

Teacher's Guide/Exploring Childhood

How the World Works

Seeing Development



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We Are a Family	Rachel at Home	Oscar at Home	Michelle at Home	Seiko at Home		Around the Way with Kareema	Rachel at School	Seiko at School	
□	△	△	△	△		△	△	△	
The Inquirer	Childhood Memories	Howie at Home	Commentaries on Family and Society Films	Craig at Home	Jeffrey at Home	Beyond the Front Door	At the Doctor's	Howie at School	Oscar at School
■	■		△	●	△	■	△	△	△
Teacher's Guide Explaining what is transmitted in care-giving interactions.						Teacher's Guide Exploring how experiences outside the family affect a child's development.			

Family and Society Module *Considering the effects of family and society on the growth of a child.*

Gabriel Is Two Days Old	Bill and Suzi: New Parents					Clay Play	Racing Cars			
△	△					△	△			
Looking At Development	Directions in Development	Making Connections	All in the Game	Child's Play	Half a Year Apart	Children's Art	Drawing Sort	Painting Time	Fear, Anger, Dependence	
■	□	■	△	■	△	■	□	△	■	
Teacher's Guide Learning about children's development and how to support it.					Teacher's Guide Examining the meaning of play for children.		Teacher's Guide Learning about children's development from their art experiences.			Teacher's Guide

Seeing Development Module *Determining children's needs and abilities at each age, what children need to grow, and*

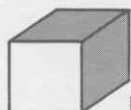
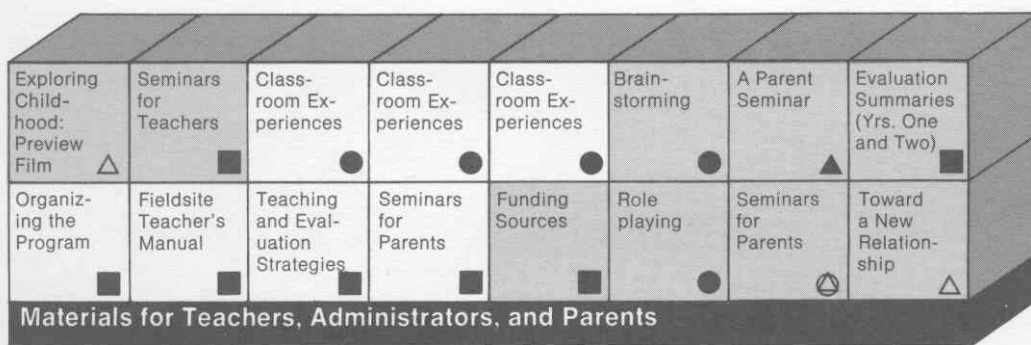
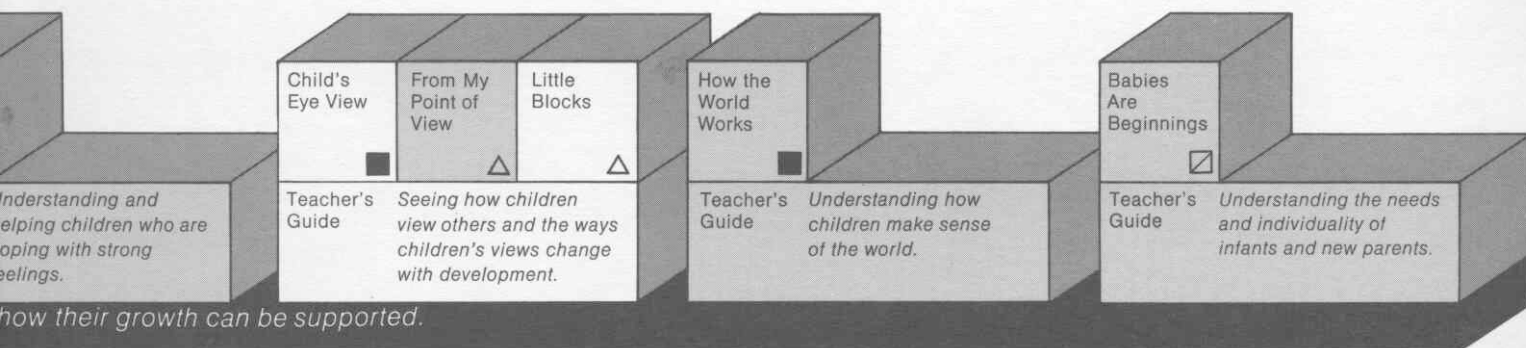
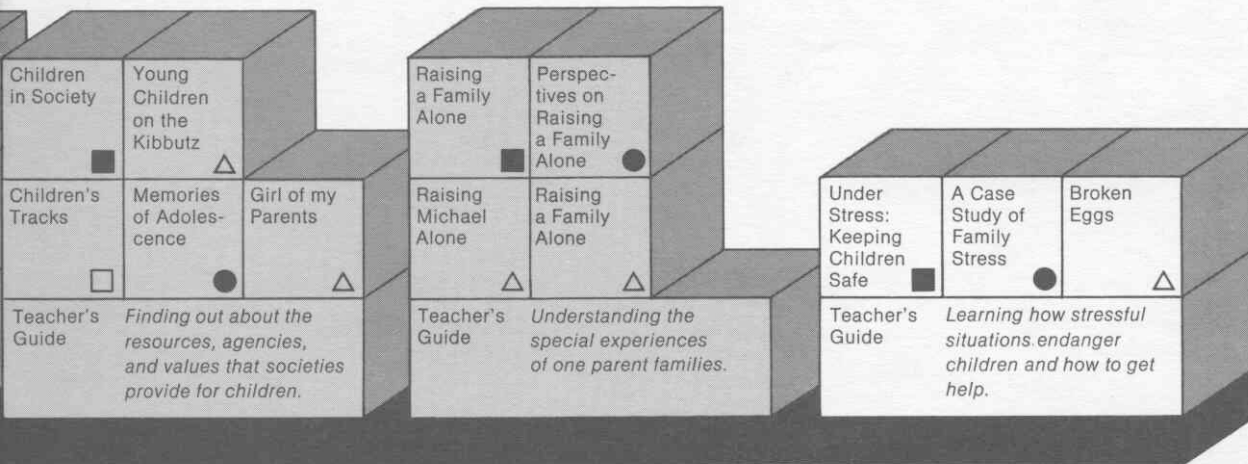
Helping Skills	Helping Is ...	Michael's First Day	Teacher, Lester Bit Me!	Water Tricks					
●	△	△	△	△					
Getting Involved	What Is a Preschool Like?	Storytime	Being There	Doing Things	What About Discipline?	What Is a Child?	No Two Alike	Children with Special Needs Go to School	Sara Has Down's Syndrome
■	■	△	⊗	■	■	□	■	⊗	△
Teacher's Guide Preparing for work with children and learning ways to discuss field work.							Teacher's Guide Examining feelings and developing skills for working with special needs children.		

Working with Children Module *Preparing for work in fieldsites, and discussion of that work.*

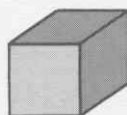
Exploring Childhood

Key

- | | | |
|-----------|------------|----------------------|
| ■ Booklet | △ Film | Filmstrip and Record |
| □ Poster | ● Record | |
| ⊗ Cards | ▲ Cassette | |



Full Year Course Selection



Supplementary Materials

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ONE TEACHER'S PLAN FOR USING HOW THE WORLD WORKS

<u>Activities*</u>	<u>Class</u>	<u>Activities</u>	<u>Class</u>
<i>Organizing Question:</i> <i>What does a child believe?</i>		and carry out fieldsite activities: the Pencil Test, Liquid Test, Object Test (pp. 13-16), and the activities described in the Piaget section of <i>Making Connections</i> ; review "Setting Up a Situation" in <i>Looking at Development</i> .	Class 5
Read "Listening to Children"; look for patterns in children's explanations; do "New Territories" listing activity (pp. 7-8).	Class 1	Report on fieldsite activities (p. 17); read and discuss "Putting Together Information."	Class 5
Read "Talking with Children at Your Fieldsite"; do role-play activities to prepare for fieldsite conversations (pp. 8-9); assign conversations to be tape recorded at fieldsites.	Class 2	View the film, "Water Tricks." Choose science projects from <i>Doing Things</i> to practice in class and try at fieldsites; discuss how to support children's experiments (pp. 21-22).	Class 6
Enter conversations on file cards, sort cards and discuss patterns, and add information to "Directions" poster (p. 10); read and discuss "Thinking About What Children Say"; read Piaget in <i>Making Connections</i> ; assign journal activity (p. 11).	Class 3	<i>Organizing Theme:</i> <i>Learning Continues</i>	
<i>Organizing Question:</i> <i>What influences what a child believes?</i>		Do journal writing (p. 20); assign fieldsite activity in "Learning Continues."	Class 7
Read and discuss "Building Understanding"; divide class into groups to plan	Class 4	Compare students' and children's questions about the world; read aloud the folk tale in "The Process of Inquiring" by Barry K. Beyer (pp. 30-31) and analyze the basic elements of inquiry; fill in "Development Is..." chart (<i>Making Connections</i>), using examples of children's and students' views of the world.	Class 8

*Page numbers refer to this guide.

Overview

Goals

The goal of Seeing Development is to broaden students' experience with children through insights about how children develop. The module attempts to help students see that a child's behavior at any one moment is a result of the child's past and may have an effect on how the child will develop in the future.

In order to think about these issues, students need to learn new ways to gather information about young children. These processes (observing, collecting, setting up a situation) are applied throughout the module for the purpose of looking at children's play and art, how children view other people, how they explain the world, and how they feel.

How the World Works is a booklet about how children experience and explain the world around them, and how children learn about the world without being formally instructed. Whereas *A Child's Eye View* is concerned with children's understanding about other people, *How the World Works* is concerned with children's views of the physical world--what makes things happen or be the way they are. Adults are generally predisposed toward explanations--often unproven--and children, to whom the world seems at times unstable and unfamiliar, are no different. They have their own ways of understanding change, cause, and effect in their world.

Children's Art focuses on individual differences and universal patterns in development. This booklet focuses on children's *inner* development, and on *outer* influences on that development. The issue remains the same: personality and experience with the environment interact as components of development. But *How the World Works* approaches that issue from another perspective, to help your students take a closer look at that interaction and its effect on children and themselves.

Materials

The student booklet is divided into three major sections. "What Does a Child Believe?" describes children's ideas about the world and how students can learn about children's beliefs. "What Influences What a Child Believes?" describes what in children's experiences affects their concepts of the world. And "Learning Continues" uses students' ideas about the world as an example of the fact that beliefs change and grow throughout life. The "Selected Readings" at the end of this guide may be used by teachers to help students explain how their world works.

Relation to Other Materials

Looking at Development and *Making Connections* offer tools for collecting and generalizing from data about children's developing view of the world. The reading on Piaget in *Making Connections* is especially relevant to understanding children's cognitive growth and view of the world. In addition to these resources, work with *How the World Works* can be complemented by reference to *A Child's Eye View* (children's understanding of other people) and *Children's Art* (the influence of experience on development).

What Does a Child Believe?

Listening to Children

Purpose: To understand children in their daily explorations of the world around them.

Time: 1-2 classes.

Materials: *How the World Works*, pp. 5-6.

A number of young children were asked the following questions:

Do you know what a dream is?

How do the clouds move?

Where did your little brother come from?

The children's responses, recorded at the opening of the student materials, offer a way to examine how children use their knowledge and experiences to answer questions about cause and change.

DO YOU KNOW
WHAT A DREAM
IS?

Have the class read the question and the responses the children gave to the question. Students can think back to explanations they gave as children, or recall similar explanations they might have heard at the fieldsite. After they have read all responses, students should note patterns occurring in the children's explanations by discussing:

How might children come up with such definitions for a dream?

One pattern in children's explanations is that they tend to explain occurrences in terms of things they are already familiar with--in these explanations, electricity, rain, movies, or a family friend. If students have trouble finding patterns in the explanations, come back to this discussion after they have read all three questions and sets of responses.

Students might also explore their present understandings of what a dream is. This informal discussion between teacher and students might take a whole period if students are interested. Students may wish to discuss:

- recurring dreams
- dreaming in color
- dreaming of being in familiar or unfamiliar surroundings
- realism and surrealism in dreams
- dreams as products of the dreamer's own mind
- whether they remember dreams after waking
- how they think the mind works when the body is asleep
- whether they think dreams are important or necessary

For several nights, students could try to remember their dreams, writing them down in the morning as journal entries.

What differences or patterns do students see in their dreams?

COMPARING
CHILDREN'S
AND STUDENTS'
UNDERSTANDINGS

Discuss how students' ability to consider dreams differs from children's, remembering that while children explain dreams from their own experiences, students can analyze the elements in dreams, the patterns among dreams, the importance of dreams, etc.

What differences do students see between the ways that they and the children explain dreams? How do they explain these differences?

HOW DO THE
CLOUDS MOVE?

After reading the responses, again note patterns in the children's explanations.

What knowledge of their own might children be using as they attempt to explain movement?

For example, since young children are very focused on themselves, they tend to view *objects* (as well as other people) as being like themselves: i.e., alive. In these explanations, one pattern is that the clouds are considered to be alive or to be moved by something that is alive. Ask students to explain their understanding of cloud movement.

How do their explanations differ from the children's? Why?

WHERE DID
YOUR LITTLE
BROTHER
COME FROM?

In thinking about the variety of these explanations, students should again consider where children get them.

Have they heard them? If so, where? Are they making them up? If so, what do they base them on?

Students will again discuss experiences that influence children's beliefs in the section, "What Influences What a Child Believes?" (p. 10), so you might keep this discussion short.

Besides contributing to the class explanations they gave as children or have heard at the fieldsite, students might recall explanations they have heard adults give to young children about where babies come from, and discuss how these would fit in with a child's view.

How would students suggest that a parent should explain to a child about a new baby?

You or your students might bring in books that are designed to answer this question, and discuss their appropriateness for children.

Sometimes adults purposely do not give information to children.

What are some reasons why children are given misinformation, aside from their own ability to understand?

On the board, make a list of the patterns seen in all of the explanations. If students have not yet begun to see patterns in the responses, go over the questions in the student



material, and list ideas about what kinds of experiences may have fed into the children's explanations. Review these ideas, looking for patterns.

POSSIBLE
ACTIVITY

If your school system has a science coordinator (or a science specialist at the elementary level), you might invite him or her to class to discuss with students how best to explain to young children how things work. Students might ask:

Do you explain with words or activities?

What "language" do you use? What kinds of activities? Why?

What do you take into consideration about the children?

New
Territories

Purpose: To examine how development shows in children's beliefs.

Time: 20 minutes.

Materials: *How the World Works*, pp. 6-7; journals; 3x5 file cards.

Students have already looked at child development as it shows in--and is influenced by--children's play and art and their view of other people. They have examined the universal effect of experience on development, as well as patterns in the way children learn. The Growth Rings Chart represents graphically the relationship between the experiences (a child's outer world) and ways of learning (a child's inner world) that all children share, and the way children explain, structure, and view or interact with the world.

In class, read aloud this sentence from the student booklet: "With development, a child moves into new 'territories,' gains new strategies for learning, and uncovers new information." Ask the class to list on the board the "territories" and "strategies" that they see pictured on the chart. Your lists might look something like this:

TERRITORIES (EXPERIENCE)

Where are children?

Crib
House and yard
Neighborhood and friends
School
etc.

STRATEGIES (WAYS OF LEARNING)

What are they doing?

Mouthing
Handling
Playing
Talking
Reading, writing
etc.

Can the students add more information to the chart? It might be helpful to review the patterns of development shown on the Data Poster and in previous booklets. Then consider:

What effect might these experiences and ways of learning have on the child's way of thinking about the world at each stage of development?

Talking with Children at Your Fieldsite

Purposes: To suggest ways to find out what children think; and to understand, support, and extend those thoughts.

Time: 1 class and a fieldsite assignment.

Materials: *How the World Works*, pp. 8-9.

The student materials suggest several ways in which an older person can be supportive of a child's exploration of the environment. Simply listening when young children speak and appreciating what they say can set a positive tone in a relationship, and may also add to children's appreciation of their own ability to learn about the world.

As a way of preparing for conversations at the fieldsite--and students should be encouraged to view this as an ongoing effort--the class could practice being supportive of what children say, using the quotations in "Listening to Children," page 5, or comments or questions they have heard at the fieldsite. With one student role playing the adolescent

and the other the young child, they can carry on short conversations built on the quote.

The class might also read the handprinted account of the conversation between Steve and his little sister, each student jotting down a response to Steve's sister. In small groups they could share their responses, and discuss how each response was or was not supportive of the young child.

To help them understand a child's point of view in these conversations, students could recall times during their adolescence when they experienced difficulty understanding a process. What explanations helped and were supportive of their self-image in understanding:

- how quantity increases when something freezes?
- how algebraic equations function?
- how electrical systems work?
- how automobiles perform?
- how genetics relate to heredity?

To share children's experience of having to cope with a mysterious environment, students might read *Flatland*, by Edwin Abbott, imagining how it would feel to be in a one-dimensional society and how they would go about adjusting to it.

AT THE FIELDSITE

Students might like to ask children at the fieldsite questions about how things work, keeping track both of what the children say and of how they, the students, responded. The class might draw up a list of questions, and choose a few questioners for sites in which there are many students. With help from you and the fieldsite teacher, students can consider:

What kinds of questions are appropriate?

What topics interest young children?

Should I use the same question for several children?

Should the ages be the same or varied?

Students should prepare for the activity by deciding which children they want to talk with, and by thinking about how

they can initiate conversations without intimidating children: discussions should be as casual as possible.

Students can devise a method for remembering conversations. A cassette tape recorder may be useful, or students may take time immediately after each conversation to note in their journals what was said. Students could also work in pairs, with one student as observer.

After the fieldsite class, students can play the tapes for the class, or share their notes. The information collected in these interviews might then be entered on file cards with appropriate headings, such as:

Question asked: _____
Response: _____
Student's comment: _____
Any further response from child: _____
Age of child: _____

Cards could then be sorted by age.

Do students see any similarities or differences in responses of children of similar ages? How do they explain these?

Would sorting by response tell them anything?
Sorting by their own comments?

Add conclusions to the "Directions in Development" poster.

Thinking About What Children Say

The concluding paragraph in "Listening to Children" describes explicitly some of the patterns students may have already seen in children's explanations of the world. The concept of egocentrism described in *A Child's Eye View* can easily be applied to many of the patterns, particularly the pattern of talking about inanimate objects as if they were alive.

In the film, "From My Point of View," for example, a young child attempts to make her paper teddy sit, and relates to the teddy as though it has the ability to sit.

Did children show this tendency in conversations at the fieldsite?

Do students notice patterns in children's explanations other than those described in this section?

WHEN CHILDREN
TALK ABOUT
RELIGION

Point out to students that some of the children's responses relate to God or the power of God. One child responded to the question, "Where did your little brother come from?" with "From God." This response may be the outcome of one or more influences, and you should encourage students not to question the child's response if they have a different opinion, but to recognize that the child's response may be the outcome of religious instruction, his own family's teaching, or his own thoughts.

Religion is a personal and sensitive topic. Teenagers should recognize that children's religious beliefs may be different from their own and should be respected.

The section, "What Influences What a Child Believes?" points out the various sources from which children receive information. Families assume the primary responsibility for developing children's religious beliefs. Students should not assume that responsibility. Students can listen to children to give them an opportunity to share with someone else their interpretation of their world. You might want to tell students that later on in the course, in Module Three, Family and Society, they will see a film, "Oscar at Home," in which a family at dinner not only thanks God for the food, but also for many other things, including the school and the teacher. By listening to the family in this film, students may sense how important religion can be in some families.

The activities in "What Influences What a Child Believes?" give students an opportunity to test empirically concepts about the world that young children do not clearly understand. Unlike these physical concepts, a child's religious beliefs cannot be tested or explained.

You might encourage students to look again at some children's responses and think about how they would respond if the child's response is different from their own (e.g., a quote from the front cover of the student material in response to the question, "Where were you before you were born?" "New Zealand. Before I was born I was in New Zealand because my mother lived there and her brothers and sister live there." A child describing a picture: "This is God in the sky. He delivers the baby to the mother").

JOURNAL
WRITING

To understand further children's explanations, students might try a writing exercise. Pretending that they do not know how something works--electricity, for example--they can write an explanation of light bulbs and light switches. What are their explanations based on? Or students might write about something they really do not understand--for example, flying saucers or the Loch Ness monster--and then analyze their explanations.

What Influences What a Child Believes?

Building Understanding

Purpose: To provide an example of how development affects a child's beliefs.

Time: 1 class.

Materials: *How the World Works*, p. 10; equipment for experiments described below--3x5 file cards, pencils, pairs of different size glasses, colored liquid, beads.

The situation between Warren, age sixteen, and Philip, age four, demonstrates this four-year-old's concept of size and shape.

Students might try the following size and shape activities themselves in class to note what mental processes are required to understand the activity. Then one or two students might try the activities at the fieldsite, letting children experiment with different amounts and observing and noting the children's actions and responses. Tell students not to give the children the correct answers: children can often memorize answers without understanding concepts.

The Pencil Test

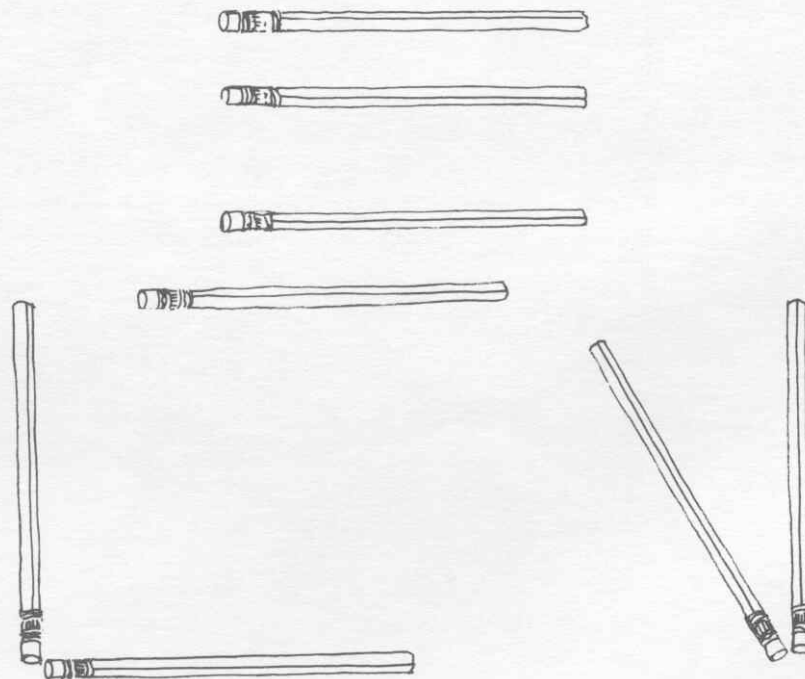
Materials: Two pencils, equal in length. (The easiest way to be sure they are equal is to use unsharpened pencils.)

Place the pencils side by side with their end points aligned. "Are these pencils the same length?" Slide one about an inch to the left. "Are they the same length now?" If he

says No, ask, "Which one do you think is longer?" Move the pencils so they are at right angles to each other, and repeat the questions. Stand one pencil on end and repeat the questions.

Comments: In Piaget's experiments only about 12-1/2 percent of the children were conservers of length [realize the lengths are equal] at the age of five. On the average, they were seven when they developed this concept....

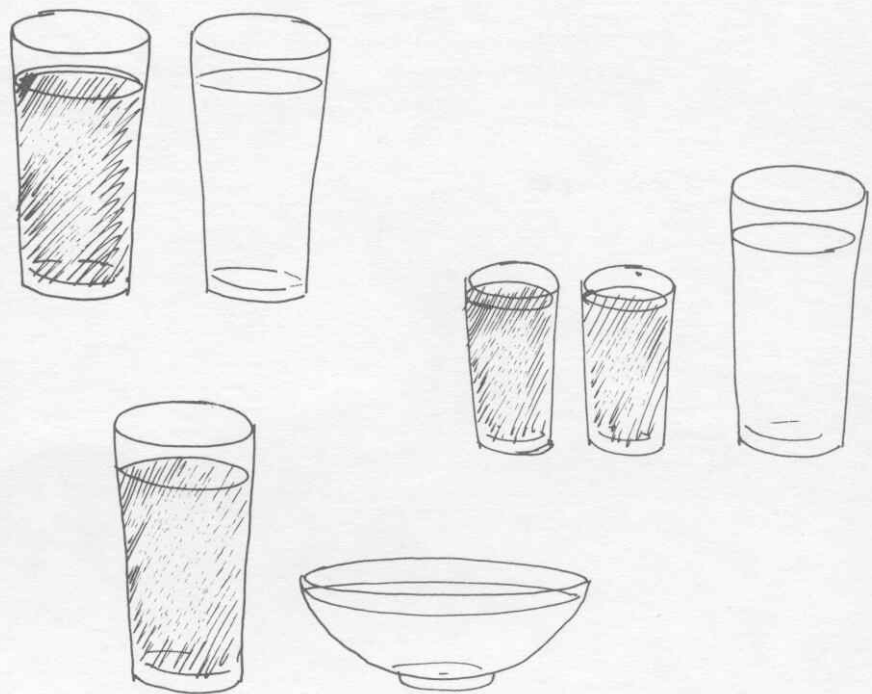
There is an optical illusion involved in some of these arrangements. When the pencils are placed at right angles, the vertical one does appear to be longer. Children are taken in by this illusion, but adults have learned to use logic in interpreting what they see.



The Liquid Test

Materials: Two identical, average-size glasses. Two smaller glasses, such as juice glasses. Two different colored liquids, such as tea and orange juice, two flavors of Kool-Aid or anything similar (carbonated beverages won't work). A shallow bowl (glass or plastic clear enough to see through).

Fill one of the identical glasses about $\frac{3}{4}$ full of tea and the other about $\frac{3}{4}$ full of orange juice (or whatever liquids you're using). Place them side by side on the table, making sure that both liquids come up to the same level in the glasses. "Is there more to drink in my glass than in yours?" "Suppose I pour my tea into these two little glasses." (Do so.) "Now does one of us have more to drink than the other?" Conservers will say No, that both are the same. They see right through the maneuver of pouring. If your child says Yes, ask him which one and why he thinks so. Pour the tea back into the original glass. "Is there the same amount in both glasses now, or is there more in one?" "Suppose you pour your juice into this bowl." (Encourage him to do so.) "Do both of us still have the same amount to drink?"



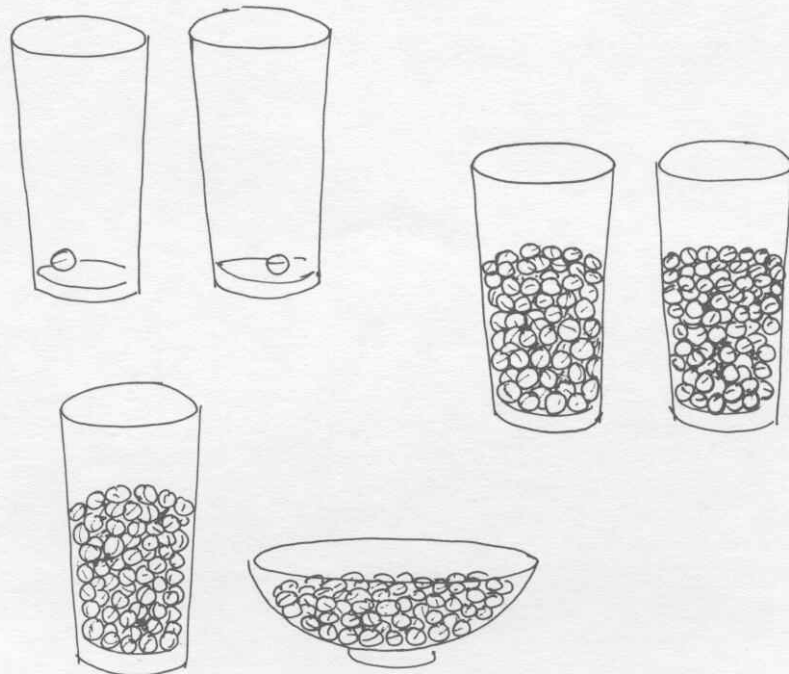
The Object Test

Materials: Two identical glasses or glass jars. A supply of small objects all alike and roughly uniform in size, such as beads, uncracked nuts, cranberries, dried beans, etc. A shallow bowl.

Set the two glasses side by side, near the pile of nuts, beans, or whatever you are using. "Take a nut in each hand. Put one in each glass at the same time." If your child can't manage this two-handed operation, put a nut in one

glass yourself as he puts one in the other. Continue until the glasses are about 1/2 to 3/4 full. If the objects are irregularly shaped, shake the glasses to settle them into place. "Does one glass have more nuts than the other?" Most children will say there are the same in both. (If your child does not, start over and put fewer nuts in the glasses.) Now pour the nuts out of one glass into the bowl. "Do you think there are more nuts in the glass, or more in the bowl, or are they the same?" Nonconservers will say there are more nuts in one. This is usually true of four- and five-year-olds. They are misled by appearances, even though they themselves filled the glasses by a method of one-to-one correspondence that guarantees the same number in each.

Comments: This test is a bridge between the conservation of quantity and the conservation of number because the objects used can be counted, which is not true of a similar test with liquids...conservation of discontinuous quantities (such as the objects used in this game) is apt to come at an earlier age than conservation of continuous quantities, such as liquids.*



*Above three "games" from Evelyn Sharp, *Thinking Is Child's Play*. New York: E. P. Dutton & Co., Inc. © 1969 by Evelyn Sharp.

Students might enter the results of these games on file cards noting:

Activity: _____
Child's response: _____
Child's age: _____

If they sort cards in order of age, what do they notice about children's responses? If categorized by responses, what do the cards say about ages? If students have trouble comprehending the children's answers, remind them that young children's understanding comes through their senses. They have trouble keeping two things (height and width, massiveness and thinness) in mind at the same time, and they do not yet associate two different forms of clay (or water or beads) as being one and the same amount. What they see is what they believe.

As students can read in the "Theorists" section of *Making Connections*, Piaget believes that children *cannot* make such associations until they have acquired the ability to keep a quantity in mind even when they see it in a different form. Telling children the correct answers will not help them acquire this ability, but opportunities to observe and experiment--as in these three games--will help them exercise this ability when they are ready to.

Results may again be summarized on the "Directions" poster.

Putting Together Information

Purpose: To examine <i>how</i> children's beliefs change.
Time: 1 class.
Materials: <i>How the World Works</i> , pp. 11-12; <i>Doing Things</i> ; journals; optional films, "Half a Year Apart" and "Water Tricks."

One way to look at children's development is to see it as influenced by two factors: the child's inner development and the factors that come from the outside world.

How the World Works (p. 11) lists a number of things that are a part of children's outer world and that can influence their view of the world. Ask the class if there are other influences they want to add to the list. Discuss what kind of influence each of these things can have by considering examples from students' childhood or by looking for differences in how these influences affect children. For example:

How is a parent's influence on a child different from a neighbor's? a teacher's? a book's?

Consider issues of emotional involvement, respect, and authority. Point out that children tend to believe and to accept without question explanations that come from authorities.

How would students compare themselves to children in this respect?

Students should recognize that influences are not separate categories, but are an integrated whole forming a child's environment. For example:

How might a child with older sisters and brothers experience television differently from one who lives only with parents? if the sisters or brothers were interested in sports, or cowboys, or mysteries?

Since various influences occur at different times in a child's life, they account in part for why a child's view of things changes. Discuss how influences are different at different ages:

Which things influence a child most in the first year of life? in the second? third? fourth? fifth? sixth?

The expanding influences in a child's life are illustrated in the "territories" of the Growth Rings Chart and are discussed in detail in the Family and Society module.

ACTIVITY

Students might like to collect children's books or comic books, or watch children's films or television programs to report about the kinds of conclusions children could draw about the world from these sources (e.g., *The Giving Tree* by Shel Silverstein; "Yogi Bear"; *Wind in the Willows* by Kenneth Grahame; Disney cartoons and nature films; "Sesame Street").

As one concrete example, the first drawing on page 12 illustrates how a child's misconception about stones might be influenced by appearances and other factors in the outside world. The second illustrates influences that might lead a child to ask a question about the world. Students could choose other questions children might ask--What causes the wind? What is the moon made of?--and consider how children might answer one of these questions, based on the impressions they form. Each student could make his or her illustrations, describing what they think influenced a child to form a certain misconception or ask a particular question.



JOURNAL
WRITING

The final assignment in this section asks students to remember some question or misconception they had as children about how things worked, and to write about the influences that affected and changed their ideas. This assignment might be done in a drawing similar to the one about Nancy and stones, and entered in journals.

Experience and the answers children get to their questions are not the only determiners of how children view their world. As Philip and Warren's clay activity shows, children's readiness for dealing with the world is affected by innate mental structures. To make this point, ask students:

Would children learn more about the world if they had books or went to school when they were two?

What do children have to be able to do before they are ready to read?

Consider children's ability to hold books, to focus their eyes on the words, to understand that words symbolize objects and ideas, to remember what came before and to want to know what comes next.

View again, or recall, the films "Half a Year Apart" and "Water Tricks."

What do the children show they are ready to learn in each case?

How do they each go about learning?

What effect do their different ways of learning have on what they are able to understand about water?

For example, in "Half a Year Apart," the girl understands that water is wet and that it makes bubbles when she blows, because she is learning mainly through sense experiences. The boy, combining sense experiences with container comparisons--pouring water back and forth, etc.--understands that there are differences in amounts of water held by different sized containers, and that water is displaced, *as well as* the fact that water is wet and makes bubbles.

In "Water Tricks," how does Paul's desire to teach about siphons match with the children's readiness to learn these concepts?

What do the children learn? What are they unable to learn?

What influence does Paul have on the children's beliefs about water?

The list of influences on children's beliefs in the student material includes one influence related to personality and development--children's own curiosity and the experimenting they do.

Can students think of other influences related to personality and development?

Go back to the lists of "Territories" and "Strategies" made when discussing the Territories Chart (this guide, p. 8) and add a list showing how these developmental patterns affect the way children explain the world. For example:

Is a child who views the world largely through the senses likely to explain wind differently from a child who can remember the past or think about the future? How?

How might egocentrism affect a child's explanation of wind?

SUPPORTING CHILDREN'S EXPERIMENTS

In addition to supporting children's efforts to learn about the world by listening and talking, students can also help children to test and experiment with their world in the way Nancy learns about stones (see right-hand drawing, p. 12, showing Nancy's inner mental process in dealing with the influences around her). Working from children's expressed interests, students should devise activities they could set up at the fieldsite--such as the siphon activities set up by Paul in "Water Tricks"--that might help children to act on their curiosity. For example, if a child made a boat that wouldn't float, a student might work with the child at the water table to see which things float and which sink. The section, "Science Projects," pages 16-28 in *Doing Things*, suggests ways to set up projects with magnets, animals, plants, balances, and water, and ways to encourage children

to discover and learn for themselves. Students might try some of these activities in their own class before trying them at the fieldsite and discuss how appropriate they might be for the children they work with. Throughout these activities, students should keep journal notes about patterns they see in children's interests and experiments, and what things aid or hinder these experiments.



Learning Continues

Considering Growth

Purpose: To examine how what we know and how the way in which we learn develops.

Time: 1 class.

Materials: *How the World Works*, pp. 13-15; journals.

ACTIVITY

The final section in the booklet suggests an activity that can help students see how much they have grown since childhood, both in what they know about the world and in their strategies for finding out about new things.

PROCEDURE

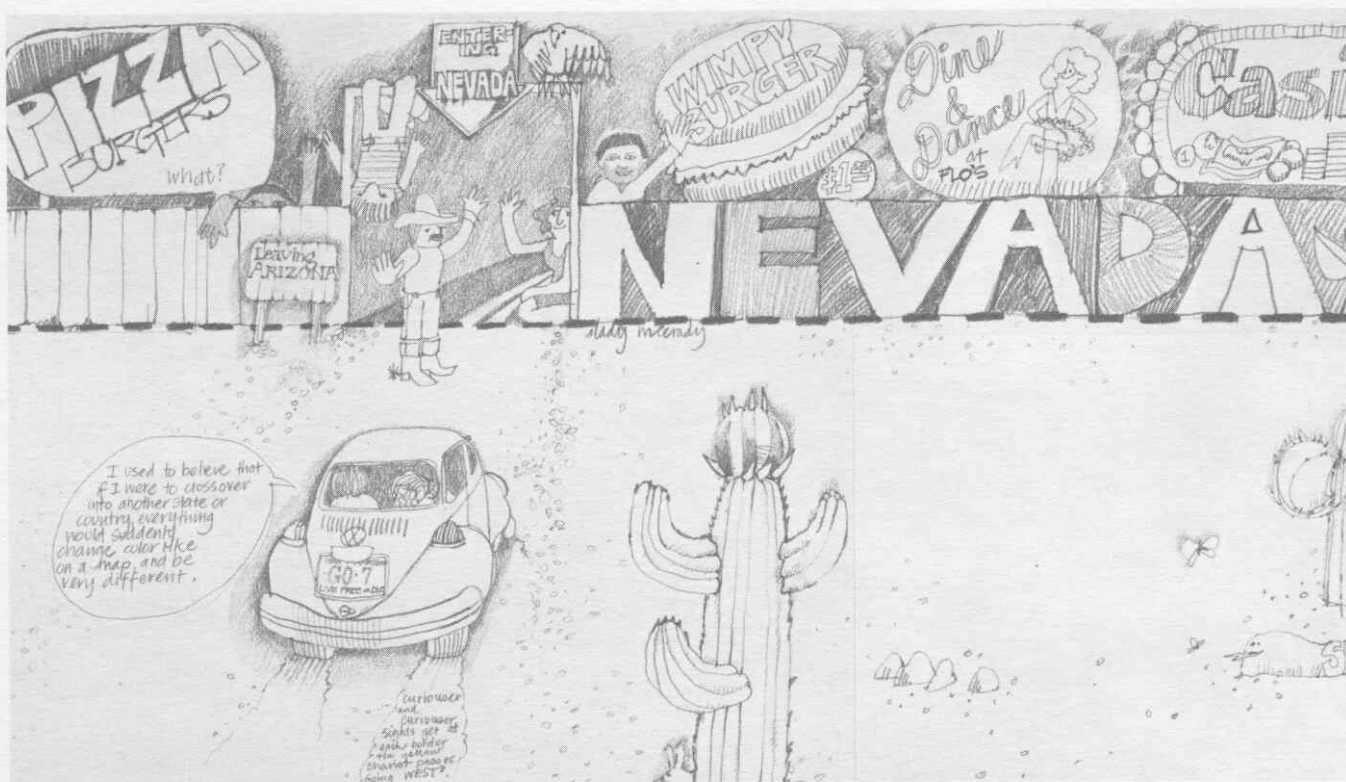
Students should consult the fieldsite teacher for help in choosing a topic of interest to the children, selecting objects to bring in, and deciding where to display them. To avoid having children make up answers to please the students, students should not direct the children's conversation about the objects, but should listen carefully, either taking notes or tape recording (with the teacher's permission) as suggested in the student material.

DISCUSSION

After students compare their classmates' and the children's knowledge about the topic and sources of information, students are asked to explain possible differences in what their classmates know. If they have trouble with this, ask them to recall sources of individual differences in children and point out that adolescents (and adults) also

have different ways of learning, different interest patterns, and even more varied experiences. Look again at the pictorial representation of adolescents on the Growth Rings Chart. Describe what is there, add new ideas, and compare this "territory" with the territories that precede it. Students can think not only about where they have come from in their learning about the world, but also about where they are going. What aspects of the world would they like to know more about? Students should make a list of these things in their journals. Choosing one from the list, each student should then list all the ways they could find out about it. Help individual students with resources they may be unaware of (people, places, experiences, written material, etc.), and encourage them to pursue their interests. This may prove to be a useful technique for helping students choose and develop a research topic in the Family and Society module.

To make the point that learning continues beyond adolescence, ask the class to list some of the questions that people are still trying to answer. For example, is there life in outer space? How was the universe created? What is matter composed of?



Selected Readings

Introduction

Included in this section of the *Guide* are two short readings that may prove useful to you in helping adolescents make sense of how their world works. Making sense of one's world --interpreting experiences and developing concepts--is a difficult task for children, adolescents, and adults alike. As students and teachers work with the course materials, engage in fieldsite activities, and share personal accounts, many questions will arise. To learn to ask good questions of ourselves and others and to develop skills that help us answer those questions are fundamental goals of the EXPLORING CHILDHOOD program.

The first brief reading, by Jerome Bruner, is taken from *Toward a Theory of Instruction*. Bruner considers one kind of discussion question that may help students order and expand upon their understanding of their world. The second reading, a selection from *Inquiry in the Social Studies Classroom* by Barry Beyer, suggests the process of inquiry as a useful tool in helping you and your students discover answers to questions that come from the course. The skills involved in the process of inquiry are those used continuously by students as they question, experience through fieldwork, interpret, and requestion in their exploration of childhood.

As you read these selections, you might think about the following:

What kinds of questions are my students asking?

How can I help students amplify the questions they're already asking?

Are there other questions they should be asking?

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Encouraging the "What If" Question

Jerome S. Bruner

Let me illustrate by a concrete instance. A fifth grade class was working on the organization of a baboon troop--on this particular day, specifically on how they might protect against predators. They saw a brief sequence of film in which six or seven adult males go forward to intimidate and hold off three cheetahs. The teacher asked what the baboons had done to keep the cheetahs off, and there ensued a lively discussion of how the dominant adult males, by showing their formidable mouthful of teeth and making threatening gestures, had turned the trick. A boy raised a tentative hand and asked whether cheetahs always attacked together. Yes, though a single cheetah sometimes followed behind a moving troop and picked off an older, weakened straggler or an unwary, straying juvenile. "Well, what if there were four cheetahs and two of them attacked from behind and two from in front. What would the baboons do then?" The question could have been answered empirically and the inquiry ended. Cheetahs *don't* attack that way, and so we don't know what baboons *might* do. Fortunately, it was not. For the question opens up the deep issues of what might be and why it isn't. Is there a necessary relation between predators and prey that share a common ecological niche? Must their encounters have a "sporting chance" outcome? It is such conjecture, in this case quite unanswerable, that produces rational, self-consciously problem-finding behavior so crucial to the growth of intellectual power.

Reprinted by permission of the publishers of *Toward a Theory of Instruction* (Cambridge, Mass.: The Belknap Press of Harvard University Press, Copyright 1966 by the President and Fellows of Harvard College), pp. 158-159.

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The Process of Inquiring

Barry K. Beyer

Inquiry is more than an abstract concept. It is a very real type of behavior. As long as it is dealt with only in abstract terms, it is likely to remain vague and elusive, if not actually confusing. To make it more concrete, to understand it better, we ought to use this concept to analyse samples of behavior that purport to be inquiry in nature....

It Was Obvious

Professional education literature abounds with many examples of inquiry in action. Most of these are transcripts of actual classroom dialogues. The example that follows here, however, is different. It is a brief folktale--fiction, of course--about a scholar who is an expert Jewish theologian. Marmaresch, the community referred to, was a typical shtetel, an area inhabited by Jewish people in the late nineteenth-early twentieth centuries in southeastern Europe. Because the scholar is native to southeastern Europe, he is well acquainted with its inhabitants and quite familiar with the people of the surrounding areas. Thus he is able to make the assumptions he does.

This particular tale is a translation from a collection of folk humor originally published in 1947. It is worth reading twice. First, read it as a story. Attention should be given to the literal meaning only. Nothing need be read into it, for it is not the content that is of major concern. The main interest here is the process used by the scholar to solve his problem. Then the tale should be read a second time for evidence of the basic elements of inquiry as represented in Figure [6]. To what extent is inquiry evident in this tale?

Reprinted from *Inquiry in the Social Studies Classroom: A Strategy for Teaching*, by Barry K. Beyer. Columbus: Charles E. Merrill Publishing Co., copyright © 1971.

A Talmudic scholar from Marmaresch was on his way home from a visit to Budapest. Opposite him in the railway carriage sat another Jew, dressed in modern fashion and smoking a cigar. When the conductor came around to collect the tickets the scholar noticed that his neighbor opposite him was also on his way to Marmaresch.

This seemed very odd to him.

"Who can it be, and why is he going to Marmaresch?" he wondered.

As it would not be polite to ask outright he tried to figure it out for himself. "Now let me see," he mused. "He is a modern Jew, well dressed, and he smokes a cigar. Whom would a man of this type be visiting in Marmaresch? Possibly he's on his way to our town doctor's wedding. But no, that can't be! That's two weeks off. Certainly this kind of man wouldn't twiddle his thumbs in our town for two weeks!

"Why then is he on his way to Marmaresch? Perhaps he's courting a woman there. But who could it be? Now let me see. Moses Goldman's daughter Esther? Yes definitely, it's her and nobody else...! But now that I think of it--that couldn't be! She's too old--he wouldn't have her, under any circumstances! Maybe it's Haikeh Wasservogel? Phooey! She's so ugly! Who then? Could it be Leah, the money-lender's daughter? N-no! What a match for such a nice man! Who then? There aren't any more marriageable girls in Marmaresch. That's settled then, he's not going courting.

"What then brings him?

"Wait, I've got it! It's about Mottell Kohn's bankruptcy case! But what connection could he have with that? Could it be that he is one of his creditors? Hardly! Just look at him sitting there so calmly, reading his newspaper and smiling to himself. Anybody can see nothing worries him! No, he's not a creditor. But I'll bet he has something to do with the bankruptcy! Now what could it be?

"Wait a minute, I think I've got it. Mottell Kohn must have corresponded with a lawyer from Budapest about his bankruptcy. But that swindler Mottell certainly wouldn't confide his business secrets to a stranger! So it stands to reason that the lawyer must be a member of the family.

"Now who could it be? Could it be his sister Shprinzah's son? No, that's impossible. She got married twenty-six years ago--I remember it very well because the wedding took place in the green synagogue. And this man here looks at least thirty-five.

"A funny thing! Who could it be, after all...? Wait a minute! It's as clear as day! This is his nephew, his brother Hayyim's son, because Hayyim Kohn got married thirty-seven years and two months ago in the stone synagogue near the market place. Yes, that's who he is!

"In a nutshell--he is Lawyer Kohn from Budapest. But a lawyer from Budapest surely must have the title 'Doctor'! So, he is Doctor Kohn from Budapest, no? But wait a minute! A lawyer from Budapest who calls himself 'Doctor' won't call himself 'Kohn'! Anybody knows that. It's certain that he has changed his name into Hungarian. Now, what kind of a name could he have made out of Kohn? Kovacs! Yes, that's it--Kovacs! In short, this is Dr. Kovacs from Budapest!"

Eager to start a conversation the scholar turned to his travelling companion and asked, "Dr. Kovacs, do you mind if I open the window?"

"Not at all," answered the other. "But tell me, how do you know that I am Doctor Kovacs?"

"It was obvious," replied the scholar.

What elements of inquiry can be identified in this story? Here is a man who finds himself in a problematic situation. He could solve his problem by asking his traveling companion his name. But he does not. Instead, he proceeds to think out the answer for himself, to reflect, to inquire. He obviously values the use of this method to solve problems and to learn.

There is evidence of other inquiry attitudes here. This scholar is certainly curious! A situation that undoubtedly is not at all problematic to many people on this train bothers him. One reason for his curiosity is the proximity of the problem to him. It is close, relevant. Another reason is that what he perceives does not make sense. He is a keen observer and has a wide background of experience. He also has a low tolerance for ambiguity--thus he wants to know "Who can it be, and why is he going to Marmaresch?" And he does not give up easily in his quest for an acceptable answer. In spite of several dead ends, he pursues the evidence until he arrives at a conclusion that proves valid, at least to his satisfaction. He is willing to suspend a final judgment until all relevant evidence is in; he examines as many sides of the problem as possible; and, finally, he has a healthy respect for evidence--he uses a considerable amount in the process of testing his guesses as to the identity of his traveling companion.

This scholar obviously knows how to inquire. Perhaps that is what makes him a scholar. At any rate, he has command--knowledge--of the basic tools of inquiry: sources of data, analytical concepts, and a process of inquiring itself. Interestingly enough, his prime data source is his memory. Over the past years he has stored away, just as all people do, bits and pieces of information and experience that he now finds relevant to the problem at hand. He also secures a considerable amount of data by observing his subject. In

addition, he has certain concepts--of courtship, of bankruptcy, of Budapest lawyers--that lead him to ask certain questions whose answers guide his analysis of all relevant data. There can be little doubt as to his familiarity with rational inquiry.

If it is nothing else, this story is vividly descriptive of inquiry in action. After sensing a problem that almost demands a solution, our scholar proceeds to hypothesize and then to test his hypotheses until he comes up with a solution to the problem. What happens as he does these things?

Defining the Problem

Our scholar is apparently en route to the town of Marmaresch. He boards a train, perhaps in Budapest, and seats himself with other passengers in one of the coaches. Suddenly he becomes aware of a situation which puzzles him:

...Opposite him in the railway carriage sat another Jew, dressed in modern fashion and smoking a cigar. When the conductor came around to collect the tickets the scholar noticed that his neighbor opposite was also on his way to Marmaresch.

This seemed very odd to him.

Certainly such a well-dressed man has no business going to Marmaresch, or so our scholar thinks. He evidently knows enough about this little town to realize that some special occasion must be calling this gentleman to visit there. He is curious--"Who can it be, and why is he going to Marmaresch?" His statement of the problem is simple and direct--he is starting to inquire.

Our scholar doesn't jump to any hasty conclusions. Nor does he tackle the whole problem at once. Instead, he breaks it into a number of subproblems, the answers to which gradually lead him to a valid resolution of the main problem. He elects first to figure out why this man is going to Marmaresch, thinking perhaps that if he can determine this, he will have some clues as to who the man is. So his immediate problem is "...why is he going to Marmaresch?"

Hypothesizing and Testing the Hypotheses

Our scholar studies the subject of his curiosity and notices that he is well dressed, modern, and apparently reasonably wealthy. He then attempts to recall information about the town that might suggest why a man like this is traveling there. As he does, he suddenly comes up with a possible reason--the town doctor's wedding. However, examination of further information about the date of the wedding and the apparently sleepy, dull nature of the community itself suggests that this hypothesis is unacceptable. So he rejects this as the answer and returns to the problem once again.

"Why then is he on his way to Marmaresch?" Courtship! A second hypothesis. So he dredges up some more information relevant to this guess:

"...Moses Goldman's daughter Esther? Yes, definitely, it's she and nobody else...! But now that I think of it--that couldn't be! She's too old--he wouldn't have her, under any circumstances! Maybe it's Haikeh Wasservogel? Phooey! She's too ugly! Who then? Could it be Leah, the money-lender's daughter? N-no! What a match for such a nice man! Who then? There aren't any more marriageable girls...."

Again, analysis of the evidence fails to yield anything that leads him to believe this gentleman could be courting a girl from the town, so he concludes that this hypothesis is inaccurate. Thus, he discards it, too.

"What then brings him?" Our scholar returns to the original problem. Suddenly he recalls more information about events in the town which appears to offer a reasonable answer. Bankruptcy! This is his third hypothesis:

"Wait, I've got it! It's about Mottell Kohn's bankruptcy case!"

Concluding

At this point the inquiry into the initial subproblem comes to a close. Our scholar does not discard the idea of bankruptcy but accepts it as the reason for this man's going to Marmaresch. He does so simply because all other reasonable explanations have been eliminated. As the last remaining apparently logical explanation, this reason merits consideration. For him, at least, part of the original problem is now solved--even if only tentatively.

Defining the Problem

The main problem still remains, however. "Who can it be...?" Having decided why the stranger is on his way to Marmaresch, our scholar assumes that this man must have some connection with the bankruptcy. Determining this connection will help determine his identity. So he asks himself, "...what connection can he have with that?" A new problem!

Hypothesizing and Testing the Hypotheses

Once again he guesses at an answer:

"Could it be that he is one of his creditors? Hardly! Just look at him sitting there so calmly, reading his newspaper and smiling to himself. Anybody can see nothing worries him! No, he's not a creditor...."

So that hypothesis is discarded and a new line of inquiry posited. What other kinds of people are usually involved in bankruptcy cases? Lawyers.

"...Wait a minute, I think I've got it. Mottell Kohn must have corresponded with a lawyer from Budapest about his bankruptcy...."

Concluding

This makes sense! Now our scholar thinks he is on the right track. His traveling companion must be a lawyer. He is one step closer to answering his original question "Who can it be...?"

Problem-Hypothesis-Test-Conclusion

He now turns to another subproblem. Since he knows Mottell Kohn quite well, or at least thinks he knows him, the solution appears to be relatively easy:

"But that swindler Mottell certainly wouldn't confide his business secrets to a stranger! So it stands to reason that the lawyer must be a member of the family...."

All he needs to do now is figure out which relative it could be. An answer is not long in coming. First he states the problem again. Then he hypothesizes. His initial hypothesis is rejected because it is not supported by the available data--the date of the marriage, and the apparent age of the man in question. But then, suddenly, everything seems to fall into place:

"Now who could it be? Could it be his sister Shprinzah's son? No, that's impossible. She got married twenty-six years ago--I remember the wedding very well because it took place in the green synagogue. And this man here looks at least thirty-five.

"A funny thing! Who could it be, after all...? Wait a minute! It's as clear as day! This is his nephew, his brother Hayyim's son, because Hayyim Kohn got married thirty-seven years and two months ago in the stonesynagogue near the market place. Yes, that's who he is!

"In a nutshell--he is Lawyer Kohn from Budapest...."

Yet, even though he knows or thinks he knows who the man is, there are several other minor problems to be dealt with:

"But a lawyer from Budapest surely must have the title 'Doctor.' So, he is Doctor Kohn from Budapest, no? But wait a minute! A lawyer from Budapest who calls himself 'Doctor' won't call himself 'Kohn!' Anybody knows that. It's certain that he has changed his name into Hungarian. Now what kind of a name could he have made

out of Kohn? Kovacs! Yes, that's it--Kovacs! In short, this is Dr. Kovacs from Budapest!"

Finally, a conclusion, an answer to the whole problem "Who can it be...?" Our scholar has gone as far as he can go on his own. But because he is human and because he too cannot tolerate too much ambiguity, he wants to know if he is right. He could ask the man, "Are you Dr. Kovacs?" but he does not. Instead he tests his own conclusion by assuming that the man *is* Dr. Kovacs, that his own conclusion *is* correct. Turning to his fellow traveler he asks:

"...Dr. Kovacs, do you mind if I open the window?"

"Not at all," answered the other. "But tell me, how do you know that I am Doctor Kovacs?"

"It was obvious," replied the scholar.

The Process of Inquiry

Such is inquiry in action. It involves all of the elements described in the preceding chapter--knowledge of the tentative, interpretive nature of knowledge, certain attitudes and values, and a process of inquiring.

This process is extremely important. The folktale used here reveals that there is much more to it than there at first appears to be. It is not a simple set of three or four single steps but a multitude of complex operations. In diagrammatic form, here is what our scholar did:

MAIN PROBLEM--WHO CAN IT BE?

- | | |
|-------------------------|--|
| 1. <i>Subproblem #1</i> | <i>...why is he going to Marmaresch?</i> |
| Hypothesize | he's on his way to the...wedding... |
| Test | |
| Conclude | No... |
| Hypothesize | ...he's courting |
| Test | |
| Conclude | No... |
| Hypothesize | it's about...bankruptcy... |
| Test | |
| Conclude | Yes... |
| 2. <i>Subproblem #2</i> | <i>...something to do with bankruptcy?</i> |
| Hypothesize | ...a creditor |
| Test | |
| Conclude | No... |
| Hypothesize | ...a lawyer... |
| Test | |
| Conclude | Yes... |

- | | |
|-------------------------|------------------------------------|
| 3. <i>Subproblem #3</i> | |
| Hypothesize | ...who could it be? |
| Test | ...sister Shprinzah's son... |
| Conclude | No... |
| Hypothesize | ...brother Hayyim's son... |
| Test | |
| Conclude | Yes. |
| | |
| 4. <i>Subproblem #4</i> | |
| Hypothesize | What is his exact name? |
| Test | ...must have the title "Doctor"... |
| Conclude | Yes... |
| Hypothesize | ...changed his name to Kovacs |
| Test | |
| Conclude | Yes... |

CONCLUSION--IN SHORT, THIS IS DR. KOVACS FROM BUDAPEST!

Then his conclusion is applied to the data to help make sense out of the situation--and to satisfy the scholar that his inquiry really is accurate.

This inquiry does not proceed in a uniform, straight line directly from problem to conclusion, but instead its operations double back on each other, occur simultaneously, and sometimes are even omitted. Even negative answers are useful in inquiring. And data--information gathered from books, others' comments, personal observation, and even memory--is most crucial. Careful analysis of this folktale, in sum, ought to help flesh out the concept of inquiry sketched in Chapter 1.

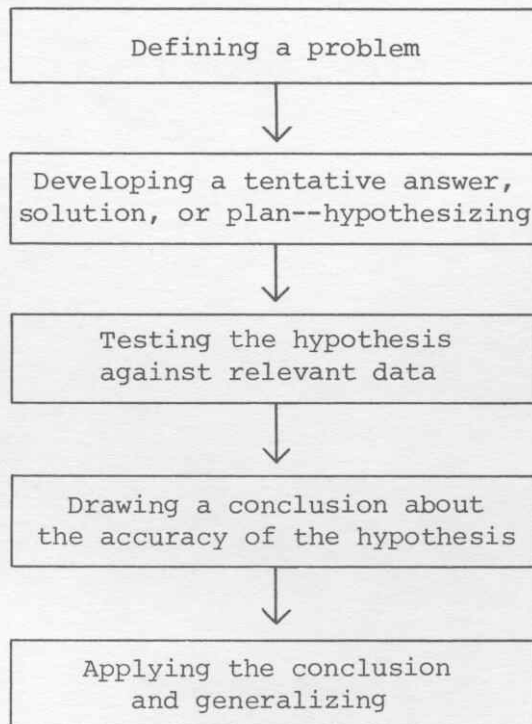


FIGURE 6

Figure 6 illustrates the essential steps of the inquiry process. But there is much more to each of these steps than is evident from this simple diagram. Further analysis of the folktale used here suggests a much more complex but precise model of inquiry. Knowledge of this model is crucial if inquiry teaching is to be at all productive in the classroom.

Evaluation Approaches

These approaches are provided to give teachers the opportunity to build evaluation into the day-to-day activities in the EXPLORING CHILDHOOD materials. Teachers can adapt these suggested approaches to the goals and needs of their individual classes. Students and teachers should share and discuss the purposes, expected outcomes, and actual results of the evaluation approach chosen.

Approach	Description of Activity and Page References	Purpose	Evidence of Student Learning
Short Answer Questions (Individual oral or written exercise)	<p>Choose one of the child explanations on page 5 of the student materials and discuss:</p> <ul style="list-style-type: none"> How do you think a child could have arrived at this belief? What might influence this belief to change? List as many possibilities as you can, giving specific examples. 	<p>To evaluate students' understanding of children's ideas about the physical world and their understanding of the different factors that cause children's ideas and beliefs to change.</p>	<p>Students look at the child's belief in terms of some of these characteristic patterns:</p> <ul style="list-style-type: none"> a child explains the unfamiliar in terms he or she already knows; children often view inanimate objects as alive; children often explain abstract or intangible things, e.g., wind or dreams, in concrete form.
Interviewing	<p>Students interview two or three children in their fieldsites about a topic of probable interest to children, such as what a dream is or where fire comes from. (Student booklet, p. 8)</p> <p>Students may wish to work together in class beforehand, developing a number of questions.</p> <p>Interviews can be recorded (a) on tape, or (b) by a student recorder, if students can work in pairs.</p>	<p>To evaluate students' ability to learn about children's beliefs by talking directly to children. This involves:</p> <ul style="list-style-type: none"> a number of skills in interviewing children: <ul style="list-style-type: none"> --talking with children while informally joining their play 	<p>Students recognize that maturation and experience together help change a child's beliefs since:</p> <ul style="list-style-type: none"> at each age or stage of growth the child experiences or learns about things differently; beliefs change as children interact with people, media, new situations. <p>Students' interviews indicate that they:</p> <ul style="list-style-type: none"> expressed interest in what the child was doing; chose simple vocabulary the child was likely to grasp; followed up on the child's own words in asking additional questions; tried again if a question did not catch the child's interest; did not insist on the child's participation in a conversation.

Approach	Description of and Page References	Purpose	Evidence of Student Learning
	Students summarize the children's views of the topic in writing or in an oral presentation, illustrating with direct quotes from the interview, or by playing part of a tape.	<ul style="list-style-type: none"> --asking questions a child will understand --probing to encourage further explanations from the child skills in summarizing information gathered from several children. 	<p>In summarizing, students:</p> <ul style="list-style-type: none"> pointed out some similarities and differences in the children's views of the topic, and in the ways the children responded, e.g., how talkative.
<p>Observation and Analysis (For small groups)</p>	<p>Carry out the activity described on page 13 of the student booklet and pages 23-24 of this guide, in which students observe children and teenagers exploring the same topic.</p> <p>Procedures: divide class into small groups, each of which selects a topic that would interest children in their field sites. Collect materials, pictures, objects related to the topic.</p> <p>Fieldsite: two group members set up materials in site and observe children's responses.</p> <p>Classroom: Set up same materials for one of the other small groups.</p>	<p>To evaluate students':</p> <ul style="list-style-type: none"> ability to set up a situation that helps them learn about children; skills in observing and recording details in relation to a focusing question; understanding of how they have changed since childhood in what they know and how they find out. 	<p>Students provide evidence in their observation records that:</p> <ul style="list-style-type: none"> the set-up attracted children for several minutes or was effectively changed during activity; they were attending to what children did with material as well as what they said. <p>Students compare the two groups in terms of such things as:</p> <ul style="list-style-type: none"> the range of responses each had: verbal, tactile, visual, oral, etc. kinds of questions asked; particular focus of interest; previous experience with subject; explanations and beliefs voiced about the topic.
	<p>How to observe: in both settings have students observe together; one observer can focus on what is said, the other on the actions of the children or teenagers.</p> <p>After both observations, students can list ways children and adolescents were similar and different in what they knew about the topic; and ways in which each tried to learn about it.</p>		

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EXPLORING CHILDHOOD has been developed by the School and Society Programs of Education Development Center under grants from the Office of Child Development and the National Institute of Mental Health, and with the support of the Office of Education.

Education Development Center, Inc. (EDC) is a publicly supported, nonprofit corporation engaged in educational research and development.