

Subject:

Perception of dimensions

Activity:

The knobbed cylinders

Type:

Individual

Age:

2½ years

Material:

- 4 wooden blocks, each containing 10 cylinders with knobs, fitting into its respective sockets in a given block.

Block 1: The cylinders vary in both diameter and height. Each cylinder decreases by 0.5 cm, both in height and diameter from the preceding one. The tallest cylinder has the largest diameter and the shortest one has the smallest diameter. They vary from tall and wide to short and narrow.

Block 2: The cylinders vary in both diameter and height as in block 1, but the tallest cylinder has the smallest diameter and the shortest has the largest diameter. They vary from short and wide to tall and narrow.

Block 3: The cylinders vary only in diameter. They are of the same height. Each cylinder decreases by 0.5 cm in diameter. They vary from wide to narrow.

Block 4: The cylinders vary only in height. They are of the same diameter. They vary from tall to short.

- Mat

Procedure

Note: The directress has to ensure that the material is adequate, clean and in proper order for use.

- Invite the child.
- Take the child to the shelf where the material is placed show him how to carry the material, holding the block with all fingers of both hands, keeping the thumbs on top.
- Bring the material to the work area and place it in the center of the mat.
- Introduce the material to the child and place the block towards the upper side of the mat.
- Take out the two extreme cylinders, the leftmost and the rightmost, holding the knobs with three right dominant fingers. Place them in the centre, and point to these with right index finger.

- Place these cylinders back in their slots.
- Take out all cylinders, starting from the left and place them randomly on the mat in a horizontal line.
- Isolate and place two knobbed cylinders corresponding to the first two slots (from the left) in the center of the mat for comparison.
- Indicate the cylinder to be put back first with right index finger.
- Place the selected cylinder in its slot and then place back the other cylinder too.
- Isolate cylinder(s) to be kept back in the block.
- Similarly put all the other cylinders back in their slots, moving from left to right (e.g. from tallest and widest to shortest and narrowest in Block 1). Randomly compare two-three pairs while doing so.
- Place the block in the centre of the mat.
- Invite the child to do the activity.
- Wind up the activity appropriately.

Note: The procedure for all the four blocks of knobbed cylinders is the same.

Control of error:

- Visual inspection.
- The material is didactic (auto-educative) and control of error is within the material. If cylinders are not put back properly in the slots, one cylinder will be completely inside the slot and one will not fit in anywhere and therefore remain outside.

Points of interest:

- Carry the block with all fingers of both hands spread on the bottom, thumb on top, to get it to the work area.
- Use three dominant fingers of right hand to hold the cylinders from the knobs.
- Show the two extreme sizes of the cylinders to the child before starting the actual activity and point to these with right index finger.
- Make two-three comparisons randomly.
- Follow the process of isolation, comparison, rejection and identification.
- Indicate the cylinder to be put into the slot with right index finger.
- Place back the cylinders following the rules of directionality.

Direct aim:

- Development of visual perception of dimensions.

Indirect aims:

- Child learns to discriminate between dimensions, as he/she perceives differences in height and diameter of the cylinders.
- Child learns mathematical concept of tenness at a sensorial level, as he perceives the decimal system (numbers 1 – 10). This serves as a preparation for mathematics.
- Child learns the concept of cylinder shape and is able to identify various objects of this shape in his own environment.

- Child also learns seriating as he can seriate from tallest to shortest/widest to narrowest and vice-versa.
- While comparing two cylinders, there is development of estimation and judgment skills as the child judges which cylinder out of the two options is the right size for the next slot to be filled. This leads to intellectual development.
- Child learns the mathematical concept of one-to-one correspondence as one cylinder can fit in properly in one socket.
- As the material is didactic, the child is able to find out his own errors and work out a solution for himself through trial and error. Being able to solve problems independently and the resultant sense of achievement improves his self-esteem and confidence.
- Eye-hand coordination is improved, as the child has to keep shifting his vision focus with each successive hand movement.
- Gross motor skills are developed while the child carries the material to the work area and then back again.
- Fine motor skills are enhanced as the child holds the knobs with three dominant fingers. This prepares the child for writing.
- Child learns new words like cylinders, knobbed. This enhances his vocabulary and aids in language development.
- By focusing his attention on the activity, the child improves his concentration and attention span.
- Child develops a sense of order.

Extensions:

- Take out alternate cylinders from the block/s and place them randomly. Ask the child to place them back in respective slots.
- Ask the child to put all the cylinders back in the block wearing a blindfold. This can also be done in a group and children can time themselves.
- Place all cylinders randomly on the work area. Keep a pen in one of the slots and ask the child to find the corresponding cylinder. This can be done with one block or more than one to make it more challenging.
- With Blocks 1, 2 and 4, place all cylinders in a mixed pool and ask the child to put back only the tallest and the shortest cylinders in their respective slots.
- With Blocks 1, 2 and 3, again make a mixed pool and ask the child to put back only the narrow cylinders.
- Similar placements with other superlatives can be called for.
- To make the activity very challenging, make a mixed pool of cylinders of all blocks and then ask the child to place them back in their respective slots.
- Child can be asked to put back only the first and the last cylinders of all blocks when the cylinders are placed randomly on the work area (less challenging) or in the classroom (more challenging).
- Randomly place the cylinders in the classroom and ask two children to find and place back alternate blocks turn by turn. This not only will improve their memory, but will also teach them co-ordination and how to work in team(s). Initially, the cylinders can also be given to them placed randomly in a tray.

- Child can be asked to seriate the cylinders in ascending and descending order without blocks. This is more challenging because the clues that he got from the didactic blocks for wrong placement are no longer available.
- In higher classes, children can be taught abstract concepts with this concrete material, for e.g. concepts of area and diameter.
- Children can be taught concepts of fat and thin using the wide and narrow cylinders.
- Children in higher classes can also be taught positives, superlatives and comparatives like tall, taller, tallest; wide, wider, widest etc. with different dimensions of the cylinders. These can be taught using the three-period name lesson.

Applications

- Finding/identifying cylindrical shaped objects in their own environment, e.g. glasses, tube lights, curtain rods, pens, pencils, gas cylinders, oxygen cylinders, street light poles etc.
- Finding cylindrical shaped objects in kitchen and seriating them according to their sizes e.g. seriating glasses, bottles etc from biggest to smallest or vice-versa.
- Making others in the class/environment stand in a row according to height from tallest to shortest or vice-versa.
- Arranging/placing pencils according to height (tall to short or short to tall).
- Arranging objects such as family members' clothes and shoes from smallest to biggest.
- Clipping together papers in order of their sizes.
- Placing books in the book shelf/school bag on the basis of their size, e.g. biggest to smallest.
- Can fit in/place eggs in refrigerators in the slots made for keeping eggs.
- Arranging pots in the garden on the basis of their size. There are also stands available for placing pots of different sizes (diameters) in corresponding sizes of bases. Children can be asked to place pots accordingly in such stands.
- Can arrange/fit in lipsticks of different sizes in a lipstick stand which has slots of different sizes.
- Toothbrush stands have slots of different sizes for different types of toothbrushes and toothpaste. The child can place these things according to their sizes in their respective slots.
- Many kitchen cabinets have specific slots for different sizes of *masala* bottles. Child can arrange bottles of different sizes in their respective slots.