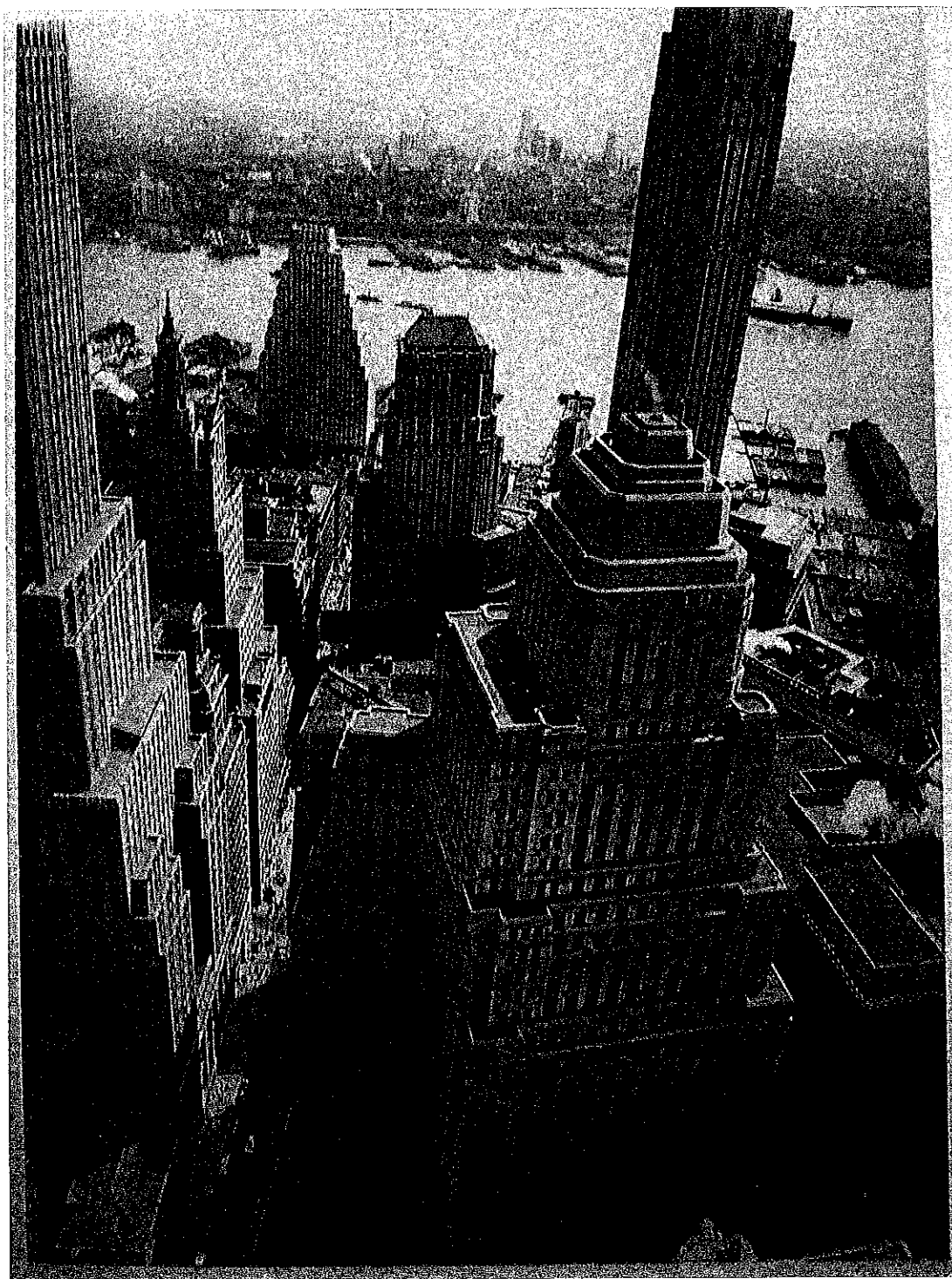
Safety



Appendix W

TRIP 6: map

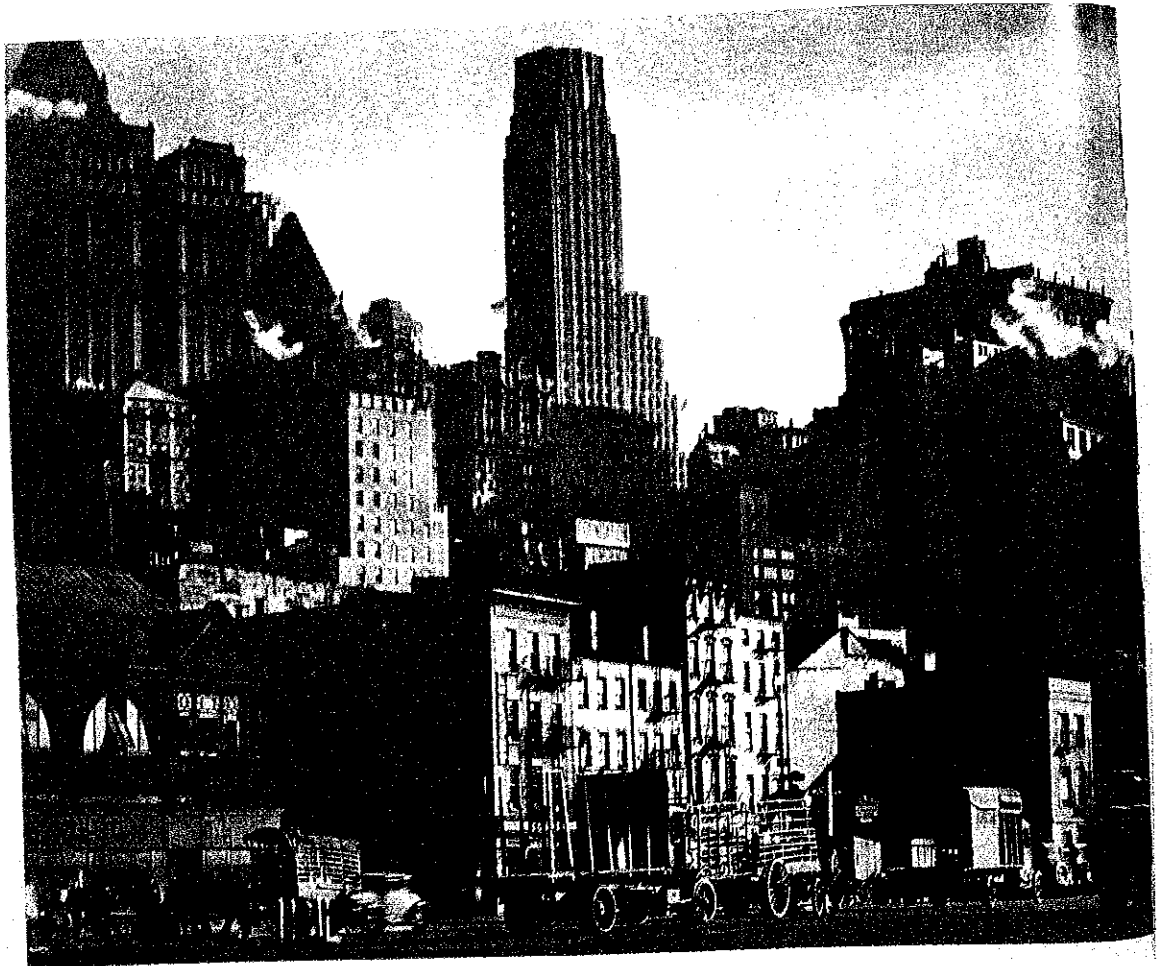


*Appendix X***TRIP 6: Abbott photo**

Lower Manhattan, view toward Brooklyn.
From *Berenice Abbott Photographs*, p. 73.

*Appendix Y***TRIP 6: Abbott photo**

Financial District.
From Berenice Abbott Photographs, p. 74.

*Appendix Z***TRIP 6: Abbott photo**

West Street.

From *Berenice Abbott Photographs*, p. 104.

*Appendix AA***TRIP 6: chart****Buildings In Our Neighborhood**

type	height	width	materials	why interesting to look at	use
apartment buildings					
schools					
theaters					
office buildings					
stores					

*Appendix BB***EXPLORING HOME: letter to families**

February

Dear families:

We have recently taken a walk to look at the variety of buildings on the streets around school. The children noticed all the different shapes, sizes, and styles of the structures, as well as the different uses. We saw schools, apartment buildings, and office buildings.

With your help, your child will now explore the most familiar building of all—home! Over the next three weeks, your child will bring home three simple work sheets for you to complete together. You will have a week to fill each one out. When your child brings the work sheet back to school, we will compile the information into graphs and charts.

Please let us know if this activity will pose any problems for your family. We will be happy to adjust the work accordingly.

Thanks in advance for your continued support,

*Appendix CC***EXPLORING HOME: work sheet 1****Think about these questions:**

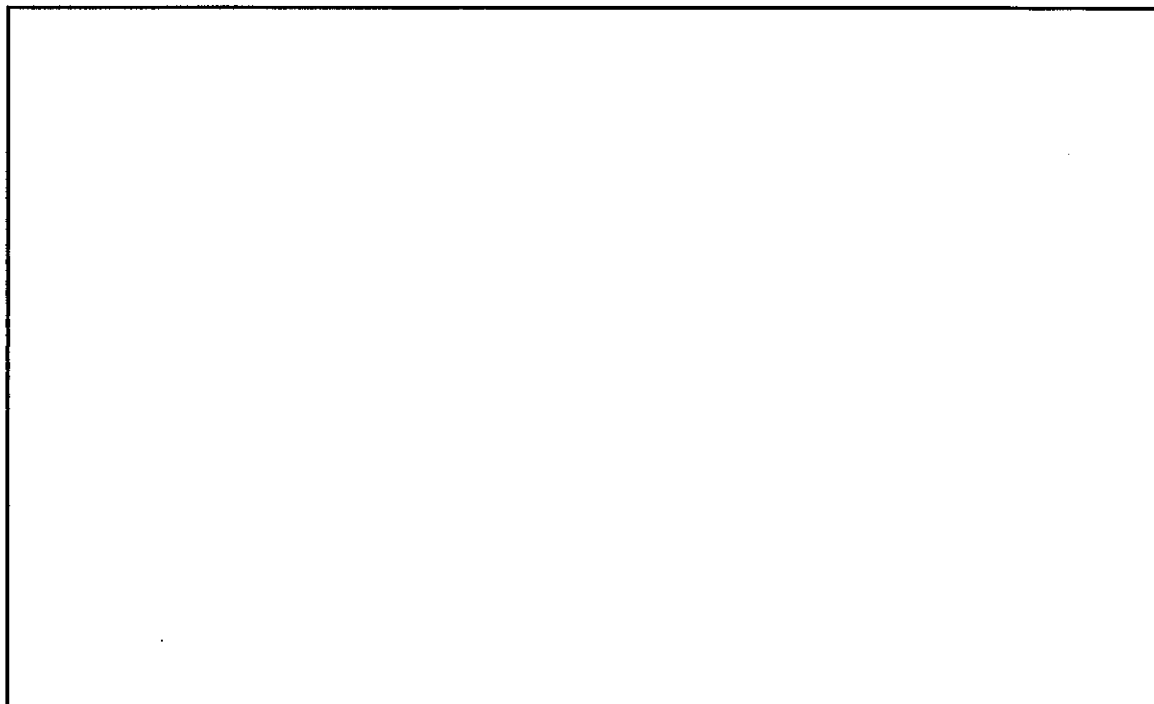
Is your building tall or short?

Is your building wide or narrow?

What is your building made of?

Then draw a picture of your building.

Use your answers to the questions above to help you add detail to your drawing.

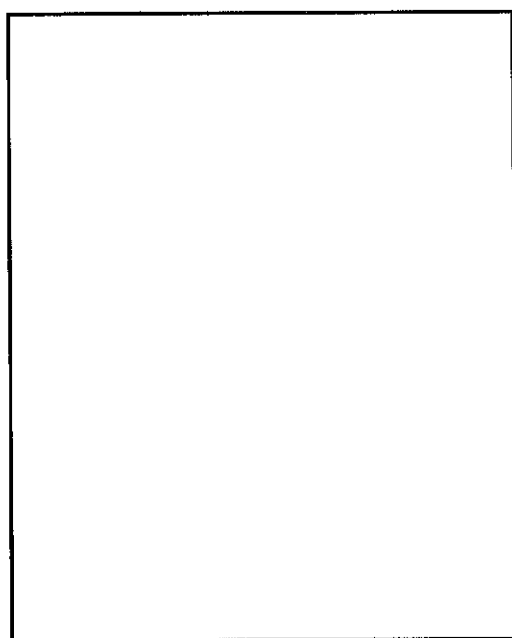


*Appendix DD***EXPLORING HOME: work sheet 2****Think about this question:**

How many doors do you go through to get from the street into your apartment?

Tell a grown-up what you need to do to get from the street into your apartment.

Draw the most interesting door in your building or apartment.



Try to think up two answers to this question:

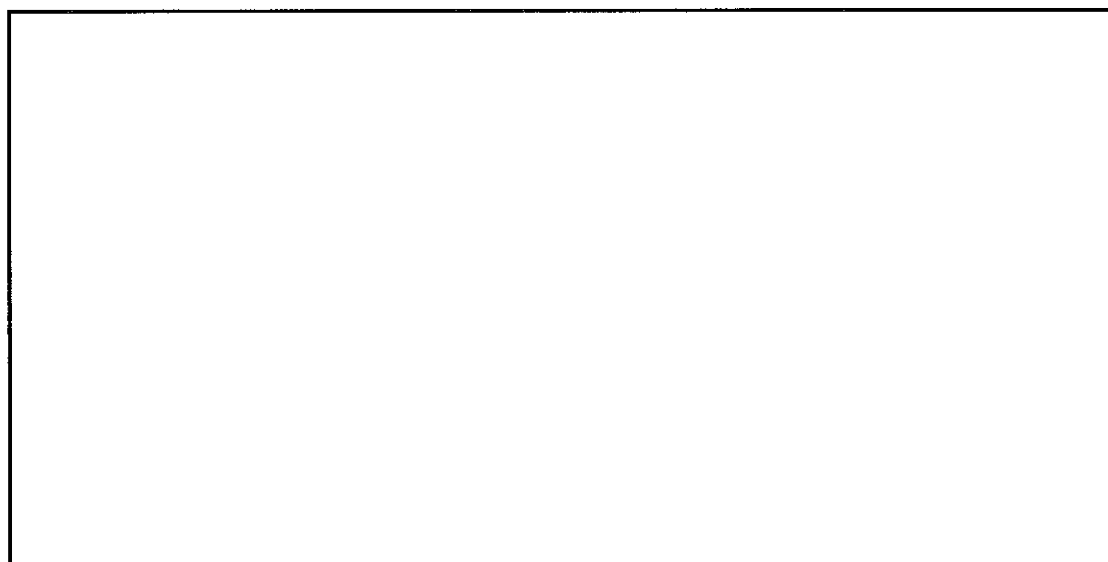
Why do buildings and apartments have doors?

*Appendix EE***EXPLORING HOME: work sheet 3****Look at your building from the outside.**

How many windows do you see?
(You can take a guess!)

Go into your apartment.

How many windows are there?

Draw something you can see from one of your windows.**Try to think up two answers to this question:**

Why do buildings and apartments have windows?

*Appendix FF***EXPLORING HOME: work sheet 1, graphs**

My Building Is...

TallShortIn betweenWideNarrowIn between

Note: Children can record data by writing their name on a sticker and placing the sticker on the graphs.

*Appendix GG***EXPLORING HOME: work sheet 1, graph**

My building is made of...

Bricks
Stone
Glass
Metal
Concrete
Other materials

Note: Children can record data by placing a sticker in the appropriate category.

*Appendix HH***EXPLORING HOME: work sheet 2, graph**

**How many doors do you go through to get
from the street into your apartment?**

1 2 3 4 5 6 7 8 9 10

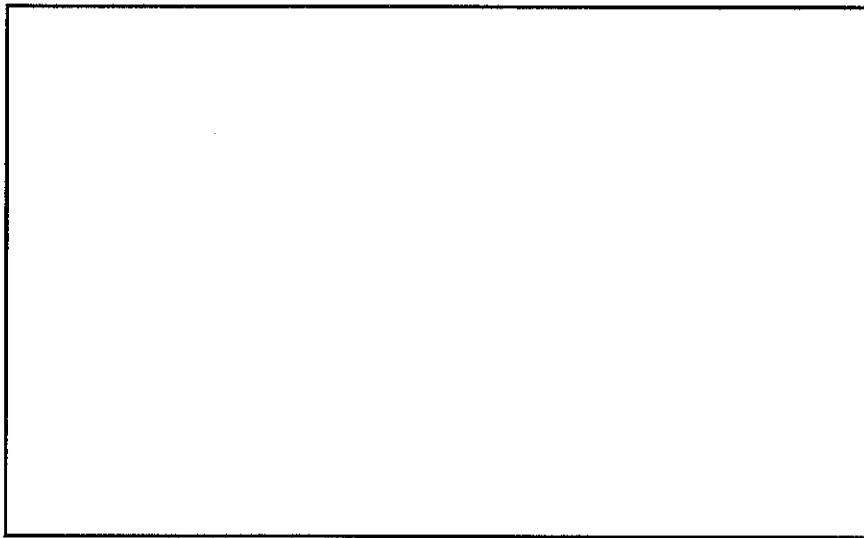
Note: Children can record data by placing a sticker above the appropriate number.

*Appendix II***EXPLORING HOME: work sheet 3, graph**

How many windows do you have in your apartment?

1 2 3 4 5 6 7 8 9 10 more

Note: Children can record data by placing a sticker above the appropriate number.

*Appendix JJ***CONSTRUCTION WORK: planning sheet****My building will look like this:****My building will be used for**

I will need these materials:

- __ cardboard __ pipe cleaners __ masking tape
__ paper __ brass fasteners __ glue
__ oak tag __ corks and other small objects

Appendix KK

CONSTRUCTION WORK: completed building



Image from promotional brochure for the condominium.

*Appendix LL***CULMINATION: letter to families**

March

Dear families:

We are nearing the end of our study of the construction site across the street. Over the past six months, we have examined the process of building a building from many angles, talking to the people who do the work, experimenting with the basic ideas behind the complexities of structural engineering, and expressing our ideas through drawings and words. We have also made many small constructions of our own—imaginative models of machines and buildings.

To bring together what we have learned about construction, we are about to start work on the creation of a large play structure for the classroom. We are making plans right now!

In the next few weeks, the children will be working in small groups, using the wood-working skills they have been practicing to build the frame of the play structure.

We are inviting family members to come in and help. Please let us know by [date] if you can join us for this activity. Then we will find a date and time that is convenient. And don't worry—you do not need to be an expert carpenter!

With warm regards,

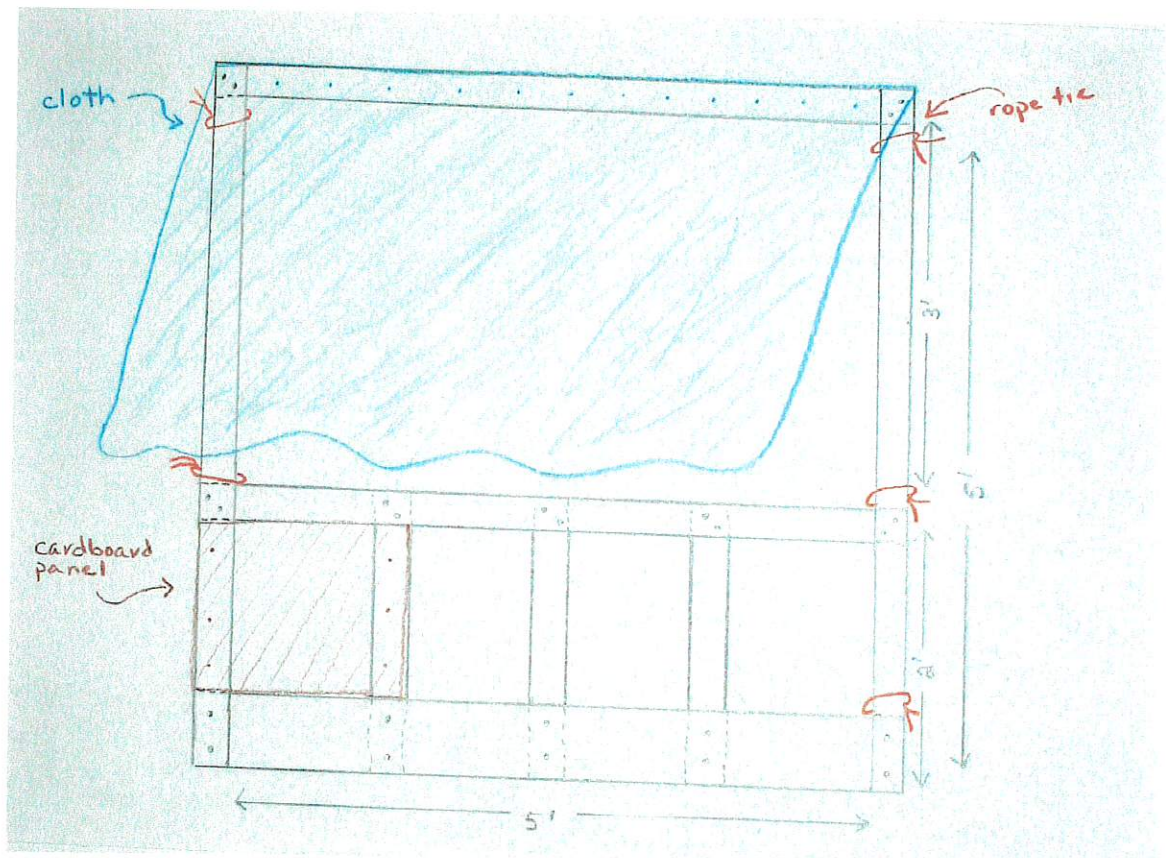
Appendix MM

CULMINATION: construction plan

Description:

This plan is closely based on the work procedure developed by Rebecca Ryan and used by her group of four- and five-year-olds to create a classroom play structure.

Four separate wooden frames will be constructed. This is the plan for each one:



When the frames are complete, they will be tied together securely at the top and the bottom of each corner to form a four-walled enclosure.

Cardboard panels can be nailed to the lower portion of the frame, with some open spaces left for going in and out. A large piece of cloth can be nailed to the upper portion of the frame and can be hooked up when children want to look out of or into the structure. Another large cloth can be draped over the top to serve as a roof. Children may like to paint the frame. Watercolors will add color and preserve the visual interest of the wood's grain.

*Appendix NN***CULMINATION: celebration invitation**

We did it!

Walls, windows, doors...
Our play structure is complete!

Please join us in the classroom to celebrate.

[date]

[time]

You and your child will have the chance
to look over the work we have done
during the course of our construction study.
Light refreshments will be served.

Please let us know if you are coming by [date].

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