

GUIDING CHILDREN'S MOTOR AND NEUROSENSORY DEVELOPMENT

Brain and body development are critically linked in the preschool years. It is through physical activity and the movement of one's own body that the human brain internalizes the conceptual foundations of laterality (left, right), directionality (up, down, in, out), and position in space (over, under, behind). All these concepts are critical to mathematical thinking related to patterns and relationships, as well as to the foundations of reading and writing. They are necessary in order for the child to "see" how letters are formed and put together in patterns to create words, and to translate this understanding into physical movements to recreate these symbols on paper in the form of writing. We need to ensure development of children's large muscles (gross motor skills) because they support the small muscles in the hands and fingers. Young children need to build strength, flexibility, and coordination in the hands and fingers in order to develop appropriate grasp and control of writing/cutting tools. Until handedness is established (usually around age 7), young children need to use whichever hand is comfortable or convenient, or to alternate hands (materials may be placed directly in front of the child). The suggested fine motor activities should not be implemented through formal instruction, but should be freely available, child-initiated, and teacher-facilitated (as unstructured as possible), with adaptations in equipment/use to meet individual needs.

The young child's brain development is still in progress. Research indicates that connections between neural pathways that are stimulated and used tend to become permanent fixtures; while those that are not tend to be eliminated. It is therefore important for early childhood teachers to provide the kinds of activities illustrated in this section that promote children's brain development.

As young children move their bodies, they learn many concepts through their senses (sensory motor integration). Children need to be provided with many experiences that integrate their body movements with their senses which include: tactile/touch; smell; hearing; taste; sight; kinesthesia (movement), and the vestibular sense (found in the inner ear that helps maintain balance and judge a person's position in space). Young children need to be provided with experiences that provide stimulation to the inner ear's vestibular area (e.g., rocking, swinging, rolling, turning upside down, spinning).

It is not enough to present experiences once or twice; young children need to practice skills over and over in order to develop concepts that enable them to plan how to operate. For example, in learning to climb, a child may stumble and fall many times before he/she learns the degree of body manipulation required. After learning how to climb in one physical setting he/she must learn to adapt the skill and transfer it to other climbing situations that require different degrees of body control. Mastery of a skill in one setting is only a first step; the skill must be encountered again and again in many variations to lead to true mastery. It would be helpful for practitioners to share this important information with families, so that parents can understand how important physical activity is from birth to age five and how critically it impacts later learning.

Gross Motor Development

Programs will provide opportunities for preschool children to:	EXAMPLES OF CHILDREN'S EXPERIENCES	OBSERVABLE INDICATORS
<p>Build body awareness through locomotion activities such as walking, running galloping, climbing</p> <p><i>*Note: skipping is generally not expected before age 6 or 7, so preschool programs should not be concerned with teaching children to skip.</i></p>	<ul style="list-style-type: none"> walking games such as "follow the leader" using different kinds of walking (tramp, stride, tiptoe, stroll, shuffle, march, waddle); walk like animals (duck, elephant, cat, mouse) and let other children guess what they are) balancing - follow the leader activities that require children to balance (imitate birds like flamingos or cranes; frog getting ready to hop) jumping activities such as jumping in a series of "baby", "giant", "elephant" steps or frog hops; pretending to be various jumping creatures (rabbit, kangaroo, frog, grasshopper); jumping to music or the beat of a tambourine; jumping along footprints cut out of contact paper hopping- after children have learned to balance on one foot, they can practice hopping - first in place on one leg, then the other, or moving forward with their hops using commercial equipment in a variety of ways (e.g., a rocking boat, when turned upside down, becomes steps; large hollow blocks with boards can become ramps or planks) 	<ul style="list-style-type: none"> Identifies parts of the body Labels or responds to various body movements
<p>Become aware of directionality and position in space (up, down, over, under, right, left, top, bottom, outside, behind)</p>	<ul style="list-style-type: none"> movement experiences, responding to musical recordings and games such as "follow the leader" and "Simon says" maneuvering through obstacle courses (e.g., go up the steps, slide down the slide, go around the cube) games in which children move and place objects in various positions (e.g., "put the ball beside the box; over your head; under your legs.") 	<ul style="list-style-type: none"> Responds appropriately to directional and positional words
<p>Develop awareness of right/left and distinguish between the left and right sides of the body (linked to accurate perception of formation of letters/numerals).</p>	<ul style="list-style-type: none"> participating in activities that use one side of the body at a time (e.g., hopping, kicking a ball with one foot) hopping in place on one leg, then the other, or moving forward with their hops 	<ul style="list-style-type: none"> Hops on one foot at a time several times

<p>Programs will provide opportunities for preschool children to:</p>	<p>EXAMPLES OF CHILDREN'S EXPERIENCES</p>	<p>OBSERVABLE INDICATORS</p>
<p>Use both sides of the body, to strengthen bilateral coordination</p>	<ul style="list-style-type: none"> • <i>jumping</i> with two feet over a line or over a 'river' created with two pieces of masking tape (the obstacle can be made progressively wider as children gain skill. After they can jump over lines they may enjoy jumping over a block or other raised object • <i>lifting</i> objects with both hands • <i>pushing</i> a wheelbarrow or doll buggy • <i>drawing</i> big circles on a blackboard with both arms simultaneously • <i>carrying</i> a tray full of cups or an armful of leaves with both arms 	<ul style="list-style-type: none"> • <i>Jumps with both feet</i> • <i>Pushes or pulls equipment with both arms</i>
<p>Alternate the left and right sides of the body</p>	<ul style="list-style-type: none"> • <i>walking, running</i> • <i>crawling and creeping</i> activities such as pretending to be worms, snakes, lizards, caterpillars, characters from familiar stories; crawling to the beat of music • <i>climbing</i> steps, low ladders, cargo nets, outdoor equipment • <i>using arms</i> to progress along an overhead ladder • <i>pedaling</i>: riding tricycles helps children learn steering as well as pedaling • <i>maneuvering</i> along a <i>balance beam</i> • <i>bouncing</i> a ball with each hand 	<ul style="list-style-type: none"> • <i>Negotiates stairs, ladders, climbing equipment using alternating left/right movements of arms and legs</i> • <i>Rides a tricycle</i> • <i>Steps between the spaces in a floor ladder or grid</i>
<p>Cross the midline of the body and train the eye to move from left to right (enabling the eyes to move smoothly across a page for later reading)</p>	<ul style="list-style-type: none"> • on a large vertical chalkboard, <i>making lines or giant circles</i> that proceed from left shoulder to the right using the right hand, and vice-versa • following <i>criss-cross footprint patterns</i> on paths • <i>placing objects at the opposite point from the child's dominant hand</i> (e.g., placing a pitcher on the left and the cup on the right of a right-handed child; placing a container of small objects on the left side and an empty container on the right and transferring objects from one container to the other) • using materials that <i>train the child's eyes to move in a left>right>left</i> sequence (e.g., a marble track, mazes, tracing /tracking activities) • easel or chalkboard activities in which children use large, sweeping motions to draw lines across the board or paper without transferring the tool from one hand to the other 	<ul style="list-style-type: none"> • <i>Uses paintbrush, chalk or marker to draw a line smoothly on a vertical surface from one shoulder to the other without changing hands</i> • <i>Transfers objects from one container to another across the midline of the body</i>

<p>Programs will provide opportunities for preschool children to:</p>	<p>EXAMPLES OF CHILDREN'S EXPERIENCES</p>	<p>OBSERVABLE INDICATORS</p>
<p>Build upper body strength and stability (to gain controlled movement of shoulders and needed to support muscles in wrist, hands, and fingers for writing).</p>	<ul style="list-style-type: none"> • <i>large chalkboard/easel activities</i> in which the whole arm/shoulder are used (e.g., make large circles on a chalkboard with railroad chalk – simultaneously, with a piece of chalk in each hand) • <i>pushing/supporting body weight with the arms</i> (e.g., using a wheelbarrow) • <i>shoulder circles</i>: pointing index and middle fingers and extending arms straight out to the side from shoulders, circling arms in reverse circular patterns, varying size and speed • <i>arm & hand mirroring</i>: working in pairs, one child initiates a slow pattern using both arms, and the other follows as if looking in a mirror • <i>pouring</i>: pouring water, sand, etc. from a plastic milk jug, pitcher or watering can into several smaller containers (within child's strength limitation) • <i>carrying objects at arm's length</i> (e.g., a marble or potato in a spoon); carrying objects such as large, hollow blocks • <i>scooting</i> - A commercial scooter-board is a 12" square board with casters on which the child can sit or lie prone, propelling the body with arms holding the head and upper body erect. • <i>hanging</i> - use outdoor equipment that facilitates upper body control such as holding onto a trapeze bar, monkey swing or tire swing and lifting feet off the ground; using an overhead ladder or a "Tarzan rope" (swinging on large rope) • cleaning the chalkboard or vertical whiteboard 	<ul style="list-style-type: none"> • <i>Pushes, pulls and carries objects easily with both arms</i> • <i>Pours material (e.g. water, sand) from a large container using one arm</i> • <i>Supports body weight with both arms when suspended</i>

FINE MOTOR DEVELOPMENT

Programs will provide opportunities for preschool children to:	EXAMPLES OF CHILDREN'S EXPERIENCES	OBSERVABLE INDICATORS
<p>Strengthen hand grasp and flexibility</p>	<ul style="list-style-type: none"> • using hand hole punchers on materials of increasing thickness (at first, children may need to use two hands or have adult assistance). As they gain skill, children punch as many holes as they are able, moving to heavier weight paper as strength increases. Holes can be counted/recorded on a daily basis, encouraging children to constantly better their own record. • using decorative hand hole punchers to make designs for collage • molding, manipulating and sticking pegs or sticks into modeling materials of varying consistency, such as play dough, clay, plasticine® or Theraplast® material • squeezing squirt bottles, basters, or syringes filled with water in the water table or using them to fill small containers • using a plant sprayer to spray plants; mixing water with food coloring to spray snow • pinching clothespins and bulldog clips of various strengths • using a hand garlic press to force play dough through the grate • placing small objects in a slit cut into a tennis ball so children have to squeeze the ball to open it and retrieve the objects • squeezing or wringing out wet sponges and cloths 	<ul style="list-style-type: none"> • <i>Uses hand hole punch successfully</i> • <i>Holds and manipulates hand tools and equipment successfully</i>
<p>Work on a vertical or near-vertical surface to allow the wrist to be extended (bent back in the direction of the back of the hand)</p>	<ul style="list-style-type: none"> • working on upright/portable easels; wall-mounted chalk/marker boards; tabletop easels • using a lighted pegboard such as Lite Brite® 	<ul style="list-style-type: none"> • <i>Engages in activities involving working on floor or tabletop easels</i>

Programs will provide opportunities for preschool children to:	EXAMPLES OF CHILDREN'S EXPERIENCES	OBSERVABLE INDICATORS
<p>Use pincer grasp of thumb/forefinger</p>	<ul style="list-style-type: none"> • using thumb and forefinger to pick up small objects and put them in container (e.g., cotton balls, miniature pompoms, Cheerios, beans, rice, small marshmallows) • picking up small objects with fingers, tweezers, strawberry huller • placing small pegs in a pegboard • using a lighted pegboard (e.g. Lite Brite®) • gluing small pieces of construction paper • creating designs with stickers, Colorforms® or self-stick reinforcements • using eyedroppers to squeeze drops of colored water onto absorbent paper, coffee filters, or paper napkins • drawing with small pieces of crayon or chalk • rolling modeling materials into tiny balls using only the finger tips 	<ul style="list-style-type: none"> • Uses pincer grasp to transfer a quantity of small objects from one container to another • Picks up small objects with tweezers • Manipulates small pieces of paper or stickers in art projects
<p>Build grasp/release and control needed for scissors through a variety of developmental tools and activities</p>	<ul style="list-style-type: none"> • using tweezers, tongs, barbecue tools to place objects in a container or move them from one container to another • pinching clothespins and bulldog clips of various strengths and placing them around the edge of a cardboard box or paper plate • using spring-action scissors that assist child in opening/closing • using 4-hole teacher's "helper" scissors if needed • using sharp, blunt scissors with small finger holes and short blade • using scissors that can be used right- or left-handed • using scissors that cut a variety of fancy patterns. • grasping scissors correctly with adult guidance (thumb and <u>middle finger</u> in the handles of the scissors, and the index finger <u>outside</u> [under] the blades to stabilize.) <p>Progressive scissor skills:</p> <ol style="list-style-type: none"> 1. unstructured snipping (e.g., snipping pieces off plastic straws or strips of paper) to familiarize child with the motion of opening/closing scissors without the pressure of making a "product" 2. cutting within a "track," 3. cutting on a line and stopping at a marked point 	<ul style="list-style-type: none"> • Successfully uses tools that require grasp/release • Controls scissors successfully through progressive skills

Programs will provide opportunities for preschool children to:	EXAMPLES OF CHILDREN'S EXPERIENCES	OBSERVABLE INDICATORS
<p>Build finger dexterity needed for grasp/control of writing instruments</p>	<ul style="list-style-type: none"> • pegboard activities using pegs of decreasing size • flipping coins from "heads to tails • putting coins or disks in slots • manipulating small objects • linking paper clips to make necklaces • using dressing frames (snapping, buttoning, zipping) • using lacing cards, stringing beads, straw segments, paper clips, Cheerios • using jars of varying sizes with lids to screw and unscrew • manipulating keys in locks of varying sizes • manipulating small toys such as Tinkertoys®, Lego® blocks, Bristle Blocks®, Unifix® cubes, pop beads. 	<ul style="list-style-type: none"> • Successfully uses finger skills to complete tasks and activities • Progresses from a hammer grasp to a tripod grasp of writing/drawing tools
<p>Strengthen finger isolation skills (use one finger at a time).</p>	<ul style="list-style-type: none"> • participating in fingerplays • creating puppet shows with finger puppets • playing piano activities • playing with a typewriter or computer keyboard • spinning tops • using clickers • winding wind-up toys 	<ul style="list-style-type: none"> • Holds up one finger at a time in fingerplays or counting activities" • Uses thumb and forefinger to spin a top

SENSORY MOTOR DEVELOPMENT

Programs will provide opportunities for preschool children to:	EXAMPLES OF CHILDREN'S EXPERIENCES	OBSERVABLE INDICATORS
<p>Stimulate the inner ear's vestibular sense (research indicates that such stimulation is critical to attention, memory, and sensory development).</p>	<ul style="list-style-type: none"> • engaging in activities that involve rocking, swinging, rolling, spinning, jumping, being turned upside-down • tumbling, turning somersaults on mats • using a "sit and spin" 	<ul style="list-style-type: none"> • After participating in a spinning activity, the child's eyes move rapidly back and forth.

<p>Programs will provide opportunities for preschool children to:</p>	<p>EXAMPLES OF CHILDREN'S EXPERIENCES</p>	<p>OBSERVABLE INDICATORS</p>
<p>Build sensory motor integration (integrate body movements with all the senses – tactile/touch; smell; hearing; taste; sight, and with kinesthesia (movement)).</p>	<ul style="list-style-type: none"> • engaging in sensory activities such as sand, water, and working with materials of various textures • participating in activities that include auditory as well as visual stimulation • tossing a "koosh ball" • playing in a sensory table filled with various materials (e.g., sand, beans, shaving cream, snow, ice cubes, "oobleck"). • playing with a "feely" box or bag to identify objects without looking • using smelling or listening containers filled with various materials • pounding, squeezing, rolling and twisting motions to manipulate materials such as clay, play dough, TherapyPutty® • making rubbings of materials of various textures or familiar objects • squeezing water out of sponges in the water table • woodworking (e.g., hammering, pounding, sawing, sanding). 	<ul style="list-style-type: none"> • Participates willingly in sensory activities such as sand/water play, play dough, finger painting. • Tolerates a variety of textures of materials
<p>Participate in activities that develop eye-hand coordination, visual perception and visual tracking, and visual motor skills</p>	<ul style="list-style-type: none"> • throwing and catching objects (catching is more difficult) such as beanbags, rings, balls of yarn, sponge balls of varying size) at a target (basket, hoop, carton). Throw underhand as well as overhand. Adapt for both indoor and outdoor play • playing with a pounding board • using building toys (e.g., Lincoln Logs®, Tinkertoys®, Legos®, Bristle Blocks®, unit blocks) • playing with a typewriter or keyboard) • tracing around simple stencils and templates • using lacing cards • reproducing patterns on pattern cards with pegs, beads or parquetry blocks 	<ul style="list-style-type: none"> • Tosses an object into a basket or to another person accurately • Replicates simple patterns or shapes • Throws and catches a large ball
<p>Participate in activities that train the eye to move from left to right (enabling the eyes to move smoothly across a page for later reading)</p>	<ul style="list-style-type: none"> • using a marble roll track • following simple mazes using crayons/markers (mazes should emphasize left-to-right orientation by marking a left start point and a right end point). As skills increase, mazes can weave from left to right and back. • using toy cars to follow roads on a rug/map • using various materials to follow a left-to-right movement (e.g., Etch-a-Sketch; white board, sand, paints) • connecting a pattern of dots on a large chalkboard from left to right • following a path on a magnetic maze board 	<ul style="list-style-type: none"> • Visually follows the left-to-right movement of a marble in a marble track • Traces a line or follows a left-right path with a toy car, crayon, marker