

SKILLS AND CONCEPTS

Exploring the potentials and limitations of various materials Observing similarities and differences
Measuring and comparing volume, mass, and length
Developing language skills

SELF CONCEPT AND SOCIAL INTERACTION.

Contributing to the learning environment by collecting materials for classmates to use
Learning to work cooperatively with others
Experiencing and sharing the joy of discovery
Acknowledging the relationship of self to others through role playing

FUTURE APPLICATION

Problem solving Logical thinking

PREREQUISITE CHAPTERS____

None

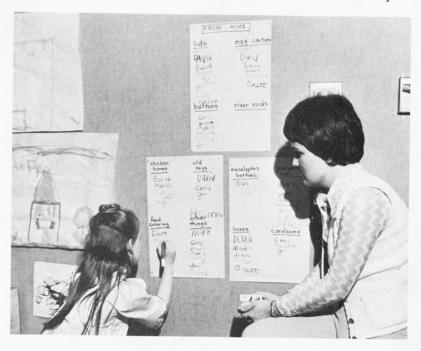


INTRODUCTION

Every child needs time to explore new materials in hisorher *own* way before those explorations are directed. A box of buttons dumped onto the table will spark a unique series of thoughts for each child. One child may begin to sort the buttons by color; another may pick up the ones that resemble buttons on an article of clothing at home and mention it to a friend; another may pick up a clear button and peer through it like a monocle; still another may pair the identical buttons. During this period questions and challenges from another person, no matter how stimulating and fascinating, interfere with the natural and spontaneous interests which the material creates in each child's mind.

Only when children have had time to play and explore new materials in their own way will they be able to see the materials as *learning materials* and be able to focus on mathematical concepts rather than on the materials themselves. Without free exploration children's play interests are unsatisfied, and until this need is fulfilled, the children will pursue this priority relentlessly.

During the first two weeks of school, introduce the materials the children will be using during the first half of the school year. Bring in a few new things each day and show them to the entire class at one time. Tell your students the name of each material and explain where it came from. (If you don't do this, the children assume the materials have appeared out of thin air.) If you sent a note home before school starts asking parents to help collect items for your math program (see Sample Letters to Parents in the appendix), you will be getting things from home by now. Each time a child brings something to class, record it and read the list to the children each day.

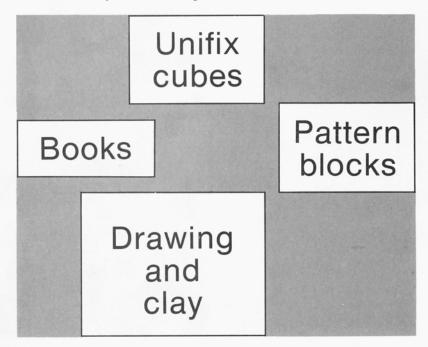


*All items marked with an asterisk are described and pictured in the appendix, pp. 360.

Show your class the catalogue you used to order Unifix cubes* or pattern blocks* and tell them the names of the neighborhood stores where you bought such items as the beans or the chicken rings. Show your class the pages in this book which have pictures of materials you are introducing that day. These details link school work with the outside world and give the children greater respect for the materials. Without these details the materials are just there, out of context; with these details the materials are in context, with a history.

···· This is an important concept for learning in general. Children rarely have the opportunity to be a part of building things from the ground floor. They are too often prevented from seeing things grow from nothing. Birthday parties, their house, their classroom, the stores, their church appear to them already completed. It is no wonder they have no sense of the work involved in creating and maintaining their surroundings. We ask them to abstract this idea, when they have not had an opportunity to experience it. Children should come to school the first day and experience blank bulletin boards and participate in making the classroom their classroom. If they bring things from home, they have a part in creating the learning materials. When children share the experience of helping one another build something, they show a pride in their classroom and in its materials that at one time you might have thought impossible.

On the first day, introduce the Unifix cubes to your class. Have half the class look at books, draw, or work with clay and the other half explore the Unifix cubes. After about 20 minutes, switch activities. The next day, introduce the pattern blocks and divide your class into three groups. Rotate the three groups among the pattern blocks, the Unifix cubes, and the books, clay, and drawing.



FREE EHPLORATION



Substitute materials freely. The goal is to introduce gradually whatever materials your class will be using.

Establish a storage place for each item, and code each box of materials and the shelf where it is to be stored. Have your class observe while several volunteers take a material, match it to the appropriate code on the shelf, and put the material away.



Each time a new material is introduced, discuss safety in using the material and point out anything the children should be particularly careful about.

For example, when introducing the geoboards and geobands, explain the danger of a geoband shooting across the table and hitting a child in the eye. Acknowledge that shooting rubberbands can be fun and suggest that if someone wants to have a rubberband shooting contest, sheorhe should let you know so that you can arrange a contest Friday afternoon. Bring rubberbands from home for the contest, so that the children will use the geobands only for creating designs.

Make it very clear that it is each child's personal responsibility to use materials wisely. Set the limits clearly. The children will understand from the discussion that there is an appropriate time and an inappropriate time for particular behavior. You want them to understand that the rules are based on reason, not on your desire to spoil their fun.

To anticipate and partially prevent two additional problems from occurring, establish the following ground rules at the outset:

- 1. When making something, you and only you have the right to mess up or put away what you created.
- 2. Never, never throw any material.

Set up three pattern block designs and ask three children to role play the first ground rule. Have each child mess up hisorher own design and then talk together as a group about the feelings that result. Does each person need a space that is hisorhers and does sheorhe need other people to respect that space? Now role play someone messing up another child's work and talk about how it makes the children feel when someone invades that space and bothers what is being worked on. Discuss accidents and stress the importance of *telling* the person if an accident occurs and of offering to help fix what was messed up.



FREE EXPLORATION

To introduce the second ground rule, have the children put their pattern blocks away. Talk about how easy it is in the excitement and fun of cleaning up to forget this rule and throw things into the boxes rather than taking the time to place them inside carefully. Then talk about why it is dangerous to throw things. Ask the children to tell stories of their past reactions to being hit by something thrown across a room. Special attention to this rule is needed again at clean up time.

Gradually introduce the rest of the materials, reiterating the ground rules each day. At the end of each work period compliment the children on their thoughtfulness for one another's safety and enjoyment. (If there have been no problems, it is still important to mention to the children that you notice they are following the ground rules.)

During the next several days or weeks as your children explore the materials freely, observe the way different children use each material, noting who explores by ordering, sorting, or arranging materials in an organized way, who has difficulty thinking of anything to do, who works with others in a group, who prefers to work alone, and so on. Try to keep informal notes of your observations (see the Observation Sheets in the Black-Line Masters).

FREE EXPLORATION OBSERVATIONS	13	/2	1/00	1/5/	13/0
Intensity of interest (low) △ + ⇒ (high)	水	*	Δ	*	
Enjoyment (low) △ + ★ (high)	+	X	3	X	
Practicing ground rules (rarely) △ + ★ (usually)	*	X	Δ	+	
Spontaneously verbalizing about task (low) △ + ≠ (high)	Δ	+	(nuse)	*	
Matching or pairing (tally)	1				
Sorting by color or kind (tally)		111			
Sorting by detail (tally)	1				
Patterning (record the pattern made with ABCs)		ABAB			
Ordering (rare) (tally)		1(size)			
Building (flat or up)	flat	up		up	
Design (simple) △ + ★(elaborate)	*	+		4	
Working preference (alone or with others)	others	others		alone	
Involvement (needs help to) A + > (self- be directed)	4	X		4	
Date: Oct 4	When	to obser	ve: Duri	ng initial fre	e
Materials from which the child so junks howels part blocks	elected:		chile	pration whenever are intro new material.	duced
Are the gorups structured by X	student or	r teac	her choice	e?	
Are chilrenrotating or cha					
Observer Police					

Some children need more time than others to explore a particular material, so there is no simple formula defining the length of the free exploration stage in each classroom. Try to let the *needs of the children* determine how long you continue. Children learn easily and joyfully from real things. This free exploration period is the foundation for later development, providing a reservoir of images and recorded sensations in the child's mind; and the only way to build this foundation is by allowing each child to have the *time* and freedom to explore. One day, or two, is not enough to permit these intuitive understandings to develop and be recorded in the child's mind, and unless they are recorded there, they cannot be drawn on later.

Try to sense when your class is beginning to lose interest in exploring the materials. After the first year you will be able to sense when it is time to move on, but the first year you may not know what to look for. If you decide to move to directed work too early, you will be able to tell that your class is *not* ready, for they will resist your suggestions in favor of their own ideas. In this case, return to free exploration for at least another week. If they are ready for directed work, they will eagerly try your suggestions.

These early free-exploration periods can be intensified if you allow your children two 45 minute or one hour periods during the first week or two of school.

When you make the decision to move away from free exploration, it is inevitable that a few children will show a need for more time at the free exploration stage. Try to provide for this need during the year by having a 20–30 minute period each day, perhaps after lunch, called activity time. During this period children are free to select and use any material or activity in the room, and those children who still need to explore their own ideas can continue to do so.



FREE EXPLORATION



APPLICATION AND EXTENSION OF FREE EXPLORATION



The following activities allow the children to explore volume, weight, mirrors, color, and design. They can be done at any point during the year and are not prerequisite to other chapters. The activity entitled "Reproducing Designs," is a useful one to help the teacher determine the children's readiness to leave free exploration and move to the directed explorations in pattern, sorting and classifying, comparing, and so forth.

The Jars

SKILLS

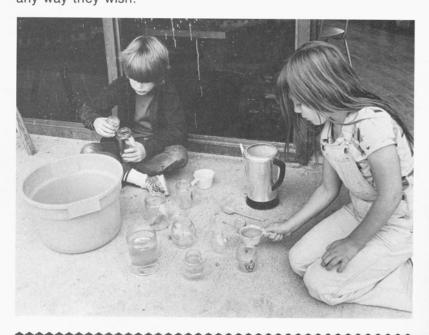
Measurement Free exploration

MATERIALS

Measuring set with jars,* sponge or broom and dust pan

ACTIVITY____

The children fill up the jars with water or rice, exploring in any way they wish.



Put a few drops of food coloring and lemon or peppermint extract in the water occasionally as a pleasant change.

Weighing Common Objects

Weighing Common Objects

SKILLS____

Measurement Free exploration

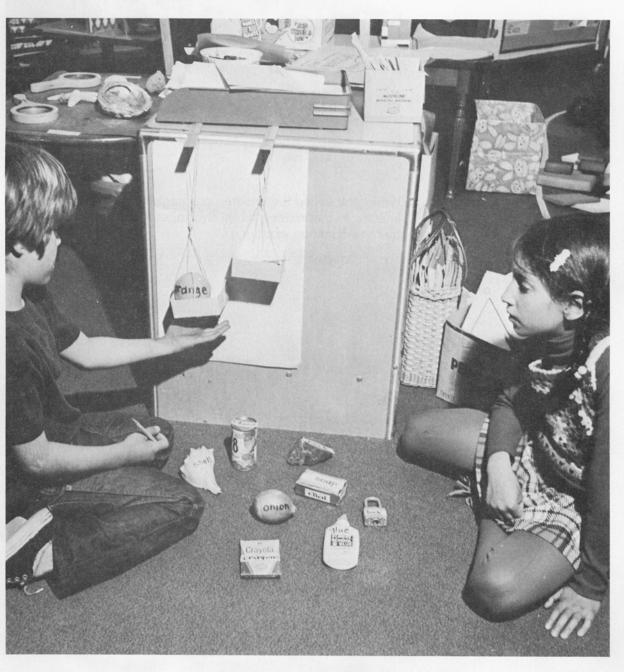
Comparing

MATERIALS.

Common objects,* two milk carton scales*

ACTIVITY____

Two children weigh objects and tell one another which is heavier or lighter.



"The orange is heavier than the scissors."

Mirrors

SKILLS_____

Free exploration
Discovering properties of mirrors

MATERIALS_____

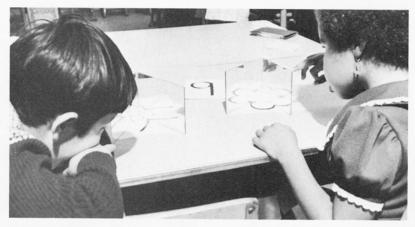
Mirrors, books, and magazines

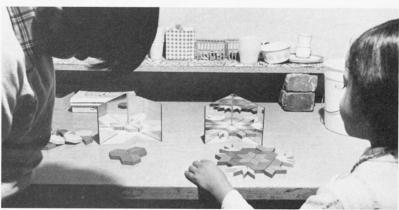
ACTIVITY____

The children explore the environment and printed materials with a mirror.



When you sense the children are beginning to lose their initial interest in the mirrors, hinge two together and encourage them to continue exploring.





Food Coloring

SKILLS_____

Free exploration Pattern Comparing

MATERIALS____

Peanut butter jars or other wide-mouthed jars, food coloring

ACTIVITY____

The children fill a jar with water and look at the pattern and colors formed when they drop food coloring into water.



After a few days, put out salt and sugar so the children can compare salt and sugar water patterns.





FREE EXPLORATION



Reproducing Designs

SKILLS Hand

Hand-eye coordination

Matching Comparing

MATERIALS_

Geoboards and geobands,* pattern blocks,* Unifix cubes* or

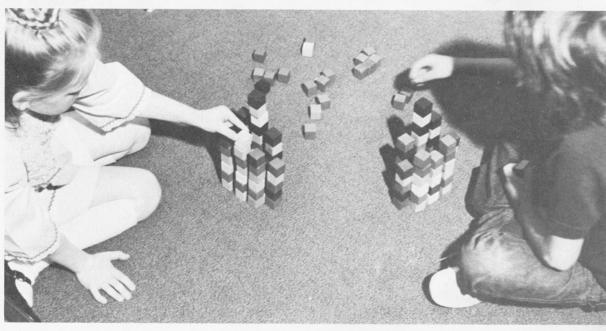
wooden cubes*

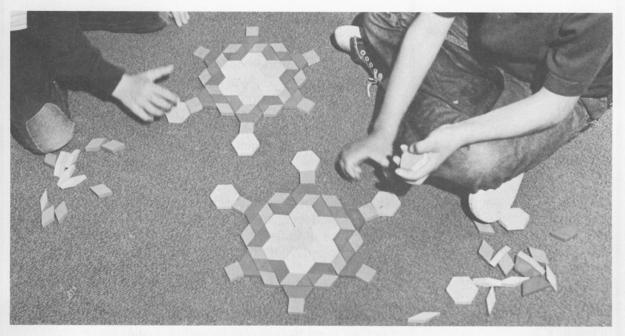
ACTIVITY ____

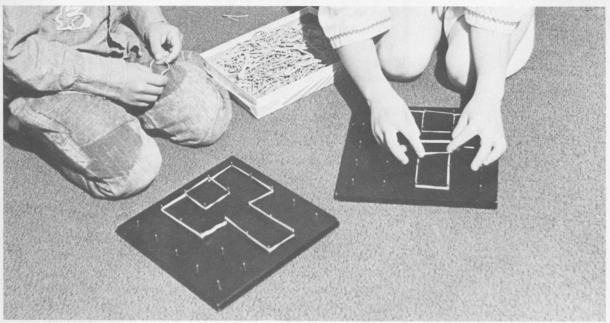
The children work in pairs. One child makes a design and the

second child copies it using the same material.









When you feel a child is successful with these activities and in need of an additional challenge, the child can copy geoboard designs onto dot paper (Worksheets 17-19) and pattern block designs by gluing down construction paper pattern block shapes (Worksheets 2-6) or by using the pattern block template*.

QUESTIONS FROM TEACHERS

DOESN'T IT TAKE FOREVER TO COLLECT ALL THE JUNK FOR THE JUNK BOXES? Yes, unless you get some help from parents and your students. Before school starts, I mail a note to my children telling them I am going to be their teacher during the next year. I ask them to bring collections of buttons, lids, toys, bottle caps, rocks, old keys, acorn tops, or other local items. I collect only a few things: perhaps the chicken rings, the glass blobs, and the cotton puffs. This makes collecting easy and turns it into a class project rather than an additional responsibility for the teacher.

I'M AFRAID MY CHILDREN
WILL THROW THESE THINGS
AT EACH OTHER RATHER
THAN EXPLORE THEM.
THEORETICALLY, I WANT
THEM TO HAVE THESE
EXPERIENCES, BUT I DON'T
KNOW IF IT'S REALLY
POSSIBLE.

Children who throw material or delight in knocking over other children's models or designs are problems I face, too. (This is how the idea of establishing "ground rules" came about.) It is important to anticipate these two problems and prepare the children before these situations arise in the classroom. Role playing is a good way of helping children understand these ground rules. After this, I observe the children's behavior while they work and use this observation to indicate whether or not we need to role play the ground rules more often. As long as there are no problems and things are going smoothly, I assume the children understand the logic of the ground rules. The important thing is not whether each child was present when the words were said, but, rather, has each child translated those words into action? When problems arise, as they inevitably do, I stop right then, gather the children together, and discuss the problem that has arisen. Remember, our focus as teachers is on the child, not on the "lessons." and we need to be just as eager to teach our children social skills as those of counting or division, being patient while both types of skills develop.

We shouldn't expect every child to be perfect in hisorher behavior by the time sheorhe reaches the grade we teach, any more than we would expect every child to have learned to tell time or count to a hundred by twos. We are each a product of our earlier experiences. The only difference between a child who "knows how to behave" and a child who doesn't is the former has been fortunate enough to have had a sympathetic adult spend the necessary time teaching himorher while the latter is still in need of someone's teaching.

If a child in my classroom is not using a material according to

the stated ground rules, I immediately remove the child from the group. I never give a warning; there is simply an immediate, serious consequence for behavior that is inappropriate. I seat the child where sheorhe can observe but cannot participate with the group. As I do this I say something like, "When you threw the buttons at John you showed me you could not stay with the group. Throwing buttons could hurt someone and keeps you and others from learning." In three or four minutes I go back to the child and we talk together about the appropriate behavior; then I invite the child to go back to work and try again. As long as a child can handle an activity appropriately, sheorhe remains in the group. As soon as I observe inappropriate behavior, the child is removed. It is very simple and, if it is handled consistently and matter-offactly, it really works. Removing a child redirects hisorher attention to the behavior that is expected. Keep your perspective and your focus-social skills are really the most important skills we can teach our children. If we teach a child or a group of children how to work side by side purposefully and cooperatively with others, we will be helping that child far more than if we give only intellectual guidance.

ALL THESE THINGS LOOK LIKE GREAT FUN, BUT IN MY CLASS, I'M SURE EVERYTHING WOULD GO HOME IN THE KIDS' POCKETS ON THE FIRST DAY!

I have learned from experience that "hoping" children will not take things from my classroom does not produce magic results. At first I ignored the problem; I expected the children to know better than to take things from the classroom or from anywhere else that didn't belong to them and if something was missing, I usually got mad but eventually replaced the missing part. Every time this happened I thought about how ungrateful the children were and how quickly they could ruin all my efforts to make a nice classroom for them. It was only after going back to worksheets and the textbook and being reconvinced that I couldn't face teaching from those materials that I started experimenting to solve the problem. The problem is not 100 percent solved; it never can be; but it is certainly manageable now.

Here's what I do now. I discuss a new material with very honest and straightforward talk about the inevitability that every person in our classroom is going to want to take some of the school materials home. I explain that wanting to take something is a very natural and normal human emotion that all people feel—even grownups. I mention other teachers' classes and the great games or special books those teachers have. I admit frankly that I would like those games for my class to use, and how easy it would be to take them. The children all know the teachers and soon they begin commenting—"My sister Julie is in that class. If our class had Mrs. Murphy's games, Julie wouldn't have them to use." "Yeah, and next year I might be in Mrs. Murphy's class and

then I wouldn't get to use them." And so on. Then we talk about all the children who will be coming to our room next year—brothers and sisters of children in our class who are a year younger—and help the children to begin to see our class materials as their materials too. This seems to make a lot of sense to the children because they identify with their friends and siblings who are younger and sincerely enjoy the idea that they too will be using these materials in the future.

The children are relieved to know that adults experience the same feelings they do, wishing they could have things they don't have. The children see the *feeling* is not bad; it's normal, and they should *expect* to feel it. *Acting* on your feeling is what is thoughtless and irresponsible because it deprives other people of what is rightfully theirs. Wanting to do it is okay. Doing it is not. And doing or not doing is under each person's control.

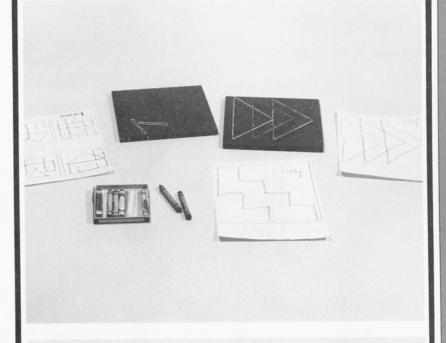
After we've talked about this together, I tell the children that if one day their need to take something overpowers them to the point that they are unable to talk themselves out of taking it, they should come to me and tell me. If they really need it that badly, I will find some way they can earn it rather than take it. (In the last three years that I have been using this approach, I have only had one child come to me, and we arranged for him to earn the thing he couldn't live without.)

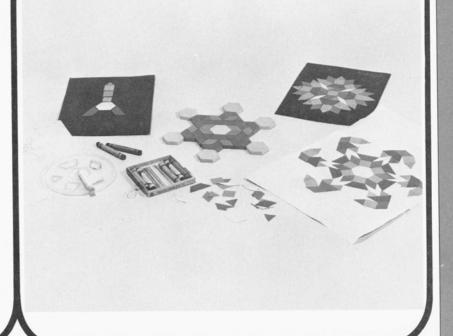
BUT WHAT EXACTLY HAS BEEN THE RESULT?

I now lose very little compared to what I lost before. I may replace a dollar's worth at the end of the year, when before it was a dollar's worth every two or three weeks. Part way through the year if I notice things are disappearing, I talk to the children again. This usually occurs after new children have come into our class who missed the initial talk. After I talk to the children again, the problem is always liveable. The magic is talking honestly about the real needs the children feel and helping the children see that other people share those feelings. Ideas of morality develop slowly over time, with repeated experiences, both slips and successes. Values cannot be adopted all at once like learning colors or multiplication tables. They are very personal and grow as our consciousness of other people's rights grows.

HOW DO YOU FIND TIME TO SET UP ALL THE DIFFERENT THINGS EACH DAY? I don't! I assign different children to do this for me. I make a map of the room and indicate the location for each material. I ask for two volunteers for each material and explain to them exactly what has to be done to set up each center. (By having two volunteers, the material still gets put out, even if one child is absent.) Children keep their job for as long as they wish. When a child tires of a job, it is hisorher responsibility to recruit and train a replacement.

HOW DO I CHALLENGE THOSE FEW CHILDREN WHO SEEM TO LOSE INTEREST IN FREE EXPLORATION BEFORE THE REST OF THE CLASS DOES? These children may enjoy making permanent records of their explorations. They can use the pattern block template* or glue pattern block shapes (see Worksheets 2–6) to paper and copy their pattern block design. They can copy geoboard designs onto geoboard dot paper (see appendix, Worksheets 17–19). These recording activities extend free exploration and you may find that many children gravitate to them. This is evidence that these children are ready for more structure and gives you a clue that soon your class will be ready to move to pattern or sorting activities.





FREE