

INTRODUCTION

Since the senses are the pathway to knowledge for the brain, they become our most important tools throughout life. The preschool child is much less dependent upon the visual sense and much more attuned to his other senses than the adult. Thus, the early years become a good time to refine the abilities of each sense. Perception is used here in the sense of discrimination between signals: visual, auditory, olfactory and gustatory. The finer the child's perception, the greater his ability to absorb and retain what he perceives.

As materials for the development of each sense are presented, the teacher will start with gross differences very few in number and work toward finer and more complicated contrasts. The goal for the child will be a greater ability to compare, contrast and classify.

The aim of all the materials is the development of perception in each sense and a refinement of intellectual acuity. Each material should contain its own control of error so that the children can work as independently of the teacher as possible. This will encourage the child to give his undivided attention to his work, as well as lengthen his ability to concentrate independently.

As with all areas of the classroom, only one unknown should be presented to the child at a time. The most concrete examples of each concept should be presented before trying to work with the more abstract. Materials should be as simple as possible and the contrasts should be very large at first so that the young child can begin where it is easiest for him to understand. Passive watching and listening in this area will not achieve the desired results. The child must have ample opportunity to work directly with materials, to experiment, to correct his own mistakes and to ask for help as needed. The adult role is to present, expand, support and inform. The goal for the child is to perceive relationships and use his senses to the best of his individual ability.

The Visual Sense

In our culture there is no sense more highly valued than the visual. Reading is a mainstay of success in our information-saturated world. Our eyes provide the bulk of our information, especially after the age of four or five. But it is not enough to be able to see. The child must also have the ability to discriminate between size, shape, color and dimension.

Some of the materials, which should be included in this area, include dimensional materials, which gradually increase in size. Didactic materials such as the Pink Tower, Red Rods and Cylinder Blocks give the child an opportunity to experiment with fine distinctions between one object and the next. The child should be able to build a tower in a graduated series, noticing when one is larger or smaller than another. His ability to order three-dimensional objects in a series is the beginning of discrimination, which will be useful both in reading and math.

Color, knowing names and grading shades, is another skill, which falls in the visual sense. Many materials can be designed for the children to sort according to color, to name each color and to make booklets, which relate color to their environment. An awareness of color in art and color-mixing allows the child to discover the practical uses of color.

Form and the discrimination of shape are primary in the teaching of reading and math. The child begins with the discrimination of simple three-dimensional forms. Geometric solids provide the child with the opportunity to see shapes in their purest form. After that, simple puzzles, which present the circle, various quadrilaterals, triangles and polygons, can be introduced. The child can learn the names of shapes, as well as draw them and integrate them into creative uses. He can discover the use of form in his environment, recognizing the pure shapes in everyday objects in the classroom or at home.

Auditory

Children can learn to discriminate between loud and soft sounds, as well as sort and match musical sounds. Tapes of environmental sounds can be very effective. The children can also experiment with various ways to make sounds. Rhythm band instruments can be used. Circle games can include silence games in which children listen to sounds in the environment. Other games where children have to find a hidden music box or repeat a rhythm in a clapping game help the children to develop their auditory sense.

Tactile

An abundance of materials to sort and classify by touch alone are often found to be intriguing for preschool children. Those who are not afraid to wear a blindfold can try to judge by touch alone. Others who feel threatened by not being able to see can simply close their eyes. Some materials, which can be used include various grades of sandpaper, wood, cloth, metal, and carved materials. The children can sort, match, and grade them from smoothest to roughest or softest to hardest. Young children also enjoy mystery bags where they cannot look but can only reach in to feel and guess what is in the bag.

Olfactory/Gustatory

The child has a much keener sense of smell than the adult. He also has more taste buds. Foods often taste much stronger to him, which is why he balks at eating things, which later on he will learn to enjoy. Experiences in various smells and tastes can broaden the child's information base. Smelling bottles and food tasting are two of the ways in which children can be introduced to new experiences. Spices, perfumes, and an assortment of fruits and vegetables are only some of the presentations that can be made.

The abilities learned in the Sensorial Area will lead directly into the child's explorations in areas, which are considered formal academic learning. The solid foundation, which this area provides ensure the child's success as he moves on through school.

IN PREPARATION FOR MATH

Many skills and concepts necessary for math are either introduced or solidified by activities in the Montessori environment, before a child ever does any formal math activities. The following pages are an attempt to list those skills or concepts, along with activities in the Montessori environment, which introduce or reinforce them.

I. PRACTICAL LIFE

The foundation for higher learning is found in Practical Life because it is here that the child acquires order, concentration, coordination and independence.

A. ORDER

The sequence of steps a child learns in Practical Life activities helps him learn to complete a task in an orderly way. This early success in problem solving techniques is a critical builder of a child's self-confidence in his own problem solving skills.

B. CONCENTRATION:

The lengthening of a child's concentration span, through Practical Life activities, is necessary before the child can focus on the mathematical material long enough to grasp the concept being taught.

C. COORDINATION:

Practical Life activities develop the child's large and small muscle coordination necessary for manipulating the math materials. In addition, the left to right and the top to bottom eye movements developed by many Practical Life activities are essential to develop an ability to read large numerals and perform mathematical operations with the materials.

D. INDEPENDENCE:

The value of independence speaks for itself. The feeling of independence achieved from Practical Life activities should carry over to more academic learning, so that the child is confident enough to pursue his own growth without habitually falling back on adults.

In addition to developing these four growths, Practical Life activities also develop several pre-math concepts; the sorting activities increase a child's perception of differences and similarities (equality and inequality). Serving food, (e.g. one carrot slice per child), and the button and snap frames are activities that develop a child's perception of one-to-one correspondence; and food preparation points toward the concept that various items can be combined, forming a new item.

II. SENSORIAL

"When we speak of the "mathematical mind" we are concerned with the content of the mind which the child collects from direct and exact experience with his environment. Unlike imagination or abstraction, the mathematical mind is made up of the perceptions of those things, which are actually present to the child. The child, through the work of his senses, acquaints himself with his environment, whether through movement of hand, or eye.

If the child is presented with an ordered sequence of activities, the child builds his mathematical mind on the orderly perception of classified and graded sensory experiences. The mind is able, through his experience, to integrate the exterior order internally so that the mathematical part of the mind is a collection of facts and realities and experiences which are classified, graded, etc. for the child's future

use. In other words, the basic foundation of the mind is one of order, from which all other processes can build."

... Ann Burke Neubert (A Way of Learning)

In the Sensorial Area the child develops the first three skills in the math sequence. Although there may be some overlapping, these three generally occur in the order given:

A. PERCEPTION OF DIFFERENCES:

Begins much earlier than the age of three. A baby notices differences between people, toys, food, and in their routine.

In the Sensorial Area, the following activities develop a child's perception of differences:

Cylinder Blocks	Pink Tower
Brown Prisms	Red Rods
Knobless Cylinders	Touch Boards
Geometric Solids	Geometric Cabinet

B. PERCEPTION OF SIMILARITIES:

This perception also begins during infancy. For instance, the baby will encounter a dog and know it's a dog, because of its similarity to others he has seen. But in the Sensorial Area itself, the child will find these activities designed to develop his perception of similarities.

Color Tablets	Fabric Matching
Baric Tablets	Sandpaper Matching
Smelling Bottles	Thermic Bottles
Sound Cylinders	Bells

Through the child's sensorial perception of differences and similarities, a foundation is laid for the later mathematical understanding of equality and inequality.

C. EXPERIENCE IN A GRADED SERIES:

After a child is aware of similarities and differences, he learns to grade a series of objects from long to short, large to small, heavy to light, etc. Sensorial materials designed for such grading include:

- Cylinder Blocks - tall to short, thick to thin, or both (series of 10)
- Knobless Cylinders - same as above (series of 10)
- Pink Tower- varies in three dimensions (series of 10)
- Brown Stair- varies in two dimensions (series of 10)
- Red Rods - varies in one dimension (series of 10)
- Geometric Cabinet and Cards: concrete to abstract
- Sound Cylinders - loud to soft
- Color Tablets, box 3 - dark to light (series of 9)
- Baric Tablets - heavy to light (series of 3)
- Thermic Bottles - hot to cold (series of 4)
- Bells - low to high (series of 8 or 13)

D. SENSE AWARENESS

1. Early unconscious Level: Birth to three
Before the child moves to the conscious level, the child absorbs the environment through his senses at an unconscious level.
2. Sensory-Motor Development
 - a. The child has experience with objects
 - b. Eye-hand coordination is developing
 - c. Large and small muscle coordination is being exercised.
3. Conscious Level: Three to six
 - a. Through the conscious isolation of sense experience the child learns:
 1. gross differences
 2. finer contrasts
 3. refinements
 4. judgment
 5. classification, etc.
4. Sensitive or Critical Periods:
The child is passing through these evolving epochs throughout his early development

E. DEVELOPMENT OF THE SENSES

1. Three-fold Aim:
 - a. Biological:
 1. To aid the natural development of the individual. For example, our senses or our ability to use our senses refine biologically and physically. i.e. the use of the hands.
 - b. Social:
 1. To prepare the individual for the community environment
 2. To help the child be aware of his environment and those things going on around him.
 - c. Psychic:
 1. Through physical and social growth, the child's psychic life is enhanced.
2. How the senses act as the pathway to knowledge:
 - a. Comprehension, perception, discernment, and understanding, etc.
 - b. Sensorial experience and development precedes intellectual activity.
 - c. Didactic materials cause the child to exercise his senses.

F. ISOLATING THE SENSES

1. Increases interest.
2. Leads from gross discrimination to finer discrimination.
3. Leads from simpler concepts to more complex associations.
4. Leads to the development of a finer appreciation and awareness of qualities in the environment.
5. Allows the child to become aware of points of contrast and consciousness.
6. Focuses the child's attention.

G. AIMS OF SENSORIAL EDUCATION

1. To develop sense perceptions as a means of acquiring classified, detailed and accurate knowledge of things in the environment and to develop a keener eye for discrimination of contrasts and identities and minute details of differences in gradations, to serve as a basis for the unfolding of the intelligence.

.....Adopted from **A WAY OF LEARNING**, Ann Burke Neubert

H. WHY SENSORY TRAINING IS IMPORTANT

1. It is a strong basis for intellectual growth; a preparation for complex learning.
2. It is a natural development of the child. It gives the child a sense of self-identity and security within the learning environment. Every child can rely on at least one sense, even the handicapped child.
3. It is needed for neurological and psychological development.
4. It is the basis for learning in an orderly fashion.
5. It is based on the logical learning sequence; concrete to abstract.
6. Through the isolation of the sense, a refinement of the senses can be developed.
7. It develops powers of concentration, observation and attention.
8. It provokes auto-education.
9. It provides aesthetic enjoyment.
10. It assists in preparation for life by developing skills in thinking, judging, associating, comparing and concentrating.
11. The materials invite the child to experiment, discover and create.

SENSORIAL

I. VISUAL SENSE

A. PERCEPTION OF DIMENSION

1. Knobbed Cylinders
Knobless Cylinders
2. Pink Tower - *tower of cubes*
3. Brown Stairs - *broad prisms*
4. Red Rods

B. PERCEPTION OF COLOR

- Color Tablets
- Matching
- Naming
- Grading

C. PERCEPTION OF FORM

- Geometric Solids
- Geometric Cabinet/Demonstration Tray
- Geometric Cabinet
- Definitions
- Constructive Triangle Boxes
- Triangular Box
- Large Hexagonal Box
- Small Hexagonal Box
- Rectangular Box
- Binomial Cube
- Trinomial Cube

II. TACTILE SENSE

- Rough and Smooth Boards
- Fabric Boxes
- Mystery Bags
- Baric Tablets
- Thermal Tablets
- Thermic Bottles

III. AUDITORY SENSE

- Sound Cylinders
- Musical Bells
- Striking
- Matching

IV. OLFACTORY SENSE

- Smelling Bottles

V. GUSTATORY SENSE
Tasting Bottles

VI. SENSORIAL EXPERIENCES WITH THE SQUARE AND CUBE CHAIN

See
→

See
→

Knobbed cylinders

Materials: Four blocks, each containing ten knobbed cylinders, with each cylinder fitting into its respective opening in a given block. The four blocks have an appropriate series of cylinder insets, which form the following graduation of exercises - from the easiest to the most difficult.

- No. 1 decreases in diameter only (red)
- No. 2 decreases in diameter and height (yellow)
- No. 3 decreases in height as it increases in diameter (green)
- No. 4 decreases in height (blue)

Aims:

Direct -

- 1. Development of visual discrimination of size.
- 2. Development of concentration and independence.

Indirect -

- 1. Preparation for writing through development of finger muscles for holding a pencil.

Presentation I:

- 1. Show the child how to carry a block by holding it at both ends and place it on the rug.
- 2. Remove all the cylinders, showing the child how each knob is to be held between thumb and index and middle finger of the dominant hand.
- 3. Place the cylinders on the rug in mixed order between yourself and the block.
- 4. With prehensile grasp, pick up the largest cylinder. Trace its base with two fingers, then trace the opening into which you will place the cylinder. Finally, place the cylinder into the opening.
- 5. Follow the same procedure with each cylinder.
- 6. Invite the child to do the exercise by himself.

Points of Interest:

- 1. Seeing each cylinder fit into its proper place.

Control of Error:

- 1. Seeing that thick cylinders will not fit into thin openings and vice-versa.
- 2. Short cylinders will disappear from eye level if they are placed in a "deep" opening.
- 3. Tall cylinders will not fit entirely into a shallow opening.

Variations:

- 1. Mix and match the cylinders using up to four at one time.
- 2. Using a blindfold, the child replaces the cylinder by feeling the opening and the shape of each cylinder until he finds the right one.

Age:

2 ½ to 4 years

* use

KNOBLESS CYLINDERS

Materials:

Four boxes of cylinders - ten in each box:

1. Red cylinders; equal in height but decrease in diameter
2. Yellow cylinders; graduated in height as well as in diameter
3. Green cylinders; decrease in diameter but increase in height
4. Blue cylinder; equal diameter but decrease in height.

Aims:**Direct -**

1. Development of visual discrimination of graduations of size.
2. Development of judgment of size through discrimination of graduations of thickness and height.
3. Development of concentration and independence.

Indirect -

1. Preparation for phonics and mathematics through the development of visual discrimination.

Presentation 1:**Horizontal Grading**

1. Invite a child who has worked successfully with the cylinder blocks to get the red box of cylinders. Show him how to carry the unopened box in two hands.
2. Place the box on the rug. Remove the lid and put it under the box. Remove the cylinders in mixed order.
3. Arrange the cylinders in their proper sequence along a straight line.
4. Break the order of the sequence and invite the child to repeat the exercise.

Presentation II:**Vertical Grading**

1. Place the thickest cylinder to one side.
2. Take the next thickest and superimpose it on the thickest, seeing that it is exactly in the center.
3. Place the additional cylinders one on the other, exactly centering each, noting that they are graded from thickest at the base to the thinnest at the top.
4. Remove the cylinders beginning from the top, and place them in order starting from the thinnest to the thickest.
5. Arrange them in mixed order and ask the child to do the exercise.

Points of Interest:

1. The differences in the grading of each box.
2. The excitement of using more than one box at a time.

Control of Error:

1. Seeing the unevenness of cylinders either horizontally or vertically.

Variations:

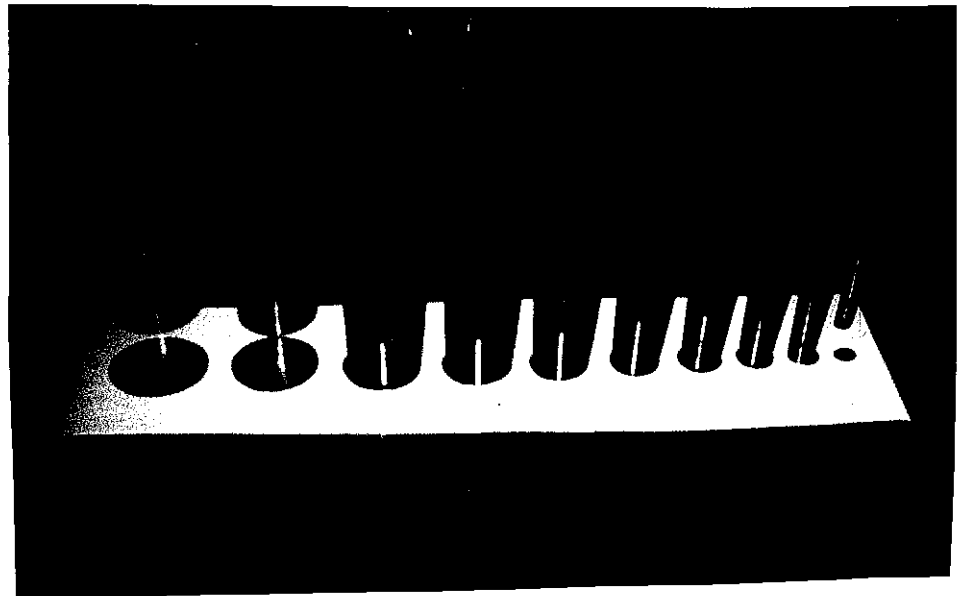
1. Horizontal comparison between yellow and red cylinders.
 - a. Place three cylinders horizontally according to size.
 - b. Similarly in front of these place the yellow cylinders.
 - c. The cylinders of the first set are all of equal height while the cylinders

- of the second set are of unequal height.
- d. The thickest of the red set and the largest of the yellow set are alike.
 - e. The thinnest of the red set is taller than the smallest of the yellow set.
 - f. Scatter the cylinders and invite the child to repeat the exercise.
2. Vertical graduation of each set for comparison.
 - a. Build the red set vertically.
 - b. Beside it build the yellow set vertically.
 - c. Note contrast; red tower is taller than yellow tower.
 3. Comparison by superimposing the yellow set on the red set.
 - a. Line up red set according to size, thickest to thinnest.
 - b. Line up yellow set in front.
 - c. Now place largest yellow cylinder on thickest red cylinder, calling attention to similarity.
 - d. Continue until all yellow cylinders are on top of red ones. Note differences between them.
 - e. Scatter cylinders and invite child to do the exercise.

Age:

3 to 5 years

Watch for children who don't cross over
(use right hand for right knobs, left hand for left knobs)
Let them try doing it all with one hand (dominant)



THE PINK TOWER

(TOWER OF CUBES)

Materials: Ten pink cubes varying in size from one cubic centimeter to ten cubic centimeters.

Aims: **Direct -**

1. Development of visual discrimination of differences in size.
2. Development of concentration and independence.

Indirect -

1. Preparation of the mathematical mind.
 - a. Ten cubes as a preparation for the decimal system
8 of the smallest cube make the second cube
27 of the smallest cube make the third cube
64 of the smallest cube make the fourth cube
1,000 of the smallest cube make the tenth cube

Presentation I:

1. Show the child how to carry the cubes, one at a time to a rug on the floor. Grasp each cube across the top with one hand to get the muscular impression of the size. Place the other hand under the cube.
2. Place each cube so that no one cube touches another.
3. Build a tower with the largest cube as a base, centering each cube on the previous one. The completed tower should have cubes in graduated size from largest to smallest.
4. Feel its height with the fingers of both hands by sliding them up to the apex of the tower.
5. Pause then disassemble the tower by removing one cube at a time; then invite the child to build it.
6. Leave the child alone to work with the cubes, being aware and cautious that he does not misuse the tower. He may not build the tower correctly the first time. Do not be discouraged or try to show him his error. Let it pass, but represent as above the next time he wishes to work with the tower.
7. When the child becomes tired working with the material, show him how to return it to its proper place in the room, carrying each cube, one by one, from the largest to the smallest.

Presentation II:

*use 3 period lesson

1. When building the tower, place the cubes in such a fashion that one corner and two sides of each cube coincide exactly with the previous one.
2. Show that the smallest cube measures the unit of increase or decrease in the cubes when the tower is built in this way.

Points of Interest:

1. The progression from largest to smallest.
2. The exactness with which the cubes are placed on one another.
3. The completion with the tiniest cube on top.

THE BROWN STAIRS

(BROAD PRISMS)

Materials: Ten brown rectangular prisms 20 centimeters in length. Each prism increases one centimeter in width and height. The narrowest is 1 cm by 20 cm and the broadest is 10 cm by 10 cm by 20 cm.

Aims: **Direct-**

1. Development of visual discrimination of width.
2. Development of concentration and independence.
3. Development of sensory motor control.

Indirect -

1. Preparation of the mathematical mind.

Presentation:

1. Show the child how to carry the stairs, one at a time and place them on a rug on the floor. No stair may touch another.
2. Child holds stair with the span of his hand so that the hand feel the thickness.
3. Select the thickest stair, lifting it with the fingers of one hand stretched across its width and place it apart from the others, on the left hand side of the rug.
4. Search for the next thickest stair and place it alongside the length of the previous one.
5. With both hands feel the sides of the two stairs to see if the edges are flush with each other.
6. Continue searching for the next thickest stair until all are placed in order. Lightly pass the opened hand up and down the stair to feel the correct sequence and the width of each stair.
7. Pick up the thinnest block and place it on each step to show the difference in dimension of each stair.
8. Rearrange the stairs in mixed order and invite the child to build it.
9. When returning the stairs to the shelf, begin with the largest.

Points of Interest:

1. The brown stair is like the pink tower in that there is an orderly progression of stairs.
2. The brown stair is unlike the pink tower in that we build in a horizontal instead of vertical direction.
3. The stairs of the brown stair are all the same length but they differ in width and height.

Control of Error:

1. The disorder that results from building the stairs in the wrong order.

Extensions:

1. Build the stair vertically.
2. Build the stair along side of the pink tower.

* use 3 period lesson

Language: Introduce language using the three period lesson; thick, thin; wide, narrow and their comparatives and superlatives - thicker, thickest; thinner, thinnest.

Age: 2 ½ to 4 years

COLOR TABLETS MATCHING

Materials:

1. Box I of the color tablets, a box containing six tablets, one pair of each of the three primary colors - red, blue, yellow.

Aims:**Direct-**

1. Development of visual discrimination of color.

Indirect-

1. Preparation for phonics through the development of visual discrimination.

Presentation:ORDER

red
blue
yellow
orange
green
pink
purple
white
gray
brown
black

1. Begin with Color Box I. Carry this box with two hands, thumbs on the lid and fingers underneath, from the shelf to the rug.
2. Place the lid under the box.
3. Indicate the tablets in the box.
4. Show the child how to take out the tablets, holding the edges only.
5. Place all the tablets at random on the rug and show the empty box.
6. Pick up one red tablet and place it at the top left-hand corner of the rug.
7. Ask the child to find the matching one and place it underneath the first red tablet.
8. Pick up a yellow tablet and place it to the right of the first red tablet.
9. Ask the child to find the matching one.
10. Proceed in the same way with the blue tablets.
11. Indicate to the child how the pairs match.
12. Mix the tablets and place them carefully back into the box.
13. At another sitting, present the tablets of color box II in the same way.
14. The exercise with color box II may be presented gradually, grouping the tablets in threes:
 - a. Take out the pairs of orange, green and purple.
 - b. Present the pairs of brown, gray and pink.
 - c. Finally the entire set of tablets may be placed in mixed order.

Points of Interest:

1. Matching the colors that look the same.
2. The color of the tablets.

Control of Error:

1. Putting colors that are not the same together.

Variations:

1. Use two rugs widely separated and place one tablet of each pair on each rug. Have the child match the tablets according to verbal directions or at random.
2. Remove one of the tablets so that the child may discover the missing color.
3. Have the child match various tablets with objects in the environment - according to matching color.
4. Have the child match the tablets to a control pattern.

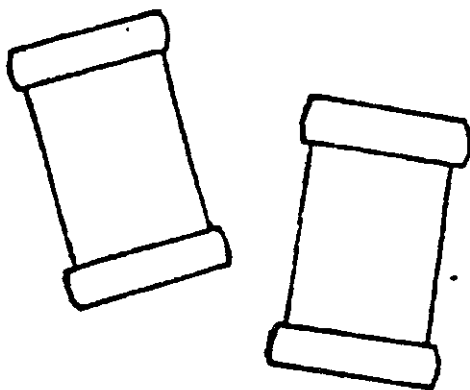
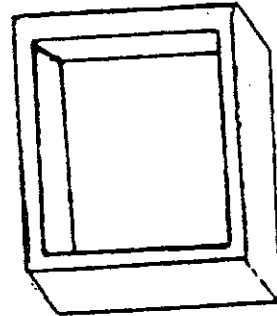
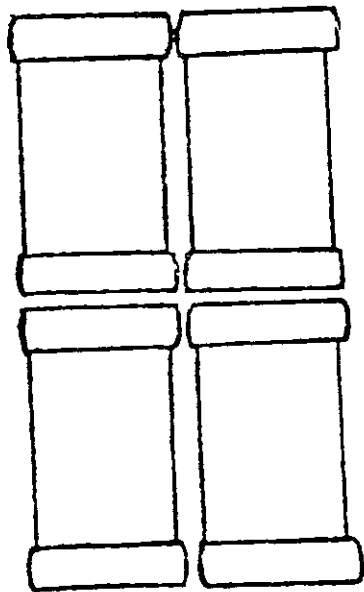
Age:

2 ½ to 4 years.

Known colors → unknown colors

COLOR TABLETS

I



vbf
'70

COLOR TABLETS

NAMING

Materials: Box I and II of the color tablets.

Aims: **Direct-**

1. Development of language by learning the names of the colors.

Indirect-

1. Preparation for phonics through visual discrimination.

Presentation:

1. Begin with box I, which contains the primary colors.
2. Carry the box to the rug, open it and place the lid underneath.
3. Place one red tablet on the rug. Then place one yellow tablet on the rug.
4. Take out the second red tablet and say "red". Match it with the first red tablet.
5. Take out the second yellow tablet and say "yellow". Match it with the first yellow tablet.
6. Mix the four tablets.
7. Indicate one red tablet, saying, "Can you find another red?" Allow the child to match the two red tablets and encourage him to name them as he does so.
8. Indicate one yellow tablet, saying, "Can you find another yellow?" Allow the child to match the yellow tablets and encourage him to name them as he does so.
9. Mix the tablets again, then say: "Can you put the reds together?" "Can you put the yellows together?" Child names colors as he puts them together.
10. Then say: "Now it is my turn to match the tablets and you tell me what I have matched."
11. Match the two red tablets and ask the child to name them. Match the two yellow tablets and ask the child to name them.
12. After the child knows the names red and yellow, present the name blue in a three period lesson.
13. When the child has learned the primary colors, present the colors in Box II.

Points of Interest: 1. The color of the tablets.

Control of Error: 1. Misnaming the colors.

Age: 2 ½ to 5 years

COLORS TABLETS

GRADING

Materials: Box III of the color tablets.

Aims: **Direct-**

1. Development of the chromatic sense through the visual discrimination of color.

Indirect-

1. Preparation for phonics.

Presentation:

1. Carry the box with two hands, thumbs on the lid and fingers underneath from the shelf to a rug.
2. Take out one set of color and scatter them at random on the rug.
3. Pick up the darkest and the lightest tablets and show them to the child.
4. Place the darkest tablet in the upper left-hand corner of the rug.
5. Indicate that you are searching for the next darkest tablet. Place this tablet beneath the darkest.
6. Continue in the same way with all the remaining tablets, sometimes picking up two tablets and comparing them to discern which is the darker.
7. If the child wishes to complete the grading, allow him to do so, if not, continue grading to the lightest tablet. Indicate the gradation by moving your finger down the column of tablets from darkest to lightest.
8. Mix the tablets and ask the child to grade them.
9. If he does not succeed, this is an indication that his visual sense is not yet capable of perceiving fine gradations of color. In that case, for the next presentation, take out only four or five tablets of the desired color, eliminating some in-between tints, so as to have a sharper gradation.
10. After the child has successfully graded two or three sets of colors, ask him to see if he can grade all the sets independently.

Note: In this exercise, the terms "darkest" and "lightest" are used to simplify the explanation. Technically, the "darkest" tablet is the basic color itself, and all the other tablets are lighter tints of the same color.

use darkest, ←
lightest, and
middle shades
first
(for at least a few
months)

Points of Interest: 1. The sense of progression from dark to light and light to dark.

Control of Error: 1. Seeing a darker tint mixed in with a lighter tint.

Language: Names of all the colors.
Descriptive words: light, lighter, lightest, etc.

Age: 3 to 5 years

THE GEOMETRIC SOLIDS

Materials:

There are ten geometric solids; cube, cylinder, cone, ovoid, ellipsoid, sphere, rectangular prism, triangular prism, square-based pyramid, triangle-based pyramid.

A set of wooden tablets, which are the bases of the solids. These bases are: circle, square, rectangle and triangle. A tray to set solids on for the forms and a covering cloth.

Aims:

Direct-

1. Development of visual discrimination of three-dimensional forms.
2. Development of language by naming the shapes.

Indirect-

1. Preparation for mathematics in the area of geometry.

Presentation I:

start with knowns

cube
cylinder
cone

ellipsoid
ovoid
sphere

rectangular prism

triangular prism

square based pyramid

triangular based pyramid

1. Carry the basket of solids to a rug.
2. Pick up the cube and feel all sides of it holding it in both hands.
3. Say "This is a cube." "Would you like to feel this cube?"
4. Allow the child to feel the cube and say, "cube."
5. Pick up a second solid (cylinder), feel it in both hands and say, "This is a cylinder."
6. Allow the child to feel it in both hands and say its name.
7. Use the same procedure for cone.
8. For the first presentation, present these three solids using a three-period lesson.
9. Place these three solids under a cloth. Have the child feel one of the solids and name it.
10. Have the child remove the form from under the cloth to see if he is correct. Continue until all solids have been removed from under the cloth.

*This same procedure is used as the other geometric solids are presented.

Presentation II:

1. Place all the bases out on the rug.
2. Place the solids on their corresponding bases. *and don't use bases.*
3. Give a three period lesson to associate bases with solids.

Note: Rectangular base is used for rectangular and triangular prism. Triangle base is placed in an upright position on triangular side of triangular prism. Square base is placed on square side of rectangular prism.

Points of Interest:

1. Feeling of the different shapes.
2. Associating the name with the shape.
3. Exactness with which shape will fit on the base.

Control of Error:

1. Seeing the wrong shape on the wrong base.

ORDER PRESENTED

Language:

Names of all the geometric solids and bases.

Age:

3 to 6 years

Mystery game:

1st: put cube, cone, cylinder under hankerchief
pull each out saying "I think I have a..."

Ask child to do the same, using same language

Alternate:

"Joey, give the cube to Suzie"

"Suzie, give the cylinder to Billy"

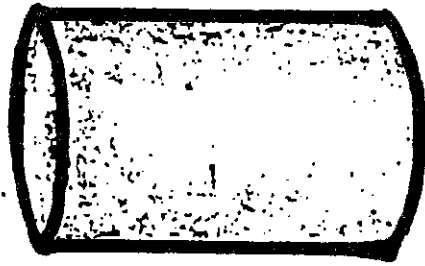
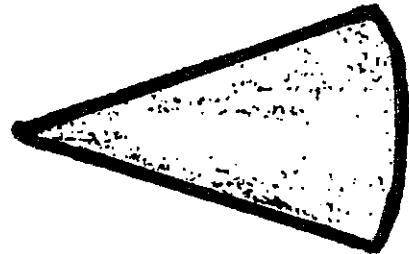
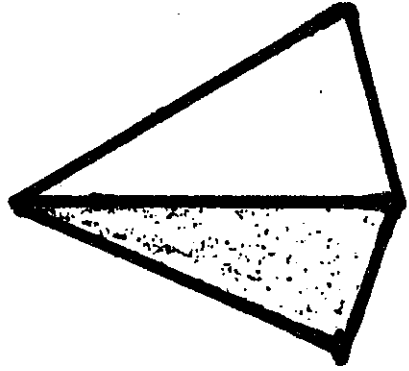
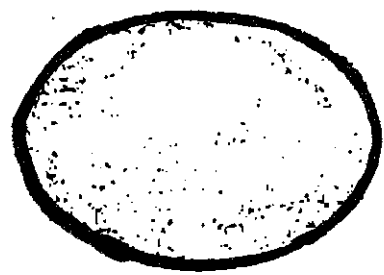
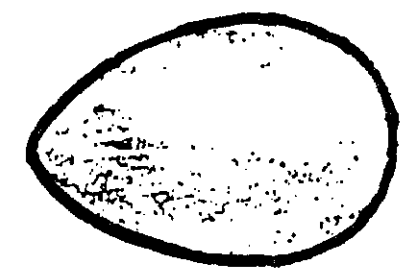
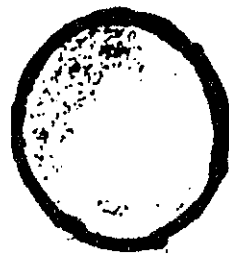
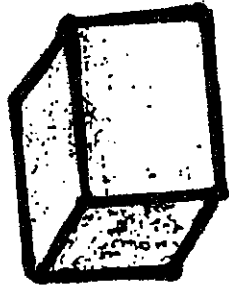
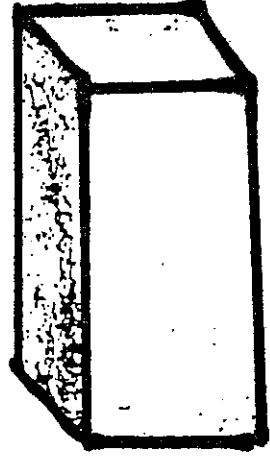
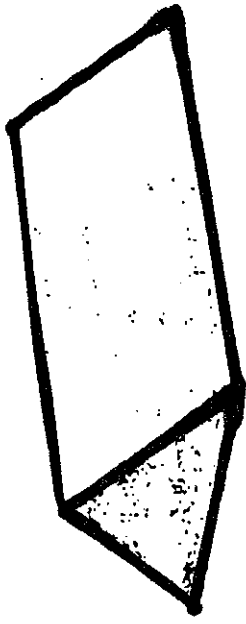
"Billy, give the cone to Joey"

"Who has the cylinder?" Billy says "I have the cylinder."

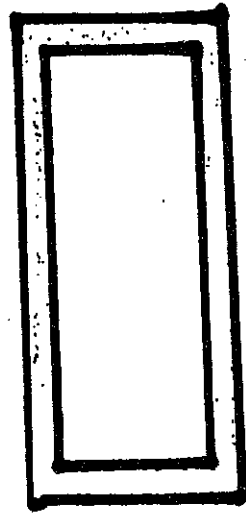
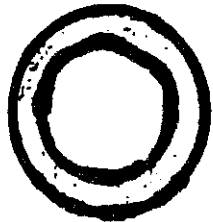
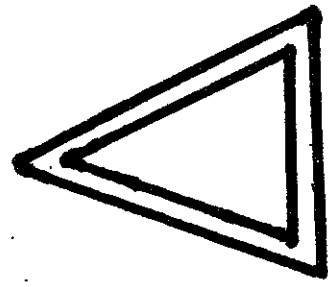
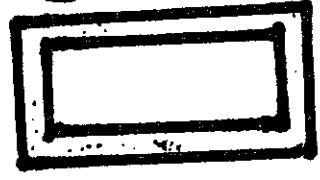
and so on...

while putting activity away, repeat the names of objects or
have children name them for you

Geo-7



GEOMETRIC SOLIDS AND BASES



vbf
© '70

GEOMETRIC CABINET DEMONSTRATION TRAY

Materials: A wooden tray containing six wooden squares, three of which have insets of the three basic plane figures: circle, square and triangle.

Aims: **Direct-**

1. Development of visual discrimination of plane geometric forms.

Indirect-

1. Preparation for writing.
2. Preparation for mathematics in the area of geometry.

Presentation I:

1. Carry the tray with two hands over to a rug.
2. Holding the knobs with the thumb, index and second fingers, take each figure out of the tray and place it on the rug.
3. Trace the square frame, using the first two fingers of your dominant hand.
4. Pick up the square inset with your other hand and trace around it, using your first two fingers as you did for the frame.
5. After you have traced the square inset, replace it in its frame and follow the same procedure for the circle and triangle: trace the frame, trace the inset, and then replace the inset.
6. Remove only the square. Have the child trace the frame, then the inset and replace it. Do the same for the circle and then for the triangle.
7. Place all three figures on the rug in mixed order. Have the child trace and replace them in proper frame.

Presentation II:

1. Take out the square saying, "This is a square." Trace around the inset and allow the child to trace it. Place it on the rug.
2. Introduce the circle and triangle in the same manner.
3. Ask: "Can you put the square in the tray?" Have the child place the figure in the tray and say its name.
4. Continue in the same manner for circle and triangle.
5. Continue with such leads as:
"Can you put the square on the rug?" etc.
"Trace the circle," etc.
6. After the child has had sufficient practice in responding to verbal leads, indicate the square and ask: "What is this?" Have him name it. Then indicate the circle and ask: "What is this?" etc.

Note: The introduction of the names circle and square can usually be given at the same time as the presentation outlined above.

Points of Interest:

1. Outstanding color of blue of the geometric shapes.
2. Moving the shape from the frame.
3. Fitting the shape back into the frame.

Control of Error: 1. Seeing that the inset of the circle will not fit the square frame, etc.

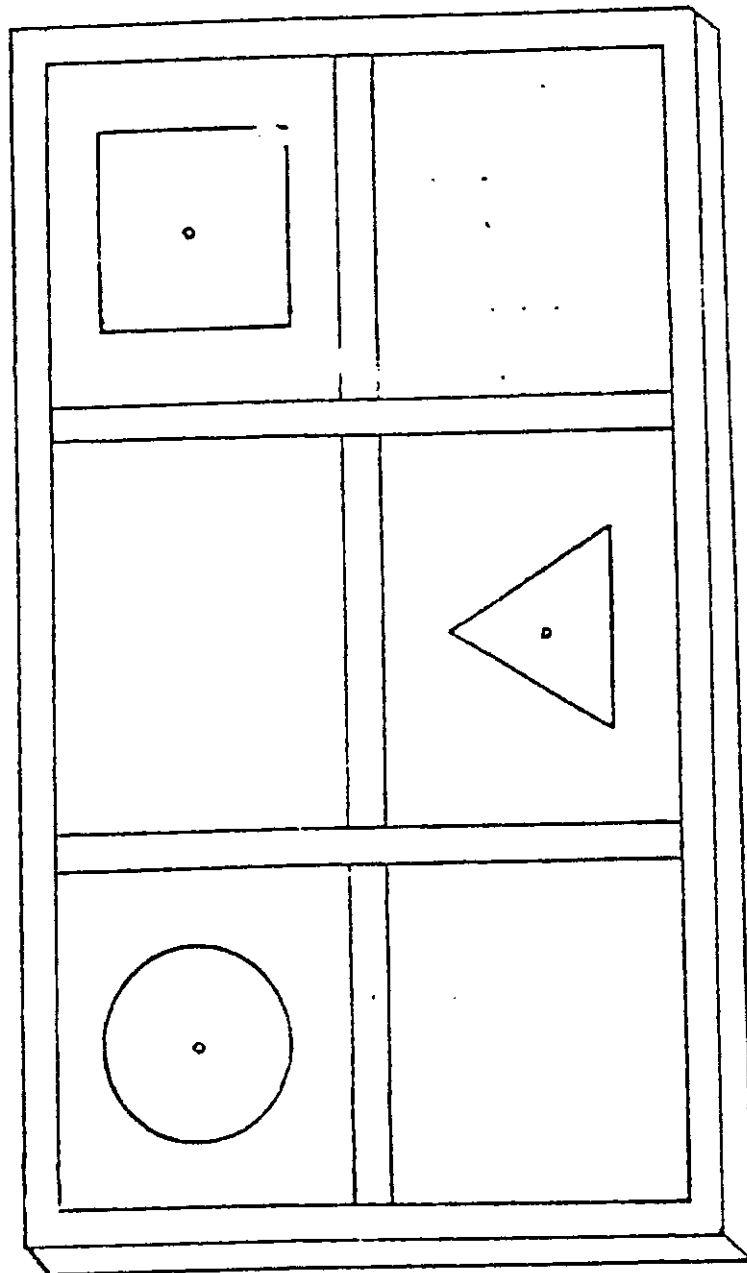
Age: 2 ½ to 4 years

1st do circle
square
triangle only!

Have children put away in correct place

GEOMETRIC CABINET

Demonstration Tray



©VBF '70

GEOMETRIC CABINET

Materials:

A wood cabinet with six drawers. Each of the drawers contains insets of various geometric plane figures.

Drawer I: contains six circles decreasing in diameter from 10 cm. to 5 cm.

Drawer II: contains one square (10 X 10 cms.) and five rectangles all having the same base. Length equal to one side of the square, breadth decreases in each by one cm.

Drawer III: contains six triangles, all very according to their sides or their angles: **equilateral**- having all sides equal.

isosceles right - having two equal sides, which inscribe a right angle.

isosceles acute - having two equal sides, which inscribe an acute angle.

isosceles obtuse - having two equal sides, which inscribe an obtuse angle.

scalene right - having a right angle inscribed by two unequal sides.

Drawer IV: contains six regular polygons: pentagon, hexagon, heptagon, octagon, nonagon, decagon.

Drawer V: contains four irregular plane-closed figures: trapezoid, isosceles trapezoid, parallelogram and rhombus.

Drawer VI: contains four irregular figures: oval, ellipse, quatrefoil and curvilinear triangle.



Aims:

Direct-

1. Development of visual discrimination of plane geometric forms.

Indirect-

1. Preparation for writing.
2. Preparation for mathematics in the area of geometry.

Presentation I:

1. Take the first drawer from the cabinet and place it on a rug. (Begin with the drawer of circles)
2. Indicate the figures to the child, saying: "These are all circles."
3. Carefully remove each figure from the drawer, holding it by the knob with the thumb, first and second fingers. Place the insets in mixed order on the rug.
4. Pick up one inset with your left (or sub-dominant) hand. Trace the inset, then trace the corresponding frame and replace inset.
5. Replace all six figures, using the same procedure.

Presentation II:

1. Take a drawer from the cabinet and carry it to the rug.
2. Take the sets of cards, which have printed figures corresponding to the insets contained in the drawer you have chosen.
3. Take the cards from the first set (complete figure) and lay out horizontally at random.
4. Take out one inset at a time and match it to the printed figure until you find the one that is exactly the same. After the inset is on the card, indicate that the printed figure is completely hidden. Do this by tracing the index finger

around the inset.

5. When the child has successfully completed the process, take out the set of cards, which have broad outlines and line them up horizontally under the first set of cards.
6. Proceed to match insets to second set of cards.
7. When the child has successfully completed matching this set, present the cards printed with a fine line, using the same procedure.
8. The child then replaces the wooden insets into the proper drawer.

Points of Interest: 1. Seeing the wooden inset fit exactly on the card.

Control of Error: 1. Printed figures larger than insets are not hidden when covered by the incorrect inset.

Variations:

1. Placing the insets on one rug and the printed figures on another, showing the child an inset and asking him to get the corresponding card or vice-versa.
2. Arranging circles from largest to smallest; polygons according to the number of sides.

Language: The names of figures

Age: 2 ½ to 5 years

Terms: A rhomboid is a parallelogram without right angles...two parallel sides of equal length, and the other two sides a different, but also equal length.
When all the sides of a rhomboid are equal, the figure is a rhombus.
A rhombus has four straight, parallel sides, all of equal length.
A trapezoid has one set of parallel sides of unequal length.
The trapezoid is isosceles if the nonparallel sides are equal.

World Book Encyclopedia: Vol. 14. 1956

1st set cards



PLANE GEOMETRY

TRIANGLES: *A scalene triangle is one which has three unequal sides.*



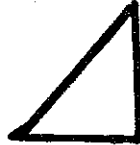
An isosceles triangle is one which has two equal sides



An equilateral triangle is one which has three equal sides



A right triangle is one which has one right angle.



QUADRILATERALS:



A trapezium has four unequal sides, no two of which are Parallel.



A trapezoid has two and only two parallel sides.



An isosceles trapezoid has the two non-parallel sides Equal.



A parallelogram has two pair of parallel lines.



A rhomboid is a parallelogram with oblique angles.



A rhombus is an equilateral rhomboid.

DEFINITIONS

LINES:

A straight line is the shortest distance between two points.

A horizontal line is a line parallel to the horizon.

A perpendicular line or vertical line is a line that stands exactly upright. A perpendicular to a line is a line that makes a right angle to the line it touches. The wall of a room is perpendicular to the floor.

Parallel lines are straight lines equidistant from one another. In the same plane, they cannot meet however far they go.

Convergent lines are lines that approach nearer together.

Divergent lines are lines that move away from one another.

A curved line is a line of which no part is straight.

A serpentine line is a line that turns one way and then the other way alternately wriggling like a snake.

A zigzag line is a line whose course is made up of a series of straight lines, which turn at right angles.

An oblique line is a line that is neither horizontal nor perpendicular, it is therefore slanting.

ANGLES:

A right angle is one of the angles formed by a line that meets another line so as to make two equal angles.

An obtuse angle is an angle larger than a right angle. Obtuse means dull or blunt.

An acute angle is an angle larger than a right angle. When we spread our fingers apart, they make a series of acute angles. Acute means sharp.

Adjacent angles are two angles that have a common vertex and a common side between them.

Vertical angles are two angles that have a common vertex and the sides of one angle are extensions of the sides of the other.

Complementary angles are two angles, which added together equal a right angle. Each angle is the complement of the other; complementary angles need not be adjacent angles.

Supplementary angles are two angles, which added together equal a straight angle to two right angles; each angle is a supplement of the other.

The median of a square is a line that divides a square in half.

The sides of a square are the lines that form the square.

The angles of a triangle are the three angles formed by its sides.

The base of a triangle is the side upon which it stands.

The vertex of a triangle is the point opposite to and farthest from the base.

The hypotenuse is the side of a right-angle triangle that is opposite the right angle.

Hilda F. Rothschild and Judith Anne Berger-November 1977

Prepared for Xavier University Montessori Education.

DEFINITIONS

Geometric definitions from Webster's New Collegiate Dictionary:

Figure - the shape and structure of anything.

Spatial form – three-dimensional – two-dimensional.

Shape - a characteristic, spatial form.

Pattern - form shape, outline.

Form - internal and external structure.

Figure - form as determined by the lines, which bound or enclose (as in plane figure of geometric cabinet).

Shape and Figure - mass or body (as used by feeling around outline of plane figure and its inset).

Polygon - many angled plane figure(s) Angles - more than four.

Geometric definitions from Webster's Third International Dictionary:

Form - the shape and structure of something as distinguished from the material of which it is composed.

Figure - a body apparent chiefly in outline - a surface shape.

Shape - the visible make-up characteristic of a particular item or kind of item; characteristic appearance or visible form (noun).

Polygon - a closed figure consisting of straight lines joined end to end - (from Webster's Elementary Dictionary on Geometry, a figure having many angles, usually more than four).

Geometry - the branch of mathematics that studies solid objects, surfaces, lines and angles.

Rhomboid - a parallelogram in which the angles are oblique and adjacent sides are unequal.

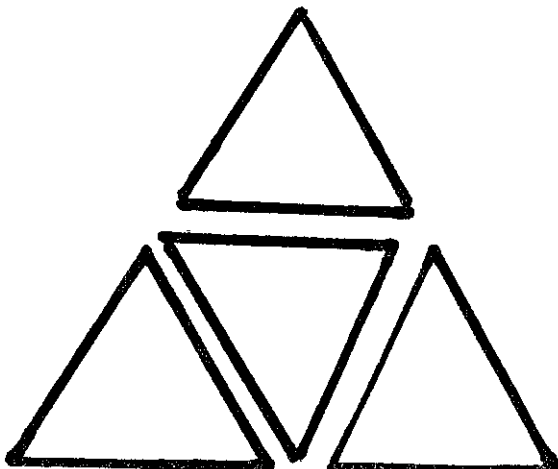
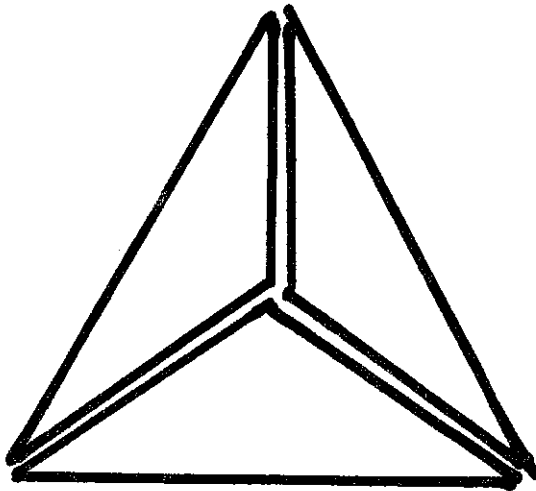
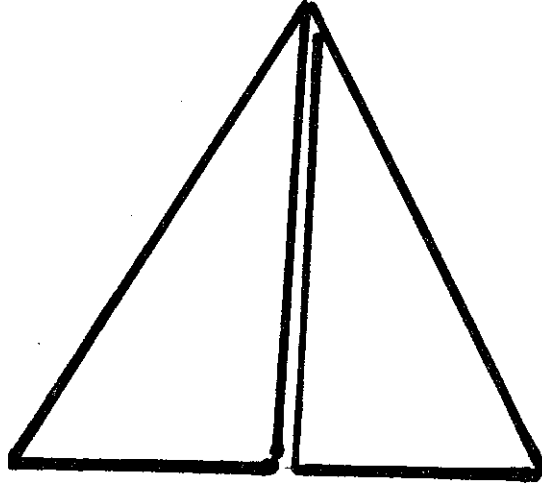
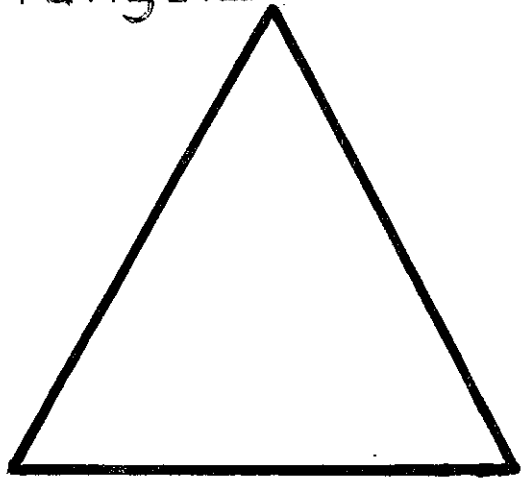
Rhombus - an equilateral parallelogram.

Trapezium - a quadrilateral having no two sides parallel.

Trapezoid - a quadrilateral having only two sides parallel.

Gundlach, BernardH. The Laidlaw Glossary of Arithmatical-Mathematical Terms. Laidlaw Brothers, Summit, N.J. 1961 (out of print)

Triangular Box



THE TRIANGULAR BOX

- Materials:** The triangular box of constructive triangles which contains:
1. One quadrilateral triangle painted gray and having no black lines.
 2. Two green scalene right triangles, which have a black line on the longer of the two sides, which inscribe the right angle.
 3. Three isosceles obtuse triangles painted yellow and having black lines on the two equal sides, which inscribe the obtuse angle.
 4. Four red equilateral triangles, one of which has black lines on all three sides and three, which have black lines on one side.

- Aims:**
- Direct-**
1. Development of visual discrimination of plane form.
 2. To show the various triangles contained in an equilateral triangle.

- Indirect-**
1. Preparation for mathematics in the area of geometry.

- Presentation:**
1. Carry the box carefully in two hands, from the shelf to the rug.
 2. Take out the green triangle, the yellow triangle and the red triangle pieces and line them up from left to right on the rug, with the red triangles to the extreme left side of the child's rug.
 3. Take out the gray triangle; show child and say "triangle."
 4. Take the green right triangles, place them in front of the child and with your index and middle finger, trace the black line on each.
 5. Slide the triangles together, forming an equilateral triangle.
 6. Show that the triangle thus formed is equal to the gray one. Do this by placing the gray triangle on the green one. Say, "It fits."
 7. Take the three yellow triangles and join them to form an equilateral triangle, using the procedure outlined above.
 8. Compare the yellow equilateral triangle with the gray triangle.
 9. Take out the four red triangles and follow the same procedure to form an equilateral triangle equal to the gray one. Compare with the gray triangle.
 10. After all the triangular figures are lined up on the rug, take apart one at a time and allow the child to join them as you have demonstrated.
 11. After the child has had the opportunity to join the sets of triangles, show him the comparison with the gray triangle, by placing it first on the green triangle, then on the yellow and then on the red.
 12. When placing the triangles back in the box, follow this order: gray, red, yellow, green.

- Points of Interest:**
1. Seeing shapes come together and naming them.

- Control of Error:**
1. Unless the black lines are mapped together the shapes demonstrated cannot be formed.

Variations:

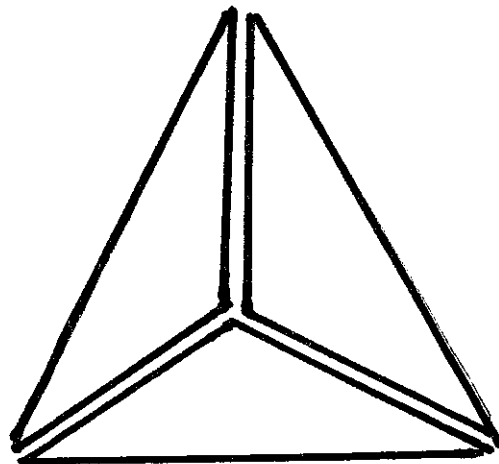
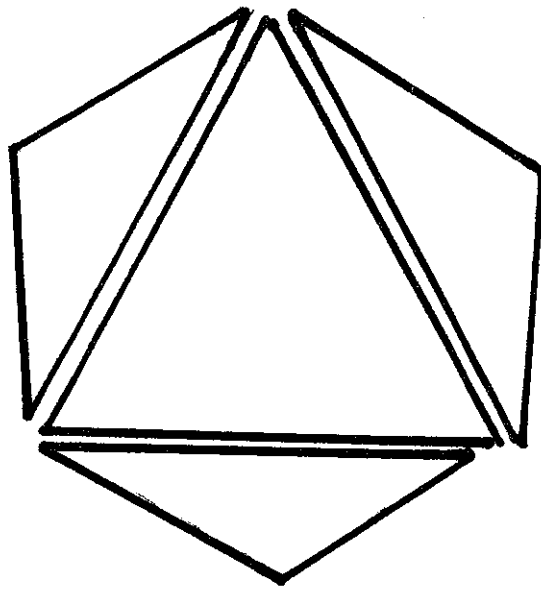
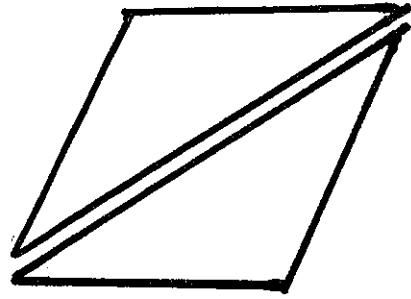
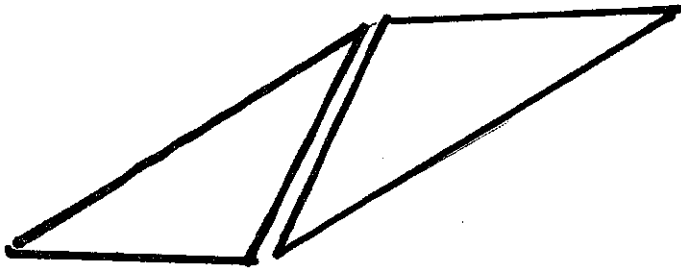
1. The formation of a hexagon, using the gray equilateral and the yellow triangles.
2. The formation of a hexagon with the green or the red triangles and the yellow triangles.

Age:

3 to 5 years

Later on, try having the children use the
triangles to make new shapes
parallelogram
rhombus

Large Hexagonal Box



LARGE HEXAGONAL BOX

Materials:

The large hexagonal box of constructive triangles which contains:

1. One yellow equilateral triangle with black lines on all sides.
2. Three yellow isosceles obtuse triangles with a black line on the side opposite to the obtuse angle.
3. Three yellow isosceles obtuse triangles, equal to the three mentioned in number two, and having black lines on the two equal sides, which form the obtuse angle.
4. Two red isosceles obtuse triangles, equal to those described in numbers two and three, and having a black line on the side opposite the obtuse angle.
5. Two gray isosceles obtuse triangles, equal to those described in numbers one to four, and having a black line on one of the sides, which form the obtuse angle.

Aims:

Direct-

1. Development of visual discrimination of plane forms.
2. To show that various triangles can be joined to create new forms.

Indirect-

1. Preparation for mathematics in the area of geometry.

Presentation I:

1. Bring the box to the rug and place it on the left-hand side.
2. Take out the triangles and line up along the left-hand side of the rug, with the red and gray triangles on the extreme left side of the rug.
3. Map the lines on the three obtuse (yellow) triangles with those of the equilateral triangle. This will form a hexagon. (You may wish to indicate the equilateral triangle inscribed in the hexagon. This can be done by tracing the black lines, which form the equilateral triangle).
4. Take out the three yellow triangles, which have black lines on the two equal sides. Map these lines to form an equilateral triangle equal to the large yellow one. Compare the two triangles by superimposing one on the other.
5. Take out the red triangles and map the lines to form a rhombus. Say "rhombus."
6. Take out the gray triangles and map the black lines to form a parallelogram. Say "parallelogram."
7. Give a three period lesson on these shapes.
8. When placing the triangles back in the box, follow this order: the yellow equilateral triangle with three yellow isosceles around it, three yellow isosceles triangles superimposed on the equilateral triangle, the gray and red triangles around the yellow triangle.

Note: When doing this activity on an individual basis, as each shape is presented, it can be taken apart so the child can make that particular shape.

Presentation II:

1. After the child has mastered the first presentation, variations can be presented.
2. Take the yellow triangles, which have black lines on the two equal sides. Map these lines to form a parallelogram. Compare to the gray parallelogram.
3. Take two of the yellow triangles, which have a black line on the longest side. Map these lines to form a rhombus equal to the red one. Compare the two rhombi.
4. Allow the child to create his own shapes.

Points of Interest:

1. Seeing the black lines mapped to bring about a new shape.

Control of Error:

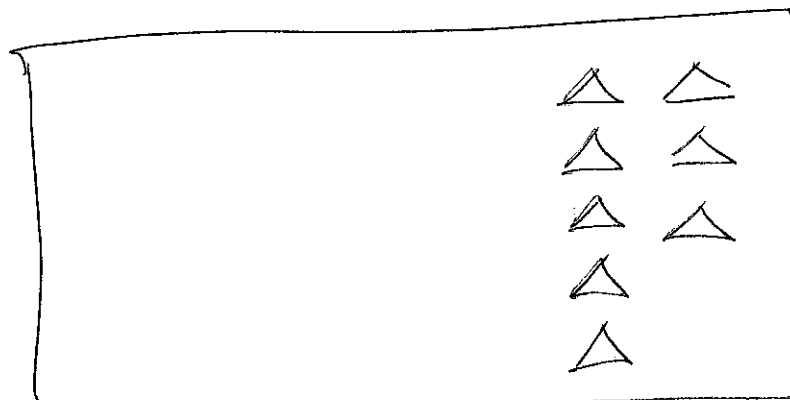
1. Seeing that the shapes presented by the teacher cannot be formed when black lines are not joined together.

Age:

3 to 5 years

order to put it away:
1st back: yellow triangle
fill in to make hexagon
2nd yellow triangle
3rd 2 gray
4th 2 red (on top of each other)

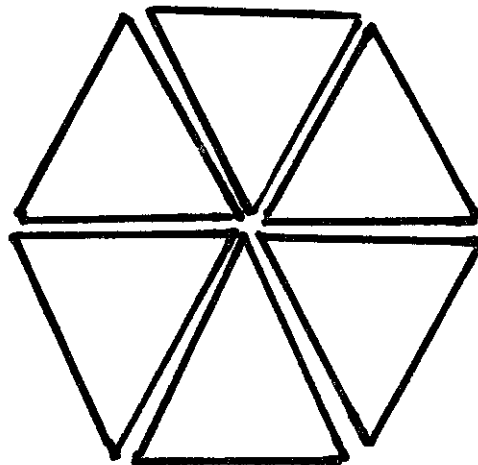
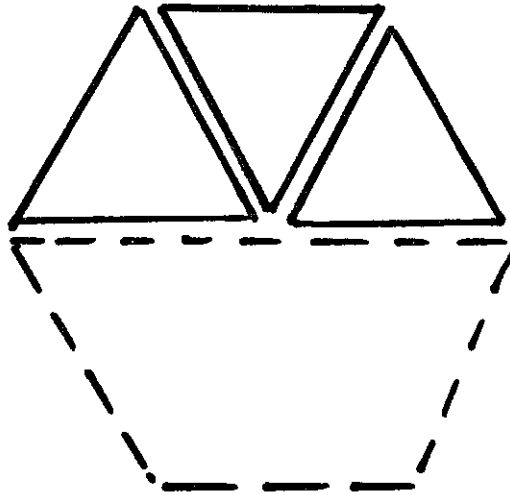
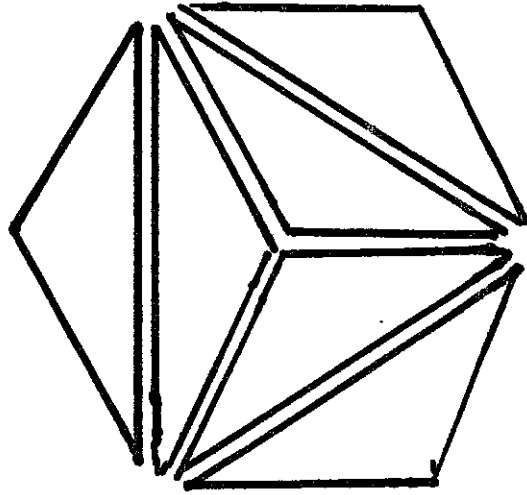
On the rug: set up everything left to right on the
Right side of the rug where you will be
sitting: seat child on left so they have
room to work



child

teacher

Small Hexagonal Box



SMALL HEXAGONAL BOX

Material:

The small hexagonal box of constructive triangles which contains:

1. Six gray equilateral triangles with black lines on two sides.
2. Three green equilateral triangles, one of which has black lines on two sides and two with black lines on one side.
3. Six red isosceles obtuse triangles, which have a black line on the side opposite to the obtuse angle.
4. One yellow equilateral triangle with black lines on all sides.
5. Two red equilateral triangles with a black line on one side.

Aim:

Direct-

1. Development of visual discrimination of plane forms.
2. To show the various plane figures included in a hexagon.

Indirect-

1. Preparation for mathematics in the area of geometry.

Presentation I:

1. Carry the box in both hands and place it on the left side of the rug.
2. Take out the triangles and lay them along the rug left to right, top to bottom. Place gray triangles to extreme left, top to bottom, then a row of red and green triangles (rhombus and trapezoid), then a row of red isosceles triangles.
3. Take three red isosceles triangles and by mapping the black lines, form a red triangle. Take the remaining three red isosceles triangles and slide them along the sides of the triangle to form a hexagon. (There are no black lines to match.) Say "Hexagon."
4. Take the yellow equilateral triangle and place it in the center of the hexagon. Observe.
5. Take the three red triangles, which formed the hexagon and place around the yellow triangle. Say "hexagon." Observe.
6. Take two red triangles and map black lines to form rhombus. Say "rhombus." Observe.
7. Take the three green triangles. Map the black lines to form a trapezoid. Say "trapezoid." Observe.
8. Take three gray triangles and mapping black lines, form a trapezoid. Say "trapezoid." Observe.
9. Take three more gray trapezoids together to form hexagon. Say "hexagon." Observe.
10. Slide the two gray trapezoids together to form hexagon. Say "hexagon." Observe.
11. Give a three period lesson on these shapes.
12. When doing individual lessons, as each shape is made, you can take the shape apart and invite the child to make the same shape.
13. When placing triangles back in the box, follow this order: gray hexagon,

take apart only slightly so the child can easily put back together

green trapezoid, red rhombus, yellow triangle, red triangles around the yellow triangle.

- Presentation II:**
1. Carry the box in both hands and place it on the left hand side of the rug.
 2. Take out the triangles and line up (see Presentation I.)
 3. Take the six red isosceles triangles and show the child how to map the black lines to make three rhombi.
 4. Take the six gray triangles and show the child how to map the black lines to form three rhombi.
 5. Invite the child to make these shapes.
 6. Show the child how the red isosceles triangles can be substituted for the gray triangles and vice-versa.
 7. Invite the child to make these shapes.
- Note: These exercises are usually the work of several sessions.

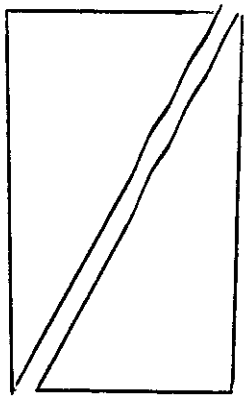
- Points of Interest:**
1. Seeing all the interesting shapes.

- Control of Error:**
1. If the black lines are not mapped, the shapes presented cannot be made.

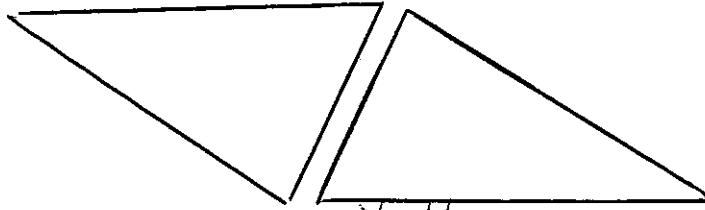
Language: Triangle, Hexagon, Rhombus, Trapezoid

Age: 4 to 6 years

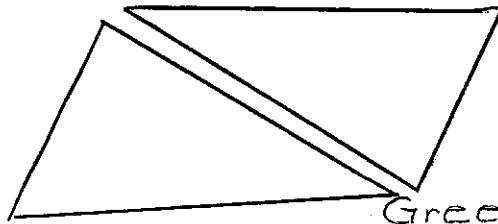
Rectangular Box + Blue Box



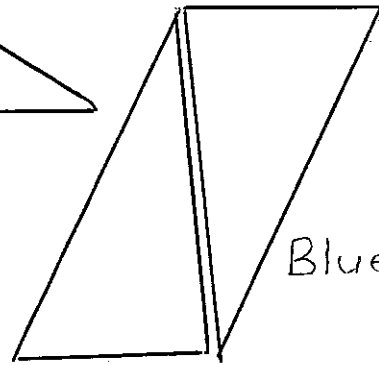
Gray



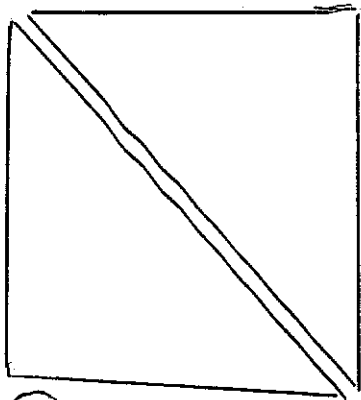
Yellow.



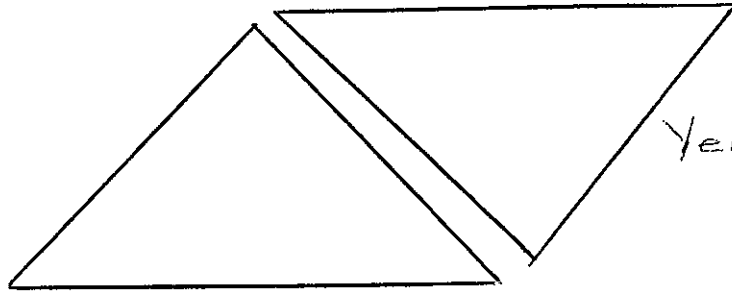
Green



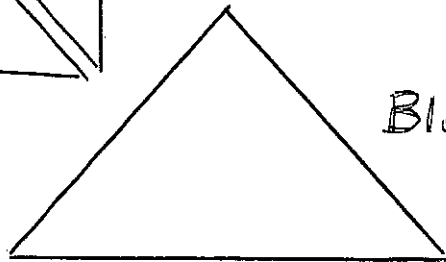
Blue



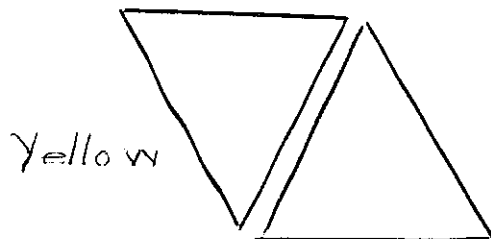
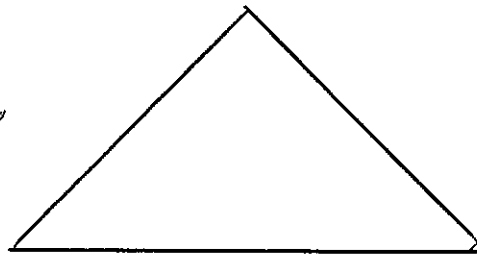
Green



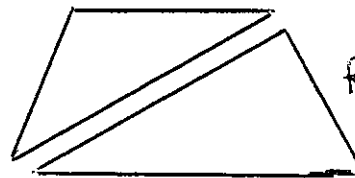
Yellow



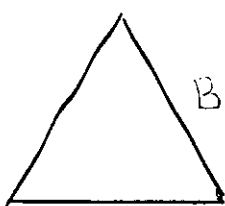
Blue



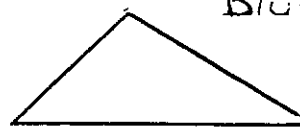
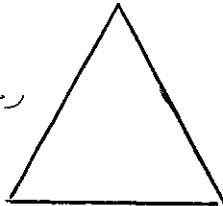
Yellow



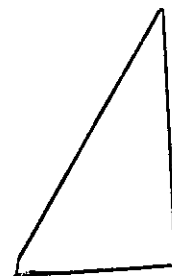
Red



Blue



Blue



RECTANGULAR BOX

Materials:

The rectangular box of constructive triangles contains:

1. Six isosceles right triangles equal in size:
 - a. Two green ones, which have a black line on the hypotenuse.
 - b. Two yellow triangles, which have a black line on one of the equal sides, which inscribe the right angle.
 - c. Two blue triangles, which have no black lines.
2. Eight scalene right triangles, equal in size:
 - a. Two gray triangles, which have a black line on the hypotenuse.
 - b. Two green triangles, which have a black line on the longer of the two sides, which inscribe the right angle.
 - c. Two yellow triangles, which have a black line on the shortest of the two sides, which inscribe the right angle.
 - d. Two blue triangles, which have no black lines.
3. Four equilateral triangles
 - a. Two yellow triangles with a black line on one side.
 - b. Two blue triangles with no black lines.
4. Two scalene right triangles, one red and one blue.
5. Two scalene obtuse triangles, one red and one blue. The scalene right triangle has a black line on the hypotenuse and the scalene obtuse triangle has a black line on the side opposite to the obtuse angle. The blue triangles have no black lines.

Note: This box is used after the other constructive triangle boxes have been mastered. The blue triangles may be kept in a separate box and used as a separate activity to allow the child to experiment with the shapes before the triangle box is presented.

Aims:

Direct-

1. Development of visual discrimination of plane forms.

Indirect-

1. Preparation for mathematics in the area of geometry.

Presentation:

1. Carry the box carefully in two hands from the shelf to the rug.
2. Lay out all the triangles at random.
3. Begin with the largest shapes; map black lines and name shape.
4. Continue until all triangles have been matched.
5. Give three period lesson on names of shapes.
6. Put triangles back in box and return to shelf.

Points of Interest:

1. Touching and mapping the black lines.
2. Working with an increasingly larger assortment of triangles.
3. Naming the figures formed by the triangles.

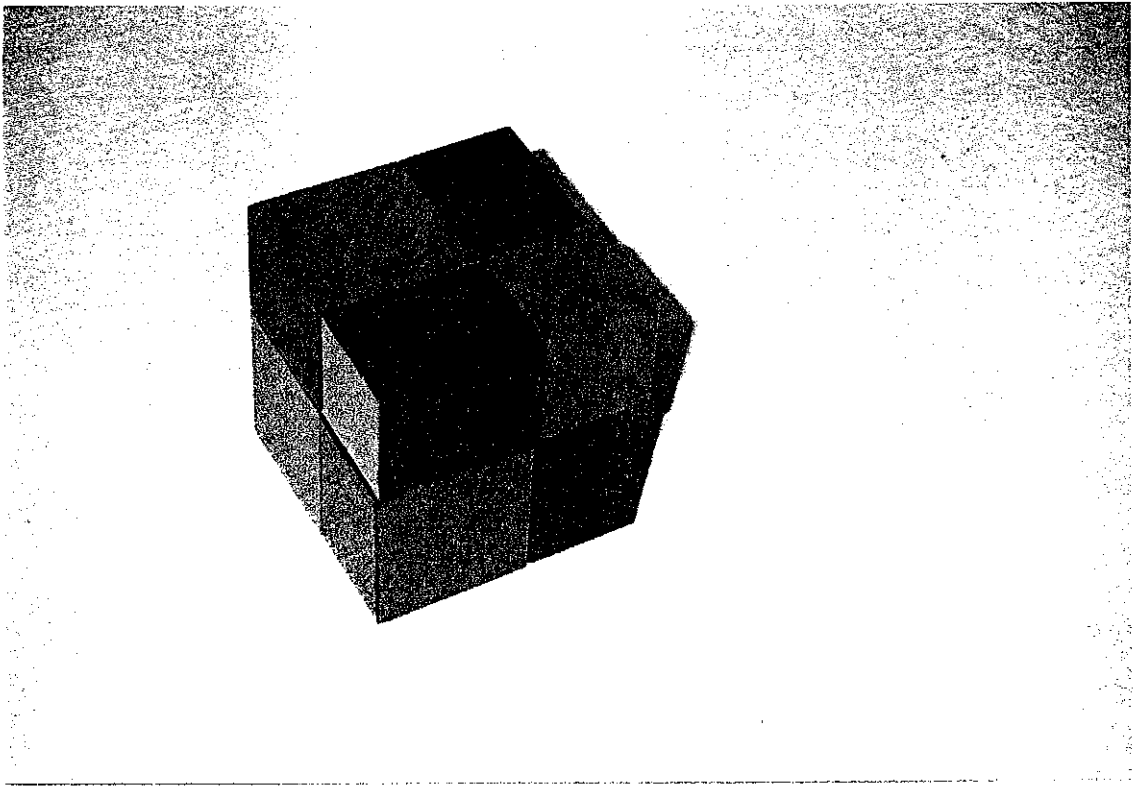
Control of Error:

1. Seeing that the proper shapes cannot be made if black lines are not matched.

Language: Triangle, Rectangle, Parallelogram, Rhombus, Trapezoid

Age: 4 to 6 years

Shows them you can make a parallelogram
out of a rectangle and vice versa
and a rhombus out of a square and vice versa



Control of Error: 1. The size of the box is such that the prisms will fit only if they are placed correctly.

Language: Binomial Cube.

Age: 3 to 5 years

BINOMIAL CUBE

Materials:

The binomial cube which is built with wooden cubes and rectangular prisms painted red, blue and black. It is contained in a specially built box with two hinged sides, which open down to reveal two sides of the cube. The base of the cube is painted on the lid.

Aims:

Direct-

1. Development of visual discrimination in a three dimensional form.
2. Development of concentration.

Indirect-

1. Preparation for the mathematical concepts involved in the binomial theorem.

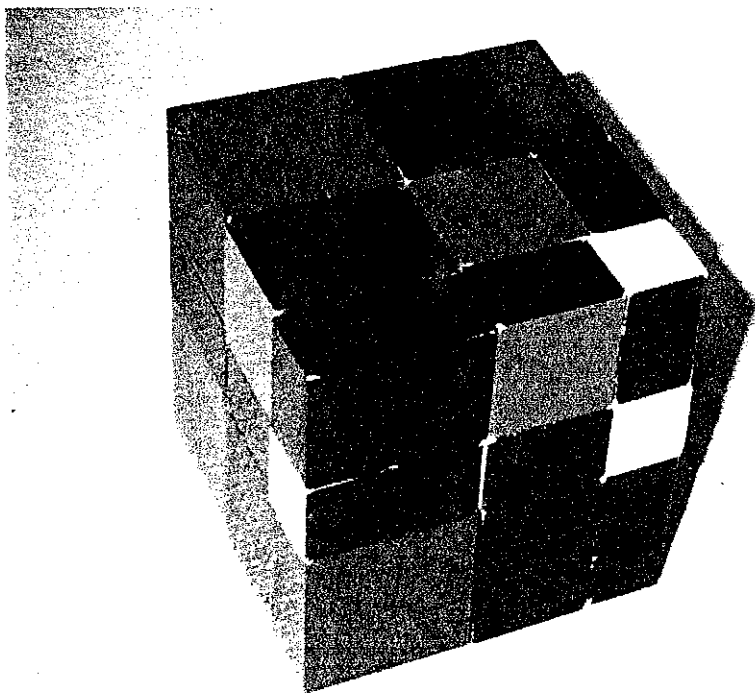
Presentation:

1. Invite the child to build the cube, showing him the box in its place on the shelf. Carry the box in both hands and place it on the rug before the child.
2. Indicate the pattern painted on the lid. Remove the lid and place it, top up, on the rug beside the box. Point out the same pattern repeated on the top of the cube.
3. Open down the sides of the box, revealing the cube more fully. Point out the pattern repeated on the sides of the cube.
4. Begin removing the prisms from the top layer and line up the prisms vertically according to color with the solid colored cube at the bottom (referred to as "leader"). *blue solid cube or red solid cube*
5. When all the prisms have been lined up, begin to build the bottom layer on the lid of the box, then build this layer directly into the box, replacing the prisms one at a time.
6. During the process of building the layers, indicate with your index finger that you always map like sides when joining two prisms, red-to-red, black-to-black, etc.
7. When the cube has been rebuilt in the box, point out the pattern on top and on two sides.
8. Run your index finger down the one ridge on one of the opened sides of the box, saying "one" as you do so. Put that side up first.
9. Run your index finger down the two ridges on the other opened side, saying "one, two" as you do so. Put this side up and replace the lid.
10. Ask the child if he would like to do the exercise.

*Each layer:
start with
largest red
each layer is
laid up first*

Points of Interest:

1. Seeing the pattern painted on the box lid.
2. Seeing the pattern repeated on the top and sides of the lid.
3. Seeing the repetition of the pattern on each layer.
4. Noticing the color, size and shape of the various cubes and prisms.
5. Touching the colors, which match and join the prisms on identical sides.



THE TRINOMIAL CUBE

Materials: Wooden cubes and rectangular prisms painted in various colors to form the cube of (ABC). These combinations are in a special cube-shaped box into which the 10 cm. cube fits exactly.

Aims: **Direct-**

1. Development of visual discrimination in a three dimensional form.
2. Development of concentration.

Indirect-

1. Preparation for the mathematical concepts involved in the trinomial theorem.

Presentation:

1. Invite the child to build the cube. (This demonstration is given to a child who has worked successfully with the binomial cube).
2. Carry the box in both hands and place it on the rug.
3. Indicate the pattern painted on the lid. Remove the lid and place it, top up, on the rug beside the box. Point out the same pattern repeated on the top of the cube.
4. Begin removing the prisms from the top layer and line them up in vertical rows according to color with the solid colored cube at the bottom of the row.
5. Rebuild the bottom layer on the lid and then in the box, beginning with the red cube and being careful to place the prisms in the box one at a time.
6. During the process of building the layers, indicate with your index finger that you always map like sides when joining two prisms. If it seems appropriate, give some verbal direction, such as: "Red with red; black with black, etc.
7. Rebuild the middle layer on the lid and in the box, beginning with the largest red and black prism.
8. Rebuild the top layer on the lid and in the box, beginning with the red and black prism.
9. When the cube has been rebuilt in the box, point out the pattern repeated on the top and then on each of the two sides. Place your hand on the top and then on each of the two sides, pressing gently to feel the even square surface.
10. Run your index finger down the ridge of one of the opened sides of the box, saying "one" as you do so. Put that side up first.
11. Run your index finger down the two ridges on the other opened side, saying "one, two" as you do so. Put this side up and replace the lid.
12. Ask the child if he would like to build the cube.

Points of Interest:

1. Seeing the pattern painted on the box lid.
2. Seeing the pattern repeated on the top and sides of the lid.
3. Seeing the repetition of the pattern on each layer.

4. Noticing the color, size and shape of the various cubes and prisms.
5. Touching the colors, which match and join the prisms on identical sides.

Control of Error: The size of the box is such that the prisms will fit only if they are placed correctly.

Language: Trinomial Cube.

Age: 3 1/2 to 5 years

Formula: $(A+B+C)^3 = (A+B+C) \times (A+B+C) = (A^2 + AB + AC + AB + B^2 + BC + AC + BC + C^2) \times (A+B+C) = A^3 + A^2B + A^2C + A^2B + AB^2 + ABC + A^2C + ABC + AC^2 + A^2B + AB^2 + ABC + AB^2 + B^3 + B^2C + ABC + B^2C + BC^2 + A^2C + ABC + B^2C + BC^2 + AC^2 + BC^2 + C^3 = A^3 + 3A^2B + 3A^2C + 3B^2A + 3B^2C + 3C^2B + C^3 + 6ABC$

Line up according to color
Always start with largest RED

Known $\rightarrow$ unknown

Red, blue, yellow, black

ROUGH AND SMOOTH BOARDS

Materials:

Rough and smooth boards; four rectangular boards divided into rough and smooth surfaces:

1. The first board is divided into two equal squares, the first square being covered with sandpaper and the second being an area of wood highly polished and very smooth.
2. The second board is divided into narrow strips of coarse sandpaper and smooth natural wood, highly polished, and very smooth.
3. The third board consists of strips of sandpaper of various grades from coarse to fine.
4. The fourth board consists of strips of several grades of smooth surfaces. Ex. drawing paper, newsprint, shine cardboard, velour, etc.

Aims:

Direct-

1. Development of the tactile sense.
2. Tactile discrimination between rough and smooth.

Indirect-

1. Preparation for writing.

Presentation:

1. Since this exercise involves the tactile sense, it can be preceded by hand washing, or by rubbing fingertips briskly on carpet to sensitize them.
2. Take the rough and smooth boards to a table and place the first board before the child. Place the others over to the right.
3. Seated at the child's dominant side, take the first board and stroke down over the rough surface with the tips of your fingers. As you do so, say the word "rough." Repeat this downward stroke several times, saying the word "rough" each time.
4. Then begin to stroke the smooth surface, using the tips of all your fingers in the same downward motion. As you do so, say the word "Smooth." Repeat this downward stroke several times, saying the word "smooth" each time.
5. Allow the child to stroke the rough and smooth surfaces as he has seen you do. Say the words "rough" and "smooth" for the respective surfaces, and encourage the child to do so.
6. The second board may be presented at this point, or at another lesson - depending on the child. Use the same procedure.
7. Take the second board and place it before the child. Allow him to see the difference between this and the first board.
8. Begin to stroke the first strip of sandpaper, using the first two fingers of your dominant hand, saying "rough" as you do so. Stroke the next strip with the same two fingers, saying, "smooth."
9. Continue stroking all the strips, proceeding across the board from left to right.
10. Allow the child to stroke the surfaces as he has seen you demonstrate.
11. When the child has completed the exercise, return the boards to their place

use blindfolds

Can put rough/smooth
objects in a
mystery bag + ask
child to pull out
something rough/smooth

on the shelf.

12. Present the third and fourth boards at separate sittings, using the same type of procedure as that used for the second board.

Points of Interest:

1. Different qualities in each of the boards.
2. Names and descriptions of the different types.

Control of Error:

1. Feeling two different types of surfaces because the fingers are not within the limits of one strip.

Language:

Descriptive terms: rough, smooth and comparatives and superlatives
Names of the different types of paper used on the fourth board.

Age: 2 1/2 to 4 years

with rough/smooth combination boards
use pointer + middle fingers

with graded rough boards to match, use thumbs

Extension (picture)

FABRIC BOXES

"The Fabric Game"

Materials:

1. The first fabric box containing four or five pairs of fabrics, each pair being identical in color and texture. All the pieces of fabric are equal in size. The fabrics in this box are of greatly contrasting textures, for example, light cotton, rayon, wool and corduroy.
2. Second fabric box containing several pairs of fabrics, each pair being identical in color and texture and all pairs being equal in size, as in the first box. This box contains a greater variety of textures, not so greatly contrasting as those in the first box, for example rayon, light cotton, muslin, flannel, linen, wool and corduroy.
3. Third fabric box containing four or five pairs of fabrics, which are identical in color and texture. All the pieces of fabric are equal in size as in the first and second boxes. This box contains textures graded from fine to coarse, for example; light cotton, flannel, linen, fine wool, coarse wool.

Aims:

Direct-

1. Development of the tactile sense.

Indirect-

1. Preparation for writing.

Presentation I:

1. *Sensitize fingers first*
Bring the first fabric box to a rug and place it in the upper left-hand corner.
2. Remove one piece of fabric from each of the two pairs, which are most contrasting e.g. rayon and corduroy.
3. Feel each fabric thoughtfully and allow the child to do so. *with thumbs*
4. Place the two fabrics side by side on the rug.
5. Take the second piece of rayon out of the box and feel it.
6. Ask the child to feel this piece of material and then to feel the ones, which you have placed on the rug.
7. Show him how to place the two rayon pieces together (on top of one another) and then place them in the box lid. (You may prefer to have them placed on the rug if there is space).
8. From the box take two pieces of fabric, one of which is corduroy.
9. Allow the child to feel them, match the two corduroy pieces and place them in the box lid.
10. Repeat this process with the remaining pieces of fabric.
11. If the child is able to match the fabrics successfully, spread all the pieces out on the rug in mixed order and ask him to match the identical pieces with his eyes closed. (Hold one piece in sub-dominant hand until the other piece is found with the dominant hand.)
12. When the child is finished working with the materials, place the fabrics in the box in mixed order and return it to the shelf.

*Keep 1 piece
fabric in dominant
hand until the
child finds a
match*

*variation: keep fabric
in "gift bags"
then the child can
do the game alone
They can reach in each
bag with each hand
and pull out matching
fabric swatches*

THE MYSTERY BAG

- Materials:** An attractive washable drawstring bag in which an assortment of small objects have been placed. (Suggested assortment: key, marble, pinecone, stone, mothball, walnut, candle, ball of wool, thimble). It is a good plan to change the contents or add to it occasionally. The names of these objects should be a part of his oral vocabulary.
- Aims:**
- Direct-**
1. Development of the tactile sense.
 2. The concept that objects exist even when they cannot be seen.
- Indirect-**
1. Preparation for language.
- Presentation:**
1. Invite the child to use the mystery bag.
 2. Place the bag on a rug.
 3. Introduce the objects one at a time, taking them out of the bag and naming them before you actually begin the exercise.
 4. Return all the objects to the bag. Reach into the bag and feel one object. Give the name of the object before taking it out of the bag.
 5. Repeat this process until all the objects have been removed and are laid out on the rug.
 6. Return the objects to the bag and invite the child to do the exercise. If a group of children is participating, pass the bag around the group and allow each child to remove one object. No group should be so big as to preclude the possibility of all participating.
 7. After the exercise is completed, place all the objects in the bag and return it to the shelf.
- Points of Interest:**
1. Feeling objects hidden in the bag.
 2. Using a blindfold.
 3. Matching like pairs of objects.
- Control of Error:**
1. Seeing that the object is different than what was named.
- Variations:**
1. Using a blindfold.
 2. Using two bags with identical objects in each bag.
 3. Grouping objects by initial, medial or final sound.
 4. Grouping objects by classification: animals, fruit, etc.
- Language:** Names of objects used in the mystery bag.
- Age:** 2 ½ to 4 years.

Note:

1. The second fabric box is presented in the same way as the first.
2. This exercise lends itself to being done by two children; one child wears a blindfold - or closes his eyes - and the other child hands him the pieces of fabric to be matched.
3. In a three period language lesson, the names of the fabrics and textures may be taught as a separate exercise.

Presentation II:

1. Follow the procedures outlined in Presentation I, numbers 1-10.
2. After the fabrics have been matched, say: "Now I am going to feel them and try to find the pair that is finest - or softest."
3. Feel the cotton pieces, place them before the child and allow him to feel them.
4. Next, say "Now I want the fabrics that are coarsest - or roughest."
5. Pick up the coarse wool fabrics, feel them and allow the child to do so.
6. Place the pair of cotton fabrics over to the left and the wool over to the right.
7. Choose a medium weight fabric and place the pair in the center. Then add the other pairs.
8. If the child seems to need additional experience with the exercise, mix the pieces, place one of each pair in gradation from finest to coarsest in a row on the rug and ask the child to place all the matching pieces on each.
9. Allow the child to match and grade the fabrics independently.
10. When the exercise is completed, place the fabrics in mixed order in the box and return it to the shelf.

Note: In a three period language lesson, the names of the fabrics and textures may be taught as a separate exercise.

Points of Interest:

1. Variation of the texture of materials.
2. Sensation of feeling like textures blindfolded

Control of Error:

1. Visual - Seeing that the pieces of fabric do not look the same

Language:

Names of fabrics and weaves

Descriptive words: rough, smooth, fine, coarse, light, heavy

Age:

2 1/2 - 4 years

BARIC (WOOD WEIGHT) TABLETS

Materials:

Eighteen rectangular wooden tablets divided into three sets, according to their weight: heavy, medium and light. The six tablets, which are heavy, are made of dark wood; the medium-weight tablets are medium in color and the light tablets are light in color.

Aims:

Direct-

1. Development of the baric sense.

Indirect-

1. Preparation for language.

Presentation:

1. Invite the child to do the exercise. (This should be someone who has worked successfully with the other materials involving the tactile sense).
2. As a preliminary, wash your hands in warm water in order to stimulate circulation and make them more sensitive to weight. Ask the child to wash his hands also. *Rub fingers on rug to sensitize*
3. Indicate the box of baric tablets in its place on the shelf. Carry the box to a rug and place it over to the right.
4. Take out two sets of tablets: heavy and light. Spread them out on the rug, keeping the heavy tablets on the left and the light tablets on the right.
5. Pick up a heavy tablet with your left hand and a light tablet with your right hand. Cup your hand so the tablets will rest on the fingertips and the heel of your hand. * * *
6. Your elbows should not be touching your body.
7. Assuming an attitude of real concentration, move your hands up and down, feeling the weight of the tablets.
8. Look at the tablet in your left hand, saying: "This one is heavy." Place it in the center of the rug, towards the right.
9. Look at the tablet in your right hand, saying, "This one is light." Place it in the center of the rug, towards the right. *hold this tablet higher in the air*
10. Pick up one more tablet from each set, and repeat the procedure outlined in numbers 5 to 9. Place the heavy tablet on top of the first heavy one, and place the light one on the first light one.
11. Continue in the same way until all the tablets are in two piles, the heavy tablets in one pile and the light tablets in the other.
12. At any point in the exercise, you may ask the child if he would like to feel the weight of the tablets. It is not necessary to do the exercise blindfolded at first. This procedure may be added after the child has classified the tablets while having his eyes open.
13. When the exercise is completed, place the tablets in the box and return it to its place on the shelf.

Note: When weighing the tablets, do not always use the left hand for heavy and the right hand for light. Change hands in order to develop a true sense of weight with both.

only bring out heavy / light at first. Introduce medium later.

Extensions:

*use
Blindfold*

1. Weighing the heavy and light tablets while wearing a blindfold.
2. Weighing the heavy and medium tablets, first while looking at them and then while wearing a blindfold.
3. Weighing the medium and light tablets, first while looking at them and then while wearing a blindfold.
4. Weighing all three sets of tablets, first while looking at them and then while wearing a blindfold.

Variations:

1. Weighing other objects on the tips of the fingers.
2. Weighing these same objects on a scale.
3. Weighing various objects on a balance scale.

Language:

Descriptive words: heavy, medium, light

Age:

3 ½ to 5 years

THERMIC TABLETS

Materials: 8 tablets, the same size, of different substances which differ in their heat conducting properties, such as wood, felt, marble and iron.

Aims: **Direct-**

1. Development of the thermic sense.

Indirect-

1. Preparation for language.

Presentation:

1. Mix the different tablets on the rug.
2. Choose one and place in palm of sub-dominant hand; rub with thumb.
3. Choose partner. Hold in palm of dominant hand. "These feel the same. They feel...warm...cool, etc."
4. Continue procedure until all tablets are matched.
5. Mix tablets and do the same procedure blindfolded.

Note: Holding tablet to check creates a greater sensitivity.

Can hold against your cheek. You will get a more sensitive feeling.

Points of Interest: 1. Feeling the differences in temperature.

Control of Error: 1. Visual....seeing that two tablets don't match when blindfold is removed.

Extensions: 1. Lead the blindfolded child by the hand and bring him around the room. Make him touch different objects and ask what it is made of: metal, wood, etc.

Variations: 1. Have the blindfolded child touch one of the tablets. Have the child remove the blindfold and ask him to go and get its partner from the set which is on another rug.

Age: 3 ½ to 5 years

THERMIC BOTTLES

Materials: Thermic bottles: eight metal containers, each with a metal ring on top and identical in all respects except temperature. The bottles are divided into two sets, with four bottles in each. Each of the bottles in one set matches a bottle in the other in temperature: hot, warm, cool or cold.

Aims: **Direct-**

1. Refinement of the thermic sense.

Indirect-

1. Development of muscular coordination and control.
2. Development of language.

**Presentation I:
Matching**

1. Invite a child to do the exercise, showing him the box of thermic bottles in its place on the shelf.
2. Carry the box over to the rug, remove the lid and place it under the box.
3. To begin with, take out only three containers: Hot, cold and warm.
4. Feel the hot cylinder by grasping it with a full fist, first with one hand and then with the other.
5. Allow the child to feel the container as you have demonstrated.
6. Feel the cold cylinder in the same way, showing the greatest contrast, and allow the child to feel it.
7. Repeat the process once more with the warm container.
8. Feel the temperature of one of the bottles on the rug (preferably the hot). Remove another bottle from the box and feel it to discover whether or not it's temperature matches the first container.
9. If the two containers are identical in temperature, place them side-by-side over to the left. If they are not, place the second bottle near the box and take out another one to find the hot container.
10. When you have matched the two hot containers, repeat the procedure outlined in numbers 1 and 2 to match the cold and finally the warm containers.
11. Mix the containers and ask the child if he would like to match them.
12. When the child is able to match these three pairs of cylinders, introduce the containers having a cool temperature.
13. Replace the containers in the box in mixed order.
14. Place the lid on the box and return it to the shelf.

**Presentation II:
Grading**

1. After the child has learned to match like temperatures, introduce the process of grading the temperatures from hot to cold.
2. At first, use only three pairs of containers: hot, warm and cold.
3. If the language for hot, warm and cold has not been introduced, it may be introduced at this point. Place one hot bottle at the top, center of the table and say "hot." Place one cold container near the bottom of the table and say: "cold." Then ask the child to feel the cold container and encourage him

- to say its name. Ask him to feel the hot container.
4. Ask the child to place the matching container next to the hot. Then ask him to place matching container next to the cold.
 5. Indicate the cold containers, ask the child to feel them and tell you their temperature - cold. Do the same for the hot containers.
 6. Place one of the warm containers between the hot and cold, saying: "warm." Ask the child to find the matching container.
 7. Continue with practice in language for warm and cold, warm and hot - if the child has not learned this.
 8. Use the same procedure to introduce the fourth pair: "cool."
 9. Mix the containers, place one of each pair in gradation from hot to cold and ask the child to place the others in gradation. He may use the first set as a check.
 10. Finally, mix all the containers and ask the child to match them, name them and place them in gradation.
 11. When replacing the containers, arrange them in mixed order in the box.

Points of Interest:

1. Feeling the containers.
2. Feeling the differences in temperature.

Control of Error:

1. Feeling a cold bottle next to a hot bottle, etc.

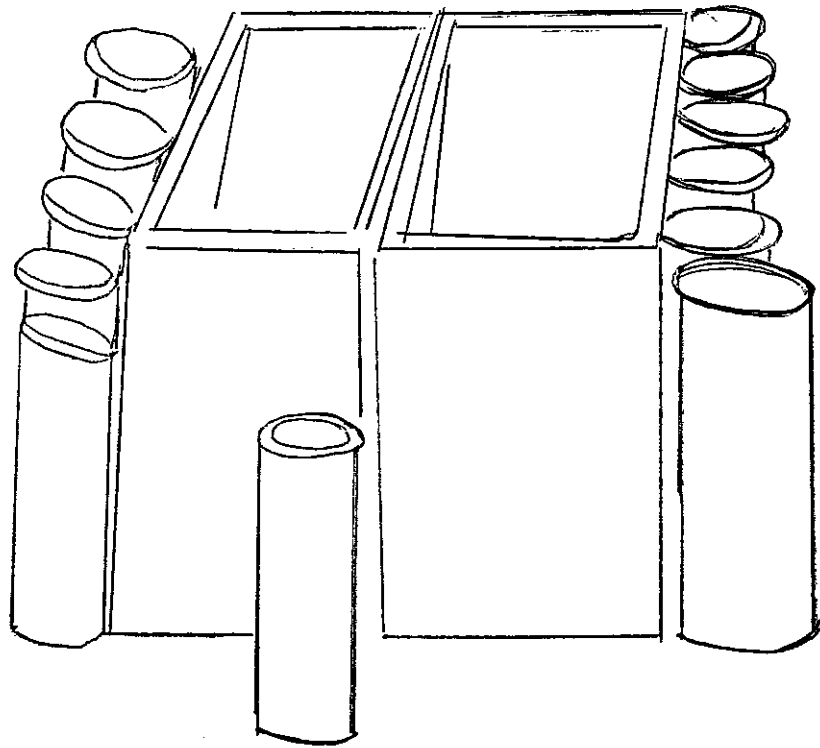
Language: Descriptive words: hot, cold, warm, cool, tepid.

Age: 3 to 4 years

good idea but not practical

after ~1 hr. all feel the same

Sound Cylinders



SOUND CYLINDERS

Materials: The sound boxes: two sets of six cylinders each. When shaken, the cylinders produce sounds graduated from soft to loud. The cylinders of the second set match those of the first set. One set is identified by red tops, the other by blue tops. Each set is kept in a wooden box having a lid corresponding in color to its top.

Aims: **Direct-**

1. Development of the auditory sense.

Indirect-

1. Preparation for phonics.

Presentation:

1. Carry the boxes, one at a time, to a rug and place them in the center.
2. Remove cover and place it under the box.
3. Line up the cylinders along the outside of each box.
4. Holding one red cylinder with the index finger on the top of the cylinder, shake it gently near the ear.
5. Shake one of the blue cylinders near the other ear, and if it doesn't match, place it back in the row of blue cylinders.
6. Test each blue cylinder until you find the matching sound.
7. When you find the matching sound, place the two cylinders side by side in the center of the rug.
8. Match the other cylinders in the same way until they are lined up in pairs.
9. Mix up the cylinders and invite the child to try it.
10. Upon completion of the exercise, return the cylinders to their respective boxes in mixed order, and return the boxes to their place on the shelf.

Note: In introducing cylinders for the first time, try using three cylinders in each box; loudest, medium and softest. Add the other cylinders when you feel the child is ready.

Variations:

1. Grade the cylinders from loudest to softest.
2. Place the two sets of cylinders on different tables, some distance apart. Ask the child to shake a cylinder of one set and go to the other set and find the matching sound.
3. Have the child identify other sounds in the room by closing his eyes and telling the sounds he hears.

Points of Interest:

1. Listening to the different sounds.
2. Shaking the cylinders.
3. Seeing the cylinders paired.

Control of Error:

1. Child recognizes that sounds are not the same.

1st time: only
present loudest,
medium, quietest

Language: Loud, soft; loudest, softest

Age: 3 to 4 years

THE BELLS STRIKING

Materials: One bell, mallet, damper (small tray if desired)

Aims:

Direct-

1. Development of the auditory sense.
2. The reproduction of musical sounds with the voice.

Indirect-

1. Preparation for further musical activities.

Presentation:

1. Choose a brown bell.
2. Carry the bell to a table with one hand on the stem and the other under the base of the bell (or place the bell, mallet and damper on a small tray and carry all together to a table).
3. Obtain the mallet and damper.
4. Hold the mallet with the thumb and first and second fingers of the dominant hand - as if holding a pencil on the opposite end from the point. The mallet should be able to swing freely. Hold the damper in the sub-dominant hand.
5. Strike the rim of the bell with the mallet. (Hold your arm high so that the ball of the mallet points toward the floor. Use a relaxed wrist motion when striking the bell).
6. Stop the tone with the damper.
7. Reproduce the sound with your voice by singing or humming.
8. The child or children may participate at this point.
9. Return the material to its proper place.

Note: The child may shut his eyes when listening. This may be done as an individual or group presentation.

Points of Interest:

1. The bells, mallet and damper.
2. The sound the bell makes when struck by the mallet.

Control of Error:

1. Striking the bell too hard or too lightly.

Language:

Bell, mallet, damper, tone sound, strike

Age:

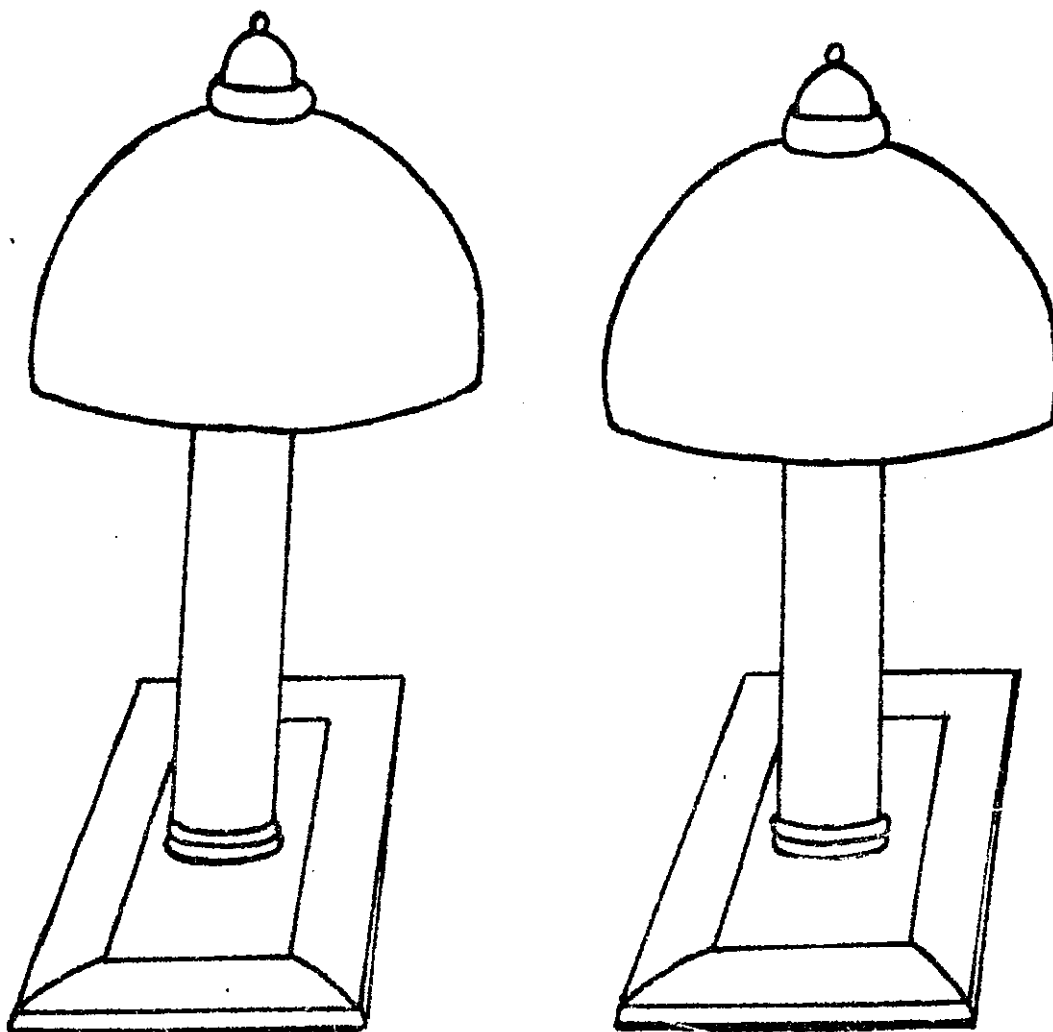
3 to 5 years

Introduce C then E → reproduce sound with voice
1st lessons: making sure they know how to hold mallet
can use game: Teacher sings Everyone, Here I am is the response

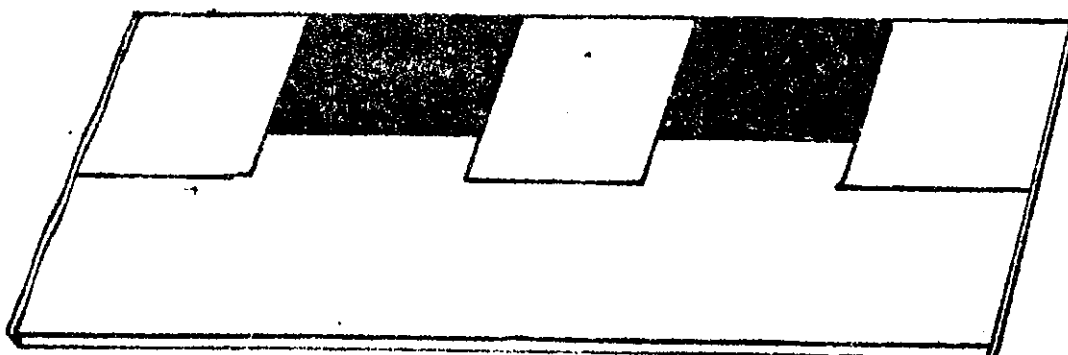
variation: Joyce has a chime-a-long; like a xylophone with labeled notes

* Don't polish
bells - will change
tone

MUSICAL BELLS



CONTROL BELL WORKING BELL



THE BELLS MATCHING

Materials: The green board with the brown bells set on the white spaces and the white bells at the rear of the board behind the brown bells, mallet, damper.

Aims: **Direct-**

1. Development of the auditory sense.

Indirect-

1. Preparation for reading.

Presentation:

1. Move two or three of the brown bells to the empty space in front of the board.
2. Strike the first white bell, which has no corresponding brown bell with the mallet, then stop the tone with the damper. Sing it. Strike the first brown bell in the same manner. Sing it also. If they sound the same and if the pitches match, place the brown bell on the empty space in front of the white bell.
3. If the tones did not match, strike the same white bell again and then the second brown bell.
4. Continue in this manner until all the pairs are found.

Note: Speak as little as possible when giving this presentation. If the child pairs incorrectly do not correct him because he himself must come to realize the correspondence and he may not be ready. Instead, invite him to repeat the exercise. If still incorrect, end the presentation.

Variations:

1. Add more pairs, up to eight.
2. Add the rest of the pairs - up to fourteen.

Points of Interest:

1. The bells, mallet and damper
2. The sound the bell makes when struck by the mallet.

Control of Error: Mismatching bells that have the same tone.

Language: Pair, match, pitch

Age: 3 to 5 years

white bells are
control- don't move
from 'keyboard'

SMELLING BOTTLES

Materials:

The smelling boxes, or bottles: six or eight cylindrical wooden boxes each containing a small quantity of a strongly scented substance, such as perfumes, spices or medicines. The boxes are paired, so that two of them have identical smells.

Put smells in masked bottles so they won't match by color

Aims:

Direct-

1. The development of the olfactory sense.

Indirect-

1. Preparation for language.

Presentation:

1. Bring the box of cylinders to a rug and place it in the center.
2. Take out two pairs of cylinders and place them in a row between yourself and the box.
3. *open all the cylinders first and line them up.* ~~Open one of the cylinders~~ and lift it near your face to smell the scent. (You may wish to use one hand in a fanning motion to wave the scent towards you).
4. Place the cylinder over to the left. *use coffee smell in between*
5. Choose another cylinder and repeat the smelling procedure, trying to discern whether or not it's scent matches that of the first cylinder.
6. If the two cylinders match, place the second beside the first. If they do not, return the second one to its place in the row, being careful to replace its lid. Then smell another cylinder to find the mate to the first.
7. Continue testing the scents until the four cylinders are matched.
8. Arrange the cylinders in a row in mixed order and ask the child to pair them, testing and matching as you have demonstrated.
9. When the cylinders have been arranged in pairs, show the child how to check his work for accuracy by looking at the marks on the base of the cylinder. Matching cylinders have identical markings.
10. Return the cylinders to the box in mixed order and replace the box on the shelf.

Note: Since the olfactory sense tires very easily each exercise with the smelling boxes or bottles should be brief and should involve a limited number of scents.

Variations:

1. Matching pictures of flowers, spices, etc. with the smelling box, which has the same scent as the object pictured.
2. Placing flowers, spices, etc. in the environment and asking the child to match these with the smelling box which has the same scent.

Points of Interest:

1. Matching like smells.
2. Familiarity of smells they recognize.

Cinnamon, nutmeg, vanilla, lemon, garlic, almond are all good ideas

Don't mix spices, with flowers with fruit - Keep a theme

TASTING JARS

Materials: Tasting bottles: four pair of bottles, identical in structure, capped, and with a dropper. Each pair of bottles contains a transparent liquid of one of the following flavors: sweet, sour, salty and bitter. The bottles are placed on a tray, paired according to flavor. On the tray there are also some small plastic spoons, a pitcher of water, a glass and a small cloth.

Aims: **Direct-**

1. Development of the gustatory sense.

Indirect-

1. Development of the ability to observe and make judgments.
1. Development of an appreciation of various tastes in foods.

Presentation:

1. Invite the child to do the exercise, showing him the material in its place on the shelf.
2. Carry the tray to the table and place it in the center.
3. Take one bottle-preferably the container with the sweet liquid and turn the cap to unscrew it and allow the air to enter, holding the bottle firmly with one hand and unscrewing the cap with the other.
4. Lift the cap, and while doing so squeeze the dropper, allowing a few drops of liquid to enter the tube.
5. Bring the dropper directly over one of the plastic spoons, but do not allow it to touch the spoon.
6. Squeeze the dropper, allowing a few drops to fall on the spoon.
7. Replace the dropper in the bottle and screw the cap tightly.
8. Raise the spoon to your mouth to taste the liquid, saying "sweet."
9. Pour some water from the pitcher into the glass.
10. Take a drink of water to rinse your mouth.
11. Allow the child to repeat the process outlined in 4-9.
12. Introduce a contrasting flavor-salty or sour-using the procedure outlined in 3-10 above.
13. When the flavors sweet, salty and sour have been tasted, allow the child to match the pairs of bottles having these flavors. At this time, re-enforce the use of the descriptive words, sweet, salty, sour, by means of the three period lesson.
14. When the exercise is completed, check each bottle to be sure that all the caps have been screwed tightly before returning the tray to the shelf.

Points of Interest:

1. Experiencing and categorizing various tastes.
2. Recalling foods, which have similar tastes.

Control of Error: 1. Seeing that the color-coding on the bottom doesn't match.

Language: Descriptive words pertaining to the scents.

Age: 3 to 5 years

- Control of Error:**
1. The matching bottles may be color-coded on the bottom.
 2. Being aware of one taste while testing another because the mouth has not been rinsed.

Age: 3 to 5 years

SENSORIAL EXPERIENCES WITH THE SQUARE AND CUBE CHAINS

Materials: 1 golden unit bead, 10 bar, 100 square, 1,000 cube. In addition to these materials you need 1 set of short bead bars. With the above materials you will also need the complete set of bead squares with their appropriate chains and the bead cubes with their appropriate cube chains. This material is kept on a large wooden frame, which contains the appropriate shelves to house the square chains and squares from 1 to 100. The cube chains are placed on appropriate hooks on the same frame and the cubes are housed on a high shelf above the cube chains (1 to 1,000). In doing these sensorial exercises one needs several rugs.

Note: Montessori says, "I have had a chain made by joining ten-bead bars end to end. This is called the "hundred chain." Then, by means of short and very flexible connecting links I had ten of these hundred chains put together, making the "thousand chain." These chains are of the same color as the ten-beads. The difference in their reciprocal length is very striking. Let us first put down a single bead; then a ten bead bar, which is about 7 cm long; then a hundred bead chain, which is about 70 cm long; and finally, the thousand-bead chain, which is about 7 meters long. The great length of this thousand-bead chain leads directly to another idea of quantity. The flexible connections between the different hundred lengths of the 1,000 bead chain permit of its being folded so that the "hundred chains" lie one against the other, forming in their entirety a long rectangle. The same quantity which formerly impressed the child by its length is now, in its broad, folded form, presented as a surface quantity." The Advanced Montessori Method - Volume Two; pp. 189, 190 - Arithmetical Operations (Part III).

Aims:

Direct-

1. To give him a sensorial knowledge of the relationship of the following:
 - a. initial golden beads one to another.
 - b. short bead stair to the square chains.
 - c. short bead stair to the square chains to the squares.
 - d. square chains to the squares.
 - e. squares to the cubes.
 - f. cubes to the cube chains.
 - g. square chains to the cube chains.
 - h. bead bars, square chains, cube chains.
 - i. figures formed with the beads in relationship to the geometric cabinet.
2. To show strikingly the difference between the square chains and the cube chains.
3. Later when the child counts - To consolidate the child's knowledge of counting.
4. To introduce linear and skip counting.

Indirect-

1. Preparation of the mathematical mind.

Presentation:

Place several rugs on the floor, one beneath the other. Bring the bead presentation tray containing 1 unit, 10 bar, 100 square, 1,000 cube to the rug. Later add to these materials the 100 and 1,000 chains. As the child progresses with each stage the materials needed will be noted. There is no formal presentation with these sensorial experiences. The various stages can be done with the children individually or in small groups. The children should have worked with the initial bead presentation and the short bead stair and be very familiar with the sensorial materials.

Stage I:

Going across the top of the rug, left to right, place the following beads:

1,000 cube 100 square 10 bar 1 unit

- A. Directress points to the 1 unit bead saying, "one." Directress points to the 10 bar saying "ten" and then counting it out. Directress points to the 100 square saying "one-hundred" and then counting, "ten, twenty, thirty, etc. to one hundred.
- B. Directress points to the 1,000 cube saying "one thousand" and then counting it out, "one-hundred, two hundred, etc. to one thousand."
- C. Next the Directress places the unit bead by each bead in the ten bar counting it out again. Then she places the ten bar, superimposed, over each ten-bar of the 100 square and counts it out. Lastly, she placed the hundred square in the same manner over each 100 square in the 1,000 cube counting it out as before.
- D. Directress asks child, "How many units are there in a 10 bar?" "How many ten bars in one 100 square?" "How many one hundred squares in one 1,000 cube?"

Stage II:

Going across the top of the rug, left to right, place the following beads:

1,000 cube 100 square 10 bar 1 unit

Under the above layout place the following bead materials:

1,000 chain 100 chain 10 bar 1 unit
(Laid out vertically)

- A. See if the child notices any similarity in these layouts. Are they the same?
- B. Directress, "Can you bring me something in the math area that would also represent units?" Child could bring to the rug:
 - a. shortest number rod.

- b. another unit bead
 - c. 1 red bead
 - d. numeral one
 - e. one spindle
 - f. one counter, etc.
- C. Directress, "Can you bring me something else in the math area that would also represent ten?" Child could bring to the rug:
- a. longest number rod
 - b. another ten bar
 - c. numeral ten
 - d. ten spindles
 - e. ten fraction parts, etc.
- D. Directress "Can you bring me something else in the math area that would also represent 100?" Child repeats above process.
- E. Directress, "Can you bring me something else in the math area that would represent 1,000?" Child repeats above process.

After this stage is complete the child or children return the materials they brought to their appropriate place.

Stage III:

Going across the top of the rug, left to right, place the following short bead stair beads.

9 bead bar, 8 bead bar.....to the 1 red bead

- A. Child counts each bead bar as it is being placed on the rug beginning with the one red bead saying, "one."
Two green beads... "one, two."
Three peach beads... "one, two, three."
Four yellow beads..."one, two, three, four."
Five light blue beads...."one, two, three, four, five."
Continue in this manner through nine.
- B. Below the above layout place in a vertical line below the appropriate beads the square chains.
- 9 chain, 8 chain.....to 1 red bead (vertically)
Beginning with the red bead the Directress places the individual bead bars next to the appropriate sections of the square chains. This is to show the child the relationship of the materials together and how many individual bars are used to make a particular chain. After placing the bead bars next to the appropriate sections of the square chain return the bead bars to the top of the rug.
- C. Repeat above process but place the total layout in a horizontal manner.

1 red bead
2 green bead bar 2 green square chain
3 peach bead bar 3 peach square chain
etc....to the 10 golden bar 10 golden chain

Stage IV:

Going across the top of the rug, left to right, place the bead bars 1-9, underneath the bead bars (vertically) the square chains and underneath the square chains the squares.

- A. Let the child or children observe this layout for a while. Does he notice any similarities? How are these chains to the squares related?

Directress then takes each bead bar and places it next to the appropriate sections of the square chains (as in Stage III, B). She then returns the beads to the top of the rug.

- B. Directress then folds each square chain, beginning with two, to form the square below. Place the squares next to the folded up chains.

Place the squares on top of the folded chains.

Return the bead bars to the box.

- C. Place the folded square chains across the top of the rug but now right to left from 1 to 100. Place the squares below this in the appropriate place. Place the squares in the Square of Pythagoras below this. Let the child observe the color relationship.

Repeat this layout but going in a diagonal sequence across the rug.

Superimpose the squares (beads) on top of one another beginning with the 100 square, square of nine, square of eight, etc. to 1. Repeat this with the Square of Pythagoras

- D. Let the children later discover if there is any relationship of size between the following:
- bead squares to the squares in the square of Pythagoras
 - either of the above to the cubes in the pink tower
 - either of the above to the broad stair
 - matching the colors to color box 2

Stage V:

Across the top of the rug, left to right, lay out the squares from 100 to 1 and below place the cubes.

100 square, 9 square, etc. to 1 red bead
1,000 cube, 9 cube etc. to 1 red bead

- A. Let child observe this new layout. Does he see any similarities? Is there any relationship? Beginning with 1 show the child how many squares are represented in each appropriate cube. After each is shown, replace the square to its appropriate place on the rug. In doing this, superimpose the square directly over each square in the cube counting it out (for an example I will use the square and cube of five.) "This is the square of five." "This is the cube of five." Placing the square of five over the squares in the cube count it out, "one, two, three, four, etc." Repeat this procedure all the way through.
- B. Layout as before but this time layout all of the squares in a vertical manner from left to right. Place the cubes underneath each appropriate row of squares. Let the child observe this pattern.

Beginning with the 1 bead place it next to the other red bead. Stack up the squares of two to form the cube of two. Stack up the squares of three to form the cube of three, etc. to 10.

- C. Repeat all of the above steps in B but do it in a horizontal manner.
- D. Beginning with the 1,000 cube build the cubes vertically to form a tower, superimposing one cube on top of another.

Stage VI:

1,000 cube, 9 cube etc.....to 1 red bead

In a vertical manner under each appropriate cube place the cube chain.

1,000 chain 9 chain etc.....to 1 red bead

- A. Let child observe the layout. Does he see any similarities? Directress then may say, "There is one bead here and one here." There are eight beads in the chain." "There are 27 beads in the cube" and "There are 27 beads in this chain." Repeat this process all the way through to 1,000 showing first the number of beads in the cube and then in the chain.

Chain of 4-64	Chain of 8 - 512
Chain 5 - 125	Chain of 9 - 729
Chain of 6 - 215	Chain of 10 - 1,000
Chain of 7 - 343	

- B. Lay out all the cube chains, left to right, across the top of the rug but vertically. Below each of the chains lay out all of the colored squares vertically under the appropriate cubes.

Fold up each length of the cube chain to form each square and then place the square next to it. Repeat this process all the way through to 1,000. When completed place the squares directly on top of the folded chains.

C. Could repeat B in horizontal manner, also

Stage VII:

Across the top of a rug, left to right, place the square chains vertically. Below, in the same manner, place the cube chains.

- A. Let the child or children observe this pattern. Place the 1 red bead next to the other red bead (moving it down). Continue in this manner placing each of the colored square chains next to each appropriate section of the cube chains from 2 through 1,000. Child can count how many square chains there are in a cube chain. Leave the square chains at the end of the cube chains.
- B. Lay out all of the bead bars across the top of the rug (vertically) from left to right. To the right of the bead bars place the square chain. To the right of the square chains place the cube chains. Let the child observe the work.
- C. Lay out before as in B. At the end of each square chain place one square and at the end of each cube place a cube. Let the child observe this pattern.

Stage VIII:

Making a booklet for the bead bars, square chains, squares or cubes. Directress should make a model booklet for each material and include the appropriate language within it.

- A. Child takes a booklet to a rug with the bead material that corresponds to the booklet. He relates the knowledge of the booklet to the materials.
- B. Later on the child may begin to make his own booklets or draw his own bead materials on white paper.
 - 1. colored bead bars first.
 - 2. squares
 - 3. cubes
 - 4. square chains on large piece of paper.
 - 5. cube chains on large piece of paper.

Stage IX:

- A. Place all of the square chains in a vertical manner on the rug, left to right.
Move down the one red bead.
Move down the bead chain of 2 (leave in a vertical manner).
Move down the peach chain and form a triangle.
Move down the yellow chain and form a square.
Move down the light blue chain and form a pentagon.
Move down the violet chain and form a hexagon.
Move down the white chain and form a heptagon.

Move down the brown chain and form an octagon.
 Move down the dark blue chain and form a nonagon.
 Move down the 100 chain and form a decagon.

- B. After forming the above, Directress points to the 3rd chain (forms a triangle) and asks child, "Can you find something in the geometric cabinet that looks like this?" Repeat this with each figure fore mentioned. Child places geometric figure on the rug next to the beads.

Stage X:

- A. Lay out all of the square chains in the same manner as in Stage IX. Beginning with the two chain, place it in the middle of the rug in an upside down V. Taking each chain, in turn, place it on the outside of the previous chain in like manner until all the chains are in the proper place. When completed put the 1 red bead in the center.

Stage XI:

- A. Layout the cube chains as before. Beginning with the 3rd chain (peach) have three children holding it in order to form a triangle. Each child in turn counts the side he is holding and then the chain is placed on the rug.
- B. Repeat with the four chain (making a pentagon) but adding another child. Repeat with the five chain (making a pentagon) but adding another child. Repeat this procedure through the ten or 1,000 chain thus having ten children.
- C. When the chains are laid out on the rug as above (geometric forms) suggest to the children that they might find these forms in the geometric cabinet. Have the children find these forms in the cabinet and bring the geometric insets to the rug and place by the appropriate beads. Return material when through.
- D. Lay out the cube chains in the shapes as in B and inside place the same shapes with the square chains. Let children observe work when completed.

Stage XII:

- A. Lay out the short bead stair on the rug in a vertical manner. Leave a space and then lay out the square chains in the same way. Leave another space and lay out the cube chains in the same way.

This shows the child the progression of different relationships between units, squares and cubes.

Give the children lots of sensorial practice with the short bead stair, square and cube chain, etc. before he actually counts them. When the child gets to the point where he is counting put out all the square chains and one square, which represents each chain. The child can count chains 1-6 in any order and then 7-10 or 100. Later on the directress adds the cube chains, cubes, rest of the squares on the bead cabinet. The children are encouraged to count the shorter cube chains before he does the longer ones.

Child is probably in his late 2nd year or early 3rd year in Montessori when counting the square chains and older for the cube chains (5 to 6).

Control Of Error:

In the sensorial experiences none is really needed but it could be visual. When the child counts the chains the control is in the directress.

Age:

4 years and up

MONOMIAL CUBE (POWER OF TWO)

Materials

Box containing, a cube divided into 7 pieces, showing the relationship in size of pieces needed to make the whole cube.

- a. $1/2$ cube green
- b. $1/4$ cube white
- c. $1/8$ cube yellow
- d. $1/16$ cube green
- e. $1/32$ cube white
- f. $1/64$ cube yellow 2 pieces (cubes)

Table to work on

Preparation

1. Carry box to the table and place in the upper left corner.
2. Open box.

Presentation

1. Carefully remove the pieces of the cube beginning with one of the small yellow cubes ($1/64$).
2. Place the cube on the table under the box.
3. Remove the second small yellow cube ($1/64$) and place to the right of the first cube.
4. Remove and place remaining cubes in the following order, white ($1/32$), green ($1/16$), yellow ($1/8$), white ($1/4$), and green ($1/2$), to the right of the previous cube.

Note. In order to remove the largest green prism it is necessary to lift the box and tip it over. Place fingers over the opening in the box to avoid prism falling out of the box on to the table.

5. Build the cube outside of the box by constructing in reverse order from way the cubes were taken out. Place white ($1/4$) prism on top back of the green ($1/2$) prism, Yellow ($1/8$) cube in front of white cube on left side, green ($1/16$) prism next to yellow cube, white ($1/32$) prism on green ($1/16$) prism and flush with other white prism, the two yellow ($1/64$) cubes in front of white prism.
6. Repeat steps 1-4 to dismantle the cube.
7. Repeat step 5 building the cube inside the box.
8. Repeat or return materials to shelf.

Control of Error

1. Visual
2. Inability to fit cube into the box.

MONOMIAL CUBE (POWER OF TWO)

Points of Interest

1. Appearance of the materials
2. The box
3. Size of the pieces
4. Removing the pieces from the box
5. Tipping the box to remove largest prism
6. Laying materials out in order
7. Fitting pieces together
8. Building the cube in the box
9. Seeing the box close

Direct Aim

1. Perfect the visual sense
2. Perfect the muscle control

Indirect Aim

1. Understanding of parts of a whole

Language

Monomial cube, green , yellow, white, cube, prism, tip, power of two

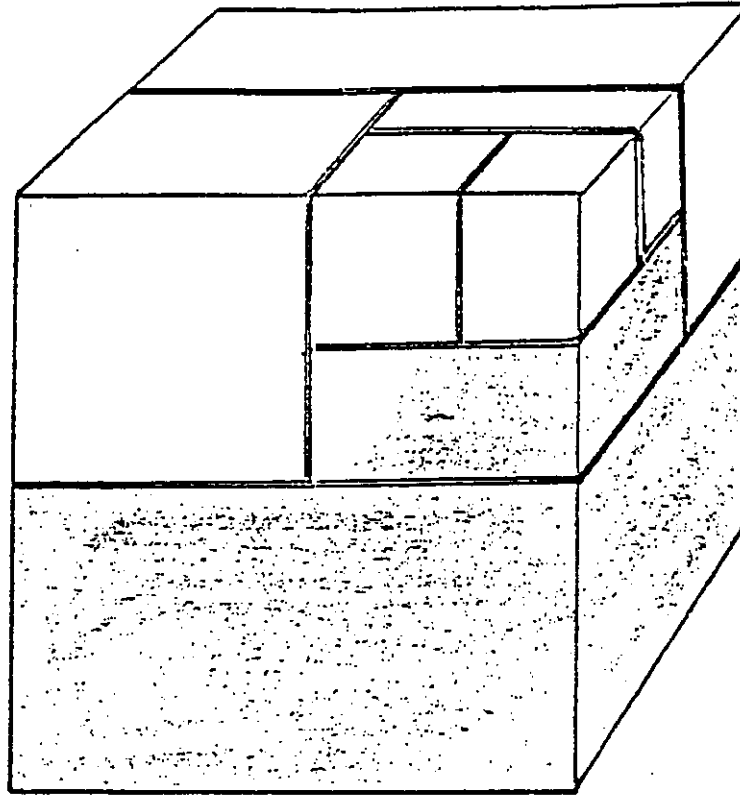
Age

3 years and up

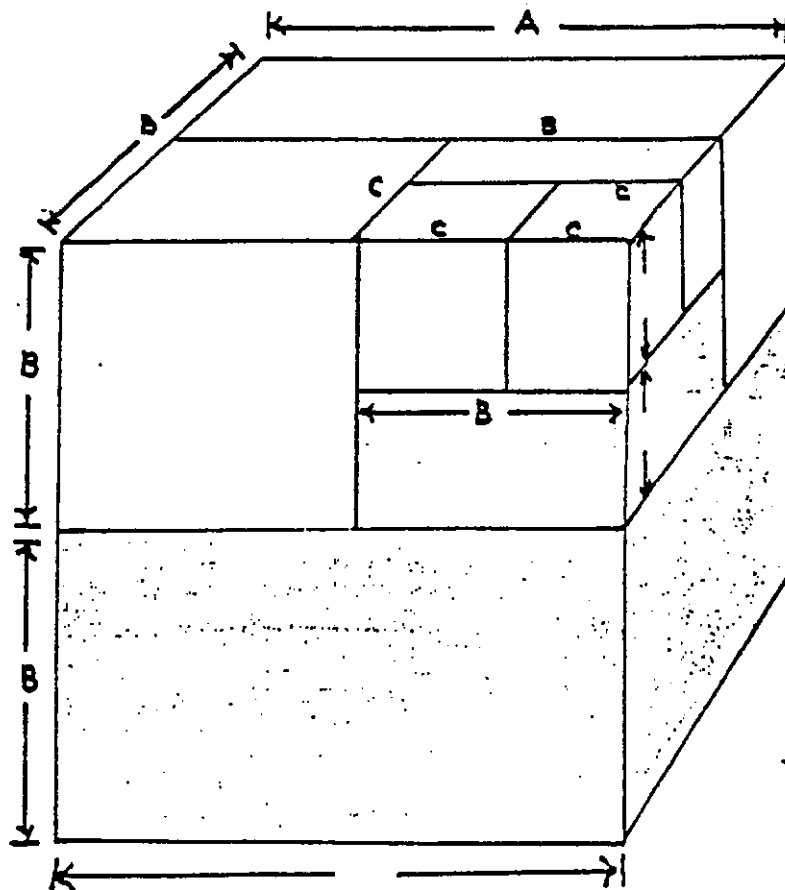
Comments

1. It might be good to place something under the lid of the box while using materials to save on hinge ware.
2. Materials maybe placed on a felt rect. to define the working area. Also helps keep materials from being chipped. White is a good color for the felt piece. Roll felt in a cylinder shape and insert in a round napkin holder as part of the exercise. It would be good to place a felt rolling exercise in Pratical Life first before putting the felt out here or with the other two cubes.

MONOMIAL CUBE (POWER OF TWO)



$$1 = 1/2 + 1/4 + 1/8 + 1/16 + 1/32 + 1/64$$



Sensorial

July 1

Learning : active process because the more he does, the more he knows

Procedure : all taught as perceptions not concepts

Contrasts : comparing, differences

Identities : matching, similarities

Gradation : sequence

Lesson : simple, objective, few words

* Read ch 13 Absorbent Mind

3 period lesson - connecting words w/ activity

1. tell child what you want them to know
ex. pink tower: "This is the largest/smallest"
2. ask them to repeat (backwards order) "what is the smallest" ^(teaching stage)
3. ask "What is this" to make him remember (again in backwards order) This tests them

The Classic Presentation

→ Original way to do it

Variations come later. Let child discover new ways

* Read ch 14 Ab. Mind

Sensorial Quiz #1

7-2-02

1. What makes up the CNS?
Brain, nerves, senses, muscles
2. Why did M.M say movement is important?
movement stimulates the brain.
3. What makes movement in man different from animals
we have to learn the movements
4. What is M.M.'s new definition of education?
Education must be thought of NOT in the sense of teaching but in the sense of assisting the whole child's psych. development
5. Give the sensorial sequence under dimension
Knobbed cylinders
Knobless cylinders
Pink tower
Broad prism
Red rods
6. What language do we teach with the pink tower? ^{red rods} Broad prism
cube, large and small; thick + thin, longest + ^{shortest}
7. Write the steps of the 3-period lesson
 1. Tell the child what you want them to know
 2. Ask them to repeat. ~~what is this~~ ^{show me} the smallest
 3. Ask them what is this
All in Reverse order...

Sensorial

July 2

The hand is connected to the Brain

We express thought thru our hands

Changes are brought about by the hand guided by the mind.

1st sense to develop: sight

Struggle is good. It means you're thinking

Gustatory bottles: tasting

July 3

Variation

Monomial Cube (?) Term doesn't exist

$\frac{1}{2}$ piece

$\frac{1}{4}$ piece

$\frac{1}{8}$ piece

$\frac{1}{16}$ piece

$\frac{1}{32}$ piece

$\frac{1}{64}$ (2 pieces)

Sensorial Quiz #2

7.3.02

1. How does M.M. explain the difference in the development of the legs vs. the hands?
legs are for function - all use them the same way
hands are & guided by the mind
2. Give an example of how history has revealed itself thru the ages?
archeological digs - finding tools to show man has used his hands thru time - evolution of man - brain changes; knowledge is greater
3. What did MM say about a child who has less opportunity for sensorial activity?
lower mental development.
4. In the sensorial activities, when we say dimension, what changes? Form?
Dimension: size
Form? shape
5. How would you simplify color box 3
Only have the darkest, lightest, + medium shades to grade.

OVER →

Sensorial Quiz 3

7.5.02

1. The materials that refine the visual sense are divided into 3 categories ;

large / small = SIZE
thick / thin = WIDTH
long / short = LENGTH

1. DIMENSION - size
2. COLOR -
3. FORM - shape

2. What comes first... Geometric cabinet or solids
Solids → they are 3-Dimensional

3. Give the sequence under form...

solids, ^{bases} cabinet, triangle box, small hex. box,
large hex. box, rectangular box, monomial box,
binomial cube, trinomial cube

4. Give the sequence under dimension...

① Knotted cylinders, ② Pink tower, ③ broad prism, ④ red rods
⑤ Knobless cylinders

5. If a child is having a problem in phonics, which sensorial material might help them?
Sound cylinders or Bells

6. Name the shapes in the large hexagon box?
Hexagon, triangle, rhombus, parallelogram

7. Name the shapes in the small hexagon box
hexagon, triangle, trapezoid, rhombus

OVER →

$$\begin{aligned}
 (a+b)^3 &= (a+b) + (a+b)^2 \\
 &= (a+b) (a^2 + ab + ab + b^2) \\
 &= a^3 + a^2b + a^2b + ab^2 + a^2b + ab^2 + ab^2 + b^3 \\
 &= a^3 + 3(a^2b) + 3(ab^2) + b^3
 \end{aligned}$$

MATHEMATICAL MIND

WHAT IS THE MATHEMATICAL MIND?

- *Content + Process*
- *Content... common for all: contains facts, data which the child
Receives from his environment*
- *Differences within the mind depends upon the PROCESSES,
HOW the content is used*
- *PROCESS is the way content is combined, classified, used by*
- *The mind at a particular time for a particular purpose*
- *In a young child, the processes occur at the UNCONSCIOUS
Level and are stored in the mind*

HOW DOES A CHILD ABSORB ALL THIS INFORMATION?

- *Through contact with surroundings (physical)*
- *All of these EXPERIENCES become part of the "mental storehouse."*
-
- *Must remind ourselves that there will be individual differences
following the interest and attraction of the child.*
-

THEREFORE, SINCE THE MIND IS MADE OF SENSORIAL IMPRESSIONS...

- *Environment enriched by sensorial activities leads to full, firm*
- *foundation for mental growth.*
- *Interaction with environment on sensorial level must always involve
movement*

MATHEMATICAL MIND MADE UP OF PERCEPTIONS (I see with my hands)

- *Through the orderly sequence in a Montessori environment there follows an orderly perception in the mind of the child.*
- *Child begins to integrate exterior order (in environment)*
- *Mathematical part of the mind (content) are COLLECTIONS OF FACTS, REALITIES, EXPERIENCES, which the child has had the opportunity to classify, grade, sort, etc.*
- *These experiences become the BASIC FOUNDATION OF THE*
- *MIND. From this order all other processes can build*

ORDER + SEQUENTIAL LEARNING + SENSORIAL MATERIALS = REFINEMENT AND SUPPORT CHILD NEEDS IN DEVELOPMENT OF MATHEMATICAL MIND.

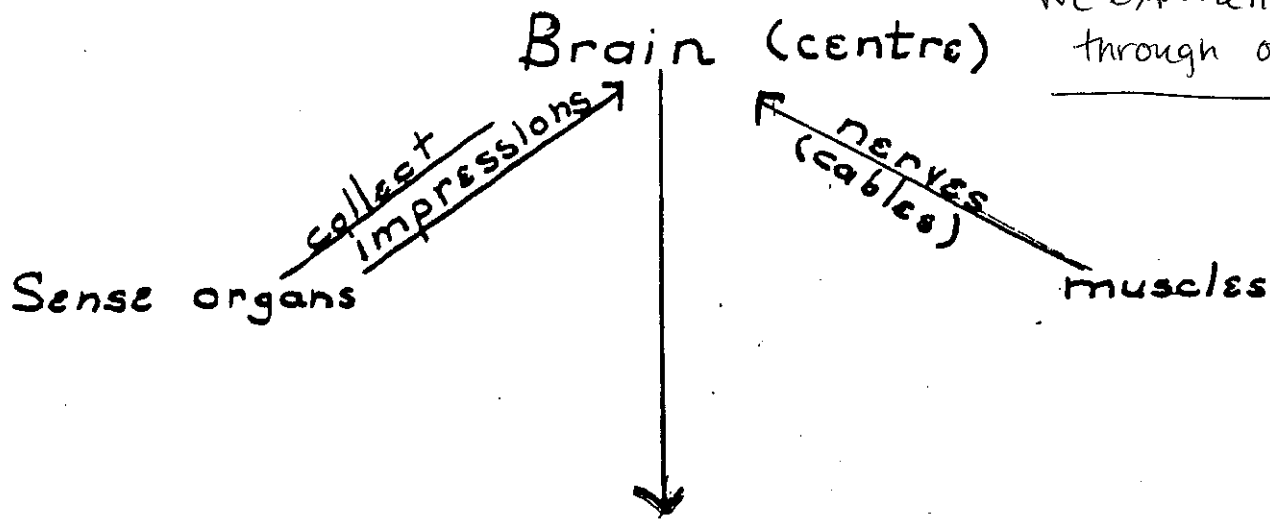
Adapted from "A Way of Learning"
By Ann Neubert

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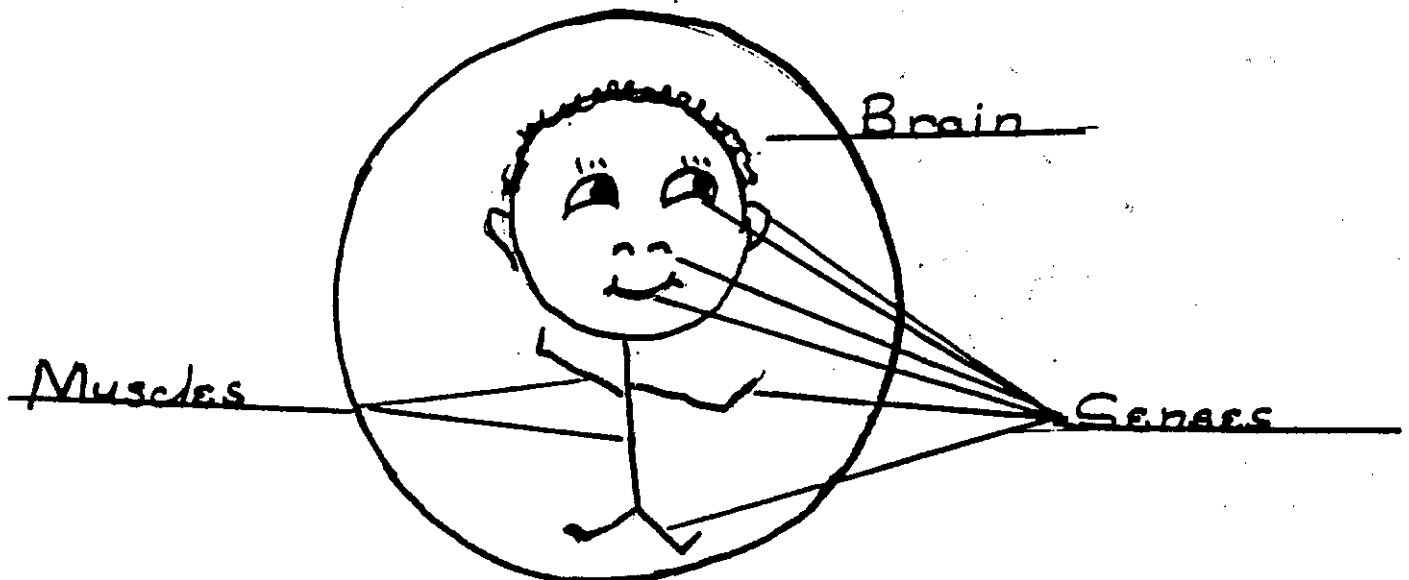
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must use brain in order to
develop senses.

We experience all emotions
through our CNS



Movement
↓
puts man in touch with his world



System of relationship

PREPARATION BEGINS



PRACTICAL LIFE

**CONTROL OF
MOVEMENT**



**EYE - HAND
COORDINATION**



WRITING



**POURING SOLIDS ... LIQUIDS
LACING ... BUTTONING
POLISHING
CUTTING ... PEELING VEGETABLES
CARRYING TRAYS**



**DEVELOPS UNDERSTANDING OF PROCESS AND
ORDER INVOLVED IN COMPLETE CYCLE OF
ACTIVITY ...**

**BEGINNING ...
MIDDLE ...**

PRACTICAL LIFE LEADS TO

SENSORIAL



EXPANDS CHILD'S PREPARATION



BUILDS ON ORDER



MATERIALS DEVELOP:

... PERCEPTUAL ABILITIES

... VISUAL AND AUDITORY DISCRIMINATION

... ABILITY TO COMPARE AND CLASSIFY



**POWERS NECESSARY FOR
WRITTEN LANGUAGE & MATH**



MUSCULAR CONTROL REFINED ...

WRITING MOVEMENTS IN HOLDING PENCIL

"It must be that our enchantered brain has created so many hand phrases because it relies on our hands for a feel of the world, and to get a grip."

Mandayam Srinivasan
MIT Touch Lab

"Give this man a big hand."

"You've got to hand it to him."

"On the one hand."

"On the other hand."

"A bird in the hand."

"Firsthand information"

"hand in hand"

Climb a rope "hand over hand"

"Right-hand man"

We have situations "in hand"

We take responsibility "in our own hands."

"Our hands are tied."

We work "hand in glove"

We give our daughter's "hand in marriage."

We may "bite the hand that feeds us."

"Get the upper hand"

Live from "hand to mouth"

GOALS OF A SENSORIAL EDUCATION

Overall Goal: To develop intelligence through the education of the senses.

PRINCIPLES INVOLVED IN IMPLEMENTATION OF SENSORIAL EDUCATION:

- A. **Concrete stimulus**
Educational aids must be concrete
- B. **Movement**
Child's sensitive period for muscular development, incorporate materials which involve movement
- C. **Aesthetics**
In order to attract child, material must be beautiful SIMPLE
- D. **Points of interest**
Sharp contrasts of extremes in any of the materials
- E. **Isolation of difficulty**
Concentration on a single quality
- F. **Use of senses together**
Using senses together often beneficial (sandpaper letters) hand-eye coordination
- G. **Limits**
Quantity of material should be limited Don't clutter; space on shelves between activities
- H. **Parallel Exercises**
Having the same operation contained in more than one material
- I. **Use of Language**
Association of language with perception Ask child "Go stand by..."
"Go get the..." to make sure they understand the language
- J. **Control of error**
The child sees the problem and corrects it
- K. **Autoeducation**
Materials must make it possible for child to educate himself Don't make materials too hard.
- L. **Repetition of the exercises**
Materials designed so that they may be repeated. "The exercises which develops life consists in the repetition, not in the mere grasp of the idea."

M. Order

The principle of order is inherent in all the sensorial materials

N. Prepared environment

Principle of order is carried over to the prepared environment

O. Sequence

Gradual movement from concrete to abstract

P. Instinct to work

Child intrigued with movement and cycle of activity, not product.

(Process vs. Product)

Q. Free Choice *children will learn when they choose.*

Must develop independence, which evokes the capacity to act alone; must have knowledge of how to use materials. Child, teacher and environment are decisive interacting agents, which affect the child's degree of liberty.

R. Principle of the "hook"

There exists in Maria Montessori's method a sort of invisible or mental "hook" which links each piece of the teaching material to something which is to follow at a later stage.

Development Required Before a Child Can Read;

1. Developmental Preparation;

1. Sensorial development to receive information.
2. Perceptual development in order to organize, understand and integrate information.
3. Neurological (tactile, stereognostic, etc.) to utilize information in a physical manner.
4. Social development of interpersonal relationships to relate to people and events.
5. Symbolic development in order to decode (Geometric Cabinet gets child ready).
6. Concept formation.
7. Verbal language.
8. Visual language reading.

2. Development Needed;

1. Gross motor control.
2. Fine muscle control.
3. Eye-hand coordination.
4. Ability to perceive figure in space (walking on line, etc.).
5. Directionality (top- bottom, right side, left side, etc.).
6. Ability to organize a temporal, spatial relationship (understanding difference between in and on).
7. Ability to differentiate contrasting symbol and sound.
[x; "a" and "t" is a good contrast in sound and symbol.
"b" and "p" are too similar.
8. Ability to classify.
9. Ability to understand conceptions presented in text (content meaning).
10. Well developed auditory discrimination.
11. Ability to focus and listen to verbal instructions.
12. General ability to focus on task in hand.

* Reference; "What's Involved in Being Able to Read" Ellen deHert
Young Children, March 1966

Stackable cups/~~sensorial~~ ^{Sensorial}

A.Materials: Rug,(10) stackable cups varying in sizes.

B.Aims:

Direct: Visual Discrimination in size and color.

Developing of coordination and concentration and also with order.

Indirect :To prepare the child for math.

C.Prerequisites: The entire sensorial sequence from Pink Tower.

D.Presentation:

1. Go to the rug basket in the room,select a rug placing the rug into your arms gently and carry it carefully in two arms to an empty space in the room.
- 2.Place your rug on the floor.
- 3.Unroll the rug.
- 4.Go to the shelf and remove the stackable cups,carry with two hands to your rug.
- 5.Place cups on rug.
- 6.Take cups out one by one and scatter on your rug randomly,starting with the smallest to largest.
- 7.Flip cups open side down.
- 8.Arrange in a straight row randomly.
- 9.Start with the largest cup,set in front of you.
- 10.Stack and build a tower from largest to smallest with all ten of the cups in front of you.
- 11.Point out the largest and smallest to the children.
- 12.Gently take cups down one by one,placing randomly on the rug.
- 13.Flip over all the cups open side up.
- 14.Start with the largest cup and begin to replace cups back inside one another until you stack all the cups back together to the smallest one.
- 15.Replace your work back on the shelf.

16. Come back and roll up the rug, put it back in the basket.

E. Points of Interest: color of the cups

Size of the cups from largest to smallest.

Cups stack inside of each other.

Completion of a cup tower with smallest on top.

F. Control of Error: The cups will not fit properly if built incorrectly
Cups will fall over if not stacked according to varying sizes.

G. Variation: "The tower of cubes", Pink tower.

H. Extensions. 1. Add color chips to a basket and have child match the chip with the right color cup.

2. Get a second set of cups and match the colored cups together.

I. Language: Large, Small, Stackable

J. Age: Three-six years

Stephanie Aiken
July 5, 2002

Ribbons Sorting/Longest to Shortest

Materials: Basket, ten pieces of ribbons differing only in the dimensions of length.
Ribbons are exactly the size of red rods.

Aims: Direct:

1. Development of visual discrimination of length.
2. Development of concentration and independence.

Indirect:

1. Development of fine muscle skill.
2. Preparation of the mathematical mind.

Presentation:

1. Lay the rug out.
2. Bring the basket containing rolled up ribbons in it and set it on the rug.
3. Invite a child and have him sit on your left side.
4. One by one unroll all pieces of ribbons and set them on the rug.
5. Now select the longest piece of ribbon and place it on the far edge of the rug. Left to right. Press it till straight.
6. Pass the first two fingers from left to right, showing the length.
7. Look for the next longest piece and place it close to the longer one that they touch.
8. Keep repeating the feeling of the length of each ribbon and touch the end.
9. Select the smallest piece of ribbon.
10. Show the smallest ribbon is the unit of measure for the difference in length between pieces of ribbons.
11. Select the longest and shortest pieces.
12. Pointing at the longest say "this is the longest". Pointing at the shortest say "this is the shortest".
13. Now ask the child "show me the shortest and show me the longest".
14. Pointing at longest ask the child "what is this?" and Pointing at the shortest ask, "what is this?"
15. Roll up all the pieces of ribbons and invite next child to try.

Points of Interest:

1. Basket, unrolling of ribbons.
2. How the ribbons increase or decrease in length.
3. Matching ribbons with red rods.

Control of errors:

Ribbons might not stay flat on the rug.

Extension:

Children can match the pieces of ribbons with red rods and lay on top.

Language:

Longest and shortest.

Age:

Three and half years to five years.

SHAHNAZ K.

Flower Pot Arranging

Materials:

5 clay pots (1 inch, 1 ½ inch, 2 ¼ inch, 3 inch, and 4 inch)
Spanish moss
Floral Foam
5 Sunflowers varying in size from largest to smallest
Aleene's tacky glue

Aims:

Direct:

1. Development of visual discrimination of differences in size
2. Development of concentration and order

Indirect:

1. Preparation of the mathematical mind.

Presentation:

1. Get rug out
2. Get tray with flower pots off Sensorial shelf
3. Place tray on the rug
4. With two hands take each flower pot off the tray and put the flower pots in random order on the rug
5. Place the largest flower pot on the left handside of the rug. Continue until all of the flower pots are in a horizontal row from largest to smallest.
6. Put hand above the largest pot sliding it to the right towards the smallest pot showing the change from largest to smallest.

Points of Interest:

1. The change in the flower pots from largest to smallest
2. The flowers in the pots
3. The change in the flowers from largest to smallest

Control of Error:

Seeing the flower pot out of order

Variations:

1. Changing the type of flower in the flower pot
2. Using real flowers in the flower pots
3. Adding more flower pots

Extensions:

Language:

Largest
Smallest
Sunflowers

Age: 3-6 years

Name: Amy Sobell

WHITE BALL GAME

Materials: Various size white balls including a baseball, golf ball, ping pong ball, styrafoam balls, softball, white plastic balls, etc.; bag that holds the balls

Aims: **Direct-**
1. Development of the baric sense and graduation of size

Indirect-
1. Preparation for math and language.
2. Realization that size doesn't indicate weight.

Presentation I:

1. Invite child to do the exercise.
2. Stimulate fingertips on the carpet to sensitize and have child do so.
3. Carry the bag of balls on a tray to the carpet.
4. Take out all the balls and examine each.
5. Choose two balls and decide which is the largest.
6. The presentation can stop here if the child can only choose between two balls
7. If the child is ready, have him grade the balls from largest to smallest. A three-period lessen can be given.

Presentation II:

1. Invite child to do the exercise, or continue with child above.
2. This time, have child hold the balls in their hands to determine which ball is heaviest. If the child is ready, he can grade heaviest to lightest. A three-period lesson can be given.

Points of Interest:

1. The use of play balls in the exercise.
2. Amazement that the smallest ball isn't necessarily the lightest ball.

Extensions:

1. Wearing a blindfold

Variations:

1. Using a scale to weigh the balls

Language: Descriptive words: Largest, smallest, heaviest, lightest

Age: 4 to 6

Amanda Labron

SOFT VS. HARD MYSTERY BAG

A. Materials: Cloth drawstring bag with an assortment of hard and soft objects inside. (Suggested objects: cotton ball, swatch of cloth, sponge, craft foam, key, battery, thimble, rock, pinecone.) A small card with the word "Soft" on it and a soft object glued on it. A small card with the word "Hard" on it and a hard object glued on it.

B. Aims:

Direct:

1. Development of the tactile sense.
2. The concept that objects exist even when they cannot be seen.

Indirect:

1. Preparation for language and math.

C. Presentation:

1. Invite the child to use the mystery bag.
2. Get a rug.
3. Place the work on a rug.
4. Put the "soft" and "hard" cards on the rug.
5. Point to the "soft" card and say, "soft." Touch the soft object glued on the card.
6. Invite the child to touch the object on the "soft" card.
7. Point to the "hard" card and say, "hard." Touch the hard object glued on the card.
8. Invite the child to touch the object on the "hard" card.
9. Put one hand in the mystery bag and find an object.
10. Before pulling out the object say, "I think I have something soft/hard."
11. Pull the object out and put it under the corresponding soft/hard card.
12. Repeat steps 6-8 until all the objects are removed from the bag and are placed on the rug
13. Return the objects to the bag and invite the child to try the work.

D. Points of Interest:

1. Feeling objects hidden in the bag.
2. Categorizing common objects as "soft" or "hard".

E. Control of Error:

1. Comparing the object from the bag with the soft and hard objects glued on the cards.

F. Variations:

1. Using two bags with identical objects in each bag.
2. Ask the child to find objects in the classroom that are soft or hard.

G. Extensions:

H. Language: Soft, hard.

I. Age: 2 ½ to 6 years.

*Great presentation and
write-up*

By: Angela Ilagan

*Thank you,
Jan*

Grading Mystery Bag/Sensorial

A. Materials:

- Bag • Rope
- Leather • Yarn
- Twine • String
- Thread

B. Aim:

Direct- Sensitize tactile sense

Indirect- Prepare muscles for writing

C. Presentation:

1. Set up rug or area at a table and bring work tray to the space.
2. Reach hand in, grasp one piece, feel it, and remove the piece.
3. Arrange piece by piece on rug; top to bottom-left to right.
4. Arrange pieces; thickest to thinnest including a 3 period lesson.
5. Place all pieces back in the bag and prepare work for the next person.
6. Place blindfold on tray as an addition.

D. Points of Interest:

Beautiful design on bag

Interesting textures

Blindfold

E. Control of Error:

Pull out material before naming.

F. Variation: Change materials in bag per season/unit.

G. Extension: Add a blindfold.

H. Language: Yarn, string, thread, rope, leather, twine

I. Age: 3-6

Brocha Baum

THE MYSTERY BAG
(MATCHING PAIRS OF OBJECTS)

- A. Materials:
- 2 Bags
 - 2 Pens
 - 2 Pencils
 - 2 Erasers
 - 2 Rulers
 - 2 Brushes

- B. Aims:
- Direct
- 1. The idea that objects exist even when they cannot be seen.
 - 2. Development of tactile sense.
- Indirect
- 1. Preparation for language.

- C. Presentation:
- 1. Take the tray from shelf to the rug.
 - 2. Put the hands straight into the bags that are kept just in front of them.
 - 3. Hold one object with the subdominant hand and feel the object. With the help of dominant hand find the same object (without seeing it) from the other bag and take the hands out and see if you have the same objects in your hands. Name the objects.
 - 4. Repeat this process until all the objects have been removed and are laid out on the rug.
 - 5. Return the objects to their respective bags and invite a children to do the exercise.
 - 6. After the exercise is completed replace all the objects in the bags and return the tray to the shelf

- E. Points of interest:
- 1. Feeling objects hidden in the bags.
 - 2. Matching pairs of objects.

- F. Control of error:
- 1. Matching wrong pairs of objects.

- G. Variations:
- 1. Using a blindfold.
 - 2. Using objects like plastic fruit and animals.

I. Language:

j. Age: 3 to 6 Years.

BIPASHA HALDEI

Mystery Bag Color Match

Visual Sense ~ Color Perception

- Materials:** Bag containing four various items of each of the following six colors: red, yellow, orange, green, pink, purple. Four red items, four yellow items, four orange items, etc. Color control cards: red, yellow, orange, green, pink, purple. Basket for control cards, and tray to place bag and basket on.
- Aims:**
Direct: Development of visual discrimination of color.
Indirect: Preparation for phonics through the development of visual discrimination.
- Prerequisites:** Through Color Box 2.
- Presentation:**
1. Carry tray to the rug, take bag and control card basket off of tray and place onto rug. Move the tray to the side.
 2. Place color control cards singularly, from left to right, at the top of rug.
 3. Say the color as it is placed on the rug.
 4. Remove empty basket and place on the tray to the side.
 5. Remove one item from the bag and say the color.
 6. Search for the correct color match.
 7. Place the item under the same color control card.
 8. Repeat this until every color has at least two items placed under the control card.
 9. Invite child to finish this work.
- Points of Interest:** The color of the various items. The different sizes, shapes, and textures of the various items.
- Control of Error:** Misnaming the colors. Misplacing the item under a different color.
- Variations:** Change the items in the bag.
- Extension:** Add more colors to the control card basket. Increase number of items under each color.
- Language:** Name of colors.
- Age:** 3 to 5 years.

Denise R. Glass
July 5, 2002

COLOUR MEMORY GAME

Materials: Square colour cards with attractive backs on them. Colours in the colour tablet box. (Red, blue, yellow, orange, green, pink, purple, black, white, brown and gray.

Aims: **Direct-**

1. Development of the chromatic sense through the visual discrimination of colour.

Indirect-

1. Preparation for phonics.

Presentation:

1. Carry the basket with two hands, thumbs holding the cards down and fingers underneath from the shelf to a rug.
2. Take out the cards, one at a time, and lay them face down on the rug in random order.
3. Flip one card over and look at the colour. Then flip another card over. If it is not the same colour, turn it face down and choose another until the match is found.
4. When the match is found say the colour, for example, once the red pair is found say "red".
5. Lay the pair at the top left hand side of the rug, side by side.
6. Continue this process until all of the colours are found and placed in rows from left to right, and top to bottom, or you may wish for the child to complete the work.
7. If you wish for the child to complete the work, then simply tell them that they can finish, but when they do the work themselves then they can do all of the matches.

Points of Interest: 1. The colours of all of the cards, and the interesting pattern on the front of the cards.

Control of Error: 1. Mismatching the colour cards.

Language: Names of all of the colours.

Age: 3 to 5 years

Jessica Beselauer

Surprise Bowl

Materials: A large bowl or small tub filled with an assortment of beans or styrofoam packing material in which to hide small objects. The objects could be colorful jems, seasonal buttons or small objects surrounding a theme in the classroom, such as dinosaurs or insects. You will need 10, and there should be 2 of each object for matching. A small tray on which the children will place the objects. A control made on white paper to fit the tray – trace 10 small circles in pairs, to show there are ten small items hidden in the bowl. The work can be set at a special table.

Aims: Direct –

1. Development of the tactile sense.
2. Development of visual discrimination.
3. Develop child's perception of similarities.

Indirect –

1. Preparation for math.

Presentation:

1. Take and roll out a rug for presentation.
2. Tell the children you have a surprise hidden in a special bowl that they can find.
3. Walk over to the special table and carry the bowl over from the table. Place it on the rug. Sit down. Tell the children that the work has a special table, as the work is too heavy to carry from a shelf. They may do the work at that table.
4. Show the children the tray with the ten circles. Tell them that there are ten things hidden in the bowl.
5. Hold hands up, fingers slightly apart. Show the children how to sift through the beans, looking for special objects.
6. Find object. Hold it up for the children to see.
7. Place object on small tray inside one of the circles.
8. Continue to look and sift for objects.
9. If you find an object that matches one on the tray, place it next to it in the corresponding circle (matching).
10. Continue until all objects are found.
11. Tell the children you have found 10 and are finished.
12. Place all the objects on the tray back in the bowl.
13. Push down gently on each to hide.
14. Now work is ready for the next person.
15. Place tray on top of beans.
16. Slowly and carefully return bowl to the special table.
17. Roll and return rug to holder.

Points of Interest: 1. Finding colorful, interesting objects.

Knobless Cylinder Chart

Materials: White poster board paper, markers, pencil, Knobless cylinder boxes red, yellow, green, and blue.

Aims:

Direct :- Development of visual discrimination of different sizes at one time.
Development of concentration and independence.

Indirect:- Preparation for phonics and mathematics.

Presentation:

1. Lay poster board on flat surface.(Table)
2. Set poster on the table.
3. Draw circles on your poster board in a shape of a rainbow using the "red" knobless cylinders to get the various detentions.
4. Make 3 rows with the "red" knobless cylinders. Make the 4th row using the "blue" knobless cylinders.
5. Color all 4 rows in this order: 1st row red-2nd row yellow-3rd row green-4th row blue. (Starting at the top.)
6. Go to your sensorial shelf and bring "red" knobless cylinder box to table. Set it on your lower left hand side.
7. Get "yellow" knobless cylinder box and set it on the left hand above the "red" knobless cylinder box.
8. Do the same for "green" and "blue" knobless cylinder boxes.
9. Start with the "red" box and remove all the cylinders in mixed order but vertically along the table.
10. Begin to take the largest cylinder and slide it to the proper color and circle. Do the same with all cylinders until they are at their proper place.
11. Continue the same procedure with yellow, green, and blue knobless cylinder boxes.
12. The final product should be a beautiful and colorful rainbow in all the various dimensions.
13. Put all boxes in proper order on shelf and put chart away.

Points of

Interest: Seeing the various dimensions at one time. Observing the perfect fit for each cylinder.

Control of Seeing the cylinders in the wrong color and row.

Error: Seeing the cylinders not even horizontally and vertically.
See the cylinders in the wrong circle.

Variations: Making a control card with various designs. Ex: A bullseye design. A swirl design.

Age: 3 to 6 years of age.

Asmahan M. Nagi

FRUIT MATCHING

MATERIALS

- 1) 5 Different wooden fruits
- 2) A basket
- 3) A napkin
- 4) 5 Matching fruit labels

AIMS

Direct: Development of the tactile sense

The concept that objects exist even when they cannot be seen.

Indirect: Preparation for language

PRESENTATIONS

- 1) Invite the children to the exercise by saying "I would like to show you fruit matching."
- 2) Choose a place to work.
- 3) Choose a table or rug. In this case it's the rug.
- 4) Walk to shelf where exercise is stored.
- 5) Carry tray carefully with two hands from the shelf to the rug, being extra careful to watch where you are walking and the position of the tray.
- 6) Set work down gently on the rug and place the work in front and organize the work.
- 7) Take the cards with fruit name and pictures and arrange them from the top left corner of the rug.
- 8) Take the covered basket with fruits.
- 9) Put your hand slowly in the basket under the cover and say "I think I have a" (name the fruit).
- 10) Pass it around for the child to feel and understand the object (*only in a small group*)
- 11) Place it with the same pictured card.
- 12) Repeat the process until all the fruits are out of the basket and matched up with the picture cards.
- 13) Say, "Fruit Matching".
- 14) Slowly pick up the fruits and put them in the basket covered.
- 15) Gather up the fruit cards and place a rubber band.
- 16) Say, " I choose to stop now. But you can do this the way I showed you."
- 17) Put the basket of fruits and the fruit picture cards on the tray.
- 18) Say, " I will have this ready for the next person to use."
- 19) Arrange tray nicely, stand, grasp tray with both hands and return correctly to the shelf.

20) Invite child to participate.

POINTS OF INTEREST

Feeling objects hidden in the basket.

Excitement of taking a fruit out of the basket and matching it with the correct pictured fruit card.

CONTROL OF ERROR

Seeing that the object is different than what was named.

EXTENSIONS

Using a blindfold.

Using two baskets of identical fruits.

Grouping objects by initial, medial or final sound.

Grouping objects by classification: fruits, vegetables, etc.

LANGUAGE

Names of objects used in the covered basket.

AGE

2 1/2 - 4 years.

NAME: Rima Roychowdhury

*Beautiful!
Thank you.
Rae*

PS: A special thanks to
Stephene Hinojosa for the
fruits.

SHAPED CONTAINERS

MATERIALS:

- Different shape of containers with lids.
- Tray.

DIRECT AIM:

- Development of visual discrimination of shapes.

INDIRECT AIM:

- Preparation for reading.

PRESENTATION:

- Carry the tray and place it on the left side of the rug.
- Layout one container at a time and name the shape of the container.
- Take off the lids from each container and place them on the left side of rug and observe.
- Pick lids back and place it over the container, one by one.
- Place the containers back on the tray.

POINT OF INTEREST:

- Seeing all different shapes of containers.
- Placing the lids on the containers.

CONTROL OF ERROR:

- Can not fix the lids on the container.

LANGUAGE:

- Circle, Square, Star, Oval, Heart, Hexagon, etc.

AGE:

- 3 to 4 ½ years of age.

SHAPE OUTLINING

Materials:	4 pieces of string, tray, basket, 4 cards with the following shapes: circle, square, rectangle, and triangle.
Aims:	Direct- 1. Development of visual discrimination of plane geometric forms Indirect- 1. Preparation for writing 2. Preparation for mathematics in the area of geometry
Presentation:	1. Take the tray and place it on a rug. 2. Remove cards from tray and place from left to right on rug. 3. Remove strings from basket and unwind. 4. Lay all the strings along the bottom of the rug. 5. Trace around the circle using two fingers and say "circle". 6. Choose one string and carefully place along the outside edge of the circle. 7. Repeat for the square, rectangle, and triangle. 8. Remove strings from edges and wind around hand. 9. Return string to basket. 10. Replace cards on tray.
Points of Interest:	Seeing strings conform to shapes, feel of string.
Control of Error:	String not laying flush to outlines.
Variations:	1. Use cards with photos or pictures of items. 2. Use cards with outlines of shapes. 3. Use wax sticks to make outlines.
Extensions:	1. Add additional shapes such as a rhombus.
I. Language:	The name of the shape of the objects.
J. Age:	3 to 6 years

Name: Alicia Jewell
Idea by: Afsheen Saif

ANIMAL SOUNDS AND MATCHING PICTURES

Materials: Rug, tray, tape-recorder, audio tape, pictures of different animals.

Aims: Direct:

1. Development of the auditory and visual senses.

Indirect:

1. To develop coordination capability (matching sounds with pictures).

Presentation:

1. Place the tray on a rug.
2. Put the tape recorder on the rug in one side.
3. Take animal picture card from the tray and place it on the rug one by one.
4. Take the audio tape from the tray and place it inside the tape recorder.
5. Invite a small group of children.
6. Play the tape of the various animal sounds. .
7. Show the corresponding animal picture card one by one to the children matching it with the sound.
8. When finished, turn the recorder off.
9. Rewind the audio tape.
10. Then tell the children, "I am keeping the tape recorder and the picture in the audio-visual corner. You can play the tape and match the sounds with the pictures."
11. Return the material to its proper place.

Variations:

1. Have the child identify other sounds.
2. Have the child associate objects with their sounds.

Points of Interest:

1. Listening to the different animal sounds.
2. Playing the tape recorder.
3. Looking at and identifying colorful animal pictures.

Control of Error:

1. Possibility of identifying the wrong animal with the animal sound.

Language:

Cat, dog, elephant, horse, lion and tiger.

Age:

2&1/2-3 years

Name: Purabi Dhar

Rough and Smooth Fabrics

Materials: The fabric basket containing five pieces of rough fabric and five pieces of smooth fabric. All the pieces of fabric are equal in size. The fabrics are of different textures, such as cotton, silk, satin, flannel and corduroy. There are two cards, one says smooth and one says rough. Each card has a small piece of fabric glued to it.

Aims: Direct-

1. Development of the tactile sense by discriminating between rough and smooth fabric pieces.

Indirect-

1. Preparation for writing.

Presentation:

1. Bring the fabric tray to a rug and place it in the upper left-hand corner.
2. Take the cards off of the tray, feel the pieces of fabric on the cards, say whether the card says rough or soft, and place the cards at the top of the rug.
3. Rub fingers on the floor to sensitive them.
4. Remove the fabric basket from the tray and place in front of you.
5. Remove one piece of fabric at a time from the basket and lay them down randomly on the rug to the right.
6. Pick up one piece of fabric.
7. Feel the fabric piece and put the fabric piece underneath the rough or smooth card.
8. Repeat steps 5 and 6 with the child until all of the fabric pieces have been sorted underneath the rough and smooth cards.
9. Ask the child if he/she would like to practice the work on their own.
10. If yes, leave the child alone to do the work.
11. When the child is finished with the materials, place the fabrics back into the basket in mixed order.
12. Place the basket and cards back onto the tray.
13. Return the work back to the shelf and roll up the rug.

Points of Interest:

1. Feeling the different fabric textures.

Control of Error:

1. Putting the fabric pieces underneath the wrong card.
2. Seeing that the rough fabric pieces look different than the smooth fabric pieces.

Variations: Placing a blindfold on the child while doing the activity.
Change the fabric pieces in the basket.

Language: Descriptive words: rough and smooth.

Age: 3-6 years

Name: Jennifer Sitowski

Fruit Smelling Bottles

A. Materials: various fruit extracts (for example lemon, coconut, cherry) one containers for each type of extract being used (glass- spice style jar), cotton pads or black felt pieces, nomenclature cards with picture of fruit and the word for the fruit.

B. Aims:

Direct: The development of the olfactory sense.

Indirect: Preparation for language.

C. Prerequisites:

D. Presentation:

Setting up of environment:

Place a cotton pad or black felt into the bottom of each container. Drop approximately 1/8 teaspoon of extract, a different one in each bottle, onto the cotton pad. Tightly screw lid back onto container. If any of the extracts are colored (not clear) use the black felt in all containers, to ensure that the children must only rely on their sense of smell and not try to correspond a color of a fruits extract with the color of the fruit itself.

Presentation:

1. Invite the children to watch the presentation.
2. You may use a table or a rug for this type of work, so find an empty table or an area to place a rug.
3. Bring the tray holding the containers and cards off of the shelf, to the work area.
4. Take all of the containers off of the tray, set them to your left, then set the cards out on your right.
5. Set the tray in the upper left hand corner of the rug.
6. Pick up one container and then open it, lifting it near your face (wafting), so you can smell the contents of the container.
7. After you have smelled the container, look at the cards- try to figure out what fruit extract is in that container. Place the container on top of or near the card.
8. Continue in the same manner until you have smelled the extract in each container and then matched it with the fruit/word card.
9. Return the containers and note card to the tray. Put the tray back on the shelf.

E. Points of Interest: Smelling of different familiar fruits. Matching the scent to the picture. Using olfactory senses.

F. Control of Error:

G. Variations: Matching different types of scents, for example spices or foods to corresponding picture/words cards.

H. Extensions: Adding more scented containers to the tray. Mixing other scents besides fruits-allowing the child to find what they think may be the fruit scents.

I. Language: The names of the fruits.

J. Age: 4-6 years old

Name: Lisa Rippon

FRAGRANCE POTS

Materials: Fragrance pots: eight white glazed pots containing a small quantity of an oil scent (vanilla, mango, wild berries, apple cinnamon). The pots are paired (four orange, four blue), so that the two sets have identical smells. A small container of coffee beans along with the pots are placed on a tray.

Aims:

Direct: Refinement of the olfactory sense.

Indirect: Preparation for language.

Presentation:

1. Carry tray carefully with two hands from the shelf to the center of the rug.
2. Take one pot in your dominant hand from the orange row and lift it near your nose to smell the fragrance. (You may wave fragrance towards you.)
3. After each fragrance, smell the control container of coffee beans to clear previous fragrance.
4. In your sub-dominant hand take one pot from the blue row and repeat smelling procedure, trying to discriminate whether or not the fragrances matches the first pot.
5. If the two pots match, place them together in front of the tray. If they do not match return pot to blue row and continue smelling pots in that row until you find a matched pair.
6. Continue testing the fragrances until the four pots are matched placing them in a row in front of the tray.
7. Return pots to tray in random order and put back on the shelf.

Points of Interest:

1. Fragrance pots.
2. Familiar fragrances.
3. Being able to match fragrances.

Control of Error:

1. Mismatching fragrance pots.
2. Not using control of coffee to clear previous fragrance..

Variations:

1. Make vocabulary cards with pictures that correspond to the fragrances.
2. Have the actual fruit and spice available so the child can see if they can match the fragrance to it.

Language: Descriptive words pertaining to fragrances.

Age: 3 to 5 years.

Charlene Pokorski-Murray

Tasting

Materials:	Three clear jars/containers with lids that contain one food that is sweet, one that is sour, and one that is salty. Jars may be labeled with such titles. A few cups and napkins, one tong, and one pitcher should be placed on a tray with the filled jars.
Aims:	
Direct:	Growth of the gustatory sense.
Indirect:	Becoming capable of distinguishing and describing different types of foods.
Presentation:	1. Invite the child to observe an exercise. Wash hands. 2. Remove tray from shelf and place on table. 3. Pull out chair and sit down. 4. Take one cup and place it right side up on the tray. Take one napkin and set it on tray. 5. Fill pitcher with water. 6. Take the container of "sweet" food and unscrew the lid. 7. Using tongs, take one food item out of jar and place it on napkin. 8. Set down tongs and close the opened jar. 9. Place the food item in your mouth. Say, "sweet." 10. Pour some of the water into cup and drink. 11. Allow child to repeat the process in 6-10. 12. Introduce contrasting flavor of "sour." Follow same procedure outlined above in 6-11. 13. Introduce contrasting flavor of "salty." Follow same procedure outlined above in 6-11. 14. Begin the three-period lesson by again using the words that describe the food items presented, "sweet," "sour," and "salty." 15. Upon completion of the lesson, dispose of used cup and napkin and return tray to proper area on shelf.
Points of Interest:	Experiencing different tastes. Seeing the various types of foods in the jars with their different shapes and colors.
Control of Error:	Not being able to distinguish between the different flavors because the pallet wasn't rinsed. Having a picture that describes the flavor on each jar so that child distinguishes between each flavor by sight.
Variations:	Using different types of food to experiment with the same flavors.
Extensions:	Adding additional flavors. Ex. Spicy Matching the flavors by having two jars for each flavor. Thinking of different foods that have the same flavor.
Language:	Sweet, sour, salty.
Age:	3 – 6 years

Name: Cheri Johnson

The Mystery Bag

Materials: A washable drawstring bag containing:

Hard Objects

Golf ball
Ankle bracelet with jingles
Wood Block
Silver coin
Bracelet
Coaster

Soft Objects

Sponge
Cotton ball
Silk cloth swatch
Soft ball
Wool yarn
Shoe polish cloth

Aims:

Direct

1. Development of the tactile sense.
2. The concept that objects still exist even though they are unable to see them.

Indirect

1. Refining small muscles for writing as they feel with their fingers.
2. Development of language.

Presentation:

1. Invite a child to use the mystery bag.
2. Place the bag on the rug.
3. Take the objects out of the bag one at a time and name them hard and soft as you introduce them.
4. Return all the objects to the bag and name them while putting it back.
5. Ask a child to do the exercise. In a group presentation, pass the bag around and allow each child to pick one object and say hard or soft before taking it out of the bag. Have enough objects in the bag so that each child can pick one, or the mystery bag will be on the shelf to use.
6. After the exercise is completed place all the objects back in the bag and return it to the shelf.

Points of Interest:

1. Feeling unknown objects hidden in the bag
2. Attractive drawstring bag.
3. Differentiating hard and soft objects.

Control of Error: Seeing that the object is different than what was named.

Variations:

1. Using a blindfold
2. Using 2 baskets one for hard and one for soft.

Language: All the names of objects in mystery bag, hard and soft.

Age: 2 ½ to 4 years.

Peg Board

Materials: Board with pegs, three spherical and three cubical knobs.

Aims: **Direct-**

Development of visual discrimination of gradation of sizes.

Development of judgment of size through matching the size of the holes to the size of the pegs.

Development of eye-hand coordination.

Indirect-

Preparation for writing through the development of eye-hand coordination

Preparation for math through the visual discrimination of gradation of sizes.

Presentation:

1. Carry the tray with the materials carefully with both hands.
2. Set the tray on the extreme right hand side of the rug.
3. Take out the board with pegs and lay it on the center of the rug.
4. Take out the basket of knobs and lay it on the right hand side of the board.
5. Pick up a knob from the basket, name it and trace its shape with the other hand.
6. Draw the attention of the child to the hole at the bottom of the knob by pointing to it.
7. Now try to find the peg that fits through the hole, while indicating with movements of the head whether it is the correct peg or not.
8. When the correct peg is found, slide the knob over it till it is fully covered.
9. Repeat this till all the remaining knobs in the basket are placed over the corresponding pegs.
10. Point out to the child how all the cubical knobs are on side of the board and the spherical knobs are on the other.
11. Remove the knobs from the board and put them back in the basket.
12. You can then invite the child to try this activity if he so wishes.

Points of Interest:

1. Fitting the knobs correctly over the corresponding pegs
2. Seeing the gradation of size of the knobs once they are fit.

Control of Error:

1. Being able to fit the knob on one particular peg only.
2. Being able to identify the shape of the knob and fitting one shape in a single row.

Age: 3 & 4 year olds.

Arthi Krishnamoorthy

STOCKABLE FIGURINES

Materials: seven stockable figurines; graduated in height as well as in diameter, basket.

Aims: Direct:

1. Development of visual discrimination of graduation of size.
2. Development of concentration and independence.

Indirect:

1. Preparation of the mathematical mind through the development of visual discrimination.

Presentation:

1. Carry the basket with the figurines to a rug and place it in the center.
2. Take the figurine and place it in front of you. Put the basket in the upper right corner of the rug.
3. Open the figurine put the top of it in front of you. Take out the one that is inside, and place it on your right side.
4. Pick up the top of the largest figurine and put those two pieces together. Place it on the left side of the rug.
5. Take the smaller figurine, open it and continue the process. Place the figurines in a mix order in front of you.
6. Arrange the figurines in their proper sequence from the largest to the smallest.
7. Give the three period lesson on the size.
8. Break the order of the sequence and invite the child to repeat the exercise.
9. Start the process of putting the figurines one inside another. Arrange the figurines in their proper sequence from the largest to the smallest. Put the smallest figurine inside the one a little larger. Continue until you have only one figurine in your hand.
10. Invite the child to do the exercise.

Points of Interest:

1. The progression from largest to smallest.
2. The process of opening, taking out, closing and putting in the figurines.
3. The exactness with which the figurines are placed one inside another.

Control of Error:

1. The visual disharmony that results when the figurines are not placed in the correct order.
2. Seeing that the largest figurines will not fit into the smallest one.

Variations:

1. Line the figurines up vertically.
2. Line the figurines up in the circular fashion.

Language: Introduce language using the three period lesson; large, small and the comparatives and superlatives.

Age: 3 to 5 years.

Aga Kasprzyk