

A photograph of Montessori geometric solids on a wooden table. In the foreground, there is a blue cone, a blue sphere with white dots, and a blue rectangular prism. The background is a blurred indoor setting with warm lighting. A teal banner with white text is overlaid on the image.

Sensorial Education 3



This week we shall continue deepening our understanding of the Montessori Child with the study of Sensorial Education.

Sensorial Education 3

Lesson Objectives:

1. To give a detailed overview of the presentation of
 - The Knobbed Cylinder
 - The Knobbless Cylinder
 - The Touch Boards
 - The Barric Tablets
 - Tessellations

Sensorial Education Notes 3

"The senses, being explorers of the world, open the way of knowledge"

Maria Montessori

Knobbed Cylinder Blocks



Materials

4 blocks, each contains 10 cylinders with knobs, each cylinder fitting into its respective hole.

Block 1: The cylinders vary in two dimensions: The diameter increases from 1cm to 5.5cm
The height remains constant at 5.5cm

Block 2: The cylinders vary in three dimensions: The diameter increases from 1cm, to 5.5cm
The height increases from 1cm to 5.5cm

Block 3: The cylinders vary in three dimensions: The diameter increases from 1cm to 5.5cm
The height decreases from 1cm to 5.5cm

Block 4: The cylinders vary in one dimension: The diameter remains the same.
The height increases from 1cm to 5.5cm

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Aims and Objectives

Direct:

- Visual discrimination of dimensions.

Indirect:

- Preparation for writing; coordination of the fingers used to hold the pencil.
- Refinement of voluntary movement. The child will be able to fit the cylinders with one precise movement.
- Preparation for mathematics.

Presentation

Introduction

Invite the child by telling him you have something to show him. Bring him over to the cylinder blocks and tell him: "These are cylinder blocks." Show the child how to carry one of the blocks by gripping the blocks on both sides with both hands and carrying it at waist level and parallel to the ground. Have the child carry the block over to the table and show the child where to place it near the median line of the table. Have the child sit down to your left and then you sit down.

Taking Out

- Begin by pinching from above the knob of the cylinder furthest to the right using your thumb and two fingers.
- Slowly pull the cylinder out of its hole completely.
- Place the cylinder standing up in front of the hole.
- Repeat by taking out the cylinder in the same way that is furthest to the left.
- Place this cylinder in front of this hole.
- Continue taking out at random each of the cylinders.
- Alternating sides after each cylinder, place them next to the furthest right cylinder and then next to the furthest left cylinder until all of the cylinders are out of their holes.
- Tilt the block slightly forward to show the child that all of the holes are now empty.

Putting Back

- Replace all of the cylinders back into their appropriate hole, one at a time and in a random order.
- Hold the knobs of each cylinder in the same way as above and slowly slide each cylinder down into its hole until you hit the bottom.

Invite the child to take out and put back each of the cylinders.
The child is now free to work with any of the cylinder blocks.

Sensorial Education 3

Exercises

Exercise 1 The child works individually with the other blocks as in the presentation.
(Blocks 2, 3, and 4).

Exercise 2 The child works individually with two blocks.

Exercise 3 The child works individually with three of the blocks.

Exercise 4 The child works individually with the four blocks.

Games

Grading from an extreme.

Grading from the middle.

Matching the cylinders to the hole.

Language

Block 1: Thick and Thin

Block 2: Large and Small

Block 3: No language because no dimension is isolated

Block 4: Tall and Short. The positives, comparatives, and superlatives.

Control of Errors

The control of error lies within the materials itself.

Age

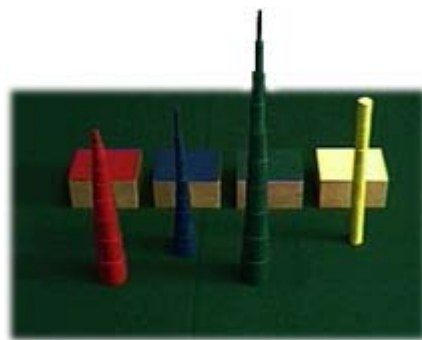
3 – 3 1/2 years

KNOBLESS CYLINDERS



MATERIAL:

Four sets of wooden cylinders corresponding in size to the cylinders of set 1, 2, 3, and 4 of the solid knobbed cylinders in the cylinder blocks. Each set is a different colour and varies by $\frac{1}{2}$ centimetre between any two in succession.



Set 1

Set 2

Set 3

Set 4

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1. Cylinders vary in height and diameter
2. Cylinders vary in height and diameter
3. Cylinders vary in diameter
4. Cylinders vary in height

PURPOSE:

- 1) Grading by size
- 2) To train the eye to perceive fine differences in dimensions
- 3) To recognize difference and similarities (when using more than one set)
- 4) Co-ordination of movement

CONTROL OF ERROR:

If a child builds a tower, the tower will fall over if the mistakes are great. However, by this series of exercises, the child uses his own visual ability to discriminate as a control of error.

PRESENTATION:

The teacher may show the child how to either build the set into a tower or how to grade them in a row.

To Build A Tower: The teacher lays out a green mat on the floor and brings a box of the knobless cylinders to the mat. (These are used on the floor because they would be too tall for the child on a table.) The teacher sits beside the child and shows the child how to slide the lid

off the box, and place it under the box. The teacher removes the cylinders from the box, placing them in a random order as they are taken out. The teacher then selects the largest, placing it away from the other cylinders. Pause. The teacher lets the child see she is deliberately

selecting the next larger cylinder. She places the cylinder concentrically on top of the largest cylinder in one movement. She continues choosing the cylinders in order and builds a tower.

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At any point a child will join in. If the child knows what he or she is doing, the teacher allows the child to take over. If the teacher completes the tower, she takes it down one cylinder at a time before the child builds it.



To Grade The Cylinders: (This can be done on a mat on the floor or at a table.) The teacher sits next to the child with the cylinders in mixed order. She arranges these in order of size beginning with the largest. She shows the child how to move carefully and place the cylinders so they are touching one another.



The child may help him or herself to the other sets in turn using each in the same way, or the teacher may give the child a lesson if he or she needs help.

SPECIAL CIRCUMSTANCES:

When building a tower with a motor impaired or developmentally delayed child, the teacher uses every other cylinder and has the child build a tower of five. When the child is successful with five, the teacher gives him or her the full set. Grading the cylinders is easier than building a tower for the motor impaired child.

EXERCISE:

The child takes one set, grades it in order of size, or builds it into a tower. As he or she progresses, the child may take two or more sets at a time.

VOCABULARY

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After the child has explored and grasped the concepts of dimension inherent in the material, the teacher may review the terminology that was introduced with the knobbed cylinders. The vocabulary is the same as for the knobbed cylinders.

Set 1 and 2:

Large - Small

Large - Larger - Largest

Small - Smaller - Smallest

Set 3:

Thick - Thin

Thick - Thicker - Thickest

Thin - Thin - Thinnest

Set 4:

Tall - Short Deep - Shallow

Tall - Taller - Tallest

Deep - Deeper - Deepest

Short - Shorter - Shortest

AGE:

3 to 5 years

Visual (Colour and Form)

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Tactile

Touch Boards

Materials

Three rectangular boards:

Rough and Smooth Board 1

One divided into two halves: the first half is polished and the second half is covered in sandpaper.

Rough and Smooth Board 2

One divided into ten strips: five strips are polished and five strips are covered in sandpaper as with the previous one.

Rough and Smooth Board 3

One divided into five strips from very rough to nearly smooth, starting with the same grade of sandpaper that is used in the previous boards (the sandpaper then in gradations of roughness).

Aims and Objectives

Direct Objectives:

To refine the tactile sense.

To acquire better muscular control, through lightness of touch.

Indirect Objectives:

To prepare the child for writing.

Presentation

Introduction

Invite the child by telling him you have something to show him. Tell him that before we can work with the material, we must always sensitize our fingertips. (See Sensitizing Fingertips) Bring him over to the correct shelf and show him the Rough and Smooth tablets. Name the tablets for the child and tell him that we will be working with them today. Show the child how to carry the one tablet being used and have him bring it over to the table. Have him place it in the centre of the table. Then have the child sit to your left.

Rough and Smooth Board 1

- Secure the board in place using your left hand, but make sure it is not blocking the child's sight or touching one of the rough or smooth parts.
- Gently place your right hand at the top of the rough half and gently stroke the rough half from top to bottom.

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Remember to keep your hand relaxed.

- Repeat in the same manner for the smooth half.
- Repeat both sides.
- Invite the child to touch in the same manner as you have done.
- Once the child has felt the board, you feel the board in the same manner as before, this time saying "rough" when you are touching the rough part and say "smooth" when you are touching the smooth part.

Rough and Smooth Board 2

- Secure the board in place using your left hand, but make sure it is not blocking the child's sight or touching one of the rough or smooth parts.
- Gently place your right index and middle fingers at the top of the first strip (the strip furthest to the left).
- Gently trace the strip from top to bottom.
- Repeat for all of the other strips.
- Remember to keep your hand relaxed.
- You can also close your eyes to feel better.
- Invite the child to feel this board.
- Then you feel the board in the same manner as before, this time saying "rough" as you pass over the rough parts and say "smooth" when you are touching the smooth parts.

Rough and Smooth Board 3

- Secure the board in place using your left hand, but make sure it is not blocking the child's sight or touching one of the rough or smooth parts.

Sensorial Education 3

- Gently place your right index and middle fingers at the top of the first strip (the strip furthest to the left and the one closest to smooth).
- Gently trace the strip from top to bottom.
- Repeat for all of the other strips.
- Remember to keep your hand relaxed.
- You can also close your eyes to feel better.
- Invite the child to feel this board.

Language

Rough and Smooth (boards 1 and 2)

Control of Error

There is no control of error in the material but the strips of sandpaper guide the child's hand.

Age: 3 – 3 ½ years

(After sufficient experience with Practical Life and early Sensorial materials.)

Baric Sense

Topic: Baric Tablets

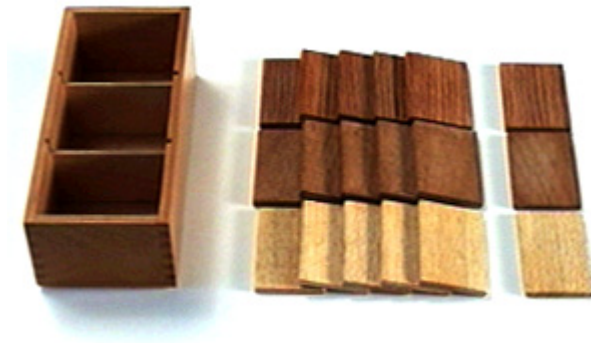
Aims and Objectives

1. To exercise the baric sense.
2. To become intelligently observant of the environment.
3. The child develops the ability to make fine discriminations in weight.
4. Preparation for mathematics and understanding measurement by weight.

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Material

- There are three separate boxes each containing 6-8 wooden tablets.
- The tablets are all the same size. A different wood is used in each box.
- The woods differ in weight.
- These woods naturally vary in colour too.



Presentation:

Two boxes, those containing the heaviest and lightest woods are taken to a table. The teacher sits opposite the children.

The teacher has the heavier tablets in one pile and the lighter in another.

Hold your hand out slightly above the table, palm upwards. Place tablets on your hand, a light tablet in one and the heavier one in the other. Then do the same for the child. Ask child which is heavier. When he has decided show him how to put the tablets in their proper place. You continue to place the tablets in the palms of the child's hands, asking him to compare weights.

When the child understands the exercise he is encouraged to use the tablets while wearing a blindfold, as then he cannot depend on the colour of the wood. Being blindfolded also enhances the child's ability to judge weight. Later, the child can manage alone. He mixes the tablets on the table and picks them up by himself and sorts them by weight.

Control of Error:

Since the sets are different woods, they differ slightly in colour.

The child can visually check to see that the colours of the wood in each pile are uniform when he has finished the exercise.

Vocabulary:

Heavy - Light

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Heavy - Heavier - Heaviest

Light - Lighter - Lightest

Summary:

Children have learnt how to weigh and differentiate weights

Do exercises in maths books to help consolidate this concept.

Tessellation

To tessellate means to cover an area without leaving gaps and without overlapping.

MATERIAL:

Examples of each of the straight sided geometrical plane figures cut out in thin plastic in at least two colours. Triangles, squares, rectangles, parallelograms, rhombuses, trapezium, trapezoids, pentagons, hexagons, octagons, and dodecagons.

PURPOSE:

- 1) Mathematical understanding of symmetry
- 2) Understanding of geometry, e.g. any side of the square will fit any side of the other squares; the equilateral triangles will tessellate, but every other triangle must be rotated 180 degrees
- 3) Understanding of art, appreciation of the beauty of geometrical design, developing an ability to create designs
- 4) Intelligent observation of the environment

Man makes use of tessellations in tiling walls, floors, pavements, etc., in making patchwork quilts, in inlay designs on boxes and furniture, and many in other ways.

The teacher should show the child examples of geometrical designs from other countries and from other periods, e.g. designs of early man. Have books available that show designs such as in the Islamic buildings. The mosques of Turkey, the Alhambra of Spain, and the Taj Mahal in India are some of the most beautiful buildings in the world and show a very rich use of geometrical design. The child should appreciate the Islamic contribution to our culture and the contributions of people around the world.

Patchwork was used in Europe, but developed to its highest form and use in America. Books showing beautiful designs for quilts can be put in the book corner, as well as other books on design.

Sensorial Education 3

Many paintings show geometrical design in floors, clothes, backgrounds, borders, artefacts, etc. Books of great paintings should be in the book corner and the teacher should show the children a few examples and leave them to find others.

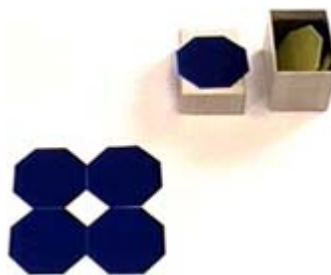
PRESENTATION:

Take a box of shapes that will tessellate, e.g. squares, to the child's table. Show the child how to make a symmetrical pattern with some of them. Let the child take any box of shapes and try to tessellate and make patterns with them. If the child wishes to transfer the pattern to paper, he can draw around the shapes and colour the resulting design.

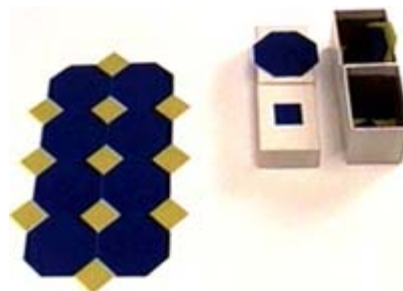


EXERCISE:

The child takes any shape and finds if it will tessellate. The child will find that he or she can tessellate with triangles, squares, hexagons, etc., but that pentagons, octagons, etc., leave gaps. A child usually begins to use two or more shapes to tessellate without being shown. When using the octagon, the space left is a square. A child often fetches the box of squares and tessellates with octagons and squares. If the child does not, after a time the teacher can show him or her how to do so.

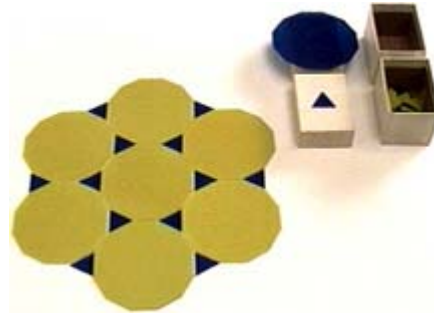


Octagon with gaps

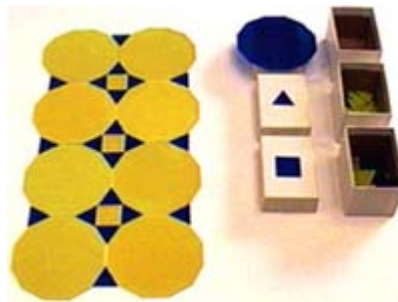


Octagon with squares

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Decagon with triangles

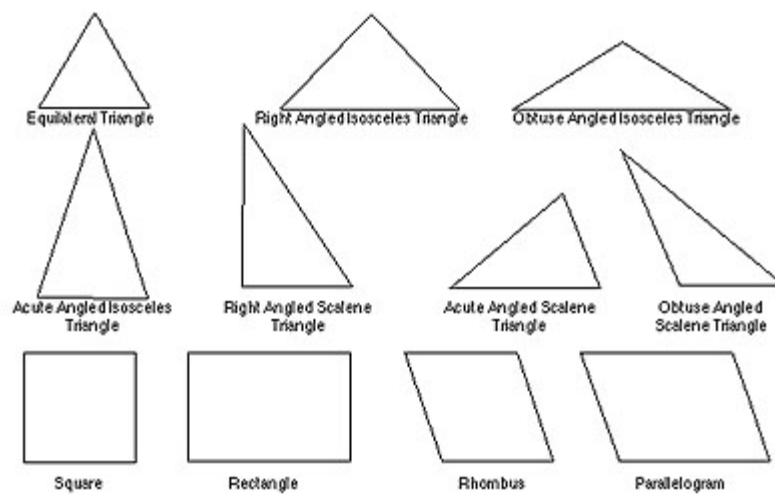


Decagon with squares and triangles (border design)

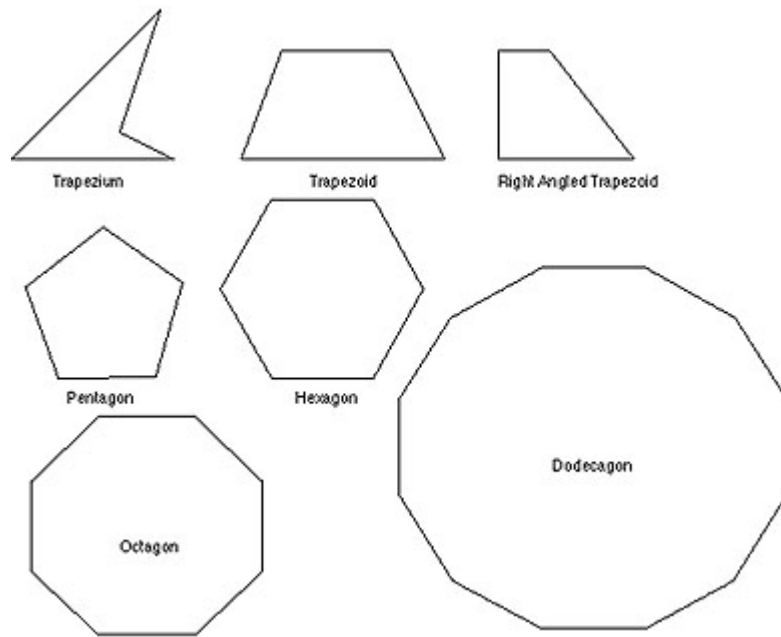


All triangles

SHAPES USED FOR TESSELATING



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One of the main points of the Montessori method is allowing the child to choose and work with materials for a long length of time without interruption. This is so that the child can internalize what he senses.

A child needs repetition in order for the lessons from these materials to really sink in.

(We will cover the presentations in detail during your Apparatus Training)