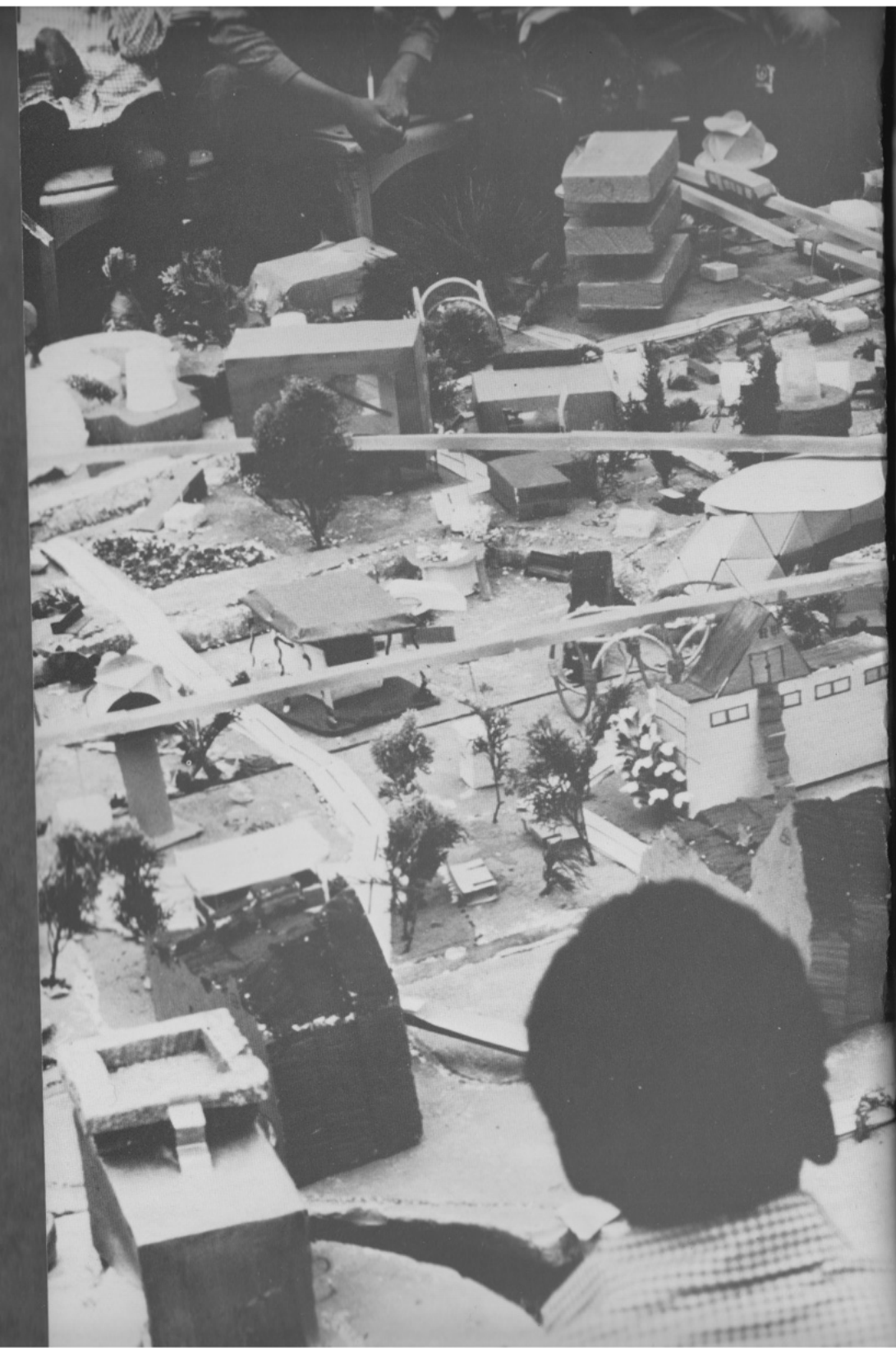


**Doreen Nelson**

**City Building Education**

*A Way to Learn*



*One of the most important and most neglected subjects of real education is that of children regarding the city environment in which they find themselves living. Can they as children have any effect on the evolution of the massive physical items surrounding them? Yes, they can. For a number of years it has been demonstrated that this subject is intensely interesting to both the children and the teens. Classes in city planning are enormously stimulated by actual designing, fabricating, and operating various building structures and, above all, by building classroom size scale models of the cities the students plan.*

*I recommend that City Building Education be included in all elementary and high school curricula.*

—Buckminster Fuller  
May 8, 1983



**Doreen Nelson** is Founder and Director of the Center for City Building Educational Programs in Los Angeles. She has taught kindergarten through university levels since 1959 including a visiting lectureship in the School of Architecture and Urban Planning at the University of California at Los Angeles. She worked as a consultant for the National Endowment for the Arts and as Artistic Director of the Children's Museum in Los Angeles. Her work in the field of education has been published widely.

**Doreen Nelson**

## **City Building Education**

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*A Way to Learn*

Written with Kirsten Grimstad

ENVIRON.  
DESIGN

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## Dedication

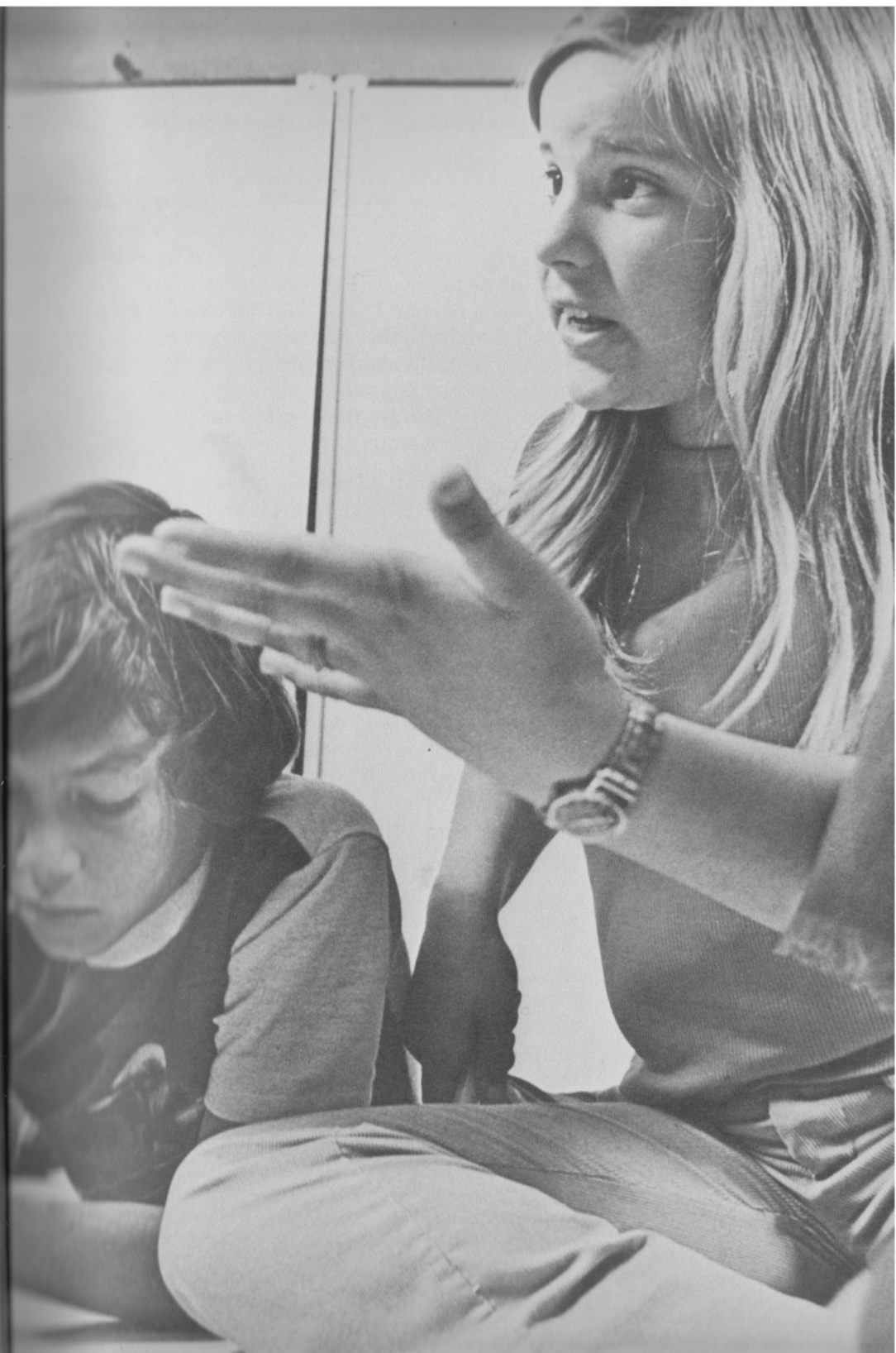
*This book is dedicated to my mother, who returned to school to get her diploma while I was still in high school and then went on with me to college. Through her example, I learned one of life's crucial lessons, namely, finishing the things you begin.*

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### What I Believe

**C**ity Building is a revisioning of basic education. It is dedicated to restoring the vital connection between the realms of thinking and doing in the learning process. By emphasizing this neglected link, the City Building approach nurtures and develops students' latent powers of originality, imagination, and invention. I regard this as the main task of education.

The concept grew out of my experience as a teacher in the Los Angeles schools – a career I began in 1959 – and my desire to uncover the essential meaning of education. Since the launching of the initial pilot study in 1969, the system has been in use in schools throughout the country and has met with enough response and success that the time has come to make the details of its vision available to a wider audience of educators. I would like to emphasize at the outset that City Building is not an alternative form of education. Nor is it another enrichment program or strategem for popularizing subject matter. Rather it is a philosophy of education based on explicit assumptions and beliefs about the learning process and the role of education, particularly in our world of today. These beliefs, articulated below, inform the substance and shape the contours of the City Building system.



All creative work requires an ability to transform that which is given and familiar into something new and original.

### *Teaching Inventive Thought*

I believe that the capacity for originality and invention – often regarded as the special province of artists, inventors, and great thinkers – is inherent in the mind of each individual. All creative work, whether it is a stunning technological invention, a brilliant theoretical breakthrough, or an improved way of organizing desks in a classroom requires an ability to transform that which is given and familiar into something new and original. City Building was founded on the belief that this ability can be taught. Developing individual creativity and encouraging students to use this skill in shaping their lives and the world – these are the two foremost items on the City Building agenda.

### *Teaching the Transformation Process*

Traditional teaching shares the aim of stimulating inventive thought, as pursued in the following manner. The student begins by acquiring information, first one layer, then the next. Then, it is hoped, at some point usually well advanced down the line, a critical mass forms which mysteriously triggers an ability to synthesize the accumulated store of information into original ideas. This is the traditional hierarchy of learning, leading from basic knowledge to the realm of pure invention. The flaw in this design is that only the very gifted students ever reach their apogee. The rest are left plodding methodically through lesson after lesson, often developing a dislike toward learning in the process.

The City Building approach reverses the traditional hierarchy by training students first in the skill of inventive thought from which the basics are derived. In its basic features, this learning involves practice and familiarity with the steps in the process of transformation which lies at the heart of the creative process. This is the essential original contribution City Building offers to education. It teaches students to take any given “thing,” whether that be an object, an organization, or an idea, and transform it into



something new by altering its size, scale, role, function, direction, its dimension in space or over time.

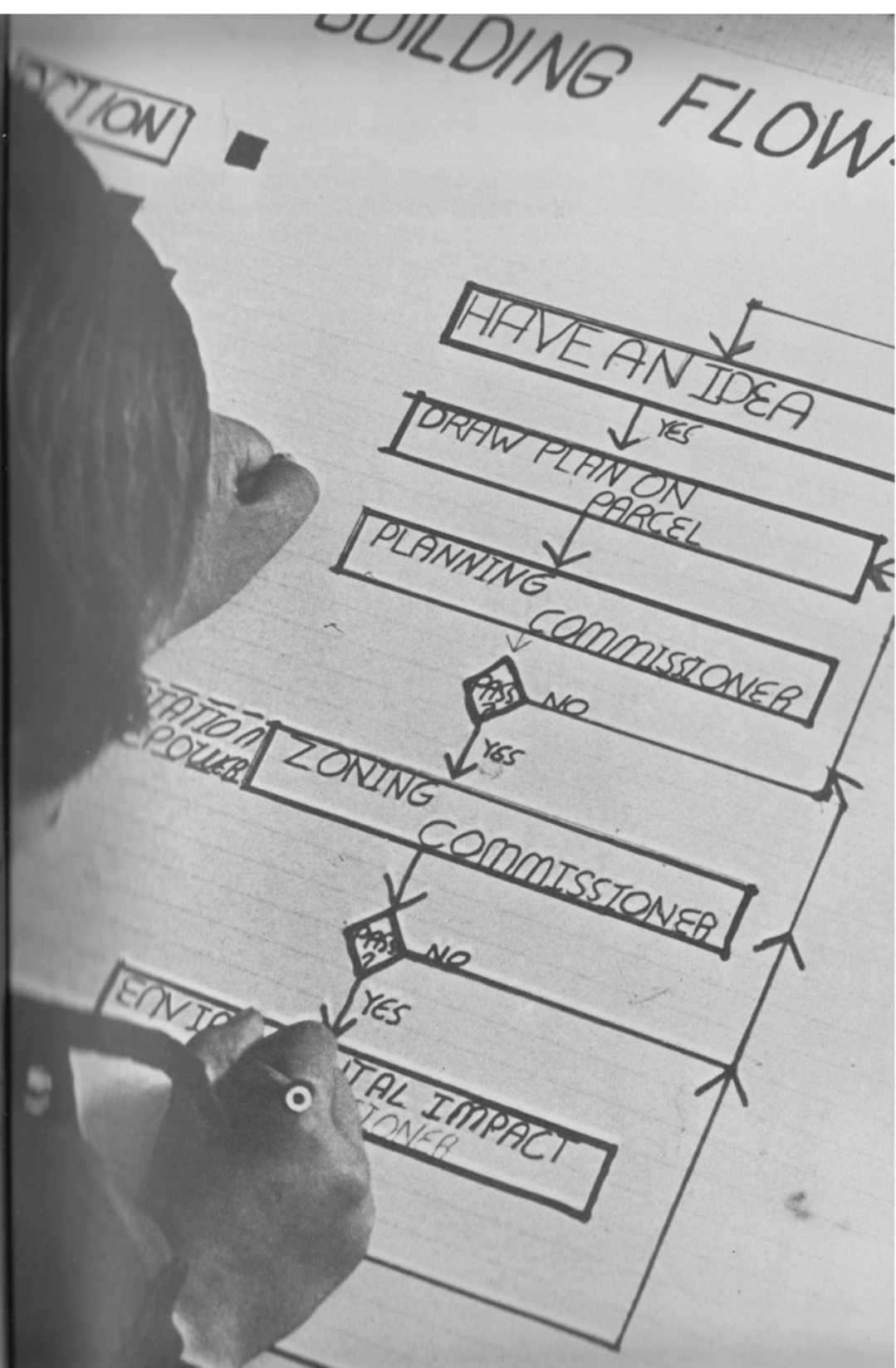
These changes, either singly or in combination, comprise what is called an intuitive leap. City Building takes the mystery out of the intuitive leap and presents its components to the students systematically. The course of study begins with simple transformation of objects to transformation of organizations and social relationships, ultimately synthesizing both of these in the transformation of the community and environment.

**The miniaturized city gives the students power over the usually unseen whole.**

Through this process, students are guided to “discover” for themselves the information and basic knowledge required for the execution of their ideas. In other words, the City Building system provides a relevant context in which basic learning takes place. By focusing on inventive thought, students automatically receive their basic education as well. The reverse is not true. A focus on basic skills does not necessarily lead to invention.

#### *The City as a Context for Learning*

The vehicle through which this learning occurs is a scale model of the students’ own city or community, projected into the future and constructed in the classroom as the central learning activity. We define a city as any group of people organized to live together, using outside goods and services. The scale model community can be urban, suburban, or rural. We use the city, in the larger meaning of the word, because it serves as a teeming microcosm of civilization. The miniaturized city gives the students power over the usually unseen whole, which, in turn, provides a dynamic context within which countless topics of learning can be studied in their interconnection and relationship to that whole. For example, a model city that is (hypothetically) located on an earthquake zone must have buildings constructed to withstand the stress of tremors. Otherwise people get hurt and die. The city planners (namely, the





The model city stands as a tangible and constant reminder of the vital bond between classroom life and community life.

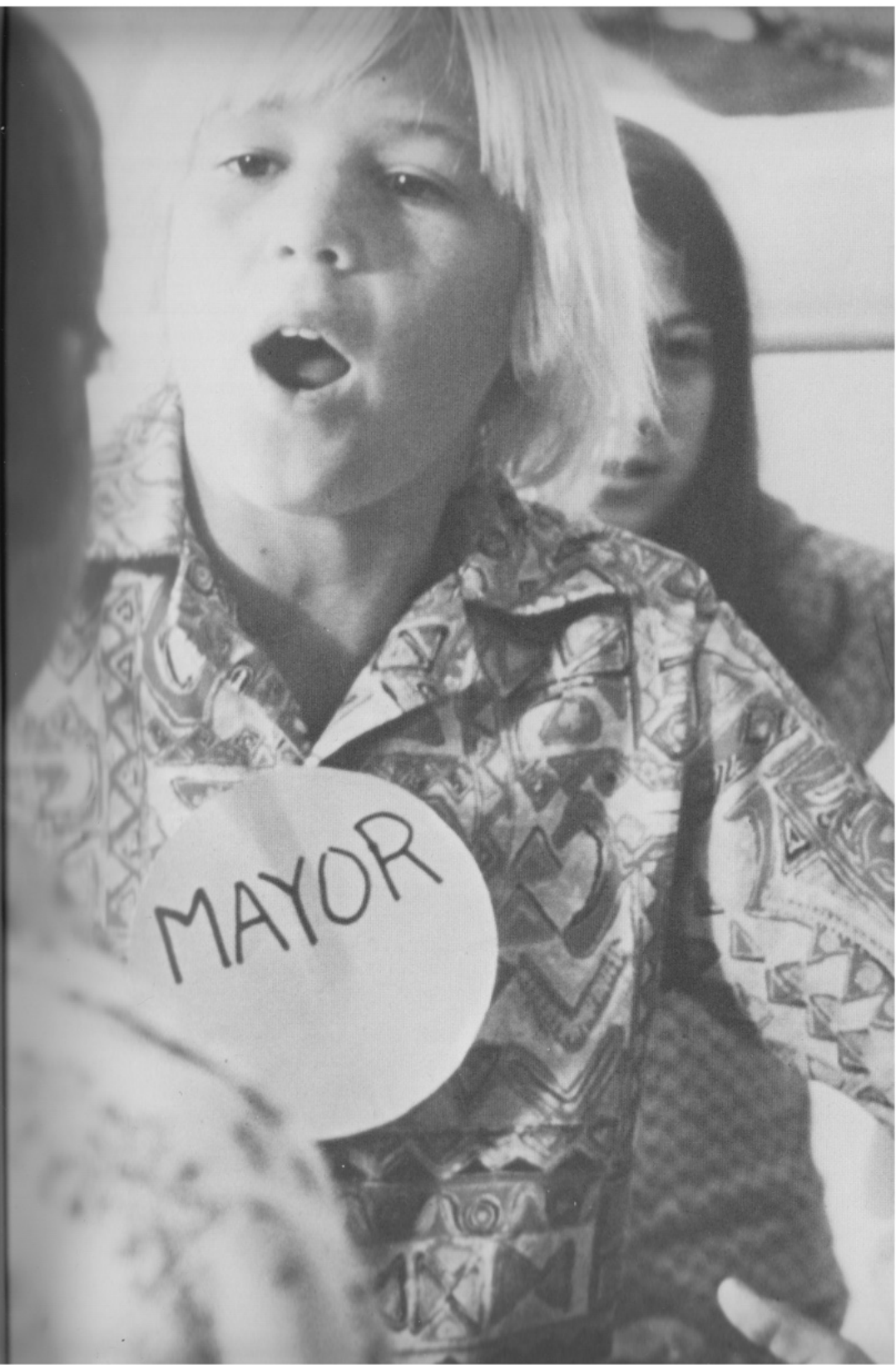
students) are responsible for protecting the city's inhabitants in case of such disasters. Therefore, earthquake-proof construction techniques must be utilized. Professional architects are called in to advise the planners on proper methods. Building codes must be established and enforced. In this example, geology, municipal planning, architecture, and construction are suddenly experienced in their profound relevance to one another. Just as in community life outside the classroom, the model community vibrates with causally connected issues and events occurring simultaneously. With the sparking of such interconnections, knowledge springs to life. The city as a microcosm of society transcends all grade levels. It can be used over and over again, each year, changing as the classroom needs change, focusing now on industrial issues, next time on marine biology, then again on health care or agriculture and food distribution, government, law, transportation, *ad infinitum*.

The model city stands as a tangible and constant reminder of the vital bond between classroom life and community life. Without this connection, I believe that learning becomes vapid and meaningless. More than eighty years ago, John Dewey stressed the significance of this link for the learning process. In his treatise "My Pedagogic Creed," he stated:

*I believe that education is a process of living and not a preparation for future living.*

*I believe that the school must represent present life—life as real and vital to the child as that which he carries on in the home, in the neighborhood, or on the playground.*

*I believe that much of present education fails because it neglects this fundamental principle of the school as a form of community life. It conceives the school as a place where certain information is to be given, where certain lessons are to be learned, or where certain habits are to be formed. The value of these is con-*



*ceived as lying largely in the remote future; the child must do these things for the sake of something else he is to do; they are mere preparation. As a result they do not become a part of the life experience of the child and so are not truly educative.*

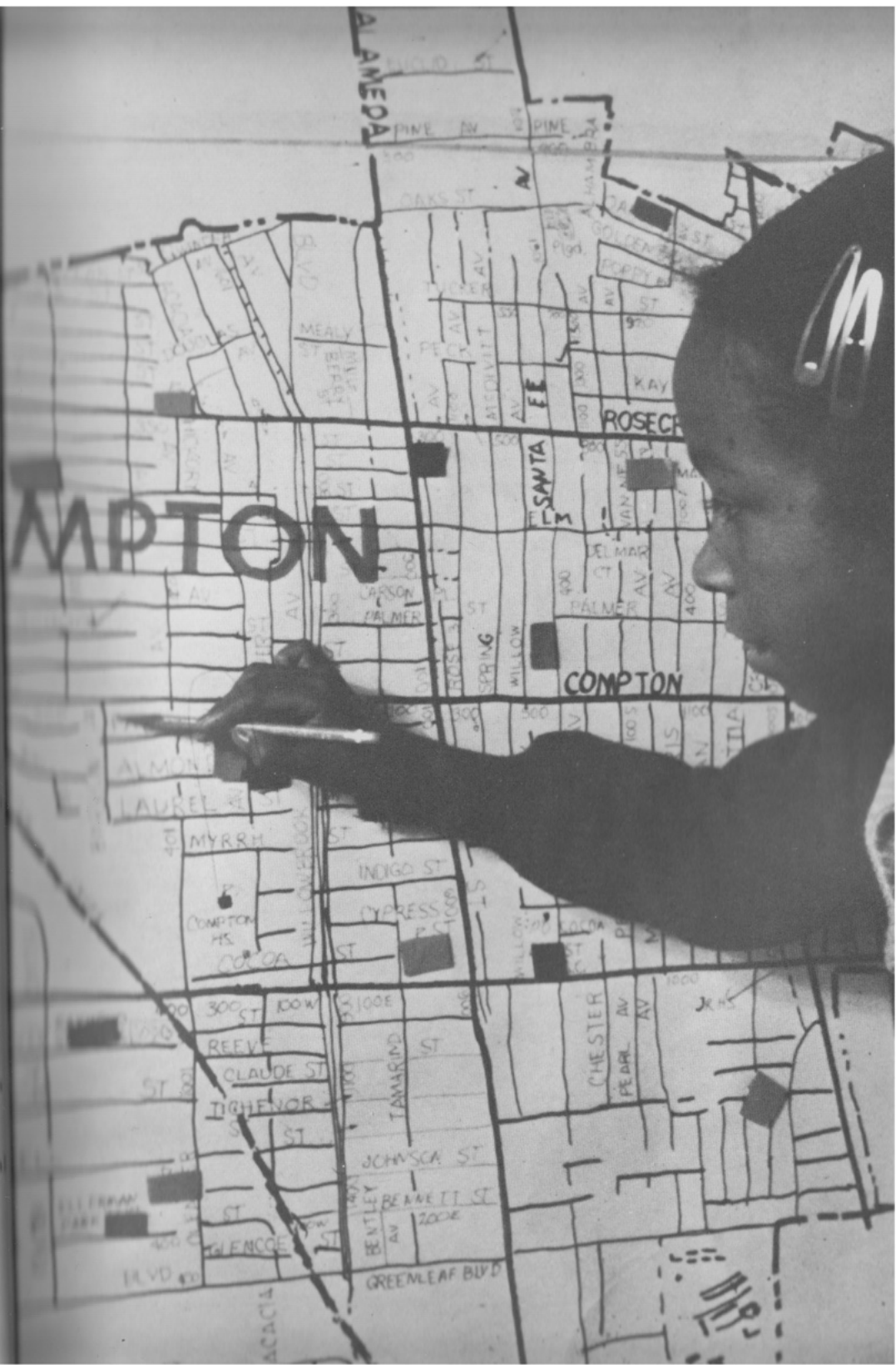
Dewey's criticism holds true today — perhaps now more than ever — with the sad result that students forget fifty percent of what they have learned within one year and eighty percent in just two years. City Building addresses the ephemeral nature of traditional learning. Through the microcosmic community created in the classroom, complete with government, postal system, property ownership, zoning regulations, stock exchange, monetary system, and so on, learning acquires a certain vividness, which, in turn, has been found to leave a lasting impression on the mind of the learner. Furthermore, projecting the mini-city into the future requires the students to create something new, not merely replicate what already exists. This aspect — designing for the future — constitutes an essential departure from Dewey.

### *Three-Dimensional Learning*

The vividness of the learning experience is reinforced by what we call the three-dimensional nature of the classroom work. Traditional learning is almost exclusively two-dimensional; students read books, hear teachers speak, sometimes see movies about aspects of life that take place outside of the classroom. The learning process is therefore almost entirely abstract and intellectual. The material, physical, and concrete dimension of learning is left out of the process.

In a City Building classroom, concrete experience is itself the vehicle for learning reading, mathematics, history, geography, and so on. Subject matter comes off the page and into the classroom where students work with it in three-dimensional form, giving it visual, spatial reality. This extra dimension is crucial on many counts. First, it helps develop the visual abilities of those students who are predominantly

Subject matter comes off the page and into the classroom where students work with it in three-dimensional form.



verbal while, at the same time, validating the abilities of visually-oriented students who are often at a handicap in traditional classrooms. Second, the three-dimensional model is both a product of design and a tool for designing. Students can try out and refine their ideas by manipulating things on the model. In this way, the model gives concrete form to the thought process itself.

Third, the spatial dimension forces the subjects of learning to be understood in context, in their relationship to other issues. Designing and implementing a transportation system, for example, involves questions of housing patterns, commercial zoning, noise and air pollution, traffic safety, traffic flow, and on and on. Unresolved conflicts acquire a tangible presence in the model city - the freeway turns out to be too close to the park, polluting the picknickers and endangering the safety of toddlers. This emphasis on context distinguishes the City Building approach from a traditional approach that may allow for an occasional day of hands-on learning.

The benefits of three-dimensional learning are vast. With the rapid advance of our technological, media dominated civilization, a certain dimension of life experience has eroded. In the old days, particularly before urbanization and the advent of the mass media, the two-dimensional nature of school learning was richly supplemented by life experience outside of school. Students would go to school to learn reading, writing, and arithmetic while outside of school they would experience the cycles of life by watching calves and lambs being born. Or they would find out about the relationship between climate and agriculture by participating in the fall harvest.

Students today fill much of their after-school time with TV, movies, video games, and other two-dimensional activities. This results in a flattening

**The spatial dimension forces the subjects of learning to be understood in context, in their relationship to other issues.**



out of knowledge. Life is not experienced directly but only seen in representation. I believe that it is essential to reinstate the material world in the process of learning and that it is up to the schools to take the initiative.

This type of involvement in the subjects of learning produces a far deeper understanding of basic subject matter than abstract learning can achieve. Beyond that, it also equips students with essential tools for living, particularly the ability to work with others in order to resolve conflicts, make decisions, organize resources, advocate ideas, assume and share responsibility, and create their own culture.

*Giving Shape to the Future in the Present*

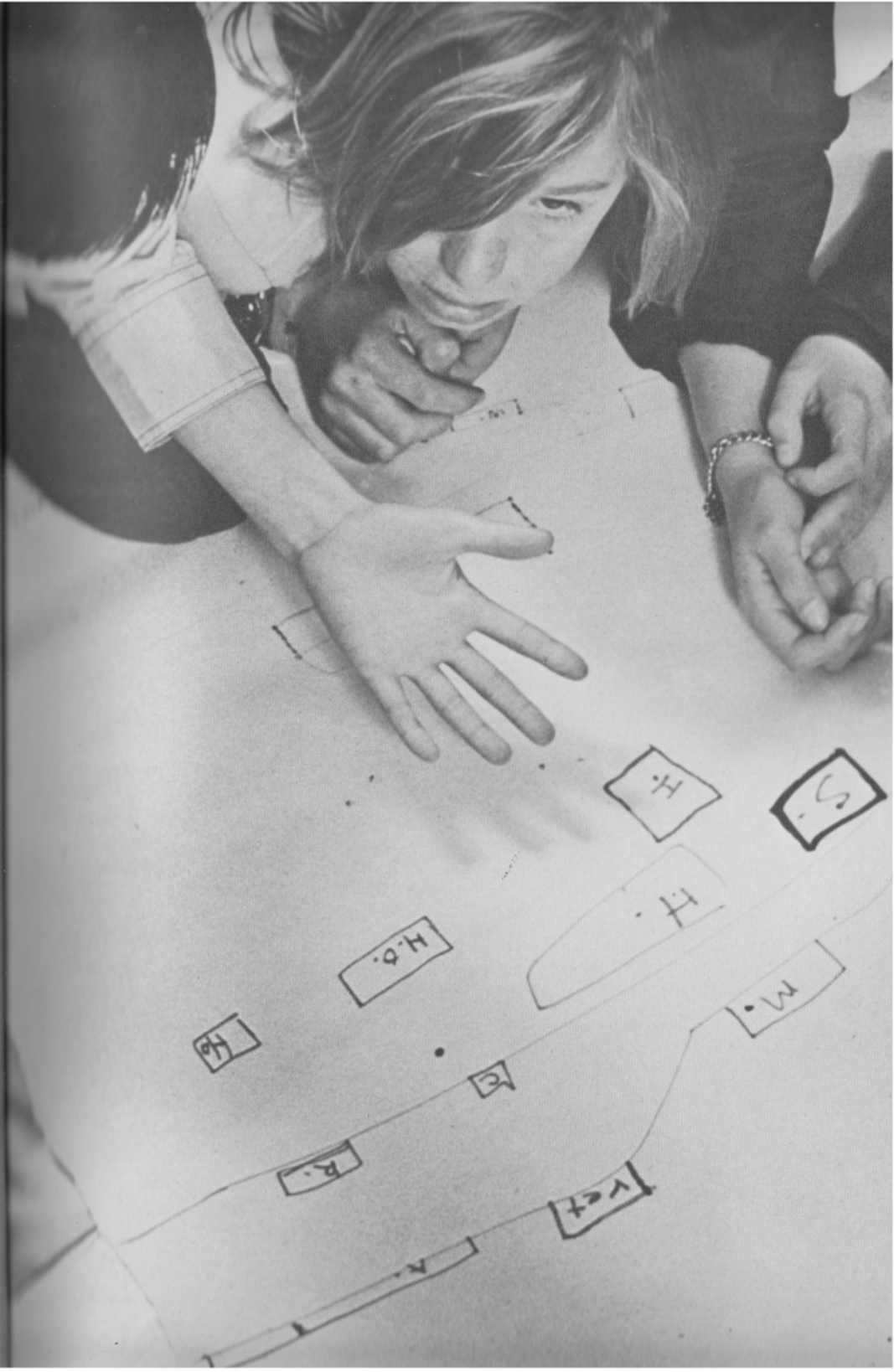
City Building also includes the dimension of time in the learning process by projecting the model city into the future. Of course, there is no textbook for the future, no authoritative work or person who can say, "this is right," or "that is wrong." Pedagogically, this fact shifts the emphasis from the product to the process of learning. The central issue becomes "how do I get the information I need to carry out my plan," not "do I know the correct answer." The effect is to encourage self-reliance and discourage dependency on authority figures. Ultimately, students learn to go to the teacher and other authorities for information but not for approval. They develop what Jerome Bruner calls courage of taste, that is, a confidence in one's own intuitions about what is good, what is beautiful, what is moving, and what is tawdry. It is this inner confidence that guides students not only in planning their community of the future but also in deciding what career path to follow, what to do with their time, and how to live their lives.

The model city also stands as tangible evidence that the future coexists with the present to the extent that our action or inaction today influences the shape of tomorrow. Students find out that by applying the



ability to transform and invent to their model community, they can determine the course of their community's future. Whatever needs they perceive in their present environment - e.g., clean air - provide grist for the mill of the imagination as they devise new and original approaches to chronic social concerns. Through their participation, the model city ultimately represents their ideal vision.

In this way, City Building fulfills my vision of education as social reform. The experience of conceiving and realizing a social vision fosters the spirit of community participation in the learner. I believe that students trained in their creative powers are less likely as adults to become helpless victims of intractable circumstance. Instead, they acquire the ability to take charge of their lives, their communities, their environment and become active creators of their world.



## Background

The City Building method has now been in use in public schools for well over a decade. Like most social innovations, its vision emerged at the intersection of educational theory—particularly the ideas of John Dewey, Hilda Taba, Benjamin Bloom, John Guilford, and Jerome Bruner—and personal experience, namely my previous fourteen years of teaching both children and other teachers in the Los Angeles schools.

### *Dreams and Frustrations*

In many ways, my dreams and frustrations as a teacher parallel those of my colleagues. Simply stated, most of us go into the field of education out of a deep-seated desire to benefit our pupils' lives by equipping them with the tools of knowledge they need in order to get by in the world and live satisfying lives.

It is by now a tediously familiar complaint that the traditional classroom does not nurture these idealistic intentions. Instead of equipping pupils to deal with life, I found myself teaching them to be imitators and replicators of knowledge conveyed in a rote manner. I was not challenging their minds to work imaginatively with the products of learning. I was not challenging myself to "truly educate" my pupils in Dewey's sense; I was too busy trying to get to chapter six on schedule and make sure I had "covered" all the material, all the while struggling to involve the parents, cope with administrative



demands, and so on and so forth. In a nutshell, I felt overburdened, isolated with my problems, and powerless to solve them. My students yawned. I yawned. Together it seemed that we were trapped in a numbing program that consistently fed the mind with facts without stimulating its ability to transform factual knowledge in everyday experience. The awareness of this growing malaise produced a search for new techniques – law-related education this year, new math the next – none of which addressed the underlying problems.

**Artists, designers, and inventors take something known and familiar and turn it into something original.**

My frustration with learning echoed my feelings about larger social concerns, specifically, the absence of human values in social planning. Like many of my contemporaries, I felt angered by the lack of a rapid transit system in Los Angeles and the dependency on polluting, congestion-creating automobiles. I hated the hideous conformity of tract houses and the fact that low-income housing was destroyed to make way for a baseball stadium. I wanted to know why there were no parks, bicycle paths, provisions for child care for working parents. Instead we have smog alerts, toxic waste pollution, and the lethal presence of nuclear reactors (located on earthquake faults) and missiles. I felt helpless and victimized by social circumstances that seemed beyond my influence or control. Why didn't They do something?

Upon reflection, it dawned on me that the vague, omnipotent They, on whom I heaped blame for our social malaise, were none other than myself and every other citizen who passively accept the deterioration of our world. The sense of powerlessness I felt as an educator and as a citizen effectively masked the actual power I had/have to shape both my work and my world.

#### *Thinking Like an Artist*

My admiration for artists sparked this realization. Artists, designers, inventors all work in the area of transformation – taking something known and familiar and turning it into something original, according



to their vision. Often the medium is a material such as raw stone shaped into sculpture. In fact, anything can serve as a medium for the creative process. Tchaikovsky, for example, expressed a world event – the War of 1812 – in a musical overture. At the Constitutional Convention in 1787, the founding fathers of our country produced the Constitution of the United States and the Bill of Rights, the creative product of their combined social-political vision.

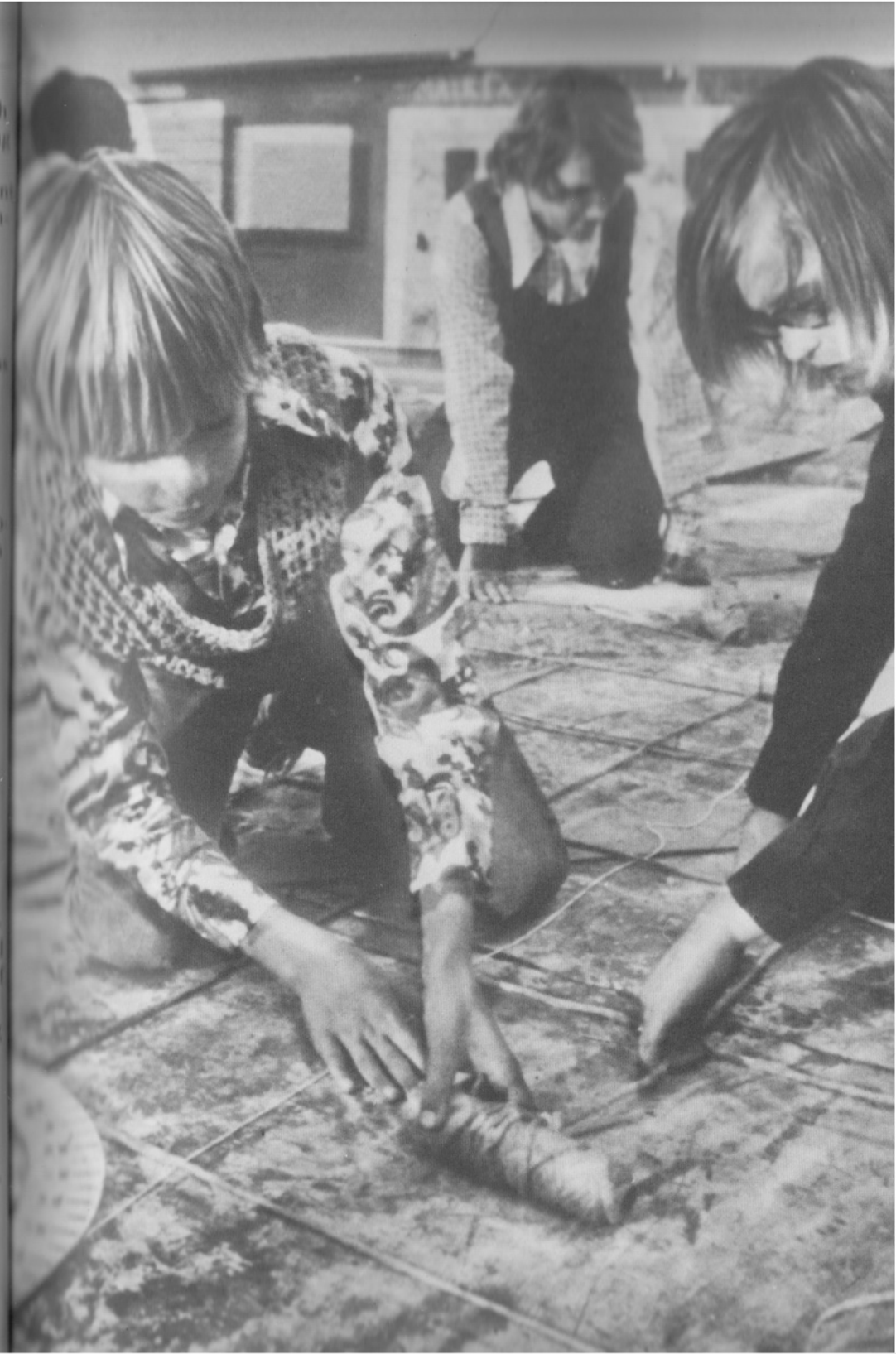
**The spark that produces great art and thought is a state of mind that is available to all people.**

In countless less-dramatic ways, the creative process that produced the 1812 Overture and the United States Constitution is at work in the daily lives of all people – athletes, gardeners, journalists, cooks, office managers, therapists, mothers, magazine editors, restaurant owners, educators, and so on. The point I am making is that the spark that produces great art and thought is a state of mind that is available to all people. And it is this same state of mind that can empower individuals to affect their lives and their culture just as artists and inventors transform materials.

With these thoughts in mind, the task of education suddenly seemed clear: to teach students to think like artists.

In exploring how to go about this challenge, I remembered the work of educator Jerome Bruner. Bruner talked of the intuitive leap as lying at the heart of the creative process. Bruner regarded the intuitive leap as a mysterious, uncharted activity of the mind. Though I disagreed with Bruner's understanding of the creative process, his language tipped me off. The challenge was to uncover the mystery of what happens during an intuitive leap. I found myself delving into this uncharted territory, seeking to demystify it.

Through my acquaintance with artists, designers, composers, and architects I began to uncover the logic behind the intuitive leap that Bruner found so mysterious. I found that each act of creation is asso

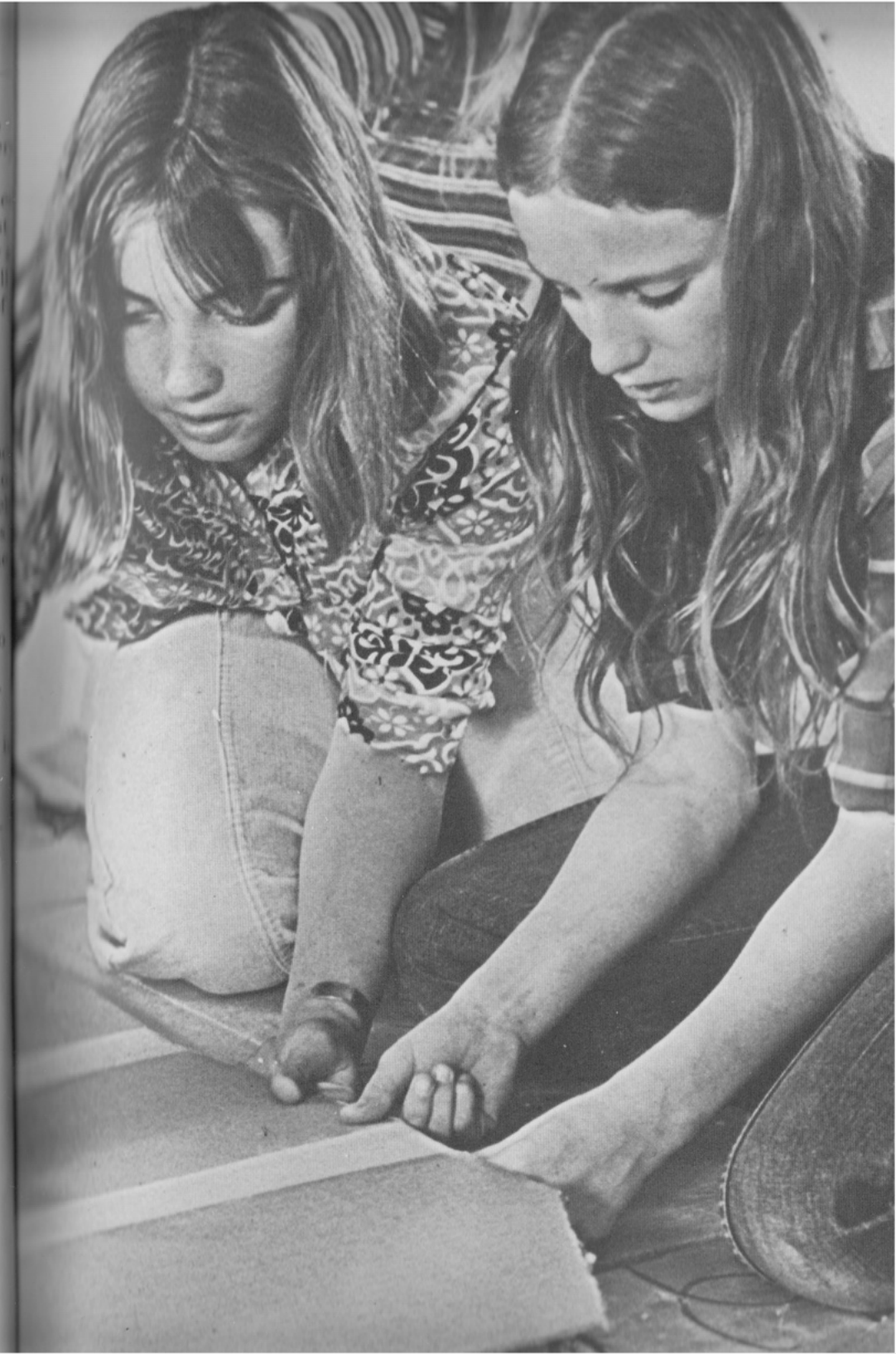




ciated with certain changes – changes in size, scale, function, role, direction in time or in space. At a very simple level, glasses filled with water become a musical instrument, two orange juice cans connected by a string become a primitive telephone. The most complex invention or work of art is ultimately only a refinement of this basic process. Practice in the skill of making such changes became the focal activity of City Building.

Before filling in the details of how City Building works in the classroom, I would like to emphasize that since the initial pilot study in 1969, the model has been continually reevaluated and refined. In fact, central to the principles of City Building is the notion that feedback produces change, and the system itself is no exception to this rule. The original model was first developed through a series of workshops at the Smithsonian Institution in 1971 and 1972. The term “City Building” was first coined there to refer not only to the physical aspects of urban living, but also to the invisible fabric of social, political, and economic relationships as well. In 1974, the Center for City Building Educational Programs was founded. The Center continues to lead intensive workshops in which primary and secondary teachers (and some college-level instructors) learn the philosophy and practice of City Building. With the active participation of teachers, administrators, university departments of education, City Building has become a dynamic context for research into the nature of learning.

**Each act of creation is associated with certain changes – changes in size, scale, function, role, direction in time or in space.**



## How It Works

The focus of the classroom work lies in constructing, evaluating, and refining the mini-city of the future. Before actually identifying community boundaries, parceling out land, and erecting the buildings the students are guided through a series of overlapping activities which enable them to see themselves and their environment as mutable entities. The charted path leads through four phases, from an introductory phase designed to reveal what information students are bringing to their work through three phases of transformation activities. Following the introduction, Phase One explores the individual relationship to objects, with an emphasis on transforming their size, scale, and function. Phase Two explores the individual's relationship to organizations, stressing the transformation of function and role. Phase Three integrates the two former phases in the transformation of the community and environment.

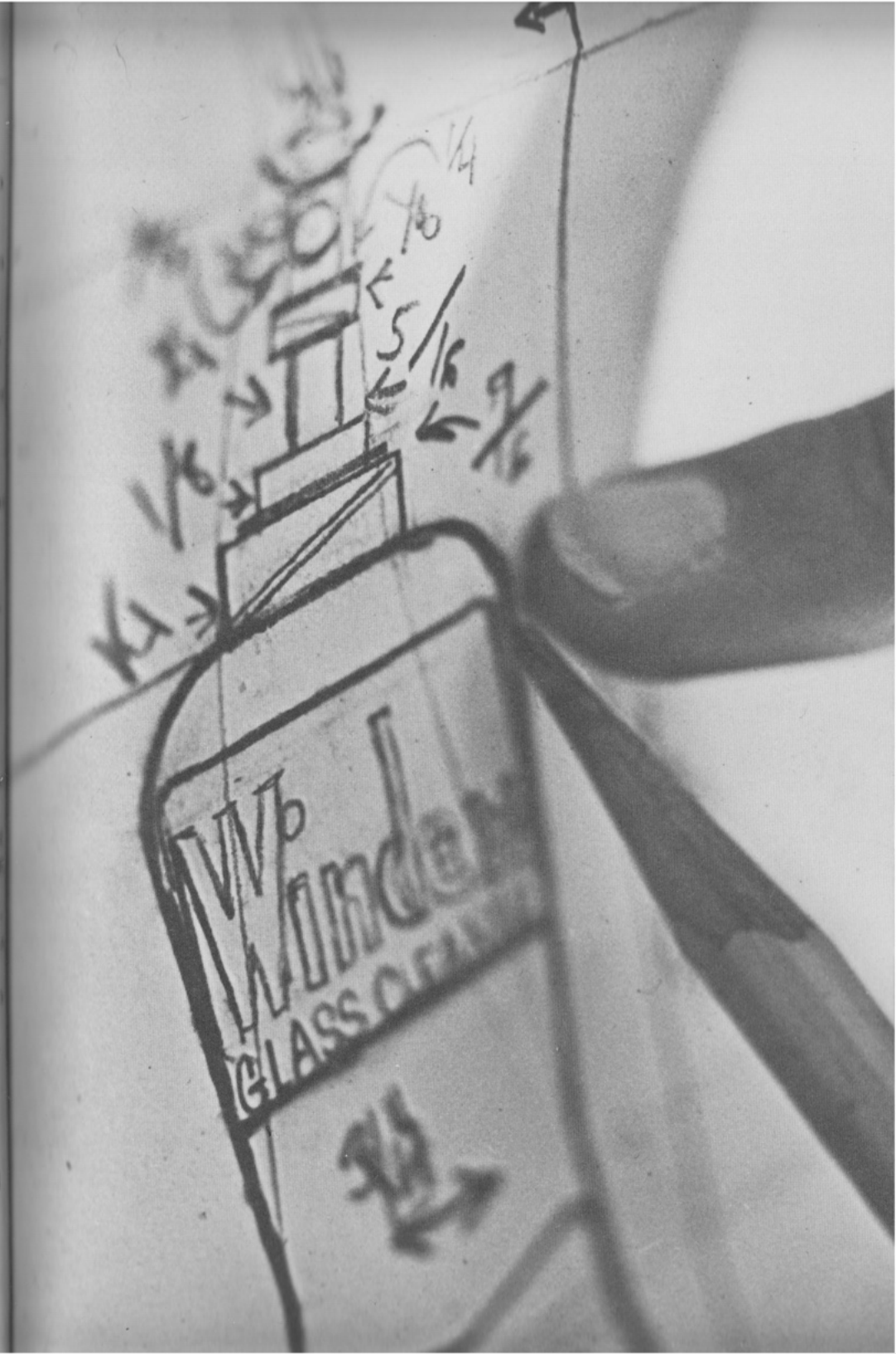
Although these phases of activity are of necessity presented sequentially, it is important to realize that in the classroom activities the different phases can and do occur simultaneously. Exercises in object transformation can take place at the same time as the mini-city is being designed. At the same time, the phases are additive, moving from simple to complex levels of understanding.



I'd like to emphasize that throughout this process, basic skills are acquired in a traditional manner – presented, drilled, and tested for recall according to standard teaching methodology. The difference is that in the City Building system, learning flows organically from the need to know to the application of the knowledge, not mechanically according to what's next on the lesson plan or which chapter follows. As part of the discussion and evaluation of the City Building activities, the teacher guides the students in identifying what they need to know in order to proceed with their designs. Then the students research the required information and study the skills they need. At that point, they apply their new skills and knowledge to the design of the model. The need to lay out a street plan, for example, requires an ability to recognize and work with parallel lines (and perpendicular ones, for that matter). After the concept has been learned, the students use this concept in laying out the streets on the model. In this way, the meaning of parallel lines is extended from abstract understanding to concrete experience.

Specific City Building tools facilitate this transition from the abstract to the concrete. These include drawing as a form of communication, setting *criteria* at the outset of each activity so that the finished product has a reference point for evaluation, writing *lists* and organizing ideas and information according to importance, producing *flow charts*, categorizing and displaying information on *drawings, charts, calendars, graphs, diagrams, maps, matrices, floor plans, prototypes, and display boards*. The *composite* is a technique used for inventing many forms by combining ideas, materials, and styles from disparate realms, e.g., a Japanese-style house that has a mansard roof, Victorian windows, and a Russian-style doorway. The *history wall* records the events and activities of the class, providing a sort of three-dimensional cultural history period. *Experience reports* describe students' feelings about events and

step-by-step -  
empirical  
testing.



objects they are transforming. *Town meetings* occur regularly as a way for students to express their feelings orally, develop group consensus on decisions, make and follow agendas, and resolve conflicts. The three-dimensional *models* show not only how things do look, but also how they might look.

#### *Introductory Phase*

The introductory phase begins with the students responding to the question, "Who Am I," to begin to establish the sense of personal identity students will bring to their own and collaborative class work. Then, to expose what they know of their environment, students draw maps of the major features of their community—landmarks, streets, significant buildings, vegetation, etc. The individual maps are then combined into a larger community map that reflects each student's community concerns. The community map indicates the location of each student's home as a way of furthering a sense of personal identification and of graphically illustrating where each student lives with respect to the others.

Another activity builds upon this incipient community knowledge to explore the notion of values. Students draw or photograph what they consider to be the "good" and "bad" aspects of their environment and list the reasons for their judgments. This exercise provides a basis for talking about the relativity of values. One student who lives in an outlying neighborhood regards the freeway as "good" because it enables her and her family to get where they want to go quickly. To the boy whose house is right next to the freeway, the freeway is "bad" because the noise, pollution, and danger of speeding cars dominate his experience. This activity helps students to appreciate each other's point of view. Ultimately, in building their mini-city, students will have to negotiate and resolve these differing values.

Early on students get to try out their knowledge in what is called instant city building. This activity is

**The three-dimensional model shows not only how things do look, but also how they might look.**



designed to help identify students' preconceived notions and to find out what information gaps exist. Instant city building provides the teacher with a data bank of what to teach. The activity is based on the following imaginary situation. In a place of great natural beauty, a new material has been discovered which miraculously makes all wastes biodegradable. Mining operations have begun, and the students have the task of planning and building a community to support the mining operation. They are responsible for providing all the facilities required by a population that doubles each year. Of course, such growth threatens the area's natural beauty, which the students are also responsible for preserving. The instant city gives students an opportunity right from the outset to experience issues and subjects in context, while putting them in a position where they have to resolve the conflicts that necessarily arise from the context, conflicts such as population growth versus preservation of the natural environment.

Students begin by constructing a scale model of a simplified natural landscape on a styrofoam base, including mountains, valleys, forests, lakes, and open land. (With a little imagination, green sawdust can look remarkably like grass; bits of green sponge impaled on toothpicks resemble little trees.) By actually creating a natural landscape students learn how the different aspects of nature interrelate - rivers flow down from mountains, emptying into the lakes below, creating a fertile valley for crop cultivation. But if the mountains are too high, they cut down on available sunlight, thereby diminishing the growing season.

The instant city site model provides the basis for other City Building activities. Each time the site model gets transformed according to need, ultimately becoming the site of the mini-city of the future. In the course of these many transformations of the original site model, students get a lot of practice in designing and building cities and generally



developing their facility with these skills. By the time they begin working on the mini-city of the future, they have already become “experts,” so to speak.

When the model is ready to go, the students develop a chart of what they need and what they don’t want in their city. This serves as a guide in making decisions and later on in evaluating to what extent they have met their own standards. Not surprisingly, pollution, crime, poverty seem to have a regular place on the “don’t want” list.

The site is divided into council districts. The students group into districts, elect representatives to the city council, and elect a mayor who then appoints commissioners for housing, transportation, health, etc. Huddling briefly with other members of their council district, students plan their district first on paper with the mayor and commissioners coordinating the planning phase. Then comes implementation. Of course, as in real life, there are certain pressures, namely time. Students have to devise housing, transportation, and other services and facilities to keep up with the rapidly growing population (without destroying too many trees or polluting the river). Getting students to respond to pressure is a central message of the activity because pressure is what causes things to change.

The activity ends with an evaluation session. Are there sufficient facilities for the population? How does waste disposal occur? Has the natural environment been preserved? The students join in a discussion of the extent to which their model city embodies the ideals listed in their “needs/don’t want” chart. The evaluation is not a measure of success or failure in the sense of a grade (A, B, C, etc.) but rather produces essential feedback that enhances subsequent activities. All mistakes and “failures” are valuable in that they are instructive as they are in the “real” world. Ultimately, there are no “wrong” answers, only those that don’t work.



### *Object Transformation: Phase I*

In the first teaching sequence, students begin to explore their relationship to the world of objects. Each student selects and builds a model of his or her chosen object (a toothpaste tube, a film reel) at actual scale, at decreased scale, at increased scale, and finally at the scale of the student's own body. Through this activity, students become familiar with the concepts of structure, scale, ratio and proportion, and geometry. In effecting these transformations, students begin to see objects as systems of interdependent parts. They discover for themselves the laws related to physical objects. They also feel empowered in the process. They see that making change is simple. By observing objects in space, building them, taking them apart and changing their functions, something new is created. Students become inventors. They reestablish their relationship with the three-dimensional world: objects in space become accessible, touchable, concrete. They also begin to see that buildings and cities are merely spaces filled with objects which have grown either vertically, like a skyscraper, or horizontally, like a tract home development.

**Cities are merely spaces filled with objects which have grown either vertically, like a skyscraper, or horizontally, like a tract home development.**

### *Transformation of Organizations: Phase II*

The second sequence of activities applies the concepts of community, structure, and transformation introduced in the previous activities to questions of organization. Here organization is understood in its largest sense as any systematic arrangement of parts into a whole. Seen in this way, nature, time, the home are organizations just as are the city council and the postal service. This series of activities is designed to develop the student's ability to recognize and define needs and to organize available resources in order to provide for those needs efficiently.

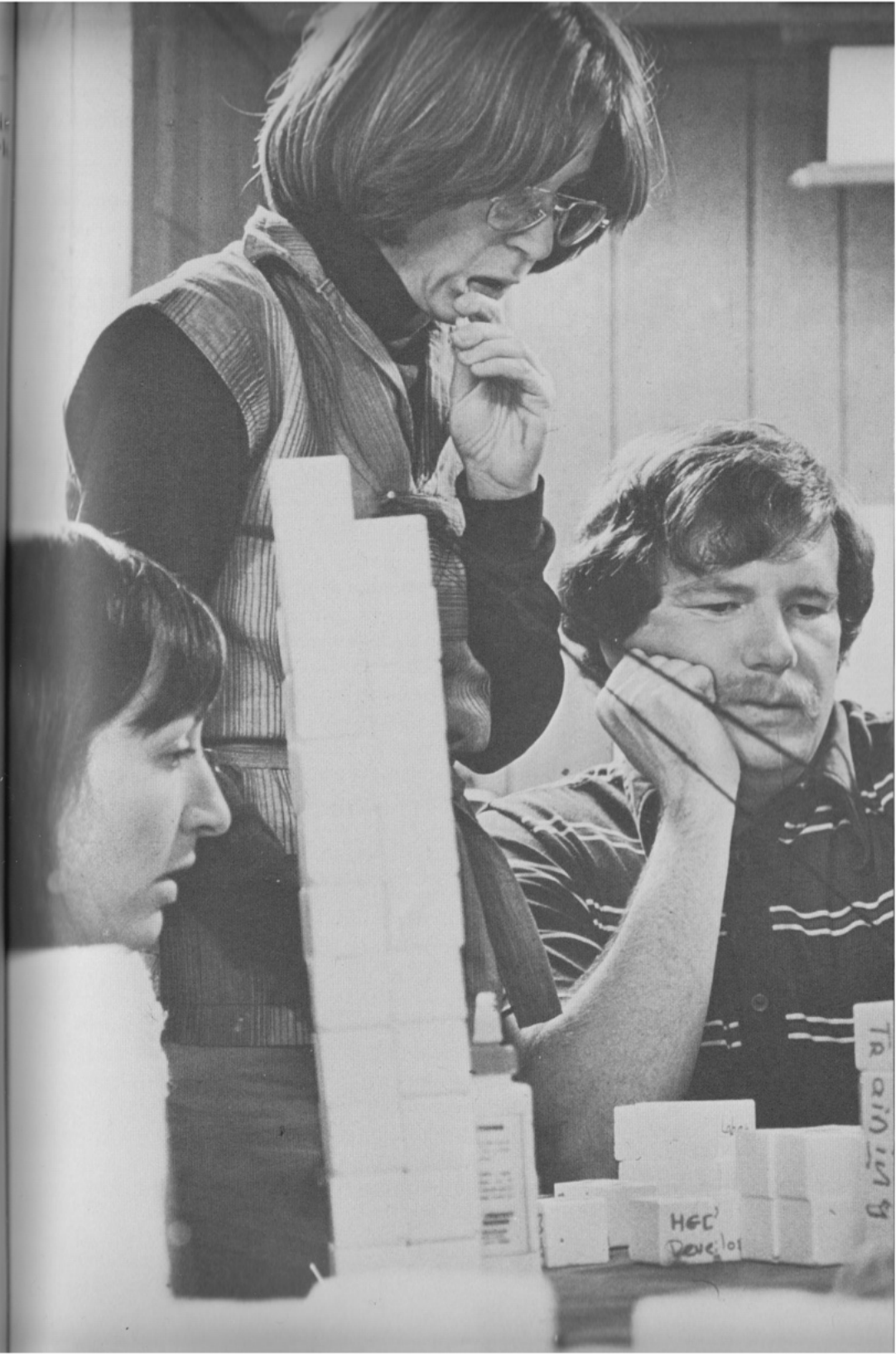
The form of organization closest at hand is the classroom which serves as both a physical and social



organization. Thus, the first need the students face is that of reorganizing their classroom to facilitate work, study, and storage. The purpose is three-fold. First, the students are introduced to an organization at a scale that is familiar and comprehensible. In this case, the physical classroom provides a perceivable structure of interrelated parts. Second, they learn about the group process of organizing the existing classroom social and physical structure into a more efficient entity. Through group participation, students imagine and invent responses to what each class identifies as needs. Third, students become aware of the need to anticipate future needs in the present, and this requires the involvement of their imaginations.

Using the skills learned in object transformation, students construct a scale model of their classroom interior which serves as the basis for discussing what works and what doesn't work in the existing classroom organization. The scale model is an empowerment tool. It provides an opportunity to experiment and play around with change before making an actual commitment. In this way it also functions as a decision-making tool. Students can test and evaluate reorganization proposals by rearranging the furniture and fixtures in the model and discussing the effects of the changes. Constructing the model - and thereby adding the third dimension - contributes information that would not be apparent in a floor plan. Viewed two-dimensionally from above, tables and desks seem to take up quite a bit of room. But in the three-dimensional model you can see that they in fact have room underneath which can be used for storage or other purposes.

Working in groups, students discuss such questions as: What is a classroom for? How is it used? What are the good and bad aspects of the current classroom organization? What can be changed, moved, installed, removed? How are changes limited by fire and safety regulations? Who owns the furniture?



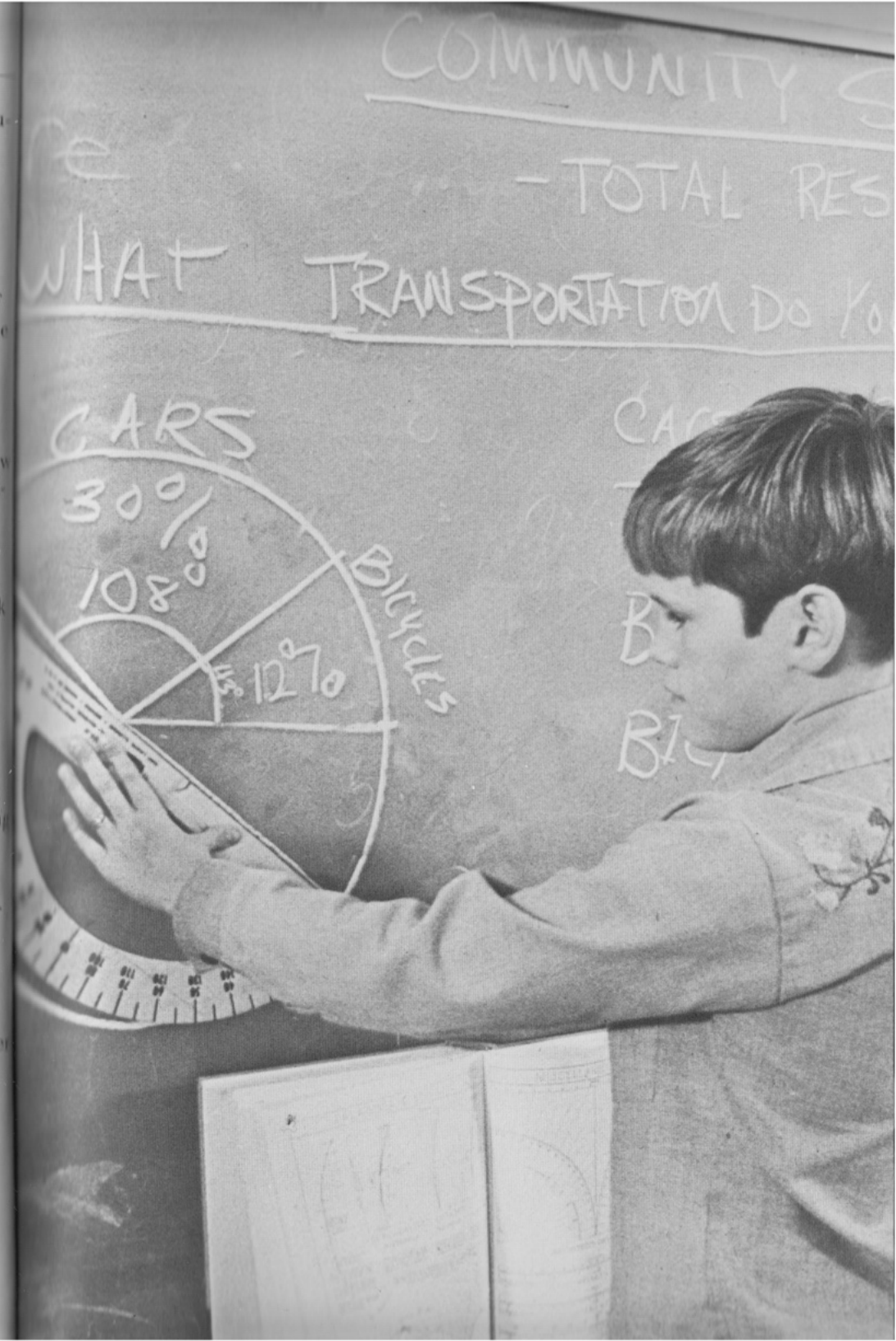


Who owns the classroom? Who is the Board of Education? Each student or group develops a plan for reorganizing the classroom along with a rationale for the plan. Next, each group selects the plan that seems to work best from among those devised by its members. The class then listens to each group present the arguments in favor of its plan. Discussion and evaluation are followed by the selection of a final plan and then the actual reorganization of the classroom. This process encourages students to advocate their ideas while giving them the opportunity to experience the tangible results of successfully advocating their vision. In this activity, the social organization is first transformed; then the new social organization itself acts to transform the physical organization, taking the level of change to the next degree.

**The teacher is not the absolute authority; decision-making is shared.**

At this point, it seems appropriate to comment on the fact that a City Building classroom does not look like a traditional classroom. Neat and orderly rows of desks give way to a sort of creative disorder with the focus of attention on the model, which itself points the way to another level of order. There are in fact many ways to arrange a classroom, depending on the immediate needs of the classroom community. As needs change, classroom reorganization can be repeated over and over, each time responding to the changing function of the classroom.

Likewise, the role of a City Building teacher differs from that of a traditional teacher. While the teacher serves as the designer of the activities and a guide along the path, he or she is not the absolute authority as in a traditional classroom. Instead, decision-making is shared as part of the learning process. Students find that they have to depend on each other and on outside consultants for ideas and feedback. Whereas traditional teaching tends to rely on the input of academicians, City Building consciously cultivates the participation of practicing professionals from the community—designers, architects, city



council members, urban planners, environmental ecologists, bankers, lawyers, shopkeepers, and so on. The teacher becomes a resource person among others the students can call upon for help in addressing needs they themselves have identified. This decentralization is crucial to the City Building concept. It encourages self-reliance in the students while freeing the teacher to participate as a resource/manager in the learning process, unconstrained by the burdens of the authoritarian role.

As part of their increasing responsibility for planning classroom activities, students learn how to use a flow chart. The planning and organizing of classroom activities is done by groups of students who share a common need or problem. A large class flowchart is constructed which serves as a visual planning and organizing aid for the entire year. Proposed activities that have been evaluated and approved by the class get placed on the flowchart in writing or using symbols.

The unfolding of classroom events and activities is documented on the classroom walls which become a "history wall," recording and visually displaying the cultural progress of the particular class. While the flowchart helps students to decide where they are going, the history wall shows them where they have been, giving the past a visual reality in the present. The items on the history wall help students to assess their past and use it to shape their future. Both the flowchart and the history wall function as communication tools.

Another activity in this phase simulates the experience of surviving in primitive surroundings. The activity begins with the adaptation of the original site model to form another natural landscape featuring mountains, valleys, lakes, canyons, meadows, rivers, etc. The activity takes place according to the following scenario. The students belong to a primitive nomadic tribe that lives during a time before tools



were invented. It is now fall, and they have come to the place of their site model to spend the winter and spring. They must set about the task of making whatever arrangements are necessary for their survival. After all, the seasons are uncontrollable and make no allowances for mistakes. Individuals will have to work fast and develop skills and tools in order to survive. They will also discover and use forms of social organization such as division of labor, selection of a leader and primitive forms of government, and the development of communication and trade between groups. The purpose of this activity is for students to experience the effects of the passage of time. The seasons represent a preordained time clock to which they must respond in order to survive. They find out that they can transform the effects of natural time through their inventions and discoveries.

Each individual is represented by a pin on the model. Applying skills in structure, spatial organization, and scale transformation, students build shelters to withstand the forces of nature. The location of the settlement is influenced by proximity to food sources, climate, building materials, etc.

Now the forces of nature begin their course with wind storms (produced by a hair dryer), rain and snow storms (produced by a water spray gun). Rain and snow storms become increasingly violent as the season passes from fall to winter. All of the natural forces that contribute to the situation are researched and produced by the students themselves. In a sense the students "invent" the seasons and other natural occurring conditions so as to approximate what happens in real life. Then, as the forces of nature are experienced, the logic and construction of their shelters become critical. Cave and mountain dwellers can get snowed in and cut off from food supplies. Riverside dwellings can get flooded as rains cause rivers to overflow their banks.



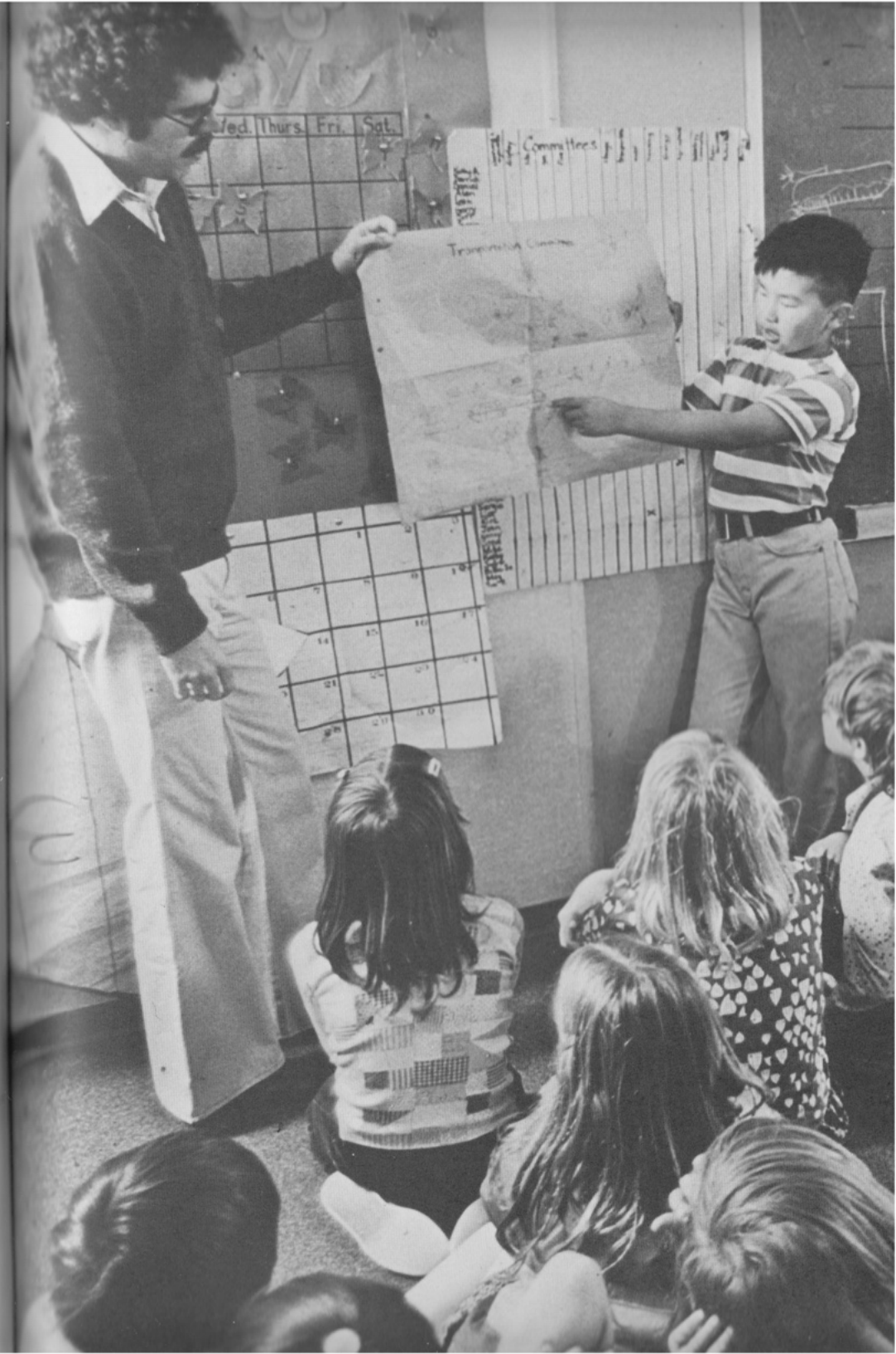
In the end, some survive, others perish. As one teacher observed, the ones who perish certainly don't forget the experience. Others survive by discovering fire for warmth or inventing weapons with which to kill animals for their meat and hides or by learning to communicate by smoke signals. Through this exercise, students learn ways to adapt and use nature; they also discover the need to invent tools and develop agriculture and other natural resources to help ensure their survival. Once they identify their needs, thorough study and research go into discovering the means to provide for the need.

**The mini-city provides practice in creating fantasy and real-life solutions to larger issues.**

### *The Individual in Relationship to the Community and Environment: Phase III*

The third and most complex phase of the City Building system concerns the design and construction of a model of the students' own community projected into the future. During this phase past learning – the concepts and skills developed in previous phases – is placed in a context that challenges the students to apply that learning to new and more complicated problems. This phase experiments with the transformation of the community and environment by changing size, scale, role, function, and direction over time and in space. Through the construction of the mini-city, students become experienced in the techniques required for addressing the issues and needs of typical real-life situations they may face in later years. It also provides practice in creating fantasy and real-life solutions to these issues. And by learning to cooperate and collaborate with one another, the students find out how their various individual solutions fit together in the larger whole.

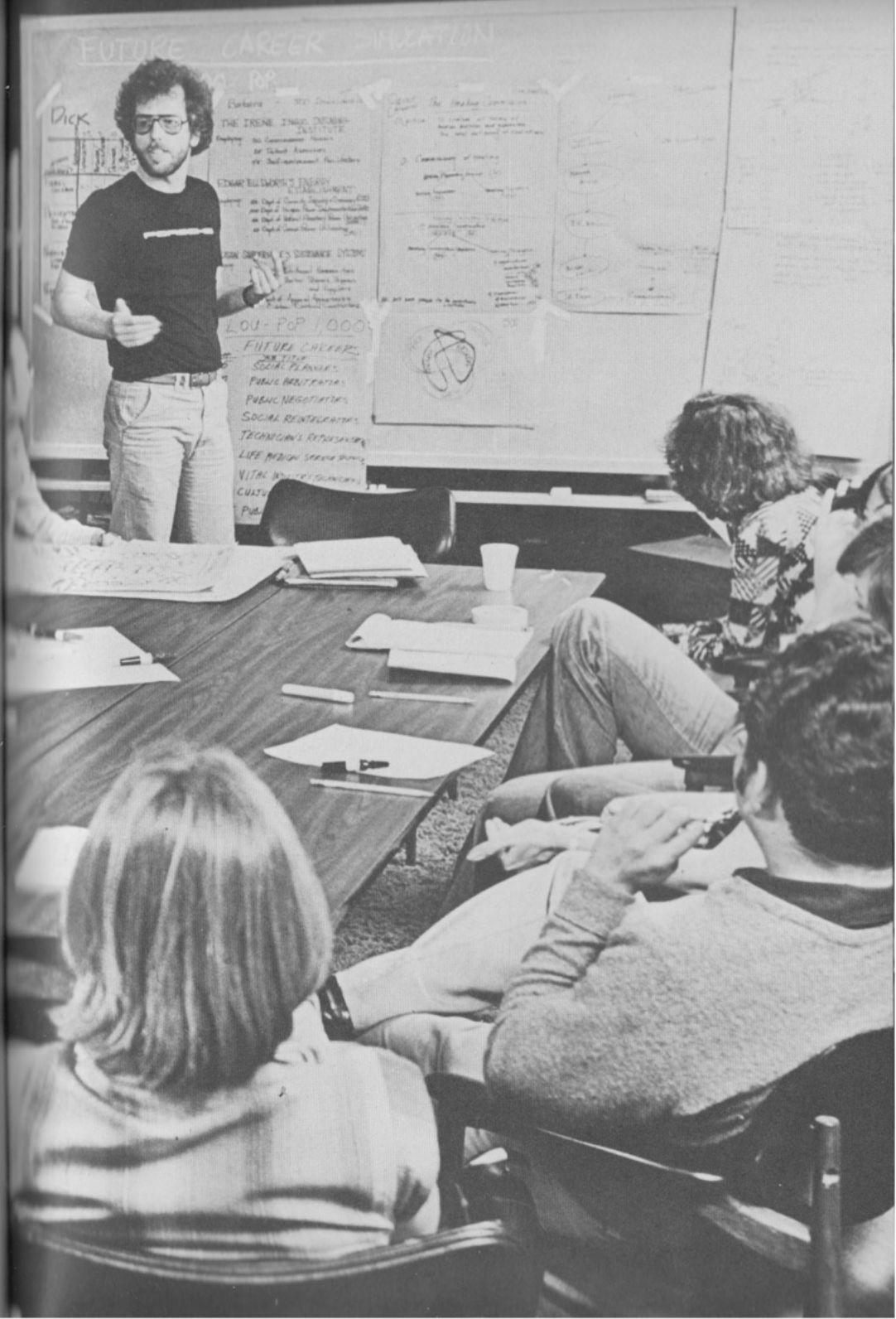
The work gets underway with the adaptation of the original site model to the contours and dimensions of the local community. By using the local community as a site, students get to perceive the transformation of something real. The work has a relevance; what they are doing matters. Using a grid, the students then develop land parcels, two-dimensionally



at first, then transferring them to the site model. Now comes the distribution of the parcels to the students. Which method shall they use? Lottery? Land grab? Auction or sale? Teacher assignment? Each method is researched and investigated. Using role playing, the class can try out each method and choose whichever one works best and most equitably. Deeds are then drawn up and issued. Each student is now the owner of a piece of property on the site, which, in turn, involves the student directly and emotionally in the problems and decision-making processes of the model city.

Students research and develop a survey of the section of the region and community they've chosen to design. The survey will serve as the basis for projecting their goals for the city. They prepare charts, maps, and graphs depicting the basic forces acting on their community, including population patterns, transportation network, communication network, energy resources and distribution, sewage and waste disposal procedures and systems, natural environment features, economic and commercial organization. The "citizens" have to take all of these forces into account in determining the rate and direction of development of their city. The regional research clearly reveals that the community is in constant flux. In recognizing the forces which control change in the city, students learn that they can influence those changes. In addition, the regional research ensures that the model city is grounded in reality and that the lessons learned are real, not just play.

Regional research is followed by a survey of the community. A group of students designs a survey aimed at finding out who lives and works in the community, what types of buildings and other objects occur there, what the inhabitants like or dislike about their community, and what changes they suggest. Using the survey, students then interview members of the community, compile the results, and present the data to the class using pie charts,



percentages, line graphs, or bar graphs to visually express the statistical results.

Professional consultants and other community resource people such as librarians, city planners, city council members, etc. also add their input to the growing body of information about the community, from which students develop a comprehensive list of goals for their city.

As in previous phases, beginning with the instant city activity, students find that implementing their goals requires an effective decision-making or governing body. As this need arises throughout the year, students get practice in developing their own forms of government. This time the process begins with research. Groups of students study particular forms of government such as tribe, anarchy, monarchy, totalitarian state, authoritarian state, constitutional democracy. As each group presents its findings to the class, the different forms are compared by tracing the course of an imaginary law through legislation and execution. To get the full impact of the meaning of government, each form is tried out in class for a day or more. In this way, students get to explore the transformation of government role and function. Ultimately, they design a form of government tailored to their particular needs.

Research into actual local (city or county) forms of government also takes place as students study the various political offices such as county supervisor, mayor, county clerk, planning commissioner. The research leads to an understanding of the flow of responsibility from one office to another which students portray in the form of a chart of the local government. This chart serves as a model for the students' own decision making procedure.

After researching theories of land division, a group of students divides the site model into council or



supervisory districts. Members of each district elect a council representative. And, finally, a mayor or county supervisor is elected or appointed, depending on the form of government chosen by the class. Following standard municipal procedure, the newly elected council members nominate students for the various appointed offices. As the work proceeds, the governing body can be refined by deleting, adding, or inventing new functions when necessary. This organization assumes increasing responsibility for the progress of the class as a whole, strengthening the values of group self-reliance and mutual cooperation that have been instilled from the outset. Within this system the teacher's role becomes one of coordinator rather than director.

At the same time that the governing structure is evolving, the planning, design, and construction of the city begins to take place. During the planning phase, each student works on an individual design for his or her land parcel, defining spaces on a piece of paper through aerial drawings. Students may create whatever they want as imaginatively as they want, but they must also take the community needs and the goal list into consideration.

The planning commission has by now usually spawned land-use and transportation subcommittees to help coordinate individual designs and to develop an overall plan for the city. The city council enacts laws to enforce the proposals of the planning commission.

Of course, the class has to evaluate critically the individual designs with respect to the whole community. This can be done by fitting all of the individual pieces together like a jigsaw puzzle and putting them up on the wall. Are there enough houses, multi-family dwellings, stores, factories? Are there too many? Is there enough open space? Does the transportation system take the effects of noise and safety considerations into account? The teacher

Goals for the city

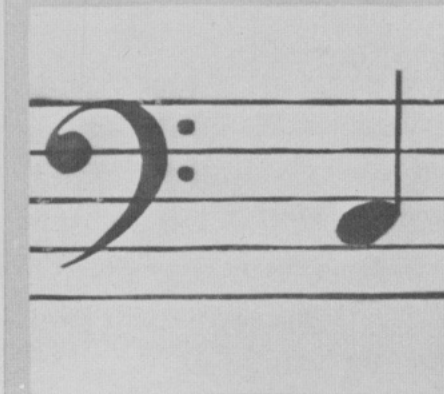
Needs

- |                        |                |
|------------------------|----------------|
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| in mass transportation | news           |
| entertainment          | museums        |
| in housing             | bridges        |
| schools                | banks          |
| for school             | solar power    |
| of bushes              | city hall      |
| of parks               | libraries      |
|                        | restaurants    |
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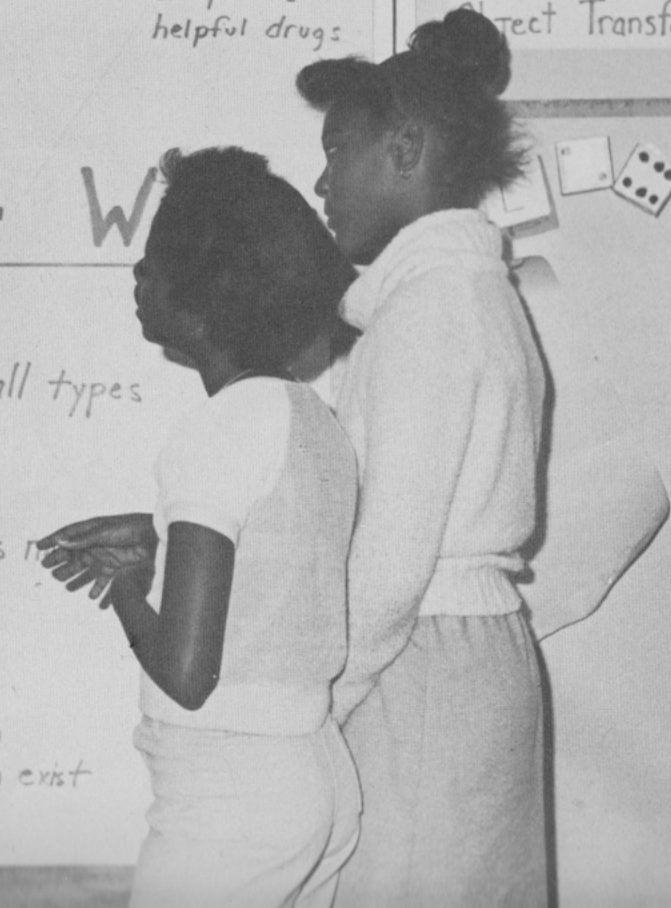
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Object Transformation



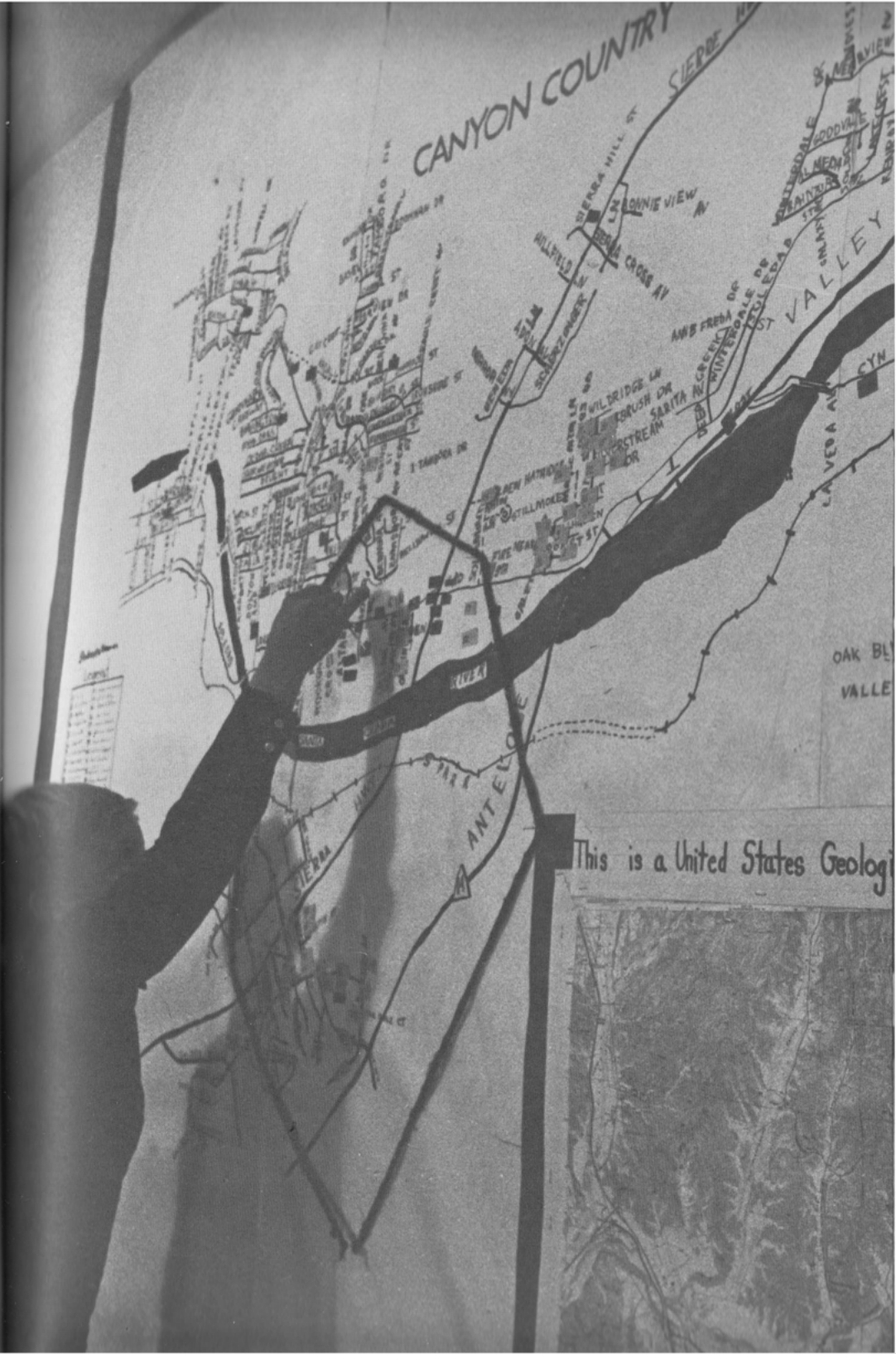
plays a significant role in challenging the students to justify their designs, to help them evaluate and perfect their inventions.

Inevitably, the individual designs fail to meet the criteria that have been set up. The students are forced to go back to the drawing boards, this time with the understanding that only through group cooperation can individual needs and community needs be successfully integrated. Students have to identify and resolve basic value conflicts between the individual and the community. If the community needs a freeway system or some other newly invented transportation network, how will that affect individual students' plans for their land parcels? In this way, issues such as the relative merits of private property versus communal ownership become part of the experience of learning, vividly reinforcing what the mind absorbs abstractly.

The city council ultimately adopts rules, regulations, and procedures for approving individual parcel plans. Students then present their plans to the appropriate committee which passes judgment on the plan's feasibility. Sometimes students find it necessary to form special interest groups to protest what they regard as unfair actions by certain committees. Once all the plans have been approved, the class evaluates its work, using the input from practicing professionals in the real world.

And that, in its essential features, is the year's work in City Building. It bears repeating here that just as the city is never finished, neither is City Building. The activities described above can be repeated over and over, year after year, in all grade levels, each time set up to reveal something new and different about our world. The possibilities are endless.

**The city is never finished, neither is City Building Education.**





### Some Implications

**C**ity Building differs from any other educational method in that it reinstates the material world – with its spatial and temporal dimensions intact – into the learning process. The presence of both these dimensions provides a firm context for understanding. In a traditional classroom, it is not uncommon to spend a day making clay pots or putting on a Christmas pageant. These activities also have a concrete spatial reality, and yet they are detached from the larger context. What is the larger context? During the survival sequence, for example, a member of the nomadic tribe might invent a clay pot, providing that clay is a substance occurring naturally at the site where the tribe has stopped for the winter. If clay is not available, they might invent some other type of container; they might learn to weave baskets, for example. But why do they invent these pots or baskets in the first place? Probably in order to store the food they've gathered, providing a ready supply during the winter months when food sources are scarce. Later on, they might invent a means of cultivating food instead of simply gathering it, and that, too, gets stored in the containers. In this way, making a clay pot becomes more than just a hands-on activity. It becomes part of the discovery of the origins of civilization.



### *Teaching Basic Subjects Through City Building*

Ultimately any subject can be taught through City Building. Of course teachers are required to teach basic subjects, and students are required to pass proficiency tests. But, in the City Building system, it is up to the teacher to design a context in which the particular subject will be revealed. The teacher creates a problem which the students have to address. In so doing, the students learn whatever it is the teacher has decided they need to learn. During the government simulation, for example, the teacher leads a discussion of organizational disorder and inefficiency. Students then learn through the experience of addressing the problem how different forms of government evolved. In the case of one first grade class, at first it seemed easiest to simply appoint a monarch. But when the monarch began lording his power over others and ruling in an arbitrary manner, restlessness and insurrection prevailed. This didn't last long, however, as a new group of leaders came along promising to reestablish orderliness. That seemed fine for a time, except that in its zeal for orderliness, the new ruling group decided to confiscate pencils and notebooks and limit access to the library. Restlessness brewed once more. The leaders were thrown out again, and the students decided this time to take responsibility for choosing their leaders and form of government. Thus a democracy was invented.

The crucial lessons in mathematics derive from exercises in object transformation. A student learns how to find the radius and circumference of a circle in order to construct his models of a film reel. Building the scale model city involves everything from simple arithmetic to complex geometry. And if the student makes an error, the building may turn out lopsided or the windows may be too close together. The results of both accuracy and error are visibly and tangibly apparent.

**The teacher designs a context in which subjects are revealed.**



### *Impact on the Student*

The City Building context gives rise to a seemingly endless stream of social, moral, scientific, aesthetic, and political issues interconnected as they are in life. As students learn to identify a problem (e.g., the freeway is too close to the park) and take steps to solve it (move the freeway; invent a new system of transportation), they become integrative thinkers who find and apply information from many sources.

Our experience shows that they also learn how to think critically for themselves and to ask questions to obtain the information they need. They learn to work cooperatively on tasks that cannot be done alone and to organize their efforts for maximum efficiency. Students learn to honor and value each other's point of view, resolve conflicts among themselves, make decisions, and take responsibility. Finally, they learn how to take risks and how to advocate their ideas and beliefs. These skills are not measured on standardized proficiency tests. They are, above all, skills of social survival.

By challenging students to give visual, material form to their ideas, this form of education fosters the connection between verbal and visual skills. Those students whose strength lies in their visual ability are not handicapped as they often are in a traditional classroom. Verbally skilled students are challenged to connect thought to action, idea to creation.

### *The Teacher as a Creative Force*

The City Building classroom changes the ground rules for the teacher who is used to simply functioning as the vehicle through which curriculum designed by others is transmitted to the students. The City Building teacher is charged with the responsibility for designing the curriculum, for creating the context in which discovery will take place. This flexibility may seem intimidating at first; in the long run, we have found that it allows teachers the



freedom to go in whatever direction they see fit as well as to bring their own particular strengths and fields of interest into the classroom. A fifth-grade teacher who has an interest in philology offered his knowledge to the girl who had been appointed public information officer of the class. She was producing a brochure about their class, located in room D-4, for distribution to visitors. Instead of simply printing "D-4" on the cover of the brochure, the teacher helped her visually show the development of the letter D and the numeral 4 as a sort of cover illustration. In this way, the teacher's entire store of knowledge and interests become engaged in the learning process, become a resource available to the students.

**The teacher becomes a role model for the creative process.**

Our experience shows that the effect on most teachers is invigorating. For them, teaching itself becomes a process of discovery, calling on their own creative powers, just as learning calls on the creative powers of the students. In this way, the teacher becomes a role model for the creative process.

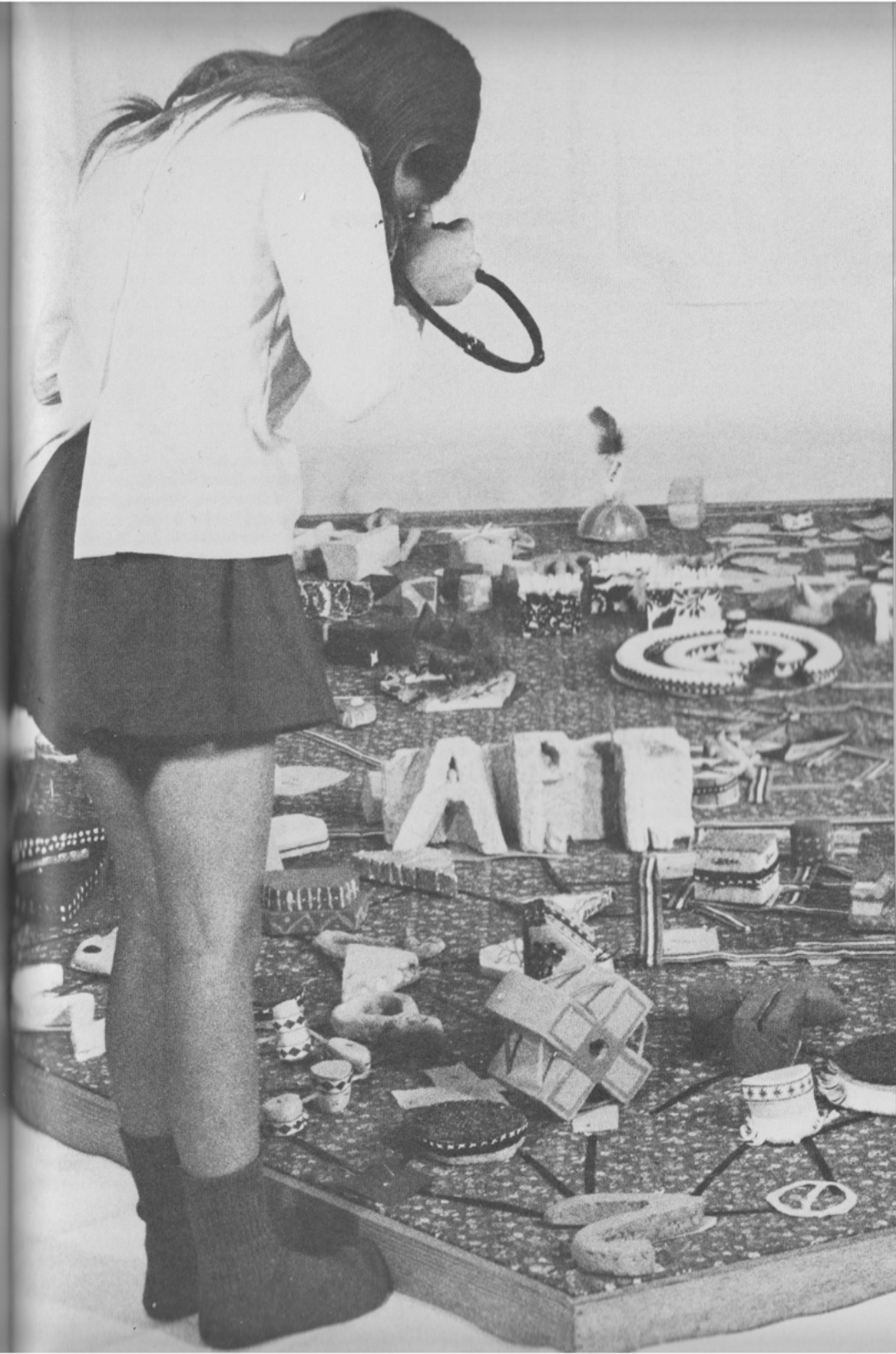
City Building ends the teachers' isolation. Their work is vitally connected to the life of the community which is manifested by the participation of community consultants, practicing professionals from the fields of architecture, design, urban planning, the sciences, as well as "lay" consultants such as parents, municipal officials, street cleaners, factory owners, etc.

The participation of community consultants removes from the teacher the burden of the assumption that he or she knows (or is supposed to know) everything. Instead, students learn to go to the appropriate resource people for information and help in solving their problems. This clears the way for the teacher to reclaim a more genuine leadership role, helping the students identify their problems and discover how to solve them for themselves. The teacher functions as a catalyst for learning.



For both the students and the teacher, the learning process comes to life, charged with the excitement, and also the seriousness, of personal involvement. What the student learns are the lessons of life in which he or she is fully involved emotionally as well as intellectually. This produces a much more resonant and lasting learning experience while dramatically nourishing the students' desire to learn. That is the essential behavioral effect of the system.

Through the act of creating, the students acquire a belief in themselves and their abilities that flows over into other aspects of life, encouraging their feelings of self-esteem. In the words of Aaron, age 12, "I really got to see what a city means, and I suddenly found out that us kids have rights too. I mean when you build a city, you see how important your job is and everyone contributes. I guess I realized I'm not just a nothing person. I'm a little important person."



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