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Approaches to Teaching and Learning

Materials developed and collected by
Bank Street Follow Through Faculty

Edited by: MARI ENDREWEIT
ELIZABETH GILKESON

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BANK STREET COLLEGE - AN HISTORICAL NOTE

The model of education for children and adults developed, enacted and disseminated by Bank Street College is based upon a consistent theoretical position which has been validated through more than 60 years of experimentation and analysis in widely differing settings. This viewpoint about learning and teaching can best be understood in the context of the institution's development over more than half a century as an experimental action center for the improvement of the quality of education.

Known originally as the Bureau of Educational Experiments, Bank Street was organized by a group of men and women of varying academic and professional backgrounds who wished to further a cooperative study of children in different environments. Beginning in 1916, the founders of Bank Street (Lucy Sprague Mitchell and her colleagues) engaged in empirical studies in New York City to explore how children learn and to identify those patterns of interaction between adults and children which were most conducive to children's growth and development. The staff of the bureau consisted of a physician, a psychologist, a statistician, a social worker, health workers, and teacher-scientists, who were supported by consultants in many of the social sciences and by the deep interest and expertise of Wesley Clair Mitchell, an economist and professor at Columbia University.

One aim of the Bureau's interdisciplinary staff was "To bring schools and specialists dealing with various aspects of children into intimate working contact with one another." Today the College still develops programs pragmatically and studies them systematically. The spirit of experimentation which imbued its founders is still the motivating force in a complex of interrelated departments and field action projects, including: teacher education, laboratory schools, publications, basic and action research, a media unit and cooperative projects in schools throughout the United States and many other countries.

In 1968, Bank Street College was invited, under the leadership of Elizabeth Gilkeson and Gordon Klopff, to join in the creation of the National Follow Through Program, an effort intended to sustain and extend the gains of Head Start for low income children. Bank Street's subsequent role as a sponsor offered an opportunity to extend knowledge, develop new tools for implementation and serve a diverse children population in many distant sites. The materials in this present volume grew out of Bank Street's efforts in this challenging program.

We thank the children, parents and staffs of all the communities in which we served. They have taught us much.



Lorraine Smithberg

Acknowledgements

The work in this folder represents just a small part of the creative thinking of the Follow Through staff at Bank Street College over thirteen years. Behind the work of every person named in this volume as an author stand the cooperative effort and shared ideas of many people. Recognition and thanks are due to Shirley Auerbach, Garda Bowman, Carol Darcy, Virginia Dearborn, Margaret Eisenstadt, Richard Feldman, Vivienne Garfinkle, Norma Green, Eleanor Greig, Lois Lord, Mark Lundeen, Shirley McCall, Ruch McIntosh, Harriet Neal, Judith Pasamanick, Madelyn Schwartz, Nancy Smith, Alma Weisberg, for their many conceptual contributions and for their tenacity in supporting the staffs of the fourteen Follow Through communities as they put into practice the Developmental-Interaction Approach to ways of teaching and learning.

Thanks are also due to our many colleagues in the field who, through their willingness to try out and to critique our suggestions, have furthered our thinking and taught us to understand the uniqueness of each setting.

We also would like to express to the staff of the Bank Street School for Children our appreciation of their cooperation as they developed and enacted within their special setting the ideas and practices which the Follow Through staff was also advocating. They have given generously of their time and the demonstration and interpretation of their work to many participants in the Follow Through program has afforded unique opportunities for learning.

We would like to acknowledge the work of the support staff under the leadership of Patty O'Brien who over the years have helped in the preparation of our many papers, only a small sample of which are represented here. We particularly appreciate the work of Diane Lewis who has planned the layout of this publication and, with the help of Ruth Kolbe and Amina Al Quhaar, has been responsible for the typing of these papers.

Mari Endreweit
Elizabeth Gilkeson (eds.)

*Approaches to
Teaching and Learning*

POSITION PAPER

Teaching and Learning in a Bank Street Classroom

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TEACHING AND LEARNING IN A BANK STREET CLASSROOM

Adapted from The Focus Is On Children

Garda Bowman
Elizabeth Gilkeson

Bank Street's approach to learning is predicated on the theory that school can be stimulating, satisfying, sensible and perceived by each child as an important part of his/her life. School can be a place where children will approach any new experience with wonder, with questioning, with experimentation. It can be a setting in which growing persons exchange ideas and learn ways to express themselves and communicate with others who share in common enterprises -- others whose ideas and desires may be different or like their own. Essentially, the classroom is a place where the child can construct -- if tentatively and crudely at first -- an age-appropriate, interactive world of work, creativity and social interaction.

For the five, six, seven and eight year olds, the effective classroom is an organized, efficient workspace where there is opportunity for motor and sensory experiences, for active investigation of what things are and how they work. There are many stimulating options for learning experiences for groups and individuals. The room has a richness of color and a vitality to which the response is both conscious and unconscious.

The physical arrangement of the room includes a variety of interest centers, equipped so that children can pursue special projects, utilizing language, artistic creation, math and scientific experiments. There is ample storage space so organized that children have easy access to materials. Flexibility is provided by means of movable room dividers and multipurpose tables. There is a quiet area for reading and a library. Musical instruments and art materials invite active participation in the arts. Children's work is displayed at the child's eye level. Materials include many teacher-made and parent-made items as well as those which the children themselves create, thus relating directly to the child's own world. There is opportunity for the care of animals and plants of various kinds. The classroom exemplifies, in itself, the importance of the arts and sciences in the child's development.

Working in this classroom, with its understandable rules and well-defined physical structure, children are helped to control and organize themselves and to develop skills for mastery in their environment. As they go about their work, children move and talk freely. They respond to a highly functional environment of written labels, messages, job charts, and other signals that tell them where things are, the events of the day, the choices that are available to them, and through which the world of symbols becomes meaningful. They make plans and carry them out with a strong sense of responsibility and purpose. They learn how to organize and record information, and how to express their thoughts and feelings. In essence, they learn how to attack problems and how to learn. Thus they bring all of the basic skills into meaningful focus.

The role of the teaching team -- teacher and assistant -- in this classroom is critical and is more than purely instructional. Adults have high expectations of children in terms of their capacity and desire to learn. The adults relate to each child as a person and as a learner. They express consistently in action and in words a respect for the child, his world and his communications. They demonstrate both knowledgeability and trustworthiness as persons.

The teaching team introduces central themes of study and activities which extend and deepen the children's understanding of the world around them. First, these themes are elaborated from the planned environment of the classroom, such as organizing chores, caring for pets and plants, cooking, building and using their library. Then from those aspects of their immediate community in which the children can see relationships, meet challenges and use their mathematical and scientific concepts, they study such topics as food marketing, traffic control, sources of water and animal and plant life. The adults encourage direct observations of the important aspects of the environment through a wide range of relevant field trips. From the earliest years, the teacher plans in strategic steps the systematic instruction necessary for the development of basic research skills. With each year of development the central themes extend in time and space to other lands and cultures.

Within this classroom world the teaching team helps each child use language to express and fulfill his desires, to formulate his questions and ideas, and to exchange meaning with others. Spoken and written words are presented as enjoyable and immediately

useful tools. Children are encouraged to experiment with them as a natural process of communication. Language permeates the whole environment. The learning and teaching of reading is a continuous activity. Books and pictures are discussed freely and frequently. Children not only learn to read but become readers. They not only learn to write, but become writers of their own stories and journals. The children are read to daily as an important demonstration of the pleasures of the printed word. Thus the children are enabled to integrate their thinking, their language use, and their mastery of symbolic skills in a situation in which adults analyze individual learning styles and plan appropriate programs.

Adults listen to the language of play and then provide new opportunities and materials which help children elaborate their ideas. For the young child play is the medium through which he or she expresses and integrates knowledge, skills and feelings. Play is, in fact, the child's work. The adults respect and support play by building it into the curriculum. For the older child, ideas are expressed in a more sophisticated use of raw materials, and the concept of play moves toward dramatic expression. For children of all ages, the opportunity to recreate experience is a continuing need.

Scheduling is a major tool for structuring group life. The daily schedule is interpreted by the adults in many ways and is clearly understood by the children. Although the schedule is carefully structured there is a high degree of flexibility which permits response to unexpected opportunities for learning experiences generated by children's explorations and ever-evolving curiosity. Children often work independently or in small groups, with or without adults, with many activities going on simultaneously. The emphasis upon individual development does not preclude concern with the group process. Actually, the reverse is true since one cannot understand the whole child without knowing how he or she functions within a group and, conversely, the small group is often a crucial factor in the individual development of its members. The whole group meets when interests converge or when the nature of the activity calls for full participation.

Transitions from one activity to another, which usually demand a high degree of adult direction, appear more reasonable and flexible in this classroom where children understand their responsibility for their own learning process. In fact, learning appropriate social behavior is part of the curriculum. The adults guide the child in developing inner controls which minimize the need for outer discipline.

In this classroom, parents come and go freely, conferencing with the teaching teams and participating in the ongoing and special activities. Through their understanding of the school world and their contribution to it, parents can provide continuity of learning and life experiences for children. For Bank Street views the classroom as a prototype of society where children may learn early in life those values which underlie a free, humanistic culture. Hence the classroom approximates a rational, democratic life situation in which the child learns to consider alternatives and initiate his or her own course of action. Essentially, it is the vitality of the total classroom life for children and their own investment in that life which determine their motivation to learn.

*Approaches to
Teaching and Learning*

STRATEGIES
FOR ENACTMENT

THE DEVELOPMENTAL-INTERACTION APPROACH IN THE CLASSROOM:
STRATEGIES FOR ENACTMENT

Organizing the Learning Environment

Materials are arranged so that they can be used independently by the children.

Materials permit divergent and individual responses.

The room is arranged in an orderly fashion so that children can learn how to organize and care for materials.

Materials and equipment are kept clean and in good repair.

Work-study areas are organized for children to use for small group and individual work.

There is an area set aside where a child or small group can engage in quiet activity.

There is a private space for each child's possessions.

Children's work is displayed prominently in such a way that it is accessible to children.

The teaching team continually modifies the physical environment to support children's current needs, strengths and interests.

There is a functional reading environment that guides the children's planning and activities and helps make written language meaningful. This includes:

charts, e.g. experience, management, attendance

labels and/or questions on display

written messages

current bulletin board and/or blackboard with schedules, news of class activities and interests, committee listings, student contributions

Cooking: There is sufficient and varied cooking material available in each building.

Blocks: There are sufficient building blocks (Kg. -1) and/or table blocks (Kg. -3) and block accessories.

Dramatic Play: There are sufficient and varied materials for dramatic play.

The reading center has a variety of reading materials:

student-made books

trade books which children in all reading levels can read easily

assorted basal readers and/or reading kits

assorted reference books

books related to special activities going on in the classroom at all reading levels, including those to be read to the children by adults

current magazines and newsletters

The listening center has such items as tape recorder and record player with earphones.

The writing center has:

paper in a variety of sizes, shapes and colors

different kinds of writing tools -- pencils, crayons, markers, pens, etc.

manipulative alphabet letters

a typewriter

word banks

spelling books

picture collections, filmstrips books without words and other story starters

children's journals, diaries and writing books

The math center includes sufficient and varied math materials:

child-made collections of found materials for counting

commercially produced counting materials

at least 2-3 structured math materials, e.g. Cuisenaire rods, Dienes blocks, attribute materials, etc.

various kinds of measuring equipment, e.g. rulers, measuring cups, scales, timers, etc.

geometric shapes, both 2- and 3-dimensional

number lines and 100 squares

math games and puzzles, both child and teacher made

assorted task cards and workbooks

The science center includes sufficient and varied science materials:

plants, terrarium

animals, aquarium

commonplace materials that can be used for investigation, e.g. food coloring, soap flakes, oil

equipment for observing and recording, e.g. magnets, magnifying glasses, batteries, prisms, etc.

The art center includes a selection of expressive media:

paints clay collage materials

drawing materials hand puppets

THE DEVELOPMENTAL-INTERACTION APPROACH IN THE CLASSROOM:
STRATEGIES FOR ENACTMENT

General Teaching Strategies

The teaching team* plans curriculum based on the needs, strengths, interests and experiences of individual children in the group.

The teaching team sets objectives for intellectual and social development for the group and plans to program on the basis of those objectives.

The objectives set by the teaching team are pursued with consistency over a period of time, and reviewed periodically.

All members of the teaching team work directly with children in a variety of learning-teaching situations.

Teachers speak directly to individuals in small or large group activities as well as to the total group.

Teachers attend to children's questions or comments with care.

Verbal interactions with children are those most likely to support their intellectual growth, as follows:

- a. Open-ended questions and questions which allow children to reconstruct experiences (in comparison to questions which require a specific fact), e. g. "What were all the different jobs people worked at in the bakery?" vs. "What was Mr. Jones' job at the bakery?"
- b. Responding to child's remarks through suggestions which extend the child's thinking or activities, e. g. Child: "I saw a truck with boxes of vegetables in front of the store this morning." Teacher: "Where do you think the vegetables came from before they were on the truck?" and then listens.
- c. Questions which lead to generalizations and abstractions.
- d. The offering of appropriate information.

* The teaching team is any combination of adults working with the children under the leadership of the classroom teacher. The team might include an aide, a parent, a student teacher, a staff developer, a curriculum specialist, etc.

Children's work reflects children's own ideas and efforts.

Children's work is accepted and displayed without marks, stars or grading.

Teacher spontaneously makes remarks about child's work in specific terms showing interest and appreciation of the process. (Teacher avoids judgmental remarks such as "good" or "It makes me happy to see you do that.")

Teacher attempts to elicit child's judgment of his/her work, e.g. "Can you tell me something about how you did this?" or "How do you feel about what you've done?" (Teacher does not make negative comparisons of children's work.)

Teacher deals with children's behavior in terms of social or personal effectiveness. (Teacher does not judge children's behavior in terms of "good" or "bad" boys/girls. Teacher does not ask children to do things for her/him, e.g. "Would you write a story for me?")

Teacher responds to child's negative remark with a positive remark which enables the child to express feeling or confusion and to take responsibility for it, e.g. Child: "That was a stupid trip." Teacher: "That's interesting. I really would like to know why you feel that way." (And then listens to what the child has to say.)

Teacher elicits children's feelings about what they have experienced, e.g. "How did you feel when you rode on the escalator?" (Teacher does not belittle, make fun of children's feelings or attempt to impose her/his feelings on the children, e.g. "All children should love their parents!" or "Big boys don't cry.")

The teaching teams keep comprehensive records on each child including diagnostic tests results, Reading Assessment Forms, examples of expressive language and writing, anecdotal records, and reports of progress.

*Approaches to
Teaching and Learning*

LANGUAGE
AND
READING

Initiation to Reading

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Initiation to Reading

BY SHEILA E. SADLER
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For children, learning to read and write has some of the drama of a tribal rite or any initiation ceremony. The weight of the culture is bearing down on the child who is introduced to printed symbols-- the adult's most sophisticated tool. At first, the teacher serves as the scribe of the tribe. In order to learn how to read, the child must learn to listen, to follow directions, to conform, to attend to detail, even to fail publicly. Such expectations do not suit the natural inclinations of the young, action-oriented, personalized children. To bring the process of initiation to reading closer to children's needs, reading should provide for individualization, self-pacing, and early success.

Ideally, every kindergarten-primary classroom should have enough staff, the variety of materials, and the supportive atmosphere which make it possible for each child to work at their own level, no matter what the age or stage may be. The teacher and the teaching team express their confident expectation that every child will learn to read in their own good time. While reading is of critical importance for children, it is not the only worthwhile part of the primary curriculum. In fact, in our view, children will become better readers if the teacher sets up a classroom environment in which reading can be seen by the child as just one pleasurable and useful skill. In that environment, purpose is personal; interest is high; and meaning is clear. Let us describe such a classroom in general terms.

Classroom Content

For the five, six and seven year old, the effective classroom is an organized, efficient workroom where there is opportunity for learning through all five senses, for active investigation of what things are like and how they work. There are many media for learning and many opportunities for making choices. Working in this room, with its understandable rules and well-defined physical structure, the children

become able to control and organize themselves and to develop skills for mastery of their environment. As the children go about their work, they move and talk freely. They make plans and carry them out. They learn the need for categorizing, seeing relationships, and solving problems. They learn how to organize and record information.

Play is central to learning for young children. It shows the teacher how each child perceives the relationships in their world. In play, knowledge, skills, and feelings are integrated. Play is a child's work and is approached earnestly. The teacher respects and supports play by building it into the curriculum. The teacher listens to the language of play, and then provides new opportunities and accessory materials which help children elaborate their ideas. Increasingly, the work of individuals becomes related to the work of others and cooperative projects are undertaken. The group process in turn serves to stimulate and generate individual thought and development. The deeper the individual's work, the stronger the group projects become. The stronger the child-society is, the more significant and fulfilling an individual's contribution to it can be.

The Teacher's Role

The teacher's role in this classroom is critical, although not necessarily always directly instructional. The teacher expresses consistently in action and in words a respect for each child's concerns and modes of communications. The teacher demonstrates not only knowledge as a teacher, but trustworthiness as a person. The teacher introduces central themes of community study and activities around them. First themes are elaborated from the planned environment of the classroom, organizing chores, caring for pets and plants, cooking, building, etc. Then from those aspects of the community in which the children can see relationships, solve problems and use their skills; food marketing, traffic control, sources of water, etc. The teacher encourages direct observations of the important aspects of the environment through a wide range of relevant field trips. The teacher provides systematic instruction for the development of mastery, but the vitality of classroom life for children and their own investment in that life exert direct influence upon their motivation to learn.

Within this classroom world, the teacher helps each child use spoken and written language to express and fulfill needs and desires, to clarify questions and ideas, and to exchange meanings with others. Spoken and written words emerge as useful and fun, and children are

encouraged to experiment with them as a natural process of communication. The children make their own "books" and share them with each other. Pictures too are discussed freely and frequently. The children are read to daily as an important demonstration of the pleasures of the printed word. The program provides each child the opportunity everyday to talk with and to work with one adult alone or in a small group. Thus the children are enabled to integrate their thinking, their language use, and the mastery of symbolic skills in a situation which is known and guided by a supportive adult.

The Bank Street approach to beginning reading has three strands. First, it relies heavily on what is commonly called a language experience approach. The children learn to read by writing: they learn to read their own thoughts expressed in the adults' code. The Bank Street approach emphasizes, in its second strand, systematic word study based upon strategic English language patterns. The third strand is book reading. We recommend an individualized selection of commercially produced pre-primers and primers, rather than the adoption of one basal series. However, the first two strands of the program can well be adapted and combined with a basal reader approach, if the teacher is so required by the local school system.

It is assumed that during the pre-reading phase the children have already participated in a program rich in first-hand experience. This provides the sensory input which stimulates both perceptual and conceptual development. They have developed a strong correspondence between spoken and written symbols. Vocabulary, concepts, and problem-solving ability have increased. The children have had many pleasurable exposures to books and words: dictating stories about their pictures, experimenting with rhyming and nonsense words, making their own "books" and contributing to class books based on group experiences. They have had training in auditory and visual discrimination, as well as hand-eye coordination. In general, they look upon teachers as helping adults who can be trusted, trusted because they listen; who can have realistic expectations, and who can make plans to implement each child's learning.

Learning to Read by Writing

During the first 4-6 weeks of the Initiation to Reading Phase* the children concentrate on the mechanics of writing. Much of the children's language work is teacher directed for short specific tasks. The teacher is teaching diagnostically--watching individual response, pursuing and elaborating, waiting or changing the medium. If they have not already done so before, the children learn to form the capital and lower case letters correctly by writing simple words and other exercises by the teacher. The children could use the wall chalkboard, or preferably individual boards for this early work. Individual boards may be made quickly and inexpensively by ordering masonite cut into 18 x 24" pieces and painting them with standard chalkboard paint. They soon move into using lined paper and the large beginner's pencil. Simple sentences dealing with classroom life are introduced, e.g., "My name is _____," "Today is Monday," "My job is juice," etc. Whenever they are able, the children begin to write individual stories. Parts of some of the stories may be dictated to a teacher or to an aide. Picture paper is introduced so that a crayoned illustration may enliven and elaborate a child's story. But every child knows some writing is expected daily.

When ready to write their own stories, each child is given a spiral stenographic notebook with alphabet tabs pasted down the side. Into this "dictionary" the teacher or aide write the words which the children need in their stories--"baby" on the "b" page, "house" on the "h" page. Upon asking for a word the child is directed first to this personal dictionary. The child identifies the beginning sound and searches for the correct page. If the word is in this dictionary the teacher points out that the word has been asked for before and makes a check mark next to it. In this way, both teacher and child see the words most commonly used, and soon the child is able to assume the responsibility of checking out those most frequently used. The dictionary is thus a skills practice device, a functional help to a busy teacher and a real source of independence for the children. In using the dictionary the child is reviewing beginning sounds, alphabetical order, developing the habit of skimming when looking beyond the first letter to see if the word needed is already there. When the child

*It should be understood that some five year olds may well have reached this stage during the kindergarten year, and that many six year olds will learn more effectively if their pre-reading experiences are extended and deepened until they are six and one-half or seven.

begins to read books, the pages beyond the alphabet have a special tab, "Books." As a book is finished and shared with the teacher, the title of the book and the date it was completed is entered on these pages. Thus, the child and teacher have an available record of progress and achievement, and before long most children are able to enter the title and date by themselves, adding to the vital sense of independence that nurtures their emotional and intellectual growth.

This personal dictionary serves yet another purpose. Reversing the book and starting from the blank page at the back it is used by the child to record practice in phonic skills as they are developed in the skills' groups. Thus, opening Betsy's book we find that she was working on:

can ----- cane

kit ----- kite

pan ----- pane

bit----- bite

hat ----- hate

By the end of the year there exists in this book a record of words needed for writing, recurring words missed which can become a spelling list for that child, books read, and phonic skills dealt with in individual or group instruction. For parents, it can be a graphic report on some important parts of the language arts program, and for next year's teacher it might serve as an indication of level, interest and skills that have been introduced.

The language experience approach to beginning reading also utilizes group stories. These stories are composed by a group of children (at first, a small group of 4-5 will be more productive) and dictated to the teacher or aide. The stories are usually responses to a school experience--either in the classroom or out of it (a trip, cooking, a pet, etc.). The teacher or aide accepts and records the children's phrases without correction. However, the adult gives much encouragement and expresses genuine enjoyment of the communications as it is elicited. All of these communications--either individual or group--are read aloud by the adults and by child volunteers as pleasurable, interesting material. There is always an open invitation to enjoy and to share each other's work by reading it aloud. However, these early stories are not treated as lessons. Not all children can (or wish to) read their own stories. However, in many classrooms where there is an opportunity to sign up on the board for story sharing at meetings set aside for this purpose, teachers find that interest is high, and listening to each other's

stories is a strong motivating factor for many children to go on with their own stories.

Basic to the beginning reading experience is the daily teaching chart for instructional purposes based on the children's language and experience, but including careful repetition of basic sight vocabulary. In classrooms where one basal reading series will be introduced later, the teacher may draw some words for these charts from the significant beginning words from the pre-primer of the particular series. However, many words are common to several different pre-primers and are easily introduced in the teaching charts, as they reflect common vocabulary in natural speech patterns.

The teacher should note how each child approaches the process of reading, particularly how the child puts reading to use in the classroom. Are the children reading the schedule and asking for labels and messages? The teacher should be more interested in the child's rate of acquisition of sight words and the way in which new words are approached than in precisely how many words have been learned. Is reading a pleasure and is it being used as a tool? Is it feared and avoided? Is there enormous effort without success? All these approaches and others will be found in a classroom. The teacher's basic job is to weave each child into a program that feels relevant to that child.

Skills Development

Simultaneous with the writing of stories and charts, the teacher is expanding the children's understanding of the relationship between the spoken sounds and symbol patterns. The teacher should be familiar with recent linguistic concepts that include the most strategic symbol patterns to teach. At this stage, the children work on the following:

1. Naming the letters of the alphabet, and associating them with their sounds.
2. Recognizing the single consonant sounds and the three most common digraphs (sh, ch, th) at the beginning and at the end of words.
3. Awareness of consonants and digraphs with medial vowel patterns. Ability to change beginnings and endings to make new words.

4. Rhyming
5. Recognizing consonant clusters--bl, tr, pl, br, cl, st, etc.
6. Building a functional sight vocabulary for life in the classroom, e.g., other children's names, days of the week, classroom jobs, number words, etc.

Many different practice games should be used to reinforce these skills. Commercially produced games are sturdy and attractive but teacher-made games are always related to the particular need of children for whom they are made. Sets of 3" x 5" file cards can be labeled and made up into rummy games. Popular games are "Names (of the children) Go Fish," "Concentration," "Days (of the week) Go Fish," etc. Shoeboxes can be divided into small sections which are appropriately labeled so that the children can practice sorting a collection of real objects by their beginning sounds, such as: a toy jeep, a toy telephone, a key, etc. Teacher-designed dittoed practice sheets are needed, too. We recommend having available as supplementary exercise material for some children the Stern Structural Reading Workbooks and the workbooks designed to accompany Bank Street Readers. If one Basal series is required, the teacher must study the workbooks and other materials which accompany the books and supplement them with teacher-designed games and exercises.

Introducing Books

After, perhaps, the first six weeks to two months of the "Initiation to Reading," the teacher sees that some of the children have mastered the skills listed above and are ready to begin a pre-primer. They can write simple stories and read most of what they write. The children continue to be read aloud to regularly and have been encouraged to handle and to look at a great variety of books, both pre-primers and trade books which have been attractively displayed in racks around the room. The teacher tries to select the pre-primer which is most appropriate for each child. The selection may be based upon vocabulary load, on the story content, or learning mode. The teacher knows that no matter what the beginning book, the child will need individualized follow-up activities.

These children, the first ones in the class who seem ready to start a pre-primer, have figured out an effective system for "cracking the code." They combine the skill of relating a sequence of letters to sounds with context clues. These children can usually handle any

of the available pre-primers. The teacher must be familiar with the vocabulary load, concept level, and story line of all the books. She can either let the "ready" children choose their own, or help those who need it with selections appropriate to each child's interests and mode of learning, whether it be sight, linguistic or phonic strengths that the child has demonstrated. In any case, it is a good idea to introduce proper names and unusual words or themes specific to a particular book or series. The English series of pre-primers, and the American "Monster" series are interesting additions to the usual collections of pre-primers.

Other children in the class will develop sufficient skill and perceptual maturity for book reading later in the year. In the meantime the teacher continues to give them language experience through charts and dictated stories on the one hand, and skills development on the other. A few children respond to "book reading" with avoidance, anxiety or anger. They need careful attention. With skillful teacher support, these children can sometimes be helped to develop their reading skills through their own writings without losing face and tuning out reading altogether. If however, they have not responded to the kinds of books suggested above, they may be able to use some of the programmed material, such as the series by Sullivan Associates, or they may be able to read material that follows specific linguistic patterns, such as the Miami Linguistic or Merrill Linguistic Readers.

Classroom Management

By now, a strong interest in reading and writing has been established for most of the children. Many have developed enough independent skills so that they can play the practice games, write stories, etc., with relatively little help. It is usually a good idea to limit choices during the work period to the related activities of reading, writing, and the language arts. The teacher can create a peaceful spot in which to work with one child at a time, while an aide (or aides) move about the room helping the rest of the children. During a one-hour work period, one teacher can work briefly with 6-9 children. Some children need only 5 minutes of individual time, other children may require 10-15 minutes. Thus, in primary classrooms of 20-25 children, the teacher sees every child individually twice a week. The impact of the teacher working with one child alone is so much greater than the more typical group reading lesson that the number of minutes per day cannot be compared in terms of effectiveness. However, as the teacher reads with each child she notes the skills that need more attention. From her records she is then

able to bring groups together for specific needs that might include identifying consonant clusters, moving from short to long vowel sounds, or comprehension skills. In this manner, groups shift and change according to need, and the teacher's time is spent more efficiently than if she taught all new skills individually. During this one-hour work period all the children are busy with self-selected and largely self-directing activities. They are expected to write something. This may include dictating to an aide, drawing a picture and writing a phrase underneath, copying a group story, copying from a story starter (oak tag cards with story beginning, such as: "My favorite job is . . . , " "At home my mother . . . , " "I get mad . . . , " or writing an original composition. Each child is also expected to "read." This may be silently or aloud to another child. Reading may also be the work in a work book; or any one of the practice games which are displayed on open shelves. It should also be remembered that other aspects of the daily program provide important and frequent opportunities for reading, writing, and the related language arts--listening to children read their stories aloud, listening to the teacher read a book, planning a social studies project, composing an experience chart, reading a recipe, writing a message, etc.

Most children need to have read several different pre-primers and primers successfully and with pleasure before moving into the next level of skill. This is another excellent reason for selecting pre-primers and primers from a variety of basal reading series. It is not until a child has mastered the first grade reader level that the wealth of available trade books can be introduced with any success. As the children finish primers and move to select first readers or trade books in an individualized program, other strands of the program (language experience and skills development) continue. The children write stories daily. They compose group experience charts. They read each other's stories and the charts. They continue their own skill development work through practice materials and in instructional groups.

Even at this early stage, a teacher should call upon whatever resources are available (reading specialist, school psychologist, project director) to help evaluate and plan the next steps for each child. Careful planning and individualized teaching at this stage can reduce the need for remediation in the upper grades. Reading with independence is the next phase of the primary reading program.

Individual Reading Assessment Form

FOLLOW THROUGH READING COMMITTEE

INTRODUCTION by KAY SARDO

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INDIVIDUAL READING ASSESSMENT FORM

"Beginnings" and "Initiation to Reading"

Follow Through Reading Committee
Introduction by Kay Sarido

Directions for Use of the Individual Reading Assessment Form

Beginnings

The Individual Reading Assessment Form was developed by Bank Street College staff, with the participation of staff developers and teachers from Follow Through sites. "Beginnings" and "Initiation" are the initial part of a continuous record of a child's development through the stages leading to comprehension of and competence in reading. This record should be passed along with other information from teaching team to teaching team as the child progresses through school.

"Beginnings" and "Initiation" focus on the child's thinking, verbal communications and motivation to understand the symbolic. These areas are basic to an understanding of the development of the child in general, and of reading in particular.

This form consists of 3 pages:

1. A cover sheet
2. Checklist Assessing Individual Development of Language and Reading--individual record
3. A Concept of Symbols or Comprehension - category reference.

The individual record sheet is a checklist of behaviors with squares to be blackened as the team observes indications of the child's strengths. Letters on the left side are category references for the page titled Concept of Symbols or Comprehension.

Tallies of these categories should be taken into account in reference to particular strengths, or areas not yet observable when talking with parents or planning for individual children.

First, 2nd and 3rd quarter designations help teams to set dates for review of the child's development in reading. Many teams have found it useful to complete this record in November, March and at the end of the school year. It is then passed on with other

pertinent information during a conference with the receiving teacher. This tool should be used as a way of showing the child's strengths and of explaining the reading program in the parent conference. It should be available for use by the interdisciplinary team when the child is being considered for special services.

A Way of Using the Reading Assessment Form

1. The teaching team meets to go over the record of 5-10 children at a time. Items are blacked in from memory. Every blackened square represents a behavior often and easily exhibited by the child. Leave blank those items which cannot be immediately identified. The team then makes a list of questions about each child. As children are observed day to day in the classroom, the team keeps track of their questions about each child. Having a notebook for this purpose is helpful. The team meets a day or two later to compare notes, black in more behaviors and possibly erase a few after their close observation.
2. Some teams have found it useful to tally the number of times Categories A, B, C, etc. occur for an individual child or group of children. This tally is a list of the categories which are probable areas of strength. Program changes should always include and expand these areas.

Teams often wonder "why not" about certain behaviors for which they feel a child is ready but for some reason not exhibiting.

Discussion questions which might help at this point:

- a. Where are the opportunities for this experience in our classroom? (Example: browsing in books)
- b. Is there anything we can see that discourages the child from using the opportunities? (Example: Must make a choice between books and blocks, and loves blocks. Can we set up time so he/she needn't make the choice between books and blocks?)
- c. How can we make it more attractive for that child? (Example: Have we included books on topics of particular interest to the child?)

- d. Will adult encouragement or help make a difference?
(Example: What happens when an adult steers the child to a book to find the answer to his/her question?)
 - e. How can we use the child's strengths and interests as motivation? (Example: The child loves to sing -- make available books which can be sung and use them at music time.)
3. The children's strengths should be noted. The team should talk over parts of the program which are especially enjoyed by each child. (Teams often keep a list of much enjoyed areas and activities with a tally or list of children's names.)
 4. Once all of the children have been assessed, a program review meeting should be held with a support person. One goal of the meeting should be to ask: What changes in classroom routine or activities might be helpful?

On the basis of knowledge about individual children and category tallies, a list should be made which includes:

- a. Activities to expand or extend
- b. Areas of program not working well for children at this time.

Once these discussions are completed, plans for indicated program changes can be designed and acted upon. Some changes will be less formal and much more related to the way adults are interacting with particular children.

When an individual child's reading assessment form has most of the squares blackened, the team should include Initiation to Reading (Section II) in their next assessment. Both forms may be retained until the end of the year, but only the pertinent forms should be passed on to the next teacher.

FOLLOW THROUGH READING COMMITTEE

Elizabeth Gilkeson, Chairperson
Carol Darcy
Vivienne Garfinkle
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"BEGINNINGS," "INITIATION TO READING"

DATE _____

NAME OF CHILD _____

GRADE _____

DATE ENTERING _____

TEACHER _____

Prepared by the Reading Committee

	CONCEPT OF SYMBOLS OR COMPREHENSION
	Oral Symbols
A	Understanding oral language as meaningful
B	Listening with comprehension
C	Expressive Communicating
D	Expanding Vocabulary
E	Following Directions
	Written Symbols
F	Understanding printed symbol as meaning
G	Writing Own Thoughts and Ideas
H	Reading for Information
I	Reading for Enjoyment
J	Following Directions
	PHYSICAL DEVELOPMENT
K	Auditory Discrimination
L	Visual Discrimination
M	Motor Skill - Eye/Hand Coordination
	SKILLS TO BE TAUGHT
	Decoding - Encoding
N	Context and Pictures
O	Continuing Expansion of Comprehension
P	Continuing Expansion of Sight Vocabulary
Q	Word Analysis
R	Spelling

*Approaches to
Teaching and Learning*

SOCIAL STUDIES

Helping Children Understand their World

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On November 14, 1975 Charlotte Winsor spoke at Bank Street College to a Social Studies Institute planned by the Follow Through faculty. Drawing upon her experience as a teacher of children and of teachers, Mrs. Winsor chose the title -- Helping Children Understand Their World. Excerpts from her talk, presented here, illustrate the thinking and feeling of children as they respond to vital experiences provided by their school program.

HELPING CHILDREN UNDERSTAND THEIR WORLD

Excerpts from an address by
Charlotte B. Winsor

"I think I know what social studies are all about. It is to find out what we are, how we got that way, and what are we going to do about it." -- A Bank Street student.

Let us look first at this definition, so simply stated and yet so encompassing of the developmental stages of growth in childhood, adolescence and on towards our own adult role. "What we are," is an appropriate age level exploration for children up to the age of seven or eight or nine. The world which they can best understand is the one in which they can see and smell and feel and hear the experiences which are theirs to know and think about. But "what we are" really develops knowing and thinking as we offer information to enlarge and validate their sensory experiences.

Let me read to you a group story, that is not only charming and worth listening to, but tells us how children are responding to an experience that has been ongoing in their lives. These are five year olds and it tells you how much experience -- often denied to many children -- these children have had. Nevertheless, what this demonstrates is not only that the children have had experiences from which they have built knowledge or content, but it has also been put through the process of artistic expression, completely unconsciously, by the children. So here is their story, true poetry, I believe. The title is "Tickets."

"Tickets"

Tickets are for giving to cars.

Giving to cars when?

Tickets are for giving to cars when they go in the wrong place.

When you go on a ferry to Fire Island you have to stop and get a ticket. You have to buy it. You have to pay money to get a ticket.

Train tickets.

You have to go to a man who sits in a little place that looks like a jail and then on the train a ticket conductor comes and takes your ticket.

Police tickets. That's when you do something against the law. You get a police ticket. It says something. It tells you what you have to do.

Bus tickets, plane tickets, toll tickets.

When you go on the turnpike, back and forth and back and forth on the turnpike, you have to buy a ticket.

When I was going to New Jersey, we had to get a ticket. When the man takes a ticket you have to pay him some money.

Car tickets, plane tickets, bus tickets, train tickets, ferry tickets, toll tickets, police tickets, turnpike tickets.

Tickets, tickets, tickets, tickets, tickets.

The children did not think they were telling a Sandburg poem, but they were, and perhaps because this group had processed their experience through the sensitive understanding of a knowing, artistic human being -- their teacher.

The next item in the definition, "How did we get that way?" Appropriately, beginning in the primary grades and on through the grades and perhaps through life, one can begin to be concerned about how did we get that way? Historical, economic, social concepts are not simple ideas but can be made available to the child's understanding as he can have some involvement in terms of his own reality. The story about tickets is one example and there are many more.

Here is another episode in a third grade in a public school: wall to wall nailed-down seats, but a willing and courageous teacher, ready to do something new and daring. The social studies theme was the woodland Indians of the Northeast. One youngster had been given a small piece of balsa wood, out of which he had carved a dugout canoe. I had been delegated to bring to the classroom an important official from the Board of Education to view the work which had been going on in this school. When we entered the classroom, this youngster dashed up to her and showed her his canoe. And she said, "Um, That's very nice." And do you know what he did? He shook his finger at her and said, "Do you know how long it took me to make this? Three weeks!" And then he went on to say, "Can you imagine how long it took those Indians to make their

dugout canoes?" My point about all of this is that it had really gotten into the innards of that little boy, that you had to sit there with that little instrument and work and work and work. This is where the idea of transmutation comes into meaning -- the feeling as well as the knowledge of what it took those Indians to make their longboats had really come to him. If ideas and concepts are interlaced with some intrapersonal reality, then perhaps the content of the learning really gets across. To make things, to do things, to draw, to paint, to sing, to write, to replay (which is the most important of all) the vicarious experience in one's own terms -- only then does it become part of one's armentarium of knowledge.

Now comes, "What are we going to do about it?" And that, of course, is the hardest part of social studies content. Do we take the sides? Do we share our despair with the children? Are facts and information necessary and relevant tools for opinion and action? Social action and true concern at a community or world level are hardly real for the child until he is at least an adolescent. Perhaps we have pushed children too hard, too soon in ways that are inappropriate. We hear that children are maturing at an earlier age, which indeed, has some truth. It has been fairly well established that physical puberty begins a full year sooner than was the average expectancy a hundred years ago. Also, as we said earlier, children are exposed to a wider panorama of personal and vicarious experience. Thanks to the automobile and airplane, more people and children go more often and to further places than ever before. And how the media bring some aspects and distortions of the world to children hardly needs to be elaborated. Nevertheless, each child has to fulfill his own childhood needs and only then can he begin to deal with the reality world. In the microcosm of the classroom, however, we do find events which offer opportunities for social conscience development -- not to be confused with adult moralizing! Social conscience development (Weltanschauung, a beautiful German word which means "looking at the world and knowing it") is a useless concept to a seven year old. But he does derive pleasure in carrying responsibility for tasks in his own group which can offer him important personal ego-building experience. We can hope and assume he will learn from such opportunities and grow into a person who cares about the world in which he lives.

Children themselves tell us how they are coming out of the physiological capsule in which we all live, how they are putting forth antennae into the larger world, and how they begin as children to live into other lives and other experiences, so readying themselves for the social contract that all of us have to make and hopefully without the loss of self.

I remember a five year old who built a rather simple railroad and day after day he would play with that railroad. As he pushed his block train on the road, he had a chant which he repeated over and over again and which said, "Power, power, I can go in the round-house." That five year old was saying to me, "Forget that I'm your little five year old -- I am a man who can run a great big train. I have power." And the fact that he used that very word was startling, gave me much thought, gave me an understanding of his wish for his own strength. And he needed to, since he was a youngster who played poorly with boys in games. But in this situation he had his sense of power and had to dramatize and so announce that strength. I remember two youngsters -- we had been on a trip where we had seen some men cleaning the sewers -- a rather unappetizing performance, but the children were tremendously impressed with the men going down and coming up with pails of gooey sludge. Two children -- Michael and Robert (called Mike and Bob by us) were re-enacting this experience in the play yard. They had built a tall structure out of the outdoor blocks and had put a pail down into it, playing the game of the men they had seen working in the street. But interestingly enough, we now had to call them Bill and Tom -- all through that day. Because they were really moving outside of themselves in their dramatic play they had to take on personalities -- at least outward signs of such personalities -- to make their play their own. In another sense they were moving outside of themselves into the adult role of work through dramatization, which can hardly be stressed sufficiently. I remember a seven year old group who were doing a great study of the city, and how we talked and dramatized the farmer sending us this, and the farmer sending us that. Then we went to the pasteurizing plant, traced the milk back to the farm, and again how the farmer sends us this and that. And one day the child said, "Hey -- what do we send the farmer?" This child was showing his awareness, social knowledge, and relatedness to others that he could not have offered us had he not lived through these experiences in his play and dramatization. I remember an eight year old group. In the school where I taught, the job program is very important, and the eight year olds run the school post office, with a great deal of responsibility. One of the children I had taught at seven came to my classroom after the beginning of the new year and said, "I love to be eight!" I was a bit dashed, after all she had been in my wonderful seven year old class the year before, but I said, "Why?" And she answered, "I love to be eight, because we're so important you know. I don't know how this school would run without the post office." It must be a marvelous eight year old experience to be able to feel that now that I have reached the mature level of an eight year old I

have this important role to play. I am old enough to render service to my community. And what was more important to me was that she was giving me the internalization of the meaning of this project. She was beginning to understand the need of a social structure. That's why we have a post office. She was also saying, quite simply, why she was so glad to be eight, she was internalizing not only what she was doing but how she was thinking about it. And she was expressing her gratification at moving up to being the person who could be doing something valued within her peer society. Some other children in this same post office job gave us in a rather jolly fashion their concept of their job, which tells how they viewed their responsibility. And this is what they published as their ad.

"Whether we are in clay or at play,
Or doing rock identification,
The mail will be delivered to its proper destination."

Which, by the way, sometimes causes quite a little problem with eight year olds responsible as postmen. A lovely warm day, you could go out to play in the yard, but you have to deliver the mail. And after you had carried out your responsibility perhaps you have learned the deeper meaning of social gratification.

Teacher Notebook for Planning a Course of Study

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"The social studies program serves as a core providing a common theme of study while integrating the learning of the basic skills."

Review of Model Implementation:
Checklist of Criteria, Project Follow
Through, Bank Street College, 1976

INTRODUCTION

At the heart of Bank Street Follow Through teaching is a way of integrating all areas of curriculum, in which the basic skills are developed as tools for achieving more significant knowledge about the world and the people in it. This is based on some fundamental assumptions about how children develop, how learning takes place, and the role of the adult in promoting children's learning. It is a view of learning and teaching which has a long history in education.

Though the integration of curriculum is a long-standing idea in education, its enactment is difficult. It is more complex than the traditional way of compartmentalizing subject matter. In order to avoid a sense of vagueness and confusion, the teacher needs an organizing framework for the study. This is the purpose of the Teacher Notebook for Planning a Course of Study, which guides the teacher from the initial choice of theme to review and assessment. Using the Notebook, the teacher sees:

- how different curriculum strands can be integrated around a central study or theme
- how the development of skills can be related to integrated curriculum
- how to combine theory with practice.

In the Teaching Planning Notebook there are both explanations of why certain choices might be made and suggestions for how to go about doing things. Sample worksheets are illustrated at the end of the notebook. These worksheets help the teacher keep track of the general development of the study and the progress and learnings of each child.

They serve to:

- track assignments
- monitor skills development
- document the growth of children's understanding
- keep track of valuable resources.

It is suggested that these worksheets be copied and inserted at the appropriate place in the text during a study. They can be removed and filed when it is over and replaced by a new set for the next project. Interleaving the worksheets with the pages of explanation helps the teacher keep thinking about the "why" of the work as she/he guides the children through the challenging and exciting complexities of an integrated course of study.

I. GETTING STARTED: TEACHER PLANNING

Children are students of their world. From infancy each child tries to know the environment by interacting with it and acting upon it. All teaching adults, relatives and caregivers as well as parents and those officially designated as teachers, join with children to help them accomplish this task. From this point of view grows the Bank Street Follow Through position that the school curriculum should be "focused on the study of the environment and the way people live within their environment." (Gilkeson and Bowman, 1975)

The child's world, however, is an expanding universe. Children enter school with many perceptions -- and misperceptions. They bring with them information -- and misinformation. The wider world of which they are becoming aware, of which school itself is one small part, is a highly complex one. Adult knowledge about it is increasing at an unprecedented rate. If the teacher is to select a piece of that world for deeper study, how is she/he to make that selection? What are the criteria for choice? What are the questions a teacher must ask to make sure that the themes chosen are those that do indeed help children better understand their world and the way people live in it?

A. Personal Interest

In considering a theme or core curriculum it is important for a teacher to ask, "Is that something I am interested in? Would I like to know more about it? Am I already knowledgeable and enthusiastic about it?" A high level of teacher interest is an important motivation for children, but interest itself is not enough. While a certain amount of "learning with the children" is fine, having a grasp of a subject makes it possible to ask the right questions at the right moment, or steer a child toward a relevant piece of information. So personal investment is a legitimate consideration.

B. Accessibility of Resources

Young children learn best through first-hand experience, so it is important to consider the availability of resources through which the theme can be developed. These resources may be people, places or things in the community as well as the materials and personnel within the school itself. Questions of safety, distance, and opportunity for more than one contact are all important.

C. Relevance

Children should feel and understand that the chosen central theme is important to them and their lives. For example, city governments may make many decisions that have great relevance to the lives of young children. But this does not mean that structure of city government is an appropriate study for first graders. However, a study of such city employees as firemen, policemen and sanitation workers (as an expression of the interdependence of people) forms a basis for later understanding of city government. Children need time to develop their sense of the connectedness of things. Young children need to study what is closest at hand and has the most visible impact on their lives.

D. Potential for Conceptual Learning

Some themes are better than others in their potential for helping children develop the "large ideas" about a community, the way it functions, the interrelatedness of its members, the way community needs are met. Teachers need to state to themselves the concepts that they hope the children will build through a particular study. A study that includes a trip to a farm may have as its conceptual theme the interdependence of people and animals, or the importance of plants as the ultimate source of all food.

E. Suitability for Children's Age Level

A theme must not be too abstract for the developmental ability of the children. There must be enough of the "here and now" to make it accessible to all the children at some level. For example, the history of the community is not a suitable study for first grade because of the limited ability of six year olds to deal with distance through time. On the other hand, third graders, with help, can understand time duration and sequence sufficiently to make it an appropriate study for them.

F. Potential for Independent Thinking

If children are to perceive learning as something they do, not something that is done to them, they need to identify "studying" in many contexts. A theme should be chosen which allows children to explore aspects of it, on their own, at home, in the playground or on their own street, as well as in school.

G. Time

Themes vary in their complexity and the amount of time that may be needed for children to carry out concept-building activities (see Sections V, VI). Different times in the school calendar offer more or less uninterrupted time for developing a core curriculum. For example, one would not initiate a long-term study during the busy time between Thanksgiving and Christmas.

Record Keeping

Once the teacher has selected a theme of study and identified the concepts she/he hopes it will help the children build, it is a good idea to write these down. Both students and teachers may think of many things it would be interesting to do that seem related to the central theme, and some may be more appropriate than others. If the underlying ideas are written down, the teacher has a guide to refer back to when making choices and decisions.

II. TEACHER AND CHILDREN PLANNING TOGETHER: INTRODUCTION, INITIATION, MOTIVATION

Once the period of teacher preparation is complete, the teacher may introduce the theme to the children through books, a film, related articles, a guest speaker, a discussion, even a trip. This introductory activity should provide the opportunity for the teacher to assess what aspects of it they would be interested in investigating further, and what their questions are.

Whole group and small interest group* meetings and discussions will help surface the children's knowledge of the subject and appropriate ways to investigate it. This is a time to involve the children in identifying people, places and other community resources which might be connected to the study. Whole group

* See Page 7 for organizing Study Groups for Skills Building.

and committee discussions, encouraging creative and speculative thinking and thoughtful exploration will help the children (as well as the teacher) become aware of:

- what they already know
- what they would like to know (their questions)
- sources and methods for learning this.

Activities at this introductory period would include, for example:

- making a chart of children's questions
- formulating and recording conjectures and hypotheses
- contacting resource people
- collecting pamphlets and schedules about community resources
- consulting with the librarian and collecting relevant books, filmstrips and other media resources.

Record Keeping (See Worksheet 2)

Skills-building activities at any point will vary depending on the grade level and competence of the children. Possible skills at this stage might include:

- the correct form for writing letters
- formulating and writing questions and statements with correct punctuation
- alphabetizing in order to use a card catalogue, encyclopedia or unabridged dictionary
- learning alphabet and numeral recognition in order to make phone calls to resource people
- reading time, to use timetables
- using maps to estimate distances, locate resource areas
- predicting distance/time relationships
- learning how to write and add sums of money
- estimating and averaging costs
- using a table of contents, index or bibliography
- the listing, reading and spelling of key words in the study.

Record Keeping

If the skills in each of the major skill areas that will be taught in relation to the study are arranged as a checklist on a class roster, this becomes a way of keeping track of each child's progress (see Worksheet 3). This helps the teacher plan for instructional groups and individual assignments. The checklists can also be used to reassure administrators or parents that skills are not being neglected while children are involved in other kinds of active learning.

III. GROUPING THE CHILDREN

Social Studies is more than a content area about the environment and the way people live together in it. It is also a way of developing understanding of social relationships by living them out within the environment of the school. Carrying out a core curriculum offers excellent opportunity to create heterogeneous ability groupings. This is especially important in classes where grouping usually serves skills instruction purposes.

Grouping supports more independent learning, giving children a chance to learn from and with other children. Grouping allows for more varied experiences. Not every group has to do the same thing, either in acquiring or in processing information. Grouping allows children to experience the value of working together as a team, and helps them to appreciate the strengths of others and to handle irresponsible or inappropriate behavior on the part of peers.

There are many possible bases for grouping:

A. Social Grouping

Social grouping may depend on the children's own choice of working partners -- "best friends" may want to work together. Or grouping may be made by the teacher on the basis of children's social development and way of functioning in a group: dependent with independent children, leaders with followers, fast thinkers with contemplative, thorough workers.

B. Formation of Research Teams

The class may be divided into research teams, with each team member assigned a specific role -- investigator, recorder, materials manager, etc. on an alternating schedule.

C. Interest Groups

Children may volunteer to work on committees that study the area of the work to which they feel most attracted. It is important to remember, however, that some children need time to explore and sample before they are ready to commit themselves to a specific area of study, although others can identify their special interest immediately. Some children's interest is soon satisfied. At this point they need the opportunity to make new choices. Others will be able to stay involved with one area for a longer time.

D. Performance Ability

Grouping may be on the basis of children's strengths, abilities and talents. Some children like to express what they know by writing, some by painting or drawing, some through dramatization, oral presentation or model making. These preferences may also serve for creating work groups.

Groups, and the basis on which they are formed, may differ at different stages of developing core curriculum. Research teams may seem more suitable for the data collection stage, while interest groups may serve better during the processing period. The teacher should be prepared for some flexibility, while thinking about how to help the children be responsible about completing one commitment before undertaking another.

IV. COLLECTING INFORMATION: RESEARCH AND RECORDING

Once sources of data have been identified, information may be collected through trips, interviews, reading, taping, photography, sketching, consulting resource materials such as maps, graphs, charts, diagrams, filmstrips, and examining artifacts.

Trips may be visits to primary sources of information -- people, a bakery, a farm, a store, a river, a restaurant; or to

secondary sources -- a library, museum, art gallery, hall of records, etc.

Reading may cover such diverse materials as the local newspaper, books of poetry, social studies texts, works of fiction, biographies, diaries, the phone book, and encyclopedias.

Children should be encouraged to be inventive about ways of recording data collected so that they can be used and shared. For example, graphs, charts, lists, resource files, maps, diagrams, and collections to be examined, sorted and classified help make the information each group has collected available to all when work groups need it.

Record Keeping (See Worksheets 4 & 5)

Skills-building at this point might include:

- taking notes (getting the main idea)
- interviewing -- asking questions and listening
- skimming written material for information
- understanding topic sentences and paragraphing
- alphabetizing
- map making and reading
- graph and chart making and reading
- understanding fact, opinion and fiction
- classification.

V. USING INFORMATION: BUILDING, DEVELOPING, PROCESSING

When children have acquired information related to the central theme and have organized it in easily retrievable form, they are ready to take the information and use it to reconstruct their learning through expressive, processing activities. Mere accumulation or memorization of facts is not enough to build concepts. Information must be processed for meaning to be gained and concepts formed. True learning is the discovery of relationships.

Model building, cooking, dramatization, crafts, painting, mural making, drawing, making books, maps, time lines, story

writing, and "sciencing" are process activities. They both draw on and help children to elaborate and connect various pieces of information.

At this stage the role of the teacher is that of participant/observer. As participant, she/he helps students clarify their "ideas," draw on available information, organize work groups, and select activities most appropriate to their needs and interests. As observer, she/he listens, asks questions, notes confusion, "problems," misperceptions, skills needs, and especially "successes" -- evidence of growth and learning.

Record Keeping

Most teachers have well-developed systems for evaluating children's progress in gaining new skills. The acquisition of concepts is much harder to evaluate, and indeed most concepts continue to be broadened and built upon throughout a person's lifetime as the result of new experiences and new information. However, if building certain concepts is the goal of the study, it is important for the teacher to be aware of how successfully her/his goal is being met. A rote verbalizing of the ideas is not a satisfactory level of learning. Rather, as the children have experiences and gather information, the teacher will need to be alert to the questions they ask, the comments they make, the methods they propose for solving problems and finding answers. She or he needs to be a good observer and to have a quick way of recording what she/he has learned through observation. Worksheet 6 is designed for this purpose.

Skills-building at this point may be concerned with:

- blueprint making and reading
- following written directions, as in a recipe
- reading and ordering large numbers
- scale and ratio
- script writing
- narrative and expository writing
- sequencing
- setting up and carrying out a science investigation.

VI. ENDING THE STUDY: PRESENTATION, REVIEW, ASSESSMENT

To maximize learning and concept development, time and planning must be invested in bringing the study to a close. Without this summarizing step there is danger of the work being trivialized into a series of pleasurable but relatively unconnected activities. Students need opportunities to identify for themselves what they have learned and to share their learning with others.

Sharing can take place in two contexts. The first and necessary sharing is among those who have been working on various aspects of the study. They need to pull together their learnings through looking at, thinking about, and discussing each other's work. This is a vital step. A thoughtful review of which resources were truly helpful, what techniques worked, and what questions still remain unanswered, helps children understand that learning is a dynamic process, and a continuous one, rather than the acquisition of a series of neat answers. And it helps put misjudgments, mistakes and failures into perspective as a necessary part of learning. These can be discussed supportively and examined in order to gain insight for future work. During this period of reflection, review and sharing, the teacher may want to help children summarize by recording those resources and materials which best met their learning needs. Certainly this is information which the teacher will want to keep, whether it is she/he or the children who take responsibility for documenting it. (See Worksheet 7.)

The other kind of sharing is a way of communicating to those outside the group -- parents, other classes, community groups -- what has been learned and developed. This sharing can be in the form of displays, such as a collection of child-made books in the library, a museum showcase of collected artifacts, an exhibition of art and craft work or a mural. Or it can be in the form of a dramatization -- a pageant, a play, a "T. V." or "radio" format, a puppet show, or a "theme" day in costume for parents visiting the classroom. (See Worksheet 8.)

During all culminating activities the teacher will continue to be aware of each child's progress towards building the conceptual learning originally defined as a goal of the project. This information will in part become the basis on which the teacher chooses the theme of the next study and decides next steps in curriculum building for individual children and the group. She/he

too needs to take a reflective look over the whole study from the teaching point of view, with the wisdom gained through experience. This is a good moment at which to write down insights, plans, regrets and second thoughts so that each successive study becomes a learning experience for the teacher as well as the children. (See Worksheet 9.)

Worksheet 1

CENTRAL THEME:

What are the concepts I want to build with the children through this theme?

Why?

Worksheet 2

TEACHER AND PUPIL PLAN

Introductory Activity

Possible Resources

Children's Questions About Theme, Learning Needs

Activities

Worksheet 4

COLLECTING INFORMATION

<u>Group</u>	<u>Sources Consulted</u>	<u>Information Made Available to Group Through:</u>

Worksheet 5

Study Groups for Skills Building

Reading/Language Assignments

Date	GROUP I	GROUP II	GROUP III	GROUP IV

Math/Science Assignments

Date	GROUP I	GROUP II	GROUP III	GROUP IV

Observation Log for Individual Children in Work Groups

Concepts of Study:

Concepts of Study:			
Name	Experience, Task	Observations, Notes	Ideas for Next Study
1			
2			
3			
4			
5			
6			
7			

Worksheet 7

Ending the Study

Resources Used

A. People

B. Places

C. Materials

D. Books

Recommend for Future Use

Worksheet 8

Ending the Study

SHARING

Date	Group	Content & Format	Audience Reaction, Comments, etc.

Worksheet 9

Ending the Study

Possible Next Steps, Comments, Special Notes:

Map Making and Map Thinking in Early Childhood Education

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MAP-MAKING AND MAP-THINKING
IN EARLY CHILDHOOD EDUCATION

Annette Shapiro
and Bank Street Workshop staff

In map-making, as in any other curriculum area, we start with the familiar and close at hand as the foundation for the child's understanding and learning. In the early school years, teachers work to develop young children's grasp of space and directional relationships in the school and neighborhood. At the same time the social studies curriculum is giving the child the knowledge and the ability to interpret and relate the facts he is assimilating as a vital background for map-making and map-thinking.

The child is beginning his map-making when he uses block buildings, carton houses and stores, transportation toys, papier-mache hills or a blue oilcloth river for his restatement of the world he lives in. He will go through gradual steps from using these concrete materials to an intelligent use of semi-abstract and finally abstract symbols. It is the teacher's role to keep the relationship between these equivalents and the real world alive and meaningful.

Suggested Activities and Experiences

- I. Use terms "uptown," "crosstown," "toward the river," etc. North, east, etc. should come later.

MAP Use a table or the floor and place cartons or boxes as the school and as familiar landmarks. Depending on the school neighborhood, this may be a large department store or the entrance to a bridge, or a railroad station. Have the children walk uptown or downtown, or if this is done on a small scale, "walk" a little doll or push a tiny bus, discussing the route meanwhile.

- II. Become familiar with the streets on which the school stands. Relate them to the classroom and the exits the children use.

MAP Reproduce with four long blocks or strips of paper, the square block on which the school stands. Be sure they are in correct alignment with the real streets. Use a pile of blocks or books to represent the school. Place a distinguishing mark on the spot representing the classroom

window. Figure out with the children where to put the school street exits. Dramatize with a small doll going in and out of the school and around the block to different entrances. Refresh the children's memory by going to an exit and viewing the street as they work this out.

III. Develop this kind of experience with other locations.

MAP A larger section of the neighborhood, including places to which you have taken trips, or other important locations or earth forms such as river, park, hill. For this the children may construct box buildings, a bridge, cars and trucks, etc.

MAP A reproduction of the corridor in which your room is situated. Lay out the corridor in correct alignment using a long, wide sheet of paper and use single blocks to denote doors, windows, closets, etc. Dramatize this by using a small doll "to walk from one room to another."

MAP A Walk -- make a report on a recent trip, laying out the streets, destination and some of what you saw on the way. Use a small doll to represent the class and move it up to each location as you add it in the course of your discussion.

MAP A block or crayoned layout of the corner street crossings which include the school. Use toy cars, a policeman and dolls to demonstrate safety procedures. Check to see that "streets" are in correct alignment with real streets.

MAPS:

- Should always be simple, concrete, and of familiar territory.
- Should be three dimensional.
- Should be horizontal (rather than vertical) in order to firmly establish space and directional understanding.
- Should represent an area that the children can explore, check for accuracy and invest with meaning.
- Should always be laid out in the room so that they are aligned with the real world they represent.

- Should preserve and point up relative proportions in sizes and distances.
- May fulfill their purpose by being developed in a short discussion or may be the product of many weeks of thought and work.

Materials in Map-Making

The following suggestions are listed for the teacher's selection and adaptation to her own special classroom needs:

Blocks

- a) Children's spontaneous building of stores, houses, boats, trains, may be the basis for informal teaching of direction, location, proportion.
- b) Single blocks serve as symbols in brief discussion maps, e. g. , laid flat for street, track, corridor or upright for single buildings, lamp pole, hydrants, etc.

Bodies of Water may be indicated by:

blue oilcloth (a larger length may be rolled up and stored with the blocks to be used when needed)

paper, painted or crayoned blue

a pie tin, lined with blue oilcloth used with real water.

Small Figures may be made with:

pipe cleaners

crayoned cut-outs attached by thumbtack on tape to a large cork or a cube for easy moving

clothespins, discarded spools of thread, cardboard cones, thick beads

Plasticene or clay.

Trucks, Cars, Wagons, Trains, Stores, Buildings
may be made with:

large and small milk cartons (water color plus soap flakes will help paint stick)

cheese, cracker, large match, frozen food, cereal boxes.

Trees or Plants or Poles

Set in a lump of worked-over plasticene to stand:

a real twig, set in clay

a rolled length of brown paper

a painted drinking straw

a length of pipe cleaner

bits of sponge as foliage or blossom

any other way the children think of.

Fences

clothespins

tongue depressors or coffee sticks

brown gummed tape

scraps of wood

Hills and Rocks

molded plasticene

papier mache mush, squeezed out, molded to shape and painted -- puncture with deep holes to ensure drying

slightly soaked brown paper, squeezed and molded to shape and placed on a pasted surface.

Brown gummed tape

is useful for stationary representation such as figures, bridge, pole, etc. Double tape, cut to size and fold back small tabs at bottom. Dampen these tabs to fasten to surface.

The construction of small representational objects is sometimes difficult for young children. It is often more expedient, when the objective is a map experience, to combine their use with small commercial transportation toys and small wooden or rubber animals and/or dolls.

Map Surfaces

Table top covered with large sheets of white paper fastened down with scotch tape

Composition board: masonite, beaver, celotex, approximately 4' x 3' to be placed over tables or desks or across two chair seats or on the floor. Small square pegs may be nailed or glued on as legs.

A length of oilcloth used on its dull side

Large outline maps.

*Approaches to
Teaching and Learning*

MATHEMATICS
AND
SCIENCE

Teaching Mathematics:
A Bank Street Point of View

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Teaching Mathematics: A Bank Street Point of View

M. Endreweit

Number, size, shape and order are the essential stuff of elementary mathematics. They are also qualities of the physical world. Thus children are exposed to the subject matter of mathematics from their earliest days. The more children interact with their physical environment, the more they encounter variations of number, size, shape and ways of ordering, in a great variety of contexts.

Children starting school, whether at the age of four or five, have had many experiences with the content of mathematics. These experiences may have led them to develop some elementary concepts and understandings about number, size, shape and order. However, mathematics is a set of complex and abstract systems, with their own formalized symbols and language. For children's experiences to become truly mathematical, they must be so organized by the teaching adult that they provide insight and entry into these systems. Both in the first years of school and on through the grades it is the teacher's role:

to select activities and materials suited to the children's age, previous experience and interest

to help children become aware of what they are experiencing with the materials in a new way, by posing problems for solution

to ask them to consider their experiences and to compare, evaluate, question and discuss them with school adults and with other children

to help them to develop new ways of recording their math learnings that are meaningful to them

to introduce them to the standard vocabulary and symbols of mathematics that are related to what they are learning

to provide opportunities for the practice of newly learned skills

to identify the next skills each child is ready to learn.

No two children come to school having had the same experiences or the same stimulation to think and talk about what they have experienced. No two children are at exactly the same stage of intellectual

development. To participate with understanding in a school arithmetic program, a child needs:

the cognitive skills of ordering, categorizing and patterning

the initiative and imagination to invent ways of representing experience with materials that lead to understanding the meaning of the standard math symbols

the ability to recognize and remember written shapes and symbols

the small-muscle control to reproduce those shapes and symbols

the receptive and productive ability with the specialized language of mathematics.

These competencies come about, partly as a result of growth, partly as a result of experience, over a period of time that will differ for each child. To make curriculum decisions, teachers need observational and diagnostic skills that are grounded both in child development and a knowledge of subject matter.

With the stuff of mathematics all around, there is never a lack of materials through which to teach math, nor of opportunities to observe children's levels of understanding as they go about the daily activities of school. Ideas about number, and the need to add, subtract, multiply and divide occur as the children assemble, then group and re-group themselves, and as they share and distribute materials all day long. Ideas about linear measure, and all the special vocabulary used to talk about it -- "height," "width," "tall," "length," "near," "further," "straight," "curved," etc. -- are used in the block corner, in arts and crafts, in the school yard, and in connection with taking and mapping trips. Insights into volume can occur as paint is poured in the art corner, as juice is poured at snack time, or as cold drinks are shared on a picnic. And so it goes all day long as the teacher "tunes in" to mathematical events and to the children's spontaneous expression of mathematical thinking.

Of course, such happenstance mathematics is not the whole of the program for any group. But where the teacher is aware of the informal attempts by the children to understand, and draws on relevant everyday experiences to illustrate and illuminate, children are more likely to perceive the formal learning of mathematics as an exciting new way to make sense of their world.

Math with Bean Sticks

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MATH WITH BEAN STICKS

David Wickens

Materials

1. Tongue depressor, the kind the doctor puts on your tongue and asks you to say "aaaahh."
2. A big box of dried beans. The best are red kidney beans.
3. A jar of glue. Elmer's glue or any glue similar to it is fine. It should be a glue that washes off hands and out of clothes.
4. Put a thin line of glue on the tongue depressor.
5. Fix 10 beans on the tongue depressor and let them dry.
6. Put the bean sticks in a container.
7. Put the remaining loose beans in a container.

What You Can Teach

Bean sticks have a wide variety of uses as a math learning material. They can be used to give a child experience with:

- one to one correspondence
- counting
- addition
- subtraction
- "tens and units"
- association of symbol with quantity

Perhaps their most important value is as a material a child can use independently to work out problems. Moreover, they allow for individualization. For example, a teacher might give some children simple counting problems and still other children subtraction problems.

Rules

There are a few basic rules that should always be followed because they are essential to using the material most effectively.

1. Bean sticks are a child made material.
Why is this important? Think about how you would go about making the bean sticks. First you would have to count out 10 beans. Then you would have to estimate how to place them on the stick. That same process -- if you let the children do it -- is drill in counting. It's also good experience in spatial arrangement. Try it. I would be surprised if any children did not enjoy this experience.
2. Bean sticks are a child repaired material.
Again, the process you would go through to repair the sticks is a basic counting exercise. Moreover, it's really a task children can perform competently and feel satisfaction about taking care of materials.
3. Bean sticks are a material that should be used to teach counting, addition, subtraction, tens and units, and association of symbol with quantity at the same time. Any problem you can use the sticks to work with involves counting. No matter what you do, the children will be getting experience in counting. Addition and subtraction are really two aspects of the same process. One process "puts together" and the other "takes apart." If you put a quantity of beans together -- for example -- 3 beans and 2 beans to get 5 beans -- take them apart and you are doing subtraction!

If the children use bean sticks and loose beans to work out problems, they are operating with "tens and units." If the teacher presents the child with a representation of 2 bean sticks and four loose beans as 24, the children are given the opportunity to associate symbols with quantities.

Example of Classroom Use

Let's follow the process of introducing and using the bean sticks through a class record.

FIRST DAY

The teacher has placed a paper plate with a pile of approximately 100 beans in front of several groups of children. Each group has 3 children. There is also a pile of 30 tongue depressors and a small container of glue in front of each group.

The teacher is handing out one model bean stick which she has made to each group. As she hands it to a child in the group, teacher says:

"Each of you count the beans on this bean stick and remember how many there are."

Each group is counting. The teacher returns to each group in order and each group reports "ten beans."

The teacher returns to the center of the room and says: "I'll show you how I made them."

Teacher has materials available, quickly puts a thin line of glue on a tongue depressor and fixes beans on the tongue depressor, counting as she does. "One, two, etc...." Teacher holds up the finished bean stick and says:

"Now each of you work together and make these. Remember, each bean stick has 10 beans on it. I'll walk around and help, if you need it."

Teacher walks around room checking number of beans on sticks. She shows several groups how to use less glue. They have had many experiences with glue before. Whenever she finds a stick done incorrectly she moves it to the side and tells one of the group:

"Work on that one again. There aren't 10 beans on it."

When the children are finished the teacher places plastic containers on the table and the children place their bean sticks in the containers as she tells them to. Then she collects all the containers and puts them on a shelf in the math area assisted by several children. There are several small containers of loose beans on the shelf. Teacher turns to the class and says: "This is where we are going to keep the bean sticks and loose beans. When you need them they will be here. Now as we use the bean sticks the beans will sometimes fall off. We will need some people to check the bean sticks every few days and repair them. This is a new job. The people who check to see that the math area is clean will also have the job of counting the beans on the bean sticks."

SECOND DAY

(The teacher and aide role-played the following sequence the day before and the aide felt comfortable about working with the bean sticks.)

A group of 8 children and teacher are seated around a large table. There is a paper plate with loose beans on it in front of every two children and a few stacks of bean sticks in the center. Teacher says:

"How many beans shall each of us take from the plate, Janet?"

Janet says, "Six."

Teacher says, "All right, each person count out 6 beans."

Teacher writes 6 on the portable chalk board at the top. She also scans to make sure each child has 6 beans.

Teacher says, "All right, Alex, how many beans shall we take this time?"

Alex says, "A hundred."

Teacher says, "That's such a large number. I don't know if we have enough beans and if we do, it would take a long time to count. Choose a small number. Less than 10."

Alex says, "Eight."

Teacher says, "All right. Everyone take 8 beans."

Children count out 8 beans.

Teacher writes +8 so now there is 6 on the board.

$$\begin{array}{r} +8 \\ \hline \end{array}$$

Teacher says, "How many do you now have altogether?"

Several children say "14" after counting. One girl says "12" and a boy says "15." "Let's go back and see what is correct. What did we start with?"

Teacher points to 6 on board.

Several children say "6."

Teacher says, "O.K., now how many beans do you have altogether?"

All children say "fourteen."

Teacher writes 14 on the board. So now there is 6

$$\begin{array}{r} +8 \\ 6 \\ \hline 14 \end{array}$$

Teacher says, "Do you remember how many beans we pasted on the bean sticks?"

Several children say "10."

Teacher says, "Right. Now I'm going to make a rule. Whenever you have 10 loose beans you must exchange them for a bean stick."

Boy says, "I have 10 beans."

Teacher says, "O.K., count them and put them back on the plate. Then take a bean stick."

All children do this.

Teacher says, "O.K., now how many bean sticks do you have?"

Several children say "one."

Teacher points to 14 on board. "That 1 stands for 1 bean stick. How many loose beans do you have?"

Several children say "four."

Teacher points to 14 on board and says, "The 4 stands for the 4 loose beans. Janie, how many beans should we take this time?"

Janie says "nine."

Teacher says, "O.K., everyone count out nine beans."

Teacher writes +9 on board under the 14.

Children count as teacher watches.

Boy says, "I have 10 beans."

Teacher says, "Exchange them for a bean stick."

Several other children also say they have 10 beans.

Teacher responds to each child. All the children exchange beans.

Teacher says, "Now how many bean sticks do you have?"

All children say "two."

Teacher writes 2 as 6

$$\begin{array}{r} +8 \\ 14 \\ +9 \\ \hline 2 \end{array}$$

Teacher says, "That 2 stands for 2 bean sticks. How many loose beans do you have?"

Several children say "three." Girl says "two."

Teacher says, "Brenda, you start with 14 beans. Here are 14."

Teacher arranges 14 loose beans and says, "Now count out 9 more and everyone watch to make sure."

Brenda counts out 9 more and adds.

Teacher says, "All right, here is a bean stick."

Teacher obviously scans beans to make sure there are 10 beans, and hands Brenda a bean stick. "Now how many loose beans do you have?"

All children say "three."

Teacher writes 3 on board to complete 23.

Teacher says, "The 3 stands for the loose beans. How many do you have altogether?"

Alex quickly says "23."

Janie counts each bean on each stick and the 3 loose ones.

Others do either of these ways.

Teacher says, "Alex, how did you know so quickly?"

Alex says, "I knew there were 10 here and 20 and 3 more."

Points to 2 bean sticks as he does this addition by 10's in his head.

Teacher says, "You counted by 10's and added 3. This number is 23." Points to board.

"Kurt, how many should we add or take away?"

Kurt says, "take away 5."

Teacher says, "O.K., take away 5 and put them back in the plate." She writes -5 under 23.

Girl says, "I only have 3 beans."

Teacher says, "What shall we do?"

Kurt says, "Take 5 off the stick."

Teacher says, "That is one way but then we would have to fix all our bean sticks. What else can we do?"

(Silence)

Teacher says, "All right. You put your bean stick back in the pile and take 10 loose beans."

All children do. Several take away 5 beans.

Teacher says, "Now take away 5 beans."

Other children do.

Boy says, "Now I have one stick." Teacher writes on board as

$$\begin{array}{r} 6 \\ +8 \\ \hline 14 \\ +9 \\ \hline 23 \\ -5 \\ \hline 1 \end{array}$$

Teacher says, "And how many loose beans do you have?"
 Several children say "eight." One girl says "five."
 Teacher points to 23 on board and says, "How many did you have after you exchanged the bean stick for 10 beans?"
 Girl says "23."
 Teacher says, "All right, Julie, put 23 beans in front of you. Everyone else leave your beans in front of you. In another place make this number." She writes 31 on the board and says, "Remember which numeral stands for the loose beans."
 Teacher scans as children do and writes another number on board for each child as he finishes.
 Teacher completes check with Julie and group cleans up.

Instructional Sequence

1. Children make bean sticks, using teacher-made model.
2. Assign a place to keep materials in containers.
3. Explain process of taking care of materials.
4. Introduce adding and taking away game with teacher writing numerals and operation signs on board but not asking children to repeat numbers.
5. Make cards with numbers on them such as 34. Use as an alternative to adding and taking away game.
6. Play adding and taking away game. Introduce teacher demonstration of carrying and exchanging as

$$\begin{array}{r} 14 \\ +6 \\ \hline 110 \end{array} \quad \text{then} \quad \begin{array}{r} 14 \\ +6 \\ \hline 20 \end{array}$$

$$\begin{array}{r} 23 \\ -5 \\ \hline \end{array} \quad \text{then} \quad \begin{array}{r} 1 \\ 213 \\ -5 \\ \hline \end{array} \quad \text{then} \quad \begin{array}{r} 1 \\ 213 \\ -5 \\ \hline 18 \end{array}$$

Teacher does this on board. Does not require child to verbalize.

7. Write problems such as: $\begin{array}{r} 7 \\ +5 \\ \hline \end{array}$ $\begin{array}{r} 17 \\ -8 \\ \hline \end{array}$ on file cards for

individualized work in teams to check each other's answers. One card for each team. If children do not get correct answer ask them to do again with bean sticks. Children write down answers.

8. Use bean sticks with worksheets. Teacher never gives child answer if he is wrong. Teacher says, "Work on that problem with the bean sticks."

Hints

1. Some children will continue to count beans on bean sticks to determine total number of beans after other children have begun to recognize a bean stick as representing 10. Teacher can point out that each stick represents 10 to these children. Teacher should not attempt to force child to count by 10's. Child will do this when he has had enough experience and it might take a long time.
2. Some children will soon be able to solve problems without using the bean sticks. These children should be allowed to work without the bean sticks when they indicate that they no longer need them. Bean sticks are meant to help the child. When he indicates that he no longer needs them, the teacher should not demand that he use them.
3. Bean sticks should always be available for all children to use if necessary. Teacher should encourage children to use them whenever there is an error. It is very important that children develop the ability to be independent of teacher and other children for working out answers to addition and subtraction problems.

Other Uses

1. Bean sticks can be used for working out multiplication and division problems. Multiplication and division are different aspects of the same operation. That operation is essentially repeated addition of the same quantity as in 5×3 (this can also be written as $3 + 3 + 3 + 3 + 3$) or the opposite $15 \div 3$ (this can also be written as $3 + 3 + 3 + 3 + 3$.) In multiplication you can add 5 groups of three to determine the answer. In division you see how many groups of 3 will add up to 15.

Bean sticks should be used to illustrate the groups of quantities that are represented by multiplication and division notation.

GOALS FOR A MATHEMATICS PROGRAM
IN BANK STREET FOLLOW THROUGH

The Bank Street Follow Through model has four general goals for its work with children. It aims to help them become people who are:

PRODUCTIVE INVENTIVE RESPONSIVE CONFIDENT

Goals for teaching the mathematics part of the curriculum are related to these overall goals for children as well as to the discipline of mathematics itself.

BANK STREET
FOLLOW THROUGH
PROGRAM GOALS
FOR CHILDREN

RELATED GOALS FOR A
MATHEMATICS PROGRAM

PRODUCTIVITY

To start children on the path to "numeracy" -- the acquisition of useful skills in computation and measurement

INVENTIVENESS

To help children become askers of questions, seekers of solutions, problem solvers, independent thinkers

RESPONSIVENESS

To help children understand mathematics as one product of the intellectual capacity of humankind, related to other cultural development and contributed to by many races and nations; and to help them experience some of the intellectual and aesthetic satisfactions to be gained through ordering experience mathematically.

CONFIDENCE

To give children a way of thinking about the many phenomena they encounter as they experience the world which will help them have another way of seeing connections and relationships, making order out of randomness and therefore developing a greater sense of mastery.

LEARNING AND THE USE OF MANIPULATIVE MATERIALS
IN MATHEMATICS

In order to move towards these goals, Bank Street Follow Through proposes an approach to mathematics learning that is:

- *materials oriented
- *experiential
- *exploratory
- *related to the real world

This approach is based upon understanding about how children learn and the way that materials support learning.

Learning is a growth process. It is developmental, characterized by stages, and highly individual.

Materials can be used at a variety of levels of understanding. The same materials can be used to develop different concepts and skills and solve different problems, according to children's learning capabilities and needs.

Learning is based on experience. It is fundamentally sensory.

Materials provide sensory experiences with color, shape, texture, heft. They can be sorted, arranged, lifted, stacked, compared, on the basis of their sensory impression.

Learning is enhanced by motivation.

Materials that are colorful and plentiful (rods, cubes, counters) or that must be handled to be useful (scales, rulers, timers) invite children to get involved. It is natural for children to want to touch, to try things, to "do it myself."

Learning requires active participation by the learner.

Materials invite participation. Well-chosen materials incorporate self-teaching possibilities through exploration.

Learning proceeds from the concrete to the abstract.

Materials permit children to do "visible thinking" - visible to themselves as well as to their teachers and peers. Experiences with them can be discussed. Children want to talk about their discoveries, and this moves them into the abstract area of language. Materials can be represented pictorially, an intermediate step towards abstraction. Materials provide a mental image for the child to draw upon when confronted later with the abstractions of the mathematical symbol system, and help give the symbols meaning.

THE BANK STREET FOLLOW THROUGH TEACHING/LEARNING
PATTERN FOR USING MANIPULATIVE MATERIALS TO
TEACH MATHEMATICS

STEP 1

Teacher decides, through observation, diagnostic testing, discussion with and about child, what concept or skill the child seems ready to learn.

STEP 2

Teacher selects suitable materials, keeping in mind both their probable interest to the child and their suitability for teaching the skill/concept that is to be developed.

STEP 3

Child explores freely with the materials, making own discoveries.

STEP 4

Child talks about his/her experience with the materials to other children and with teacher. Teacher helps child develop appropriate vocabulary.

STEP 5

Teacher helps child find an informal (representational) way to record his/her findings. The recording may be in the form of a picture, a dictated "story" which is illustrated, a model-type display with the actual materials, a graph or table. (This step need not be taken every time. Discoveries of particular significance mathematically or to the child can be selected and highlighted by recording.)

STEP 6

Teacher sets a problem for the child to work at with the same materials. This is a guided exploration for the child and may make him/her aware of properties and relationships in the materials that had previously gone unnoticed.

STEP 7

Repeat STEPS 4 & 5. After discussion and recording it may seem advisable to allow the child to return to free exploration to further the new discoveries, or the child may need more guided explorations.

STEP 8

After meaning has been established through manipulation, discovery and discussion, the teacher introduces the standard symbols for recording. This is first done in conjunction with representational recording. Then graphic representation gradually gets phased out until the child can write and respond to problems entirely in mathematical symbols.

STEP 9

The teacher provides opportunities for practice.

STEP 10

The teacher helps the child find appropriate ways to use those symbols already mastered at STEP 5 for the next sequence of concept or skill learning.

Prepared by Mari Endreweit

Teaching Science: A Bank Street Point of View

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TEACHING SCIENCE: A BANK STREET POINT OF VIEW

Mari Endreweit

In keeping with its developmental-interaction approach to all areas of learning, Bank Street Follow Through's approach to science is process oriented. The major goal is to develop in children particular attitudes of mind and a style of work which are common to scientific effort at all levels. Children are encouraged to become:

- accurate observers
- systematic recorders
- question askers
- creators of reasoned hypotheses
- inventive seekers for evidence by which to check their ideas.

Learning within the classroom atmosphere established by the teacher, children:

- work cooperatively rather than competitively
- develop tolerance for dissent and failure
- are willing to share their findings, including errors
- show regard for honest effort
- develop appreciation for the aesthetic aspects of the patterns and structures they discover.

Young children like to investigate and ask questions. Unless punished for treading into forbidden territory, they show boundless curiosity about the natural and technological world. Their own bodies, plants and animals, all kinds of machines, air, soil, water, heat and cold, light and dark are all sources of interest and curiosity as well as objects of wonder, amusement, awe or fear; for intellect and feeling coexist in science as in all other learning.

It is the teacher's role to keep alive through the grades the questioning and wonder that comes so easily to the youngest child. This is accomplished first by the careful selection of materials. These should be chosen for their probable interest to the children, depending on the age and past experiences of the group. Topics for investigation are included in the curriculum:

- because they have interest and meaning at a variety of levels
- because they accommodate to individual learning styles
- because they are related to important science concepts and issues.

As materials are introduced, children's interest and eagerness are stimulated. Given opportunities for free, playful exploration, which is at once sensory, intellectual and emotional, they make their own observations and begin to frame their own questions. These questions are shared with teachers and peers, who help design ways to seek answers. This leads to more purposeful, directed, investigative activity which is recorded, reported and discussed. Open discussion is a vital step, for it is the discussion and analysis of the experience which may lead to a higher level of understanding, to further questions and to a continuing, ever-widening spiral of learning.

Scientific exploration of the material and technological world integrates easily with other areas of curriculum. Social studies examine the social world, but the social world is interdependent with the natural world and powered by science and technology. It becomes almost meaningless to study one without the other. A core curriculum that starts with a theme from the social world may soon come to include investigations of natural and physical phenomena. Similarly, a core curriculum that begins by focusing on the natural world must sooner or later consider the impact of humankind. So the subject matter of social studies and the natural and physical sciences are bound together.

Science integrates with the basic skills of language and mathematics through the method of work. Reading is a necessary way to gather information and learn about the experiences of others who have also looked for answers to similar questions. Writing skills are necessary as information at increasingly complex levels is gathered, recorded and reported. The methods of science and those of mathematics are virtually identical, and science depends upon mathematics for measurement techniques and for ways of organizing and expressing relationships (e.g. graphs). As children carry out and record their scientific investigations they find themselves drawing upon mathematical concepts and skills. Thus science, both as a special subject and a method of work, interrelates with other major areas of the curriculum. The article, "Science as a Spiral of Learning," illustrates how this can work in the classroom.

Science as a

Spiral of Learning

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SCIENCE AS A SPIRAL OF LEARNING*

In the fall of last year, a class of 6, 7 and 8 year olds at the Bank Street School for Children went on a trip to the George Washington Bridge as a part of a study they were doing on bridges. While there, they picked a pail of wild cherry leaves from some trees which were shedding their foliage. When they returned to their classroom, they began to make dye from the leaves. They boiled them for a few hours and the water turned an olive green. They dipped pieces of old white sheets in this solution, thus dyeing them green. When the sheets dried, they printed on them by dipping various objects in paint and pressing them on the sheet. They even used a fish skeleton to print with, creating a beautiful pattern!

After these experiments, the class decided to evaporate the dye solution until it was reduced to a powder. They used this as powder paint, dipping wet brushes in the powder and painting with it.

Because this is an ungraded classroom of 6, 7 and 8 year olds, many of the same children are members of the class again this year. When the class went on a trip to a vegetable market, several children suggested that they try printing with some of the vegetables they bought. Starting with beets, they found that not only could they get a bright juice from this vegetable, but that the beet itself could be used as an object with which to print. Also using onions to print with, they dipped the cut-open onions in beet juice or paint and made several beautiful designs on rice paper and displayed them on the classroom walls.

At this point, the class began to approach the making of dyes systematically. One day the teacher, Mrs. Suzanne Monell, brought in a pail of sumac heads and branches from the country. The class separated the heads from the branches. A sumac head consists of a cluster of reddish seeds at the tip of a branch. Mrs. Monell asked, "Do you think we could get any color from these?" The class made guesses as to what color they would get.

Before starting to make the dye, they decided to weigh the heads. First, they weighed the pail itself. Then they weighed the pail with the sumac in it. Finally, they subtracted the weight of the pail to find out the weight of the sumac itself.

* Reprinted from Bank Street Follow Through Program Inter-Project Newsletter, Vol. II, 3. Mar. 1970.

As they worked, the children recorded their findings and measurements in a book they were making, Working With Sumac. They wrote:

The pail weighs 3 lbs., 4-1/2 oz.
The pail and sumac heads weigh 5 lbs., 9-1/2 oz.
The sumac weighs 2 lbs., 5 oz. alone.
Before we cooked the sumac, it weighed 2 lbs., 5 oz.

After all this weighing, the teacher asked, "I wonder how many sumac heads we have altogether?" They decided to count by fives. They laid out the sumac heads in sets of five. One child wrote in the book, "We have 10 sets of sumac. Each set has 5 heads. So we have 50 sumac heads." They were familiar with sets because of work they had been doing with Cuisenaire rods.

The next question posed was, "How long a line do you think we would have if we lined all the sumac heads up end to end?" Again, working in multiples of 5, they began by lining up 5 heads end to end and measuring the length. Then they figured out how long the line would be with all the heads. One child wrote:

5 sumac = 43"
We think that 10 rows of 5 end to end equal 430".

Some children noticed that some of the sumac heads were much larger than others. They talked about how old each plant might be. Then they decided to weigh the heads to see if the smaller plants weighed less. They found that their hypothesis was correct.

They took some berries off the heads, looked at them under the microscope, and chopped some open so they could smell them and see what they looked like inside. They examined the insides of the berries under the microscope as well. Then they put all the heads in a pail and added water to cover them. As they added water, they measured it and wrote down exactly how much water they used. They left this to soak overnight. The next morning, they looked to see if any of the color had come out. Then they began boiling the sumac with about 1 tablespoon of alum,* a mordant which is added to make the dye permanent. They also added cream of tartar to make the color brighter. Later, they did experiments to compare the colors when cream of tartar is used or not used.

* Alum may be purchased at any drugstore.

As the sumac boiled, a delicious smell permeated the room. Although not everyone in the class was directly involved in the project, this was a good time for everyone to come by and see how the dye was proceeding. As it boiled, more of the color came out into the water. At the same time, the sumac became lighter and duller in color. The children noticed the changes and wrote about them in their books on natural dyes. At various times during the boiling, they took samples by dipping a piece of cotton cloth into the solution and then rinsing it in cool water. Only some of the dye would stay in the fabric, and this indicated the strength of the dye at that point. They found that the longer they boiled the sumac, the darker the cloth would be after it was dipped and rinsed. Sometimes they added water and they measured and wrote down how much they had added.

After several hours, they let the solution cool and poured the dye off into jars which they labelled "Sumac Head Dye." They poured the wet berries into a piece of cheesecloth and hung it over a pail so the liquid could drip out. After the boiling process, the mass of berries looked much smaller. The teacher asked, "Do you think they weigh more or less than before we boiled them?" The children estimated that the berries would weigh less since they were smaller in size. They weighed them and found that: "The sumac weight went up 2 lbs. 4-1/2 oz." Together they discussed why they had been wrong. They were able to deduce that the sumac weighed more because of the water it had absorbed.

One day the group had tangerines for lunch. One of the children, Isabel, had an idea. Her story is presented below in her own words as she wrote about the experience later in the book the class was making, Natural Dyes, Volume I.

Once when I was sitting at my table and I was peeling my tangerine, I was thinking of all the dyes we had made already. So I said to Mrs. Monell, "Mrs. Monell, since we have so many dyes, why don't we make a dye out of tangerine skins!" So we got a dish and collected everybody's tangerine skins. Then we put them in a pail and covered them with water and cooked them for about three hours.

Opposite this entry in the book were glued samples of pieces of white sheets before and after they were dipped in the tangerine dye. They had produced a beautiful orange color. Also glued in were samples of natural wool yarn and bleached wool yarn before and

after being dipped in the tangerine dye. Each material had taken on a slightly different hue. This provided an opportunity to talk about the different kinds of materials in nature. The teacher brought in raw cotton on the stem, and wool from right off a sheep. They looked at these fibers under the microscope and discussed possible reasons why some materials are more absorbent than others.

Through the months that followed, many experiments in dyeing were conducted. Children used sumac branches and compared this color with the color they got from sumac berries. They made dye out of maple leaves, black walnuts, onions, and so forth. They began to keep lists of the colors they had: "Lavendar, purple, red, violet, orange." They labelled every ball of yarn they dyed, every piece of fabric. They labelled the jars into which the dyes were poured. They found that some of the dyes had to be kept in the refrigerator to prevent mold from forming. But some of the dyes would keep indefinitely at room temperature. Some of the children looked at the mold with magnifying glasses or under the microscope. They learned about mold formation -- what it is and under what conditions it grows.

The above experiences present one example of the way in which learning spirals: from one beginning, many paths evolve and each child is encouraged to pursue his or her interests.

Of course, this was just one part of the total classroom activity. While some children were stirring the dye and observing its changes, others were working in the math area with math materials. Others were reading and writing, others were working in the block area, and still others were in the library doing research. The dyeing was just one thread of the classroom activity -- a thread which began last year and is still providing a wealth of learning experiences.

One of the children in the class wanted to know how they could make black dye. Several of the children did research on this by going to the library and reading about how the Indians made dyes. They found that the Indians made dye out of soot. So they tried this in the classroom. What they came up with was a gray dye. They are still trying to figure out how the Indians succeeded in getting black dye. This is not only a science study, but a social study of the history of man and the way man has utilized his environment.

Working in this way, the children are learning the scientific method:

- First, a problem is posed.
- Second, they study available information.
- Third, they suggest a method for solution of the problem.
- Fourth, they figure out a way to test their ideas.
- Fifth, they conduct an experiment to see how their idea works.

Throughout this process, the teacher helps the children define the problem and think about ways of going about solving it.

Scientific habits and attitudes are encouraged in this kind of work. These include the habits of careful observation, accurate interpretations of observations, and recording of information. As an example, here is an excerpt from the book, Sangre Engrada, a class-made book on the children's work with branches from a tree which grows in Arizona. A teacher from another class had brought this branch back from Arizona where she had visited relatives over the Christmas holidays.

We cut a branch open and inside there was first a light green sort of outside and then a dark green middle. Then something happened. I cut one open and I found a little juice. It tasted like when you smelled grass and taste it. Karen just handed me a bigger one. It does not look like the little one.

(Here there was a place where the child had printed a little of the juice on the notebook and labelled it: "Dye from stem.")

If you taste the juice from the stem, it makes your mouth turn dry. Dahlia smashed a part of the branch near the root and showed it to us. Kim said, "Look the blood came from the inside." "Part of the stem is pink and part of it is green," said Isabel. Some stems are dry and some are wet. We put 1 pint, 4 quarts of water over the crushed branches. Kim looked at the branches soaking and noticed white bubbly stuff in the water.

As a result of noticing this juice or sap in the branches, the class became interested in "What is sap?" This led in turn to a comparison with blood. Any study should always relate back to

the children themselves. This study of sap also led to a study of the water pipes running through the city which supply people with water, gas, and so forth.

If you walk into this classroom now, you are likely to see several children weaving on their own hand-made looms. They are using yarn which the class dyed themselves. As they weave, they are learning about numbers and patterns. They are learning new words with which to describe their experiences. If they run out of a color, they can dye more yarn with the jars of dye they have on reserve. Several children are trying a new experiment -- creating a dye out of cabbage leaves. This vegetable produces a blue dye. However, they have found that this dye is not very permanent. They discovered that there is a wide variation in the way dyes "take." A very bright-looking dye might produce a pale color and vice versa.

They are writing down what they do in their latest book, Natural Dyes, Volume II. Other children are making designs on rice paper by printing different colored dyes in an overlapping manner. They are learning about form and color as well as developing manual dexterity.

When spring arrives, the class is planning to go on trips to woods and fields where they will collect specific plant parts to make dyes with. In preparation for and during this trip, they will learn how to distinguish different kinds of plants and trees.

An understanding of science can be brought about only by direct experiences with how things work.

In the elementary school years, a child should have the opportunity to have many first-hand experiences with a variety of materials in a variety of ways. These experiences need not be set aside as "science." Rather, the habits and attitudes of science can be brought to bear on every activity in which the children engage. Although content is important, the more important aspect is approach. As John Dewey said:

"Some of the phases of instruction that may be shared with children are: choosing problems, defining problems, suggesting methods for solutions of problems, relating experiences to the solution of a problem, suggesting observations that may be made, thinking through the problem, assisting in drawing conclusions, assisting with experiments ---"