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ABSTRACT

The resource manual, in two parts, provides a compilation of methods for enhancing the development of handicapped children from birth to 5 years in the areas of motor, communication, cognition, self help, and social skills. The manual is intended to aid in (1) assessing and identifying target behaviors to be achieved, (2) identifying methods for teaching and stimulating behaviors, (3) identifying methods for the refinement of target behaviors, and (4) identifying steps to achieve target behaviors. The introductory section contains special considerations in using the manual, and a sample daily plan schedule with target behaviors coded to the manual. The next section provides a review of child development for the five areas of the curriculum. The section on teaching strategies includes subsections on the developmental approach, structuring the environment, enhancing self concept, prescriptive teaching and task analysis, types of aid, behavior mangement procedures, and individualization. A brief chapter on assessment includes a sample criterion and prerequisite list and recording sheet. Also included is a glossary and a bibliography. (DB)

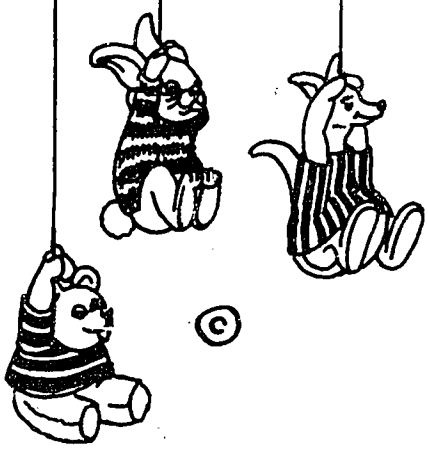
MARYLAND STATE DEPARTMENT OF EDUCATION

DIVISION OF SPECIAL EDUCATION

RESOURCE MANUAL:

HANDICAPPED CHILDREN

BIRTH TO FIVE



PART 1

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FOREWORD

Maryland's commitment to early education for the young handicapped child is founded in State statute and is reiterated in Bylaw 13.04.01, Programs for Handicapped Children, which mandates the provision of special education services to children identified as handicapped beginning at birth. This legislation provides the opportunity for handicapped infants to receive full appropriate educational services and assumes that no handicapped child is too disabled to learn in some way.

This Resource Manual is designed to assist those individuals engaged in the important task of providing educational services to young handicapped children and their families.

Martha J. Irvin
Assistant State Superintendent
Division of Special Education

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1. INTRODUCTION

This manual was developed as a result of a need for comprehensive resource materials for teachers and other service providers who work with handicapped children, ages birth to five. It is needed because of the large number of children currently requiring special education services and those who will require services in the future, and by, the scarcity of simple and functional resource materials. The manual is a companion to Handicapped Children Birth to Five: Administrative Guide.

The need for resource materials was further expressed by teachers, therapists, parents, and parent surrogates who had little or no previous experience working with handicapped children in this age group. Although a good teacher draws from many sources, it is the intent of this publication to bring together many materials to aid in program planning for young handicapped children.

Numerous resource materials, publications, and curricula were examined in the preparation of this guide. Curricula and publications currently used for teaching young handicapped and nonhandicapped children are reflected here (Bailey, 1976; Folio, 1974; Karnes, 1978; Richardson, 1975; Rogers, 1977; Sanford, 1976). In addition, the format and the teaching methods were adapted in part from Project PREP - a Carroll County project originally funded under the Elementary and Secondary Act, Title VI. Various professionals who will work with young handicapped children, including occupational and physical therapists, speech and language therapists, and early childhood educators had a hand in the development of this publication. The teaching strategies suggested are a compilation and combination of those found to be successful by these professionals and those suggested in other curricula and resource materials.

During the 1979 school year, a draft edition was distributed for pilot testing by teachers and other service providers working with young handicapped children in Anne Arundel, Caroline, and Washington counties. These professionals made many valuable recommendations which contribute to the usefulness of this manual and their expertise is reflected throughout.

(For the convenience of the reader, the construction he/she will not be used; the pronoun he will be used in the Introduction through the Fine Motor Section and she will be used in the Communication Section through the Social Units. Also, methods suggested within the Resource Manual are not geared toward one gender.)

Purpose

This manual provides a compilation of methods for enhancing the development of handicapped children from birth to five years in the areas of motor, communication, cognition, and self-help and social skills. This information provides teachers, related services providers, parents, and parent surrogates with suggested teaching and enrichment strategies for carrying out specific objectives in a center or home-based environment.

The manual is useful as a resource for:

- assessing and identifying target behaviors to be achieved,
- identifying methods for teaching and stimulating behaviors,
- identifying methods for the refinement of target behaviors, and
- identifying steps to achieve target behaviors.

Ultimately, this manual should be useful in designing an intervention program in accordance with the child's Individualized Educational Program (IEP).

Target Population

The target audience is teachers and other service providers responsible for teaching handicapped children from birth to age five. Other potential users include parents and related services providers, such as occupational and physical therapists and speech and language therapists.

Organization of the Resource Manual

The manual consists of two major sections. The first section presents an overview of child development, teaching strategies for working with handicapped children, and information on the use of the manual's Performance Record Sheet (PRS). The second section is divided into six units: gross motor, fine motor, communication, cognitive, social, and self-help. Within each unit, behaviors are clustered to include a criterion behavior and one or more prerequisite behaviors. Clusters are distinguished by item number and codes. Criterion behaviors are distinguished from prerequisite behaviors by paper color: criterion behaviors are printed on blue, prerequisite behaviors are printed on white.

Criterion behaviors describe the actions to be achieved, i.e., grasping: reaches for and obtains an object placed 10-12" in front, whereas prerequisite behaviors describe steps for achieving a criterion, i.e., grasping: holds object placed in hand. Each criterion and prerequisite behavior lists methods for use in teaching and stimulating development of the behavior. Methods are listed in a series from simple to complex. Included are refinement methods for strengthening a given behavior and carryover methods for use by parents or parent-surrogates in the home environment. Boxes identifying special considerations for an item are also indicated. This same format is repeated in each unit of the manual.

The following information describes each unit:

Using the Resource Manual for Planning

General Considerations for Using the Gross/Fine Motor Resource Unit

- The criterion items in both fine and gross motor are listed developmentally wherever possible. Some criterion and prerequisite behaviors listed sequentially actually develop simultaneously. The teacher is referred to the Milestones of Normal Development Chart

in the Child Development Section for sequence in development and the ages at which skills usually develop. The age range from birth to five has been fully covered, with particular emphasis on the age range from birth to two since most gross motor milestones occur during this time.

- The acquisition of fine motor skills is dependent upon achievement of prerequisite gross motor skills. Therefore, in the use of the fine motor resource unit, care should be taken to insure that children have attained both the prerequisite fine motor skills and the prerequisite gross motor skills. The Milestones of Normal Development Chart in the Child Development Section is useful for identifying the ages at which children develop both specific gross and fine motor skills addressed in this Resource Manual.
- Many gross and fine motor skills can be taught together. For example, as a child practices sitting, reaching and grasping behaviors can also be stimulated.
- Language and cognitive skills can and should be incorporated in the acquisition of motor skills. The child should be encouraged to verbalize what he is doing when he is walking, running, or playing.

Special Considerations

- An occupational or physical therapist should always be consulted if a child's response to stimuli is questionable. This is particularly true for a child who exhibits signs of a physical handicap, such as cerebral palsy, limb malformations, etc. Also, when working with physically impaired children, a therapist should be consulted regarding positioning.
- The intervention plans for specific children should not be generalized from one child to another without first consulting with a therapist.

General Considerations for Using the Communication Resource Unit

- In using the communication resource unit, it is suggested that the instructor teach criterion and prerequisite behaviors from the other curriculum units, particularly cognition, to facilitate the learning of skills and concepts which occur simultaneously at a particular developmental stage. Reference to the Milestones of Normal Development Chart found in the Child Development Section will help in determining the particular skills which develop at similar stages.

Special Considerations

- It is recommended that a speech and language therapist be consulted when any communication problem is suspected. Also, the therapist is a valuable resource for determining appropriate teaching strategies regarding communication.

General Considerations for Using the Cognition Resource Unit

- It is necessary to observe the behaviors in this unit from the perspective of the developing concept, rather than the particular skill to be accomplished. The action of a child repeatedly removing a cloth from his or her face can be viewed from two perspectives. It demonstrates the gross motor skills, head control, and reaching skills. It may also demonstrate a cognitive concept, reinitiation of a game.
- It is necessary to integrate the behaviors in this unit with those in the communication resource unit when designing an intervention plan. It is important to note that in the development of the manual, an effort was made to prevent repeating cognition behaviors in the communication unit and vice versa. Therefore, gaps in the sequences of behaviors may be evident in those two units of the Resource Manual.

- Many cognitive concepts develop within a particular child at the same time. These concepts may develop relatively independently of one another, but later concepts will be built upon all of a child's previous learning processes.

Special Considerations

- The Cognitive Resource Unit contains criteria which are listed sequentially and, at times, actually develop simultaneously.
- These concepts are geared for children who are developmentally at birth to two years and also at four to five years. A gap exists at the two to four-year level since cognitive behaviors which are closely linked to language development are located in the communication resource unit. For example, telling the function of an object is included in communication even though the task has both cognitive and communicative aspects.

General Considerations for Using the Self-Help Resource Unit

- When teaching self-help skills, make every effort to incorporate these activities into the child's daily routine. The child then acquires the skills in the context of meaningful life experiences. These self-help skills become the functional skills necessary for independence in later life.
- The performance of self-help skills depends on the successful acquisition of prerequisite fine and gross motor skills. The teacher should always determine whether the necessary motor skills are present before encouraging self-help behaviors.

- The acquisition of self-help is dependent not only on motoric readiness, but also on an individual family's expectations of the child. The age at which a child exhibits such skills as dressing and toileting is greatly influenced by the demands and expectations of his family.
- Parent participation in the stimulation of self-help skills is essential. Since these skills are incorporated in daily living experiences, their mastery will be greatly facilitated by the parents' aid and interest. It may be necessary to determine and work initially on those skills the parents feel are necessary.

Special Considerations

- Consultation with a physical and/or occupational therapist may be necessary in developing self-help skills. A therapist may prove particularly helpful with feeding problems.

General Considerations for Using the Social Resource Unit

- It is necessary to integrate the behaviors in this unit with those in the communication and cognitive units as the development of social abilities is greatly dependent on skills such as imitation, memory, receptive and expressive language, and attention span.
- The skills presented are listed in a broad sequential order although many of the latter items will be developing simultaneously. In using this section, it is recommended that a child's developmental functioning level be carefully considered in determining appropriate target skills.

Special Considerations

- A child's participation in frequent and varied social experiences may be limited because of a handicapping condition. Prolonged hospitalization, routine transportation difficulties, communication deficits, and restricted mobility may contribute to delays in social abilities. The handicappe d child may require a great deal of practice in a variety of social situations to compensate for limited experiences prior to intervention. School personnel and parents can work together to create social situations in which a child can participate to the fullest extent.
- Whenever possible, handicapped children should be given an opportunity to interact with nonhandicapped peers in social and play situations. Suggested strategies include inviting preschool siblings to class parties, sharing a field trip with a community nursery or day care center, or sharing a class prepared meal.

Using the Resource Manual for Planning

- The child's medical history and pediatrician's diagnosis may serve as the basis for selecting methods suggested in this manual. Before employing methods suggested in this manual, teachers and other service providers must have collected assessment data regarding the child's level of development in the areas of gross motor, fine motor, communication, cognition, and self-help. It is recommended that the behavior check list and Recording Sheet be used for this purpose. Following collection of initial assessment data, the teacher or other service providers must then develop a plan suitable to the child's level of development and needs.

The following outlines the seven steps to be used in this process:

Step 1 - Review the child's IEP.

Step 2 - Review the completed Recording Sheet for each child.

Step 3 - Identify the criterion behaviors to be used for each child. Use the item number to locate criteria in the appropriate resource unit.

Step 4 - Identify the prerequisite behaviors to be used for each child. To locate the behavior in the resource unit, use the item number and prerequisite number.

Step 5 - Review the methods in the Resource Manual for each prerequisite to be addressed.

Step 6 - Select methods to use when teaching.

Step 7 - Organize all methods into a daily plan.

Included on the following pages is a sample daily program plan that reflects the use of the Resource Manual. The plan was designed for a class of 12 three and four-year-olds. Methods selected from the curriculum are indicated in parentheses. For example, unzips zipper (SH #5 P2) indicates that this behavior is Self-Help Item #5, Prerequisite #2. The other codes are:

Communication - Com

Cognition - Cog

Fine Motor - FM

Gross Motor - GM

Criterion - C

Prerequisite - P

Date 9/10/80

DAILY PROGRAM PLAN

Target Group Approximately 12

3-4 year olds

LONG RANGE OBJECTIVES

1. The children will be able to participate, verbally or nonverbally, in daily circle time activities
2. The children will be able to name and match like objects on 2 of 3 trials.
3. The children will be able to manipulate cubes in activities such as building and placing cubes in containers.
4. The children will be able to climb up and down stairs with assistance.
5. The children will participate in exploratory play activities.

TIME	ACTIVITY	TARGET BEHAVIORS	SETTING	MATERIALS	STAFF
8:00 - 8:35	Staff Preparation for the day				Entire Staff
8:35 - 9:00	Child Preparation (Toileting)	Removes simple garments (SH#6, P1) Unzips zipper (SH#5, P1) Urinates or defecates in toilet or potty chair (SP#7, P2) Purposefully uses towel to dry hands so that wetness is gone, some moisture remaining (SH#10, P1)	Coat Area	Coat Racks	Anna
9:00 - 9:20	Greeting	Waves hand in response to "Hi" (Com #3, P3) Uses three-word utterances (Com #13, C) Participates in nursery rhymes and simple songs by action or vocalization (Com #26E, P1) Carries out simple action (Com #7, P1)	Circular Rug	Record Player or Recorder and Records	Karen

TIME	ACTIVITY	TARGET BEHAVIORS	SETTING	MATERIALS	STAFF
9:20 - 9:40	Snack	Carries out simple commands (Com #7, C) Names objects (foods) (Com #10, P1) Holds, bites, and eats a cracker (SH #2, P2) Lifts and drinks from cup (SH #3, C) Clearly indicates that he wants food or drink by verbalization and/or gestures (SH #24, P1)	Activity Tables	Snack, chosen for the day (Junior cup for Peter)	Karen, Anna, John
9:40 - 10:40	Learning Centers	I Communication and cognitive skills - Matches like objects (Cog #9, P2) Names objects (Com #10, P1)	At rug or on Small Table	Cardboard Picture Cards Card Rack for Sam	Karen
		II Fine motor skills - Places cubes in cup (FM #7, C) Uses pincer grasp (FM #10, P2) Stacks one block on top of another (FM #13, P1)	At Table *Sam in Standing Table	Small Cubes Plastic Cups	Anna
		III Gross motor - climbing Climbs upstairs using rail (FM#25, P3) Climbs downstairs holding hand of adult (GM #26, P2)	Outside	Stairs	John
10:40 - 10:50	Clean Up	Puts away own playthings with direction (SH #13, P1)	In Room		Karen, Anna, John
10:50 - 11:00	Morning Review	Responds to simple yes/no questions either verbally or with shake of head (Com #12, C)	On the Rug	Pictures Depicting Morning Activities	Karen

	ACTIVITY	TARGET BEHAVIORS	SETTING	MATERIALS	STAFF
15	Bathroom	Unzips non-separating zipper (SH #5, P1) Urinates or defecates in potty chair (SH #7, P2) Purposefully uses towel to dry hands so that wetness is gone, some moisture remaining (SH #10, P1)	Bathroom	Potty Chair	Anna
50	Unstructured Exploratory Play	Places three shapes in form board (Cog #12, P2) Turns pages of a book (Cog #14, P1) Avoids accident-provoking circumstances (SH #16, P1)	Theme Areas in the Room (Kitchen, Sand Table, Block Corner)		Karen, Anna, John
	Individual Skills Reinforcement	(Direct instruction or stimulation for individual Behaviors, Individual target behaviors for each child.)			
00	Bathroom	See Bathroom (11:00 - 11:15).			Anna, John
00	Lunch	Carries out simple commands (Com #7, C) Names objects (foods) (Com #10, P1) Holds, bites, and eats a cracker (SH #2, P2) Lifts and drinks from cup (SH #3, C) Clearly indicates that he wants food or drink by verbalization and gestures (SH #14, P1) Cleans place at table (SH #13, P2) Wipes spill with some moisture remaining (SH #15, P1)	At Tables Sam in Standing Table	Cafeteria Lunches Adaptive Silverware-Jocy, Linda	Karen, Anna John feeding Sam
	Rest and Review of Day	Responds to simple yes/no questions either verbally or with shake of head (Com #2 C)	On Rug	Pictures depicting Days Activities	Karen
	Child Preparation for Leaving	Put on coat with only verbal assistance (SH #8, C)	Coat Area		Karen, Anna, John

2. CHILD DEVELOPMENT

During the first five years of life, children are involved in a process of rapid growth and development. Biological maturation and the integration of learning experiences combine toward the development of skills in many areas. Most professionals in the field of child development recommend a developmental approach to teaching the young handicapped child. Each child's development proceeds through a sequence of stages, as reflected in subsequent sections of this manual. The rate at which children progress through these stages varies, depending upon genetic, biological, and environmental influences, including a child's handicapping condition. It should be emphasized that handicapped children generally pass through the same stages of development as nonhandicapped children; however, they do so at a slower rate. The manual's point of reference is the nonhandicapped child's development from birth to five years. Understanding the "normal" child's pattern of development will enable the professional to assess a particular handicapped child's behavior and skills relative to "normal" expectations.

When observing preschool handicapped children, then, the regularity of the developmental sequence remains despite differences in the rates at which individual children progress. As referred to earlier, some of these individual differences result from hereditary and biological factors. It has also become increasingly evident that environmental factors, such as patterns of interactions between caregivers and infants and the amount, nature, and quality of environmental stimulation from persons and objects, also play important roles in influencing the early development of the child (Escalona, 1968).

The pattern of interaction commonly known as bonding (Stone, 1979, in Journal of the Division of Early Childhood, Shapiro, ed.) develops as a result of nurturing experiences between a child and a significant person. It is facilitated by continually meeting a child's desires and needs. In turn, bonding helps the caregiver to perceive the child's cues in which the needs, interests, readiness for learning, style of learning, and so forth, are displayed. The accurate interpretation of, and appropriate response to, such cues by teachers, parents, or parent surrogates ultimately enhance the child's growth and development. Unrealistic expectations and lack of understanding of the child's abilities and needs hinder bonding.

From birth to age five, changes occur in a child's ability to control body movements, use language, apply cognitive skills, and gain a sense of identity. Patterns and processes in these areas are interrelated and interdependent. One area cannot be understood without considering the functioning of the others. The development of language facilitates cognition; sensorimotor acts lead to cognition and language; and development of perceptual capacities influences the development of self-concept. As a child increases his ability to communicate with others and control environment through language, feelings of self-worth and effectiveness increase. The development of cognitive skills and feelings of self-accomplishment facilitate feelings of "I can" in a child, which encourage the seeking of new experiences.

The manner in which skill areas are most obviously combined can be observed in children's play. Piaget referred to play as "the work of children." It is their opportunity to explore the environment and test out new ideas. Children learn to integrate skills, learn roles, establish coping behaviors, and develop a sense of their own abilities through

constructive play. Play should not be considered an isolated activity. Cognition, motor, and language skills occur and develop naturally in an atmosphere of adult approval and support.

In the first year of life, children regard themselves as the center of their environment. They are controlled by their physical and emotional needs and build a sense of trust and security as these needs are satisfied. The primary source of satisfaction in early infancy is the caregiver, who represents "the world." It is through this important attachment that children discover themselves and the world outside (Gordon, 1977).

Additionally, each learning experience is based upon previously learned behaviors which have been practiced, modified, and repeated many times as the infant explores his or her environment. From this process, the infant becomes aware of the possibility of controlling the immediate environment. At first, the environment is the body. As the child masters repetitive body actions, he begins to coordinate body action with objects. The development of hand manipulation skills is a good example of this. The child spends a great deal of time exploring and playing with the fingers before combining that skill with the increased ability to perceive and reach objects. At six - eight months of age, a child who is developing normally has combined and refined all of the skills which enable him to reach for, obtain, and manipulate toys. Also at this time, the infant becomes aware of the distinction between objects and people. Interacting with people and objects in a positive way provides vital learning experiences which should be encouraged. Appropriate guidance and encouragement in a setting which invites exploration continue to motivate the infant to expand experiences. In working with handicapped children whose ability to obtain sensory information may be impaired, an adaptive environment that will provide stimulation and challenge the child's

interests is important. Very frequently, blind infants are referred to as "very good babies" who do not demand attention; hence, they may not have adequate stimulation (C. Etta Watters, 1976). A two-year-old who is unable to walk must be positioned in a variety of settings with the same amount of environmental stimulation that a mobile child can experience so that other areas of development will not be neglected.

At the end of the first year, exploratory behavior made possible by locomotion allows children to begin to establish an important emotional independence. In the next two years, children greatly expand their communication system. As they interact with the environment, they use communication to accomplish their own objectives. As children approach two and a half they settle into a new phase of control. They are more certain of their capabilities and their independence from some parental demands as they increase their decision-making abilities. They have learned to cope with cultural expectations, such as feeding and toilet training, and show a powerful striving toward independence.

Preschoolers also exhibit a characteristic which Piaget called "egocentrism" and defined as the inability to see events or situations from another's point of view. An example of egocentric behavior would be the child who snatches his playmate's shovel, and is then surprised when the playmate appears to be upset by that action. The child's actions had been directed by his own desires, with no perception of a playmate's coexisting desires.

From three to five years, normal children are growing in self-awareness and ability to control behavior. They are developing definite attitudes toward their own development, mastering skills, and forming concepts related to physical and social reality. Although children are

self-centered at this age, they now desire peers to play and work with, even though an adult is still needed to mediate. A sense of initiative develops in three to five year-olds which enables independent action on the environment with some planning. At five, language is a social tool that children can use to control their environment. They can ask questions about their experiences, and they have developed into more organized, focused, active, and conventional individuals.

The following sections address in detail the sequences normal children follow in the development of language, cognition, self-help, and motor abilities and propose suggestions for working with handicapped children in these skill areas.

The charts on the following pages delineate the developmental milestones for normally developing children from birth to five years. They have been further divided into the skill areas of gross and fine motor skills, communication, cognition, self-help, and social development.

There are two important points to keep in mind when using this manual and referring to the charts. First, there may be considerable variation in the rates at which even so called "normal" children progress in their development. The two year-old who has not yet achieved all the communication milestones listed at 18-24 months and the two year-old who has achieved them may both be developing normally. Developmental norms are intended to provide a framework for conceptually organizing the types of occurences that can be expected as children develop. However, they are not static or fixed concepts.

The second point is related to the first and was mentioned earlier. Secondly, although the manual and charts separate development into separate domains for organizational purposes, i.e., cognition, communication, etc., these six areas are interrelated and interdependent. For example,

laughing, which involves communication, also includes social and cognitive skills. The child turning his head toward his mother's call is exhibiting gross motor, social, communication and cognitive skills; the infant establishing eye contact exhibits cognition, social, and fine motor skills.

Here are examples of the interrelationship of the skill areas for five ages.

AGE 1: A mother leaves her child in one room, goes into another, and the child crawls after her calling "ma-ma" in an upset tone.

COGNITION: Searching for hidden person

COMMUNICATION: Uses "ma-ma"

GROSS MOTOR: Crawls on hands and knees

SOCIAL: Cries when left alone

Seeks companionship

AGE 2: A child asks for a cookie. Mother gives the child a wrapped cookie which he takes and quickly sits in a small chair to unwrap and eat.

COMMUNICATION: Asks for cookie

GROSS MOTOR: Sits in chair

FINE MOTOR & SELF-HELP: Unwraps cookie

AGE 3: A child participates in a simple game which involves pointing to one or many objects and whispers the answer "yes" or "no" during the game.

SOCIAL: Participates in game

COGNITIVE: Points to one or many objects

COMMUNICATION: Whispers yes or no

AGE 5: A child retells a story of how he eats with a fork and spoon and hangs up his coat all by himself.

COGNITION &
COMMUNICATION: Child retells story

SELF-HELP &
SOCIAL: Eats with a fork and spoon and hangs up coat

The professionally recognized developmental scales from which the following charts were adapted include Alpern, 1972; Bayley, 1968; Brazelton, 1973; Cattell, 1940; Cohen, 1979; Doll, 1966; Frankenberg, 1966; Sanford, 1974; Schafer, 1977; Sobel and Fruend, 1977.

MILESTONES IN NORMAL DEVELOPMENT

Although handicapped children develop at slower rates, they generally pass through the same stages of development as nonhandicapped children.

There is variability in the rates at which even normally developing children progress in the skill areas.

Cognition, communication, fine and gross motor, self-help and social skills are interrelated and interact with one another.

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 0-3 Months

COGNITION:

Responds to new sound in environment with change in physical activity or vocalization
Glances momentarily at the point where a slow-moving object disappears from sight
Discriminates different stimuli in rooting reflex
Follows movement of hands with eyes
Visually fixates on object or person
Shows positive response to hearing familiar sounds

COMMUNICATION:

Makes small, throaty noises
Coos expressively, vocalizes spontaneously
Smiles at mother's voice
Makes single vowel sounds
Responds vocally to the friendly approach of a new person

FINE MOTOR:

Visually tracks horizontally and vertically
Alternates glance from one object to another
Grasp reflex present
Follows moving object past midline
Holds rattle when placed in hand
Watches movement of own hands
Hand predominately open

GROSS MOTOR:

Waves hands and kicks feet in prone position
Turns head to either side in front or back lying position
Rolls from side to back
Holds head steady in upright position and when being held above adult's shoulder

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 0-3 Months

SELF-HELP:

Demonstrates sucking reflex
Opens mouth to bottle or breast and sucks
Demonstrates gag reflex
Sucks liquified food from spoon

SOCIAL:

Enjoys being tickled and fondled
Smiles spontaneously
Smiles in response to smile, nod, voice, or touch
Expresses pleasure with increased physical activity
Quiets when picked up
Maintains brief period of eye contact during feeding.

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 3-6 Months

COGNITION:

Repeats action on objects
Visually recognizes mother
Turns head to look for fallen object which fall in view
Looks at hand and object when grasping
Visually directed reaching
Secures partially hidden object
Imitates cooing sounds
Uses procedures (e.g. smiling, vocalizing, arm movement) to have an interesting game continued.

COMMUNICATION:

Turns head to locate sounds and voices
Engages in vocal routine with adult; responds to speech with vocalization
Responds to voice by vocalization or change in activity
Vocalizes sound patterns; begins babbling
Varies crying to different stimuli
Babbles, using a series of syllables

FINE MOTOR:

Uses ulnar grasp
Holds hands together at midline
Brings hands together at midline to hold object
Uses radial palmar grasp (thumb and forefinger)
Bangs in play

GROSS MOTOR:

Pushes up from ground to bear weight on forearms
Pushes self to sitting position; sits alone momentarily
Rolls from stomach to back
Pushes head and trunk up with extended arms; lifts head and chest
Straightens hips and lifts legs when placed on stomach
Reaches for feet and brings to mouth

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 3-6 Months

SELF-HELP:

Sucks pureed foods from spoon and swallows
Eats mashed foods
Integrates bite and rooting reflexes (no longer elicited by stimulation; action is voluntary)
Anticipates feeding with increased activity
Reaches for and holds bottle

SOCIAL:

Laughs aloud often
Discriminates strangers from familiar persons
Makes noises to voice pleasure, displeasure, or satisfaction
Approaches image in a mirror
Cries when left alone or put down
Likes physical play
Shows awareness of strange environments

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 6-9 Months

COGNITION:

- Imitates simple, familiar gestures (e.g. shaking toy)
- Responds to name
- Uncovers toy that has been partially hidden
- Shifts attention appropriately, resists distraction
- Tracks and locates object falling out of view

COMMUNICATION:

- Vocalizes consonant/vowel syllables
- Engages in vocal play; uses word-like vocal expressions
- Vocalization used for attention
- Responds to name with vocalization
- Produces two-syllable vocalizations (e.g. gaga)

FINE MOTOR:

- Uses raking motion to obtain an object
- Rotates wrist to manipulate toy or object
- Reaches for and obtains objects 10"-12" away
- Retains one cube when given another
- Transfers objects from one hand to other
- Claps hands
- Combines objects at the midline

GROSS MOTOR:

- Sits without slumping over
- Bears weight in standing position
- Sits and reaches for toys
- Sits unsupported
- Lifts head when on back
- Rolls from back to stomach
- Outstretches arms for protection when in a sitting or upside down position
- Crawls forward with stomach on floor
- Bounces when held in standing position
- Maintains balance on hands and knees
- Assists in pulling to standing position
- Assumes sitting position himself

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 6-9 Months

SELF-HELP:

Begins chewing movements
Reaches for and holds bottle
Drinks from a cup with help
Manipulates finger food
Holds, bites, and chews biscuit

SOCIAL:

Plays peek-a-boo
Expresses pleasure when playfully handled
Reacts playfully to mirror image
Plays unattended for short periods of time
Understands and adapts to social signals (smile, harsh tone)
Shows dislike when familiar toy is removed

MILESTONES IN NORMAL DEVELOPMENT
AGE RANGE: 9-12 Months

COGNITION:	Plays simple games, (e.g. pat-a-cake) Acts on or with visible toys or objects, (e.g. squeezing doll to make noise) Uses some form of locomotion to reach a desired object Finds a completely hidden object. Looks at pictures in book Touches adult or object as causal behavior
COMMUNICATION:	Plays pat-a-cake; waves bye-bye Imitates coughs, tongue clicks, lip smacks Stops activities in response to "no" Echolalia stage (repetition of what adult says without comprehension of meaning) Comprehends a few words and gestures Uses jargon or non-meaningful monologue Imitates new words
FINE MOTOR:	Isolates index finger from other finger movements Purposely releases an object Makes mark on piece of paper with pencil or crayon Uses neat pincer grasp Pokes at objects with index finger Bangs spoon or cup
GROSS MOTOR:	Creeps forward on hands and knees Pulls to standing, using stable support Sits from standing with assistance and then independently Cruises for several feet Walks with support Lets go of support and stands alone

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 9-12 Months

SELF-HELP:

Ceases drooling
Licks food off utensil or from sides of mouth
Finger feeds for part of meal
Usually weaned from breast or bottle
Drinks from cup, some spilling from mouth

SOCIAL:

Laughs aloud in play with adult
Responds appropriately to adult's change of mood
Temporarily responds to "no"
Shows preference for one toy over another

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 12-18 Months

COGNITION:	Places one round shape in a form board Uses a tool such as a stick to obtain objects Recognizes shapes in a puzzle board Imitates unfamiliar sound patterns Imitates unfamiliar gestures Points to an object named or wanted Imitates at least one facial gesture Attempts to find causal mechanism to operate toy
COMMUNICATION:	Shakes head side to side to mean "no" Uses first spontaneous words Uses holophrastic utterances (one word utterances such as "milk" to express an idea or a concept) Follows simple command Performs requested actions
FINE MOTOR:	Places cubes in a cup Uses both hands to perform same action Holds crayon and scribbles on paper Stacks one block on top of another Builds tower of three or four cubes Places 1/4" pegs in board
GROSS MOTOR:	Makes four-five stepping movements in place Creeps up stairs Stands alone in the middle of floor Walks backwards and sideways Climbs upstairs, one hand held Creeps downstairs backwards Rises to standing position independently Kneels unaided Walks alone

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MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 12-18 Months

SELF-HELP:

Picks up cup and drinks
Spoon feeds without many spills
Removes simple garments on request
Cooperates in dressing and diapering by moving limbs
Indicates wet or soiled diaper

SOCIAL:

Repeats a performance laughed at
Exhibits specific emotional behaviors such as fear, joy, anger
Gives affection-returns a kiss or hug
Makes some decisions for self

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 18-24 Months

COGNITION:

Identifies parts of own body
Places three shapes correctly in a form board
Names five parts of the body
Attends to nursery rhymes
Points to pictures in a book upon request
Imitates sounds, words, or body movements
Activates objects directly, e.g., attempts to activite mechanical toy without demonstration
Deduces location of object from indirect visual cues
Places three shapes correctly in a form board.

COMMUNICATION:

Uses two-word utterances in interactional speech
Uses two words to describe actions
Uses general referents, (e.g. "cookies" refer to any similiar things
Refers to self by name
Uses two-word possessives, (e.g. "Daddy car")
Follows verbal instructions
Uses familiar names of objects

FINE MOTOR:

Imitates vertical crayon stroke
Places three shapes in a form board
Manipulates an object with fingers and thumb alone
Imitates stacking tower of four cubes
Turns pages of book one by one

GROSS MOTOR:

Walks downstairs with support
Jumps in place
Pushes/pulls a light object
Sits directly in small chair
Runs length of the room without falling
Stands on one foot momentarily
Picks up toy from floor from standing position

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 18-24 Months

SELF-HELP:

Zips and unzips large zipper
Attempts to put on shoes
Removes all clothes without help
Attempts to put familiar object away
Unwraps enclosed food such as crackers
Ceases activity for naptime

SOCIAL:

Cries or fusses for short period of time during parental absence
Plays alone for extended period of time
Enjoys accompanying adult on short walks
Shows intense positive and negative reactions
Becomes easily frustrated
Shows pride in actions
Pays attention to other children

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 24-36 Months

COGNITION:	Matches familiar objects Enjoys short stories read from picture book and describes simple pictures Understands one-to-one correspondence of sets up to ten Points to "one" and "many" Sorts objects into two given categories Exhibits a sense of ownership, (e.g. "It's mine") Recognizes self in mirror Engages in domestic make-believe play Places five shapes correctly in a form board
COMMUNICATION:	Joins in songs and rhythm Uses own first name Uses three-word utterances Uses word "no" appropriately Uses simple pronouns Says complete name Asks questions, using correct intonational pattern (Pitch proceeds from high to low) Carries out two-step commands Uses regular plurals
FINE MOTOR:	Imitates drawing horizontal and vertical strokes Snips or makes small cuts with blunt scissors Strings three-four beads Completes form board of five or more pieces Holds crayon resting on middle finger Builds tower of nine blocks
GROSS MOTOR:	Walks up and down stairs with rail Stands on balance beam Kicks ball without support Jumps from bottom stairstep Throws ball overhand Rides tricycle using pedals Balances on one foot Walks up stairs with support, alternating feet Runs Walks with reciprocal arm swing

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 24-36 Months

SELF-HELP:

Gets drink unassisted
Independently eats an entire meal with spoon
Begins to use a fork
Indicates need to toilet and attends to needs except for cleaning. Has no more than two bowel accidents per week
Puts on simple clothing, (e.g. hat, pants, shoes, socks), and then all clothes except for buttoning
Washes hands with assistance and dries separately
Brushes teeth with some assistance

SOCIAL:

Varies mood in response to reactions of others
Plays or works on own project when near other children
Initiates own play activities
Participates in simple games
Indulges in pretend or make-believe play
Requests that specific stories be read
Avoids hazardous situations
Attempts to take turns

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 36-48 Months

COGNITION:	Matches two-three colors Knows concepts big/little, fast/slow, long/short Tells a simple story Matches pictures of like objects Rote counts up to three Completes a form board of five or more pieces Discriminates size, weight, length
COMMUNICATION:	Knows own sex Asks questions beginning with who, what, where Uses possessives correctly, (e.g. "Mommy's car") Uses regular past tense Uses prepositions in, on, under Learns to whisper Uses normal loudness and tone Uses language in imaginative play Uses sentences most of the time
FINE MOTOR:	Strings 1/2" beads Copies a circle Puts together objects requiring fine muscle control Cuts along 1/4" line with a continuous opening and closing motion Laces shoes - not necessarily with pattern
GROSS MOTOR:	Catches a bounced ball Walks downstairs alternating feet without support Jumps forward without falling Throws ball overhand Stands on balance beam unassisted Walks entire length of tape line on floor Climb to top of slide and slides down

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 36-48 Months

SELF-HELP:	Buttons and unbuttons larger buttons within reach Completely dresses with verbal assistance Wipes up spills Brushes teeth with verbal assistance Washes and dries hands independently Completely cares for self at toilet
SOCIAL:	Initiates play in group and remains to play Shares toys upon suggestion Performs simple errands Plays cooperatively with other children Consciously identifies with parents Shows sympathy and concern when appropriate Enjoys helping and participating in adult tasks

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 48-60 Months

COGNITION:

Knows own age
Knows day and night
Matches and names four primary colors
Counts 10 objects; answers how many on request
Sequences pictures in order of occurrence
Answers questions about a story being read
Names three objects from memory
Chooses own categories for sorting

COMMUNICATION:

Regularly uses pronouns, (e.g. he, she) and possessive pronouns, (e.g. his, hers)
Uses some adverbs
Verbally calls attention to own performance
Carries out series of three unrelated commands
Uses future tense
Names attributes of objects (size, shape, color)
Uses "no" and "not" appropriately
Uses contracted negatives, (e.g. can't, don't, isn't, won't)

FINE MOTOR:

Draws a picture
Demonstrates hand preference
Copies shapes (circle, square, triangle, rectangle) from example
Draws stick figures
Cuts out a circle and other simple shapes

GROSS MOTOR:

Gallops
Walks full length of balance beam without falling
Kicks rolling ball toward target
Skips, alternating feet
Hops on one foot
Catches a thrown ball
Walks on tiptoes for 10 feet

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 48-60 Months

SELF-HELP:

Blows and cleans nose independently
Serves self at table from bowl without spilling
Eats with spoon and fork skillfully
Stays dry overnight
Distinguishes between front and back of clothing
Plays in yard with periodic monitoring
Hangs coat on hook

SOCIAL:

Calls attention to own performance
Uses social responses, (e.g. please, thank you, raises hand, stands in line)
Chooses another child to play with
Talks about family
Prefers to be with peers rather than adults
Able to control emotions by five years old, expressing them in acceptable ways

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 60+

COGNITION:	Matches sets of items to numerals, 1-10 Sequences up to five daily activities Retells a brief story Gives home address Knows left from right
COMMUNICATION:	Tells story by reading the pictures Asks meaning of abstract words Speaks fluently and correctly, except for confusions s, f, ch
FINE MOTOR:	Prints capital letters and simple words, with frequent reversals Uses appropriate hand placement while cutting and writing Laces own shoes Prints numbers one-five
GROSS MOTOR:	Jumps rope Roller skates Hops 2-3 yards forward on each foot separately Jumps on toes only from height of 12" landing Runs with arms swinging in opposition to feet

MILESTONES IN NORMAL DEVELOPMENT

AGE RANGE: 60+

SELF-HELP:	Brushes and combs hair unassisted Puts toys away neatly in box Dresses and undresses alone Crosses street safely
SOCIAL:	Comforts playmate in distress Plans and builds constructively Understands need for rules and fair play Relates clock time to daily schedule

Motor Development

Introduction

The development of motor skills provides the foundation from which subsequent sensorimotor, cognitive, language, and self-help skills evolve. Although the curriculum presented here treats these areas separately, they cannot be examined without the consideration of motor development. Some form of motor skill or involvement is found in every type of behavior a child exhibits. An infant's first sounds are produced in association with movement and provide the basis for later verbal communication. At this beginning stage, motor and perceptual behaviors are also the vehicles through which cognition is developed and later expressed. Later, through movement, most children learn principles of time, space, and measurement concepts. Additionally, much of a child's self-concept is dependent upon his ability to control his body movement, his environment, and his relationships with significant others.

Piaget states that the child learns to know the real world by acting upon it. If all of a child's senses are present at birth, he utilizes sensory impressions in conjunction with motor output to gradually refine movement. In combining these senses, the child is increasingly able to learn about himself and his potential for acting upon the environment. Piaget also indicates that at an early age, the coordination of simple actions with incoming perceptions predominates in the mental activity of the child. He combines the perception of discomfort with the motor response of crying to produce a situation in which he will be satisfied (fed, changed, handled). Motor development is a result of physiological maturation and environmental learning, both of which are essential for maximum development. Physiologically, there are five principles of motor development to consider:

1. Gross motor development occurs from head downward to the feet. The baby develops head control skills which allow him to lift and turn his head before he develops trunk control or volitionally moves his feet. As this process continues, he develops more coodination and control of the shoulders. Later, the trunk develops, followed by control of the legs.

2. Fine motor development proceeds in a direction from the trunk outward. Thus the child learns to control the shoulder joint movements before he learns control of the fingers.

3. Motor development occurs in a sequential fashion. Each new acquisition of a skill is based on those skills that preceded. A child uses components of movements which he has already achieved and combines them in new forms which develop into a new motor act. The rate of development varies among normal children, but the sequence of development remains fairly consistent. For example, a child should be able to bear weight when supported in a standing position before he can stand with support and finally stand alone.

4. Motor development sequences are overlapping. While a child is mastering a certain motor behavior, he is experimenting with components of succeeding stages while continuing to practice previously learned skills.

5. Increasingly motor maturity is characterized by breaking up of gross motor movements into finer, more selective patterns which allow separate parts of the body to move independently. The infant's movements are generalized and massive, later becoming more specific and localized. For example, a child at two months at play, thrusts the arms reacting in excitement, by five - six months the child will reach toward an object and grasp it.

In environmental terms, caregivers may foster motor development by providing varying experiences in which children explore and learn about their world. From early infancy, a child needs to experience a wide range of objects which will stimulate the coordination of muscular activity with the sensory processes. In turn, these sensorimotor activities stimulate mental activity and strengthen perceptions generated by the child's actions. Further, the child uses varied objects in his environment to test perceptions. In building a tower of blocks, a child learns physical principles by testing which stacking methods work. A varied and stimulating environment assists successful developmental progression.

Normal physiological maturation combines with environmental learning to produce a natural progression of gross motor skill achievements. Many of these skills are present at some level by the end of the first year. From birth to a child's first birthday is a period of rapid growth and development, with the body increasing over one-third in length and almost tripling in weight. During the first months of life, there are many changes that occur in the infant's development as he addresses himself to the new environment. Internal bodily processes have stabilized while external movements of the head, trunk, arms, and legs are experienced. As primitive reflexes are integrated into the CNS, the infant increases his repertoire of voluntary motor skills.

A new born begins life remarkably flexed with the extremities drawn toward the baby and the chin tucked into the trunk. As the infant grows, the arms and legs straighten away from the trunk. It is this important development from flexion to extension that allows a child to become upright against gravity at about one year of age. It is important to remember that an infant's movement against the passive pattern of flexion into

antigravity extension is not an all-or-none phenomenon of flexion into extension. As the infant is practicing extension, he is also learning new flexion movements. Learning to combine the patterns of flexion and extension allows for controlled, mature movements. Gross motor development can be broken down into: prone, supine, sitting, and standing progressions.

In prone, a sequence of development involving extension is apparent in the infant's first year of life. Within this sequence, a child passes through a number of behavioral and motor milestones. Each milestone represents increasing mobility against gravity and each demonstrates more complex development of independent movement. In the next several months, extension is gradually developed in all positions.

In prone, the infant first learns to lift and control his head gaining extension in the neck. Extension begins to develop in the upper back as the child begins to support on forearms as well as experiencing a greater sensory awareness of his arms, and an ability to see his hands in prone. At four-six months as extension develops in prone, the infant occassionally assumes a "swimming" position while supporting most of his weight on his abdomen with arms and legs stretched out off of the surface against gravity. The infant also practices movements and shifting weight while supporting on forearms. Equilibrium reactions develop in prone which will give the baby the ability to lift one arm and reach out while supporting on one forearm.

This is the beginning of development of rotation in the trunk. At six-eight months, gradually hips are brought under control with complete extension. The baby also develops good mobility in prone by pivoting in a circle.

The limbs are used symmetrically (evenly on both sides). Rotation of the trunk is further developed, which enables the baby to combine flexion and extension into more directed and controlled activities. The baby is able to perform pivoting on fully extended arms and is able to reach out. The child will often push himself backward across the floor; in doing so, he may lift his abdomen off the surface and end up sitting between his feet. Pushing back and forth in this manner will reinforce the use of arms for protection when falling forward.

Rotation of the trunk further develops in rolling when the infant is able to roll segmentally (the earlier neck righting reflex resulting in rolling over as a single unit). With increased trunk rotation, the body moves less as a whole and more in segments.

With more back extension, and increased weight bearing on the arms, control of the shoulders develop, and the child may start to use his arms to pull himself forward with random leg movements. He may soon pull both hips and knees under the chest in an all-fours position. In this position the child rocks back and forth achieving alternating hip extension and flexion which helps to separate hip movements from trunk movements. Soon reciprocal creeping movements develop at ten months and by twelve months, the child creeps well. The components required for creeping are extension of the head, trunk, and limbs; rotation between the body segments; and the ability of the limbs to move separately from the trunk.

In newborn supine position, the limbs are partially flexed, never completely extended. As extension develops in prone, extension also becomes evident in supine, partly due to the influence of the tonic labyrinthine reflex. Because the baby lacks the control to maintain his head in the midline it is usually held to one side. Thus the newborn tends to be asymmetrical and displays the influence of the asymmetrical tonic

neck reflex. If the infant's head is strongly turned to the extreme side, his body may rotate as a whole in the same direction, due to the neck righting reflex. Segmental rotation is not well developed in the body parts but is developing between the head and trunk.

By four months, the baby centers the head to look straight up and can reach out to bat an object. By five months, the motivation to move and good head control in supine coincide. The child may lead with the head and roll over to his stomach, where play is more accessible. The head is now able to move separately from the limbs; this frees the limbs from complete domination by the position of the head (due to the influence of primitive reflexes). Thus the baby develops arm and leg movements bilaterally (both right & left sides). The shoulders and hips develop first and direct the gross reaching and kicking movements. By six months of age, the infant progresses to a more active physical manipulation of objects. Sensory cues tell him where his arm is in relation to his body and in relation to the object. The child will begin to reach across his body for an interesting toy while lying supine. The lower part of the body develops weight shifting through "bottom-wiggling" activities as well as pushing with one foot on the mattress to achieve pelvic twisting and sometimes rolling onto the abdomen. The bridge between supine and prone progression occurs when a child learns to roll over and then to crawl.

When pulled to sit, the newborn shows little control of head flexion (the ability to pull head forward) and the head lags back awkwardly. By three-four months, the head is held stiffly in line with the trunk. In a month or two, the youngster not only tucks the chin in, showing well-developed flexion of the head, but also counterbalances the movement with the legs to help pull up with the arms to come to a sitting position.

This ability to combine the patterns of flexion and extension allows for controlled mature movement. When the infant is placed in a supported sitting position at four-six months, the upper back extends, lower back is rounded, and the infant lacks the lower trunk control needed to maintain an independent sitting position.

The development of head control in the supported sitting position (antigravity posture) is very important to the child's visual understanding of his environment. It enables him to view his world from an upright orientation. Increased mobility of the head allows him to monitor visually a much larger portion of his surroundings. At age six-eight months, the baby develops sufficient extension so that his back is straight in sitting. At first he does not have true balance in this position and must rely on the use of his arms extended in front for support. Later the child is able to remove the hands from the floor and even turn the head and shoulders to one side or the other without losing balance. It is here that we see further evidence of the ability to break up the total pattern of extension of the back that he has been practicing for six months in prone. In sitting the infant can now flex at the hips while being able to maintain extension of the spine at the same time. This combination of flexion and extension is vital for futher development of mature motor skills. However, it will take several more months of practicing rotation between shoulders and pelvis until righting reactions are mature enough to permit him to rotate from the prone-lying into the sitting position independently.

Righting reactions are usually fully integrated at nine months of age. Once in a stable sitting posture, the child spends a lot of time rocking back and forth, experimenting with trunk mobility. Equilibrium reactions and protective responses of the arms enable him to regain his balance.

As the child moves toward independent attainment of a standing position he may also receive many opportunities for assistance in standing from parents. The way in which a child adjusts motorically to the assistance he may receive also follows a developmental sequence. Thus a child engages in two integrated extension sequences: the unassisted progession toward pulling to stand independently and the assisted standing sequence. A newborn held in standing may stiffen one or both legs and support full weight momentarily; if tipped slightly forward, the infant will take a few steps forward. Both behaviors are reflexive and depend on the proper stimulus as well as outside support for successful completion. The reflexive response may be intensive at two weeks of age and then begin to disappear in the presence of mature volitional movements. Sometimes infants in this transition period will refuse to take any weight on their legs. At the age of three-four months a child may stiffen legs for support if the foot touches the surface. Gradually the child supports a larger fraction of his weight but requires assisted support. Before a child has the balance to walk independently, the child must have the ability to step forward volitionally. Initially, two hands must be held then, at eleven months, only one hand support.

Progression of developmental skills in prone and assisted standing merge together when a child pulls himself to standing and then learns to control getting down from standing. Standing momentarily alone is accomplished with the arms held high for balance. At first when the baby attempts forward walking his legs will be widely abducted, rotated outward, and are moved forward by total flexion. Steps are very short and do not allow the infant to cover much ground in the beginning walking stage. The child practices quick balance on one leg and then the other. The arms are held high which results in strong extension of the upper back to compensate

Development of Flexion and Extension During the First Year of Life

Newborn → 1 Yr.

Supine

Flexed posture asymmetrical. → Stays flat no rolling → The child centers the head in midline, reaches with arms, flexion of neck matures to tuck chin forward when pulled to sit, assists in pulling with the arms, rolls to side → Flexes hip to pull foot to mouth, rolling develops, lifts head and shoulders as if to sit up

Prone

Flexed Posture → Lifts head momentarily as extension develops in neck → Legs are almost straight, holds head up so face is vertical. Extension maturing in neck, upper trunk, arms. Extension beginning in lower trunk and legs → Props on extended arms gets into crawl position. Extension is maturing in lower trunk and hips → Gets on hands and knees and rocks, alternating flexion and extension → Creeps on hands and knees, coordination of reciprocal movements has matured

Sitting

Not able to control falling backward or forward → Requires some outside support but showing initial back extension → Child balances cautiously in the middle, but leaning too far back or forward causes loss of delicate balance between flexion and extension. → The spine is well extended, reaches and moves in and out of sitting from crawling, crawling, has refined the combination of flexion of hips and extension of spine and knees.

Standing

Held under arms makes stepping movements → Held, takes small fraction of weight on legs. May lift one foot at a time → Held under arms bounces actively alternating flexion and extension of legs. Supports a large amoung of weight due to maturing extension of the legs → Pulls self up to stand position showing controlled extension down through the legs. Lowers self down from standing showing the ability to control extension in combination with flexion. → Walks with one hand held for balance, controlled extension is well developed. Child takes several steps independently.

This developmental time table is designed to give a better understanding of the development of combined flexion plus extension movement patterns in the first year of life. Gross motor behaviors are listed under general categories of development (prone, supine, sitting, standing). This time table is very general and should not be taken as a specific tool in the developmental sequence.

for the lack of good hip extension. Rotation is seen in forward walking first in the pelvic area. As back stability increases, the arms come close to the sides, the legs come further under the pelvis, and maturing leg movements are seen. As the arms show greater dissociation, (ability to move separately) regular reciprocal arm movements begin. Reciprocal walk becomes refined after much practice and maturation of balance at 18 to 24 months. As the toddler decreases the width of his stepping base, he relies increasingly on equilibrium reactions to maintain balance. The child will soon be able to step sideways, backwards, and run. Control of the trunk and limbs is mastered and as he approaches the age of two, refinement of basic skills and an increasing mastery of balance dominates his activities. This frees the hands for manipulative tasks while walking. The child is jumping with both feet, walking downstairs with assistance, and throwing a ball overhand.

At three, the child is a confident, mobile individual. He runs with few falls; he quickly alternates sitting and standing and walks up and down stairs, alternating feet with rail support. The child's balance is quickly improving, although he will experience difficulty with equilibrium at age 3-1/2. At three, the child probably can pedal and steer a tricycle. At four, the child is a competent individual who has many adult motor skills. He ascends and descends stairs independently, runs smoothly, hops on one foot, and performs many other movements with agility and balance. At five, gross motor development is nearly complete. The child is refining many skills, such as balancing on one foot for an extended period of time or skipping smoothly.

The development of gross motor skills serves as the basis for the emergence of fine motor skills. Head and trunk control are prerequisites for reaching and grasping and for their later refinements, such as manipulation of small toys and the establishment of handedness.

The Development of Fine Motor Behaviors

As the child grows, he combines sensory stimuli and gross motor skills to produce fine motor behaviors. Even in the first six months, these combinations enable the child to demonstrate many reaching behaviors, including reaching for and mouthing objects, holding a bottle, and banging objects held in his hand. At one year, the child has refined and coordinated these reaching movements to enable him to grasp, manipulate, and release objects.

As the child grows, he combines sensory stimuli and gross motor skills to produce fine motor behaviors. As the child develops head control that enables him to maintain his head in midline, the limbs become free from complete domination of the head position. The infant is then able to demonstrate a two-handed approach to reaching objects in midline. He uses hands to play with his undershirt, brings objects to his mouth, and explores his clasped hands. At six-eight months of age, as the trunk and upper extremities become more controlled, these combinations enable the child to demonstrate a more active physical manipulation of objects which includes reaching behaviors, banging, shaking, and holding onto a bottle. At one year, the fingers become more individualized and the child has refined and coordinated reaching movements to enable him to grasp, manipulate, and release objects.

At two, the child has more precise hand-eye movements. He builds block towers, turns knobs, and enjoys scribbling. At three, the child is fairly proficient with a writing tool. He holds a crayon with his fingers, making pictures for Mommy and Daddy, and imitates drawing lines and circles. When reading a story, he likes to turn the pages himself.

At four years, the child completes increasingly adult gross motor abilities with similarly mature ones in fine motor skills. He manipulates small objects with ease, copies circles and crosses, and is beginning to cut with scissors. At five, the nonhandicapped child is ready for academic readiness kindergarten activities. He can make capital letters, enjoys drawing, and can cut on a line. Hand dominance is finally established.

Motor development is sequential and overlapping, and it proceeds from breaking gross motor behaviors into more selective fine motor behaviors. This curriculum follows these developmental sequences in its teaching strategies, recommending use of those environmental factors which influence motor development.

In the section describing gross motor reflexive development, it was stated that the sequential acquisition of skill depends upon higher centers gradually imposing inhibitory control over responses from the lower centers. However, if something occurs that interferes with this dynamic process, the course of development may proceed along very different lines.

Damage which occurs before birth, during the birth process, or in early childhood may prevent sensory messages from reaching or becoming fully integrated at higher levels of the nervous system. Messages are circuited to the lower portions of the nervous system, and the responses that emerge are appropriate to responses from those lower levels. When damage occurs in an immature brain before development is completed, the high brain centers may not get a chance to evolve full control over the lower centers.

The result may be movements that are stereotyped, atypical, and usually associated often with abnormal quality of muscle tone. Muscle tone may be too high (hypertonus) as in a spastic child; too low (hypotonic) as in the floppy child; or fluctuating between high and low tone, as in the athetoid child.

The child with brain damage may show motor responses and reflexive motor behavior in an exaggerated form. For example, when a normal baby occassionally assumes the "fencing" posture of the asymmetrical tonic neck reflex he will be able to move out of that posture with relative ease. However, the brain damaged child may be "locked" into that position every time the head is turned to one side, preventing him from putting a toy in his mouth or exploring it with both hands, and the vision field may be greatly limited. Such a child may experience greater difficulty or never develop the ability to integrate fully his visual, tactile, kinesthetic, and auditory modalities.

Additionally, reflexive behaviors may tend to persist for a longer period of time than in the normal infant. When the reflex is stimulated, the baby's whole body may be involved, and more selective movements made impossible. A child with increased tone may have difficulty developing head control, reaching and supporting reactions of the arms, ability to sit securly with good posture and balance, the ability to come to sitting normally, and the ability to come to creep. All of these skills are essential to the development of more complex skills such as independent walking.

The child may not perceive the irregular muscle and motor patterns as abnormal, since they are the only sensation of movement that he has experienced. The child may overutilize his abnormal limited motor patterns

in movement in early exploration. This may limit subsequent motor achievement to a foundation of abnormality. Thus a child may develop along a course that becomes increasingly abnormal, resulting in the habituation of undesireable movements. The severely involved spastic child may have minimal, if any, free movements. He may remain in one posture continually or use abnormal patterns of movement which reinforces his motor handicap. Without proper interventions, the child's physical disability may become more severe as he grows older. Secondary disabilities such as contractures and deformities may subsequently develop.

In curriculum planning, it is important to assess the infant in all developmental areas and determine the manner in which his physical handicap may be limiting his overall learning. Activities and methods of handling should be chosen that will minimize his physical difficulties and free him to enjoy more normal experiences. Special positioning may be needed to adapt to the child's unique needs to facilitate development on all areas. Any child who exhibits such problems as abnormal muscle tone; primitive reflexes which are persistent, asymmetrical, poorly integrated, or absent; structural deformities; absent or poor equilibrium, righting, and protective reactions; or muscle weakness, should be reported to a physcial therapist, occupational therapist, or phyician. In regards to such children, teachers and parents who are planning in areas that involve gross motor and fine motor skills and handling and positioning are urged to work closely with the child's therapists and physician.

The Role of Sensory Systems in Motor Development

Sensations are "food" or nourishment for the nervous system. Every muscle, joint, vital organ, bit of skin, and sense organ in the head sends sensory inputs to the brain. Every sensation is a form of information. The central nervous system uses this information to produce responses that adapt the body and mind to that information. Without a good supply of many kinds of sensations, the nervous system cannot develop adequately. The brain needs a continuous variety of sensory nourishment to develop and then to function. Sensations include the following: vision, sound, touch or tactile sense, proprioception (movement of muscles and joints), and vestibular (balance and position in space). The tactile, proprioceptive, and vestibular systems are three of the largest most complex systems.

The skin has many different kinds of receptors for receiving sensations of touch, pressure, heat, cold, pain, and movement of the hairs on the skin. The tactile system is the largest sensory system and plays a vital role in human behavior. Touch receptors send information to different levels of the brain; this information is then widely distributed throughout the rest of the brain. Many of these messages never reach the highest centers of the brain that make us aware of the sensation. Instead, these messages are used at lower centers of the brain to help us move effectively, to influence emotions, and to give meaning to other types of sensory information. Parts of the lower brain centers that process tactile inputs can tell us that something is touching the skin and whether something is painful, cold, hot, wet, or scratchy. In general, the brain's lower centers tell us whether a stimulus is dangerous. However, it is the higher brain centers that tell us where the stimulus is on the skin or what shape it is. Details of location and shape are processed in the sensory

areas of the cerebral hemispheres, the higher centers of the brain. The tactile system is the first sensory system to develop in the womb and is able to function effectively when the visual and auditory systems are just beginning to develop. As the tactile system matures, the increase in tactile perception skills enable a more detail information from the skin which enables the child to feel and manipulate objects with greater skill. For these reasons, touch is very important for overall organization of the brain and nervous system. Without a great deal of tactile stimulation of the body the nervous system tends to become imbalanced. Disorders of the nervous system may result in an abnormal and serious condition. One example may be tactile defensiveness which is the tendency to react negatively and emotionally to touch sensations. For example, a child may avoid physical contact and may react as if being threatened. This example of poor tactile sensory processing may lead to discomfort and behavioral reactions which may interfere with the learning process.

Teachers are urged to consult carefully with an occupational and/or physical therapist when dealing with children who appear to have possible abnormalities in the tactile sensory system.

Proprioception refers to the sensory information caused by contraction and stretching of muscles and by bending, straightening, pulling, and compression of the joints between bones. The sensation from one's own body occurs during movements and also while standing still. Muscles and joints constantly send information to the brain to tell us about our position in space. Because there are many muscles and joints in the body, the proprioceptive system is large. Proprioception helps us to move. Without adequate proprioception, the body movements would be slow, clumsy, and require considerable effort. Propriorceptive messages are processed in the brain centers which do not produce conscious awareness. We rarely notice

the sensations of muscles and joints. For example, if proprioception from the hands are not sufficient to tell the child what his hands are doing, the child will have difficulty buttoning clothes or manipulating toys. Children with poorly organized proprioception usually have a lot of trouble doing anything when they cannot see it with their eyes.

The vestibular sense is another vital sensory system. The inner ear contains a structure called the labyrinth which contains both auditory receptors and two types of vestibular receptors. One type of receptor responds to the force of gravity. Vestibular messages are relayed to centers in the brain. Because gravity is always present, the gravity receptors send a continuous stream of vestibular messages to the brain throughout life. When the head moves to one side, up and down, or in any direction that changes the pull of gravity, the vestibular input from the gravity receptors changes the information sent to the brain. The second type of vestibular receptor lies in the closed tubes called semi-circular canals in the inner ear. There are three pairs of semi-circular canals in each inner ear and each are filled with fluid. When the head moves rapidly in any direction, the fluid backs up in one or more pairs of the canals in each ear. The pressure of the fluid backing up in the canals stimulates the receptors that lie inside the canals. The receptors then send messages to the appropriate brain centers. These vestibular messages change whenever the head changes the speed or direction of its movement, which gives us the sense of movement. The combination of input from the gravity receptors and the semicircular canals is precise and gives us information on exactly where we are in relationship to gravity, whether we are moving or still, how fast we are moving and in which direction. These sensitive, powerful messages have a powerful effect on the brain, and interact with other sensory messages to give us our perception in space and our position and orientation to that space. They affect posture, balance, and movement.

When the activity of the sensory system becomes more organized as the brain and nervous system matures, the sensory systems become more integrated with one another. For example, when the child creeps across the room his entire body works together as one balanced unit. The sensation from these full body adaptive responses generate a well-organized and balanced pattern of activity in the brain. When the whole body and all of these senses work together as a whole, adaptation and learning are easy for the brain. (Ayres)

NEURO DEVELOPMENT: AN OVERVIEW

Portions of this section have been printed in boxes to alert the reader to basic information and issues of particular importance.

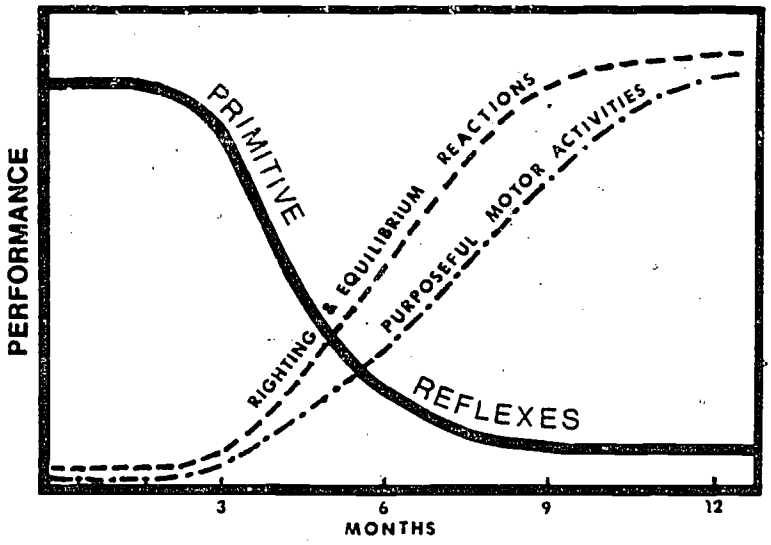
The human organism depends on an intact nervous system for all aspects of its functioning. It is artificial to consider development of language, cognition, speech, and motor behavior as separate entities. Each area of growth, development, and skill acquisition stems from predictable and sequential development of the nervous system. For example, by the third or fourth months of gestation, kicking and repositioning is apparent. By the time of birth, the infant has developed a set of foundation motor behaviors known as reflexes. These reflex motor patterns function to provide the new born with rudimentary survival skills. Some reflexes are protective in nature, some enable the newborn to locate the breast, suck and swallow, and others permit the beginning of orientation of the body within the force of gravity.

Reflexes may be defined as observable behavioral responses to stimuli. Reflexes are not voluntary. The presence or absence of these stimuli give early indication of the health of the nervous system and provide the building blocks from which subsequent development may emerge.

The following section offers some basic information regarding reflex behavior of infants. It is not intended to provide information for an assessment of reflex movement. Teachers are cautioned not to attempt the deliberate eliciting of reflexes, as normal neuro development requires the gradual integration of reflex behavior in increasingly refined and consciously controlled gross and fine motor functioning. Irreparable harm can result if primitive reflexes are strengthened by misdirected intervention methods. (Finnie, 1975).

The role of reflex behavior and the development of motor skills are evidence of the maturation of the central nervous system (CNS). This system includes the brain, the spinal cord, and the spinal nerves, none of which are fully developed at birth. The lower portions of the brain concerned with regulating vital functions and early primitive reflex behavior mature first. Early in life, the newborn experiences sensations from movement, particularly active movement. These sensory experiences stimulate the development and gradual maturation of higher, more consciously controlled areas of the brain. Thus, the infant is born equipped to influence its own neurological growth through the interrelation of sensory input and resulting motor behavior. Early reflex behavior starts this cycle of nondiscriminatory reflex response: sensory stimulation, partial patterns or motor activity, additional sensory stimulation, increasingly specific and localized movement. Sensory information including touch, sight, or smell is transmitted through the nervous system and integrated at specific levels of the brain and spinal cord. Responses to these sensory stimuli are then sent out in the form of motor actions. The activity continues, integretion occurs at higher levels of the nervous system and motor responses become more controlled and sophisticated. With additional forms of motor expression available, the growing infant is able to explore his environment and thus experience new sensations which are in turn fed back into the nervous system. This process helps to establish links and pathways between brain cells in the cerebral cortex, so that higher cortical centers may exert increasing influence over the behavior of the developing child. As the child matures so does the brain, and early reflex patterns of motor activity are no longer needed. They become integrated into the higher centers and may only reappear as the outcome of brain injury or in response to extreme physical stress.

The following graph illustrates this:



The child gradually gains a sense of equilibrium which permits moving from fixed positions, and encourages increased interaction with his surroundings. The greater part of motor development is not complete until the child is five or six years of age.

The lack of integration of primitive reflexes by the end of the child's first year suggests immaturity of the central nervous system. Early warning signs are:

1. Absence of primitive reflexes in the first few months of life.
2. Different responses from the right and left sides of the body as a result of the same stimulus. For example, when turning an infant's head to the right results in right arm extension with the left arm flexing, but when the head is turned to the left no result is produced.

3. Maintenance of one reflex posture. For example, the child remains in the asymmetrical tonic neck reflex posture (see Primitive Reflex section) and is unable to voluntarily change the response. This is known as an obligatory response.

4. Lingering evidence of a strong primitive reflex well beyond the time one would expect to see integration. For example, in a child one year or older, quick movement backward from a sitting position results in a moro reaction (see Primitive Reflex section).

Awareness of primitive reflexes is vital to an understanding of motor development. The following section provides an overview of major reflexes which affect development of motor behaviors. Illustrations of selected reflexes and information on the ages at which normal infants achieve integrated reflexes are included. All of the illustrations depict a positive reaction or presence of the reflex. This section is not an inclusive study of neurological reflexes but it offers basic information needed by educators working with young handicapped children. Reflexes are generally divided into three categories: primitive reflexes, righting reactions, and equilibrium reactions.

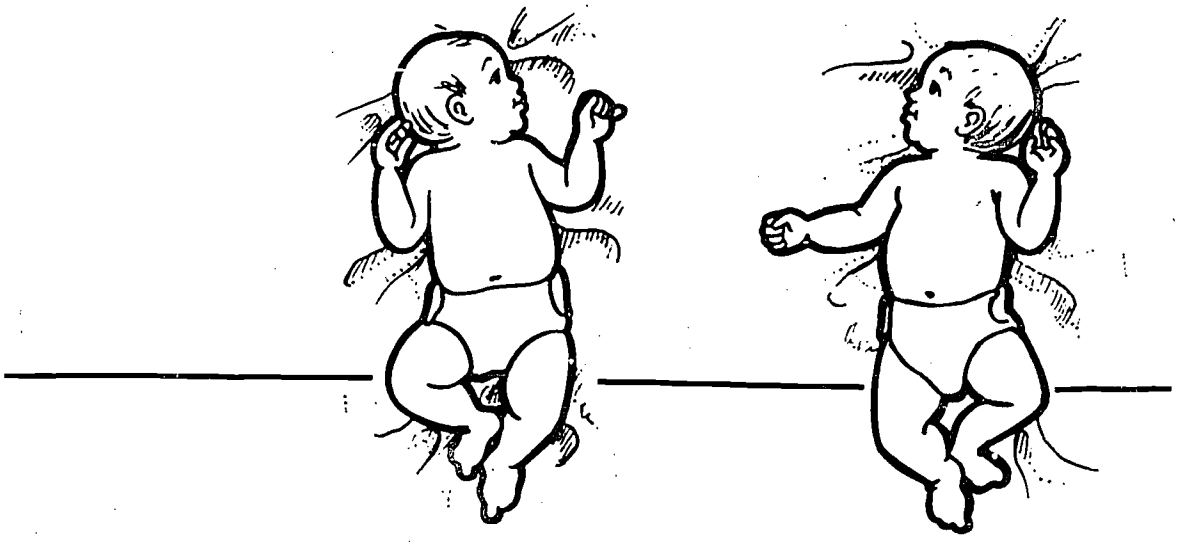
A word of caution: integration of the reflexes into the control of higher centers is critical to development of gross and fine motor skills and therefore these reflexes should not be strengthened. Suspicion of early absence (first few weeks) of reflexes, of differing responses from right and left sides, or maintenance lingering of reflexive posture beyond the normal time for integration should be reported to the child's parents with a recommendation for a physical examination. Furthermore, abnormalities in motor behavior should be immediately reported to the physical or occupational therapist. No intervention strategy should be implemented for a child who appears to lack integration of reflexes until a therapist is consulted. This policy cannot be overemphasized.

Asymmetrical Tonic Neck Reflex (ATNR).

The ATNR, as the name implies, is a postural reflex which is elicited by turning the neck or head. When the child's head is turned to one side, a typical pattern occurs in the extremities if the ATNR is present. In a young child, as illustrated in the supine (backlying) position, when the head is turned to one side, the arm and leg on the face side extends or straightens and the opposite side flexes or contracts. These patterns are more easily remembered by visualizing them as a "bow and arrow" position or "fencing position." This reflex may be stronger in the arms than in the legs. The ATNR is evident at birth but the peak incidence of the ATNR pattern is generally between one - two months of age. The pattern continues thereafter with a gradual decline in frequency until six months of age when a definite ATNR should not be observed.

The ATNR contributes to the development of nonstressful movements. It is believed that the infant first observes his hand (hand regard) while lying in the ATNR position and that the observation assists the infant in beginning to develop head control in a supine position. The pattern cannot be imposed on a normal infant, child, or adult to a completely obligatory extent (that is, as long as the head is held to the side, the individual cannot escape the pattern.) Although this reflex becomes integrated at six months of age, it can be elicited in the older child or adult in stressful and nonstressful situations. It should at no time interfere with motor activity but should enhance the supportive framework of a voluntary motion. The continued presence of the ATNR in older children may be evaluated in motor behaviors such as sitting, reaching, grasping toys, eating, creeping,

walking, running, and skipping. Failure to integrate this reflex (gain control or modify it into voluntary movement) by an appropriate age may cause a delay in developing the motor milestones. An obligatory ATNR will prevent the infant from touching and exploring his own body. The child will not be able to bring his hands to the midline to play with them, nor will he be able to bring his hands to his mouth and suck on his fingers. All of these activities are essential for self-feeding, dressing, and developing a positive body image. The infant dominated by the ATNR will not be able to raise his head symmetrically when prone or supine, to roll with a normal movement pattern, to reach and grasp objects, to sit unsupported, and to maintain balance well enough to walk. In addition, a persistent or obligatory ATNR may result in deformities such as scoliosis or dislocation of the hip. The dominated child will be likely to have difficulty in tracking an object across an arc to 180°. The child may be able to focus on an object and begin to follow it visually to midline, but may have difficulty following an object past the midline. In the older child, this could affect reaching and writing across a paper. A persistent but not obligatory ATNR may impair motor planning skills and bilateral motor coordination.



Sym trical Tonic Neck Reflex (STNR).

As with the ATNR, the position of the extremities is influenced by the STNR, which is triggered by the position of the head. The STNR appears beginning at six months of age and is fully integrated by the time the infant reaches the age of eight -twelve months. Extending the child's head will promote extensor-tone (tension in muscles which straighten a body part) or extension (straightening) of the upper extremities and flexor tone of the lower extremities (tension which bends a body part) (see Figure C). Flexing the child's head will promote increased flexor tone or flexion of the upper extremities and extension of the lower extremities (see Figure D). Often the response is more evident in the legs.

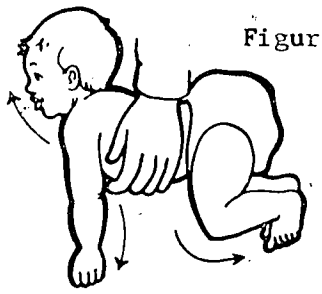


Figure C

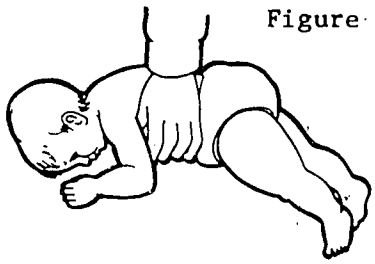


Figure D

If a response is not seen, changes may be perceived by hand contact with the muscles of the extremities depending on the position of the head. The STNR pro tes the four-point kneeling position in the developmental sequence y br aking up the extension patterns strongly developed by six months o age, but must be integrated for a child to creep with reciprocal movement of the arms and legs. When creeping, if the child's head is extended, there will be extension of the arms and flexion of the legs so that the buttocks rest on the heels. The child hops forward like a rabbit because he is unable to lift his buttocks from his heels without the arms

flexing and causing the child to fall on his face. A persistent STNR may also affect the child's ability to sit in a chair with good sitting posture with the head flexed causing the hips to extend. Other problems may include difficulty propping on flexed arms in a prone position while the head is extended, problems with walking, and problems with getting to the floor from a standing position.

Tonic Labyrinthine Reflex.

The tonic labyrinthine reflex (TLR) is a reflex which is stimulated by the position of the head in relation to gravity. The TLR is present at birth but is usually integrated by six months of age. The TLR demonstrates the primitive influence gravity has on the labyrinthine receptors in the head and on the rest of the body. When the body is supine and the head in midline, extensor muscles are facilitated and flexor muscles tend to be inhibited. Prone lying produces the opposite response. Positional changes may not be observed to be different in either prone or supine, but tonal changes may be felt (more flexor tone may be felt when a chiild is prone than when he is supine or vice versa). The persistence of an obligatory TLR prevents motor development.

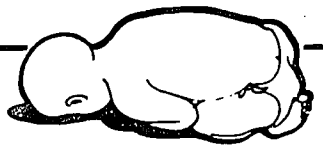


Figure E

When prone, the child cannot lift his head and support his weight on forearms or later on extended arms; he may have great difficulty rolling from prone to supine. (Figure E) When supine, the child may not be able to lift his head to come to a sitting position, flex and bring his hands to midline, and consequently may not be able to place his hands in his mouth

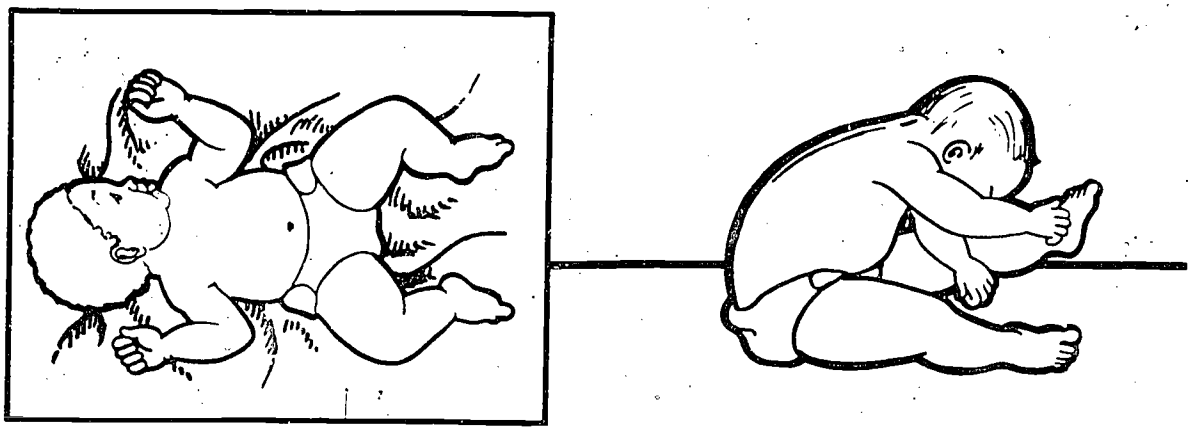


Figure F

Figure G

or suck on his fingers. Rolling to prone from supine may also be difficult or inhibitied. All of the acts are prevented by the overpowering extensor tone. (Figure F) Because a dominant TLR may impair the ability of a child to gain head control and rolling skills, further developmental milestones will be difficulty or impossible to attain. Motor skills require a controlled balance between flexor and extensor tone. If a TLR dominated child is to sit, he may to do so with total head flexion and a rounded back. (Figure G) If he extends his head, the child will tend to fall backward due to facilitation of extensor tone, causing the trunk and hips to extend backwards. He may not be able to assume all fours and creep and cannot stand and walk. A persistent or obligatory TLR in the older child may result in contractures of flexors or extensors muscles. In the adult in whom a remnant of the TLR is present or has not been totally suppressed, the individual will experience difficulty with bilateral motor coordination, crossing the midline of the body, and motor planning skills.

Positive Support Reaction.

The lower extremity positive supporting reaction allows the infant, child, and adult to bear weight when placed in an upright position. There are two types of positive supported reactions, the neonatal positive support, which is a primitive reflex; and the more mature form of the reaction, the weight bearing positive supporting reaction. The purpose of the positive supporting reaction is to permit the child or adult to stand and bear weight in an upright position. The mature form appears at six - nine months and persists throughout life. When the feet touch a supporting surface, the muscles of the leg contract to enable the extremity to form a supporting pillar as seen in illustration I. Almost all of the weight is borne and the hips and knees are fully extended. The neonatal positive supporting reflex is characterized by only partial weight borne on legs and the hips and knees partially flexed as illustrated in H. This reflex is present at birth and becomes integrated at two months of age. The positive supporting reflex should not result in a rigid posture which would prevent normal activity or movement.

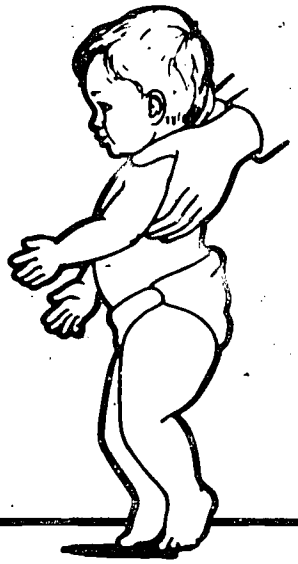


Figure H

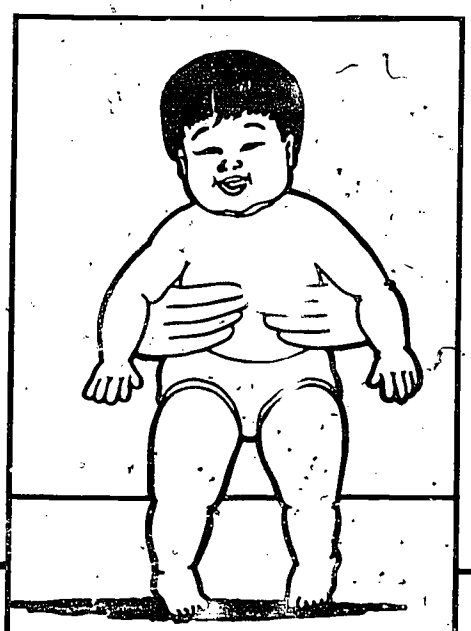


Figure I

The infant who does not bear weight when placed in the upright position will not be able to stand independently or subsequently walk. The child who demonstrates an exaggerated positive supporting reaction also will not stand independently or walk. Even if he eventually "learns to use" the exaggerated positive supporting reaction, he will not demonstrate a normal gait pattern. The legs will tend to be turned in, adducted, and up on toes. In walking, these infants touch the ball of the foot to the ground first; this further stimulates an increase of the extensor tone and prevents flexing one leg forward to separate the legs in transfer of weight from one leg to another to take a normal step. The individual can neither place his heel on the floor nor pull his foot up. Consequently, he uses his head, trunk, and the rest of his body for maintaining balance. This prevents normal gait. The child so dominated will also have difficulty sitting in a chair, standing up from a chair, and climbing up and down stairs. The increased extensor tone can lead to deformities such as hip dislocation.

Moro Reflex.

The moro reflex is one of the most commonly used reflexes in the evaluation of the neurological status of a newborn infant. It is present at birth in a full-term infant, and is strong from birth until two - three months of age and then progessively becomes weaker until it can no longer be elicited by five - six months of age. It is triggered by a sudden change in position of the head in relation to the trunk. For example, when the child is held in a sitting position and the head drops backwards suddenly, the result is a rapid, symmetrical outward and upward movement of the arms, opening of the hands, and crying, followed by the arms returning downward and inward across the chest with hands clapsed resembling an embrace.

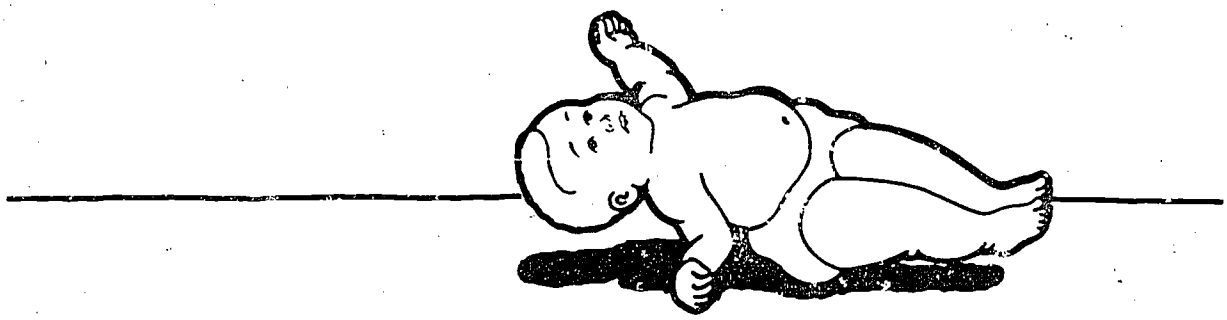


Figure J

All components of the reflex are present at birth of a full-term infant. Late persistence of the response affects the development of motor milestones and the appearance of other reflexes and reactions. As the moro reflex is being integrated, there is progressive acquisition of head control and the child is able to sit momentarily without support. If the Moro persists beyond the time it should have become integrated, there is a delay in the acquisition of head control and sitting postures and further developmental skills are depressed with the arms responding in an upward and outward manner away from the body when the head falls in extension. Protective reactions are not developed.

Flexor Withdrawal Reflex.

The flexor withdrawal reflex is present at birth and is usually integrated between one - two months. When a noxious stimulus is applied to the sole of the foot, the infant will extend the toes, dorsiflex (pull up) the ankle, and flex the leg at the hip and knee joints, as illustrated, in the supine position. The infant uses the withdrawal reflex as a protective mechanism against noxious stimuli.

Flexor Withdrawal Reflex

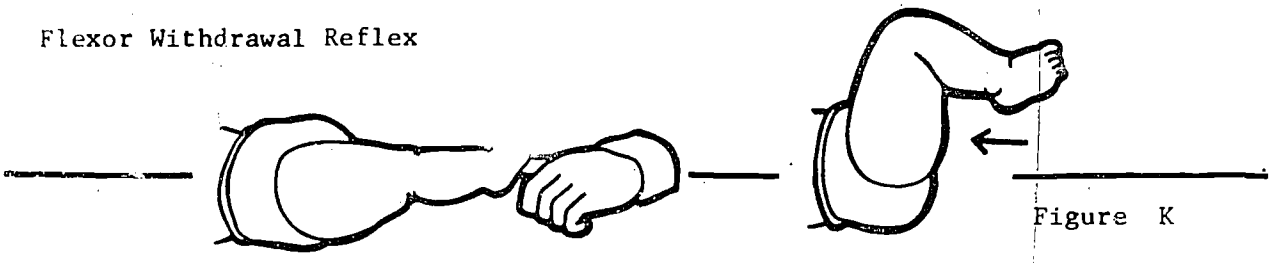


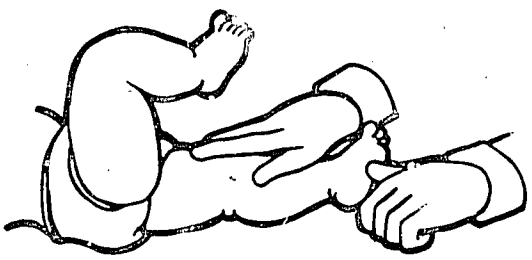
Figure K

As the nervous system matures, the reflex becomes integrated but may still be used if needed. An adult or older infant may simply dorsiflex the ankle or turn the foot to avoid the noxious stimuli. An infant dominated by the flexor withdrawal reflex will automatically withdraw in a total flexion pattern which may continuously prevent weight bearing on the legs and interfere with standing.

Crossed Extension Reflex.

The crossed extension reflex is present at birth and is integrated quickly by two months of age in normal infants. The cross extension reflex gets its name because a noxious stimuli or pressure applied to the ball of the foot of a fixed extremity will cause the other lower extremity to flex, then adduct (pull toward midline) and extend as seen in illustration L in the supine position. The reflex is also present if passive flexion of an extended leg results in extension and adduction of the opposing leg.

Figure L



The crossed extensor reflex is integrated as a result of maturation of the nervous system. However, if we need to use it, it is still there. For example, if you are walking barefoot and step on a piece of glass, you will immediately withdraw that extremity (due to the flexor withdrawal) and the opposite leg will have to bear the weight of your body. This is made possible by the positive supporting reaction and the crossed extension reflex which causes increased extensor muscles of the opposite leg. If the cross extension reflex persists beyond the time of its integration and becomes obligatory, it will dominate the individual's posture. An infant will not demonstrate good receiprocal movements in the lower extremities and which will possibly interfere with walking and may ultimately cause hip problems.

Primitive Reflexes: Oral

Teachers are urged to consult carefully with a speech pathologist and/or occupational therapist when dealing with children who appear to have possible abnormality in oral motor relexes.

Rooting Reflex.

The rooting reflex is present at birth and is integrated at approximately four - six months of age. The rooting reflex is an orientation reflex to tactile stimulation around the infant's mouth. When the corner of the mouth is gently stroked toward the cheek, the head should turn and the tongue move toward the stimulated side. With stimulation of the upper lip the mouth should open, the head extend, and the tongue move upward. Following stimulus of the lower lip, the mouth opens, jaw drops, and tongue moves downward. These responses allow the infant to search and grasp with his mouth so that he can take his mother's breast or a bottle without using his hands. The rooting reflex is also believed to functi in addition to feeding in normal development.

Repeated spontaneous head turning, which is percipitated by hunger, results in rotation of the neck and elicits the neck righting reaction to enable the infant to roll over. The rooting response also enhances the

development of head shaking, nodding, and perhaps smiling. If the response persists beyond the age when it should be integrated, it can interfere with sucking and result in the infant's turning his head at the slightest touch on the cheek.

Sucking-Swallowing Reflex.

The sucking-swallowing reflex is present at birth and integrated between two - five months of age. When the lips are touched the lips and mouth closes, in preparation for sucking and tongue movements in a swallowing pattern. When a nipple or finger is placed into an infant's mouth, the reflex is elicited resulting in a rhythmic sucking movement followed by a swallowing movement. A sucking sound can be heard. A persistent suck-swallow reflex inhibits the development of voluntary sucking movement, inability to seal the lips around a nipple, difficulty in closing the jaw and coordinating tongue movements for proper chewing and swallowing, and difficulty managing saliva, which may result in drooling. If the suck-swallow reflex is weak, poor sucking may result in feeding problems.

Bite Reflex.

The bite reflex is present from birth and gradually becomes weaker and suppressed at about three - five months. Stimulation of lips and gums results in closure of the mouth and raising and lowering of the jaw in a biting vertical up and down direction. Lack of integration may result in the child being unable to control holding his mouth open so a spoon can be inserted and removed. A dominant bite reflex may make feeding and dental care difficult and unpleasant; a child may be able to bite a cookie but not chew it. Consequently, food is swallowed without first being softened; the result is frequent choking, gagging, or coughing.

Gag Reflex.

Although the gag reflex is present throughout life, the newborn has an especially strong reaction to tactile stimulation and pressure on the back half of the tongue and soft palate which becomes weaker after about seven months when chewing begins. Such stimulation results in the child's choking, gagging, and regurgitation. Integration results from the ability of the infant to tolerate oral sensations. Failure to integrate this reflex may result in gagging or vomiting when food is placed near the front of the tongue. Lack of this reflex may result in large bites of food lodging in the throat.

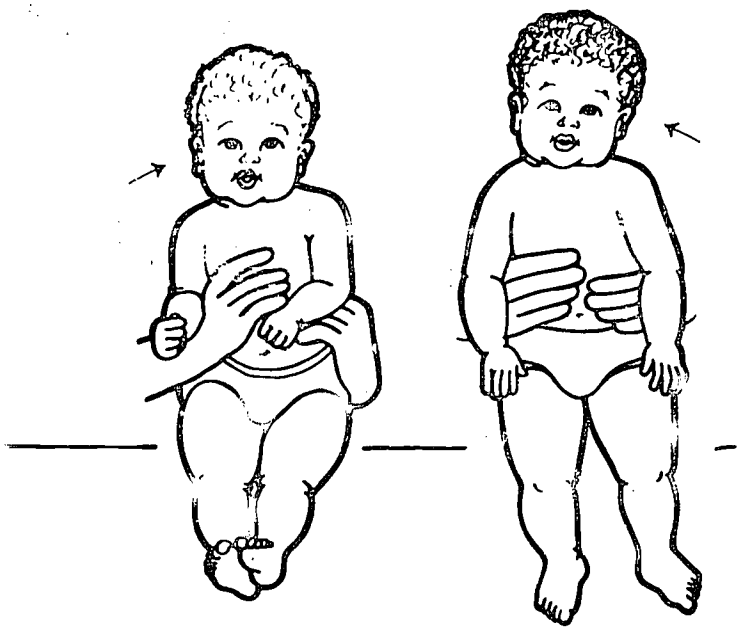
Righting and Equilibrium Reactions

Righting and equilibrium reactions, like gross and fine motor skills, follow a natural developmental sequence and result in more sophisticated physical movement.

Righting Reactions are unconscious and automatic responses which bring the child's head and trunk into a normal position in space and in relation to the ground when the body is put into an abnormal position or lack of alignment with gravity. This enables the body to assume the normal standing posture and to preserve its balance in the process of changing from lying to sitting to a fully upright position, as well as other skills in the development sequence. Righting reactions follow a definite sequential development and coincide with certain stages in motor development. Most righting reactions remain throughout life. There are several different groups of righting reactions which work together to adjust parts of the body in space. Along with other reactions, a baby uses these righting responses to roll over, crawl, creep, stand up, and eventually walk.

Labyrinthine Head Righting and Optical Righting Reactions

The labyrinthine head righting reaction keeps the head in a normal position in space or brings it into the upright position. Stimuli and gravity act on the labyrinthine which result in contraction of the muscles of the neck which right the head. Normal head righting is dependent on visual cues in addition to labyrinthine stimuli; this is known as the optical righting reactions which become predominant later on, usually becoming distinct around two months of age and gradually becoming stronger around six-eight months of age when the normal head position and its alignment with the trunk have been well established with the help of the labyrinthine righting reactions.

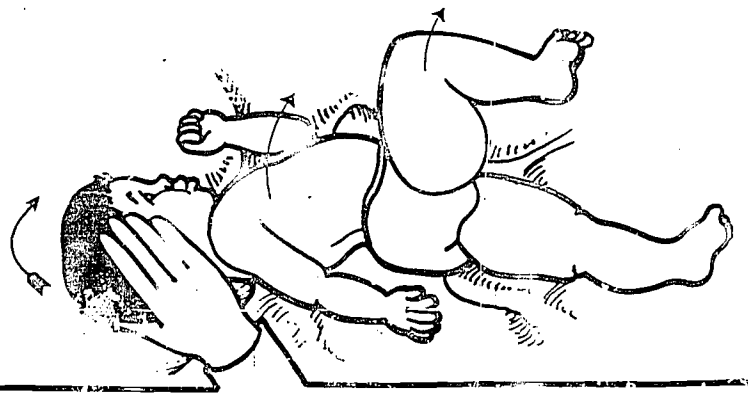


In step with the maturation of the labyrinthine organs, the baby gradually improves his head control. This begins around the fourth week in prone-lying; at first with only intermittent and weak abilities to raise the head. The improving head control can also be observed when the baby is pulled up to sitting from supine; by four months there should be litle or no head lag. As the head righting reaction and head control grow stronger,

the child is able to lift his head in prone while propping on forearms and eventually on straightened arms. At six months of age, a child held under the arms and tilted to one side will right his head to the normal vertical position. Righting reactions of the head persist throughout life and work together with other righting reactions to adjust the entire body in space in further developmental skills.

Neck Righting Reflex

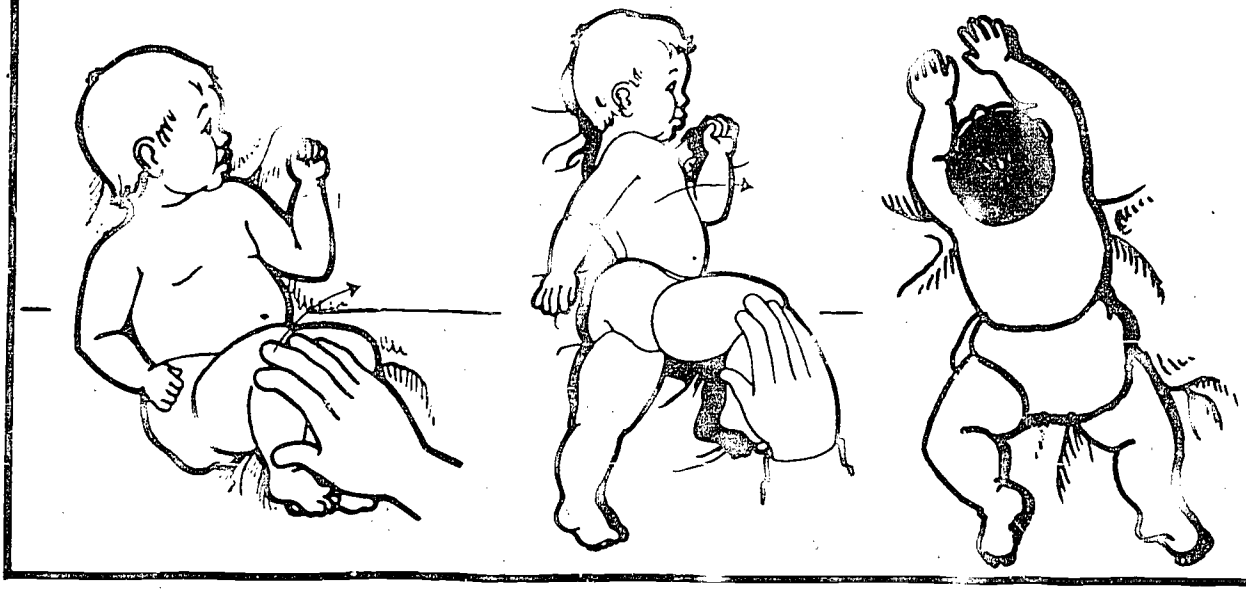
The neck righting reflex appears in an immature form at birth. When the newborn is lying in a supine position, and the head is rotated passively and to one side, the body rotates to the same side as a whole unit righting itself to the head. The shoulders and pelvis move in the same direction at the same time. This action, also known as log rolling, later enables the infant to learn to roll from supine to sideli[illegible]g. Log rolling does not have segmental sequences as in the more mature infant. This immature form indicates that rotation is beginning to develop around the body axis of the child. The mature form of this reflex appears at four-six months and produces a segmental rotation pattern as seen in the illustration. First the head rotates to one side, then the shoulders and trunk rotate, followed by the pelvis. Thus the mature form of neck righting organizes rotation around the body axis and allows the infant to roll from supine to prone and reverse.



This reaction becomes integrated at four - six years of age when the child can attain the standing position from a sitting position without rotation. The persistence of the immature neonatal form of the reflex prevents the development of segmental rolling. If segmental rolling is prevented, the child will have difficulty with other development of segmental milestones because he cannot use rotational components. A child that does not have the ability to right the body is usually severely limited because he will not be able to dissociate his body from his head to move one without the other. He will lack trunk rotation patterns needed for rolling, attaining sitting, standing, and all upright activities which require rotational components.

Body On Body Righting Reaction

This reaction develops at the age of four to six months and works in reverse to the neck righting reflex. When the child is lying in the supine position and one leg is flexed up towards the chest and rotated across the body, the child will roll over with rotation, the pelvis moving first followed by the trunk. If the child rolls as one segment as in log rolling, the body on body reaction is not present. A child uses body righting with full rotation to attain sitting at ten months of age.



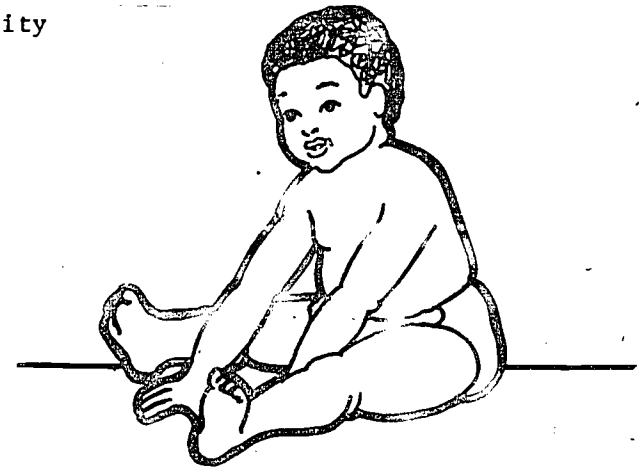
When the child begins to assume a hands and knees position, he must separate the alignment of hips from his shoulders, drop back onto a hip and then realign himself to come to a sitting position. At approximately ten months until two years, to assume a standing position from supine, the child must roll to prone with complete rotation, attain a hands and knees position, and then stand. Between two -three years when there is a transition from complete rolling over to rolling to side to attain sitting. The body righting reaction is not needed at the age of four to six years when the child rises from supine to sitting without using rotation. All righting reactions work together but the body reaction appears to be the most important part of the movement in attaining an erect position from supine. Rotation is critical in learning to walk. The child must be able to move his alternate hip and shoulder and then realign them to be able to use an arm in balance with the opposite leg. A shift gait pattern is an example of inadequate body righting.

To summarize, the righting reactions work together to achieve developmental milestones. The labyrinthine and optical head righting reactions enable the child to learn and maintain head control; the stimuli include visual, proprioceptive, and labyrinthine. The neck righting and the body righting reflexes enable the child to achieve rotation between the body parts. They are both stimulated by tactile and proprioceptive stimuli. In the absence of righting reactions, a baby will not learn to develop head control, roll, sit, or walk.

Equilibrium Reactions are the body's automatic reactions which the body uses for maintaining or controlling its center of gravity. Any time the center of gravity is moved in any direction, some form of an equilibrium reaction is elicited. Equilibrium reactions can be divided into two different categories: protective reactions and tilting reactions.

Protective Reaction serves to protect the body when it is displaced by horizontal or diagonal forces. These reactions automatically enable the body to protect itself from falling. The reactions develop from infancy and remain through adult life.

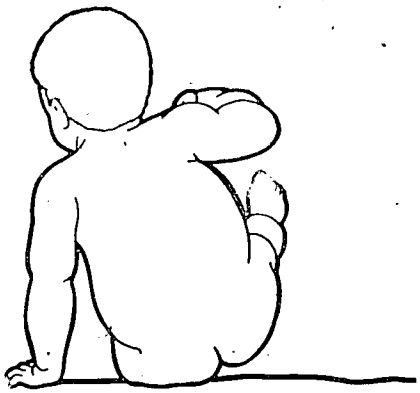
The pre-requisites for protective reactions of the upper extremities develop sequentially and can be seen when an infant is placed sitting on the floor and his weight is suddenly displaced forward. The arms flex forward at the shoulders and extend at the elbow and hands touch the surface to prevent falling forward by supporting self on extended arms. The onset of the protective reaction forward is seen at six - seven months and coincides with the infant's ability to bring extended arms forward for reaching out and bearing weight when sitting with arms propped forward. (See Figure T) →



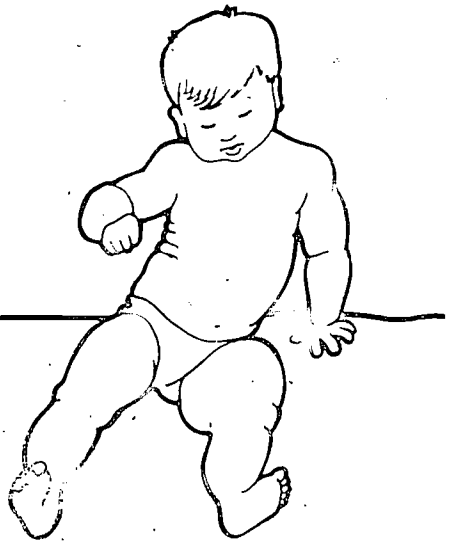
The protective reaction parachult reaction is seen at [illegible] months. (See Figure U) →

When an infant is held in a vertical position and is plunged downward toward a flat surface, the arms abduct, elbows extend, and the fingers extend and spread as if to break a fall.

The onset of the protective extension reaction sideward is generally at seven months of age and prevents falling to either side when center of gravity is displaced.



As the infant learns to sit, this reaction can be readily seen in coordination with its predecessor, the protective reaction forward. The protective reaction of the arms backwards can be elicited at nine - ten months of age.



This reaction protects against a fall when the center of gravity is displaced backwards. Both protective reactions forward and sideways are needed for the infant to be able to sit without arms supported. At nine - ten months of age when the protective reactions are present and are used for support and balance, the normal infant generally has good sitting balance and can rotate the body about its axis without falling. In addition, these protective reactions are part of the requirements needed

for the child or adult to push up to sitting from prone or supine; attai[illegible] hands and knees position for creeping, plantar grade walk, and to attain a standing position from supine without rotating the trunk. (Righting reactions are also necessary for these activities). The legs also develop protective reactions which serve to maintain balance.

Ti[illegible] Reactions

The second category of equilibrium reactions is referred to as tilting reaction[illegible]. These reactions occur because the body's center of gravity has been displaced by a tilting of the base of support or anytime the base of support becomes unstable when the subject is moved in such a way that his center of gravity moves outside his base of support. Proprioception, vestibular, and vision all play a role in tilting reactions. Tilting appears in an orderly developmental sequence. The reaction in prone develops at five months and supine at seven - eight months. (Figure X) When a child is lying on a surface and this surface is tilted, you would expect the infant's spine to curve into the shape of a "C", the head will turn, the upper leg and arm may abduct and extend toward the high side of the tilt. The response in sitting occurs at seven - eight months and appears as described above when tilted sideways.

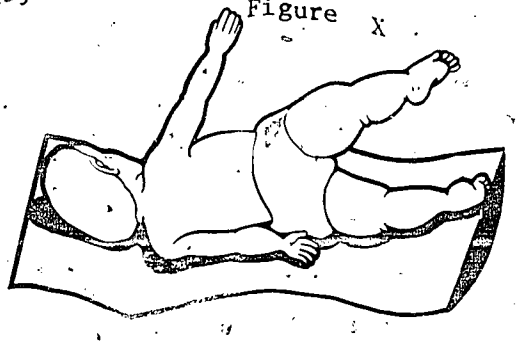


Figure X

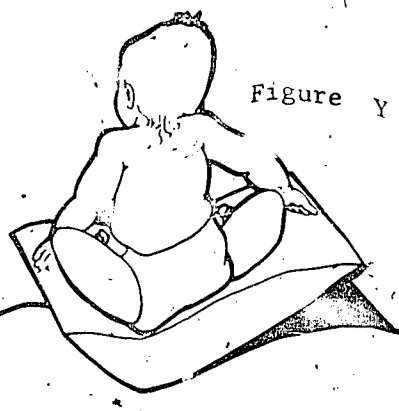


Figure Y

Figure 2

When tilted forward or downward, the spine will extend and limbs pull back, and the head rights. When tilted backwards, the spine flexes, limbs advance, and the head rights. (Figure 2) Full tilting reactions prone and supine and beginning reactions in [illegible] are needed for an infant to sit without hand support. Tilting reactions on all fours appear at nine to twelve months. All reactions persist throughout life. Full tilting reactions in sitting and beginning reactions on all fours are needed for creeping. Full tilting reactions on all fours and beginning reactions in standing are needed for standing and walking. Thus beginning tilting reactions in specific developmental positions are needed for the acquisition of motor milestones while perfection of the tilting reaction does not take place until the child has advanced developmentally one stage beyond it.

Communication Development

Introduction

A child's major accomplishment during the period from birth to five years is the achievement of language. During those years, the child learns to be a communicator, using a complex symbol system shared by his community. He understands and gives information, and uses language to control his environment. The development of this communication system depends upon development in the motor and cognitive areas as well as interactions with people and the environment. To facilitate this development in both normal and handicapped children, it is important to know what language is, to be aware of the components of language, the major stages that characterize language development, and the sequence of acquisitions in each stage area. It is equally important to understand how caregivers aid a normal child to develop language, and how these procedures can be applied to the handicapped child.

Receptive and Expressive Development

To begin, we need to understand the nature of receptive and expressive language development and the interaction between understanding and speaking in the course of communication development. In language, receptive development represents comprehension: the listener understands and more specifically, develops the the ability to derive intended meaning through decoding the language heard. Expressive development refers to speech production, what a speaker says, and more specifically, the speaker's ability to use words for a particular meaning. Many factors contribute to developing understanding and expressing messages in early language. Cognitive development, cues from facial expression, gaze and gestures of the speaker, and cues from events in the context are important as well as understanding the system of word order.

Over the years, the view has been held that understanding occurs before expression in the course of normal language development. Recent data and perspectives have challenged this assumption. To date, the best resolution suggests that comprehension and production do represent dependent, yet different processes. Although comprehension seems to be the first step in the language acquisition process, there may be a shift of influence over the course of further language development. Thus, the timing and sequence of receptive to expressive language development appears to be a function of many variables and seems to vary over the course of development. These two aspects seem to occur concurrently, at different stages, within the context of early social transaction. The teaching process must be sensitive to the child's development in both areas and not assume one will occur or has occurred on the basis of a measure of the other.

There is a dynamic interaction between receptive and expressive development. For ease of use, the communication behaviors unit addresses both areas. The division of receptive and expressive competencies is intended to assist the teacher in identifying of the child's strengths and weaknesses, and in choosing appropriate teaching methods. In reality, behaviors are not absolute and exclusive; they develop on a continuum. Some overlapping is inevitable.

Throughout the teaching process, it is critical to observe the child in the generalized setting, or understand his functional level of performance. Skills exhibited in this situation are key to the child's level of impairment. Some general characteristics which reflect degrees of receptive and expressive language impairment are listed below as an aid in understanding how a child is functioning in the language areas.

I. Receptive Involvement

A. Severe Comprehension Difficulties

1. A symbol is lacking. The child understands neither spoken words nor meaningful environmental sounds, and cannot relate these to an appropriate experience.

2. The child responds inconsistently to words or sounds that he hears.

3. The child may be learning only through vision and touch.

4. The child may appear quiet and use few sounds.

5. The child may follow gestural commands, as opposed to words alone.

6. The child repeats what is spoken to him without understanding it.

7. The child may experience difficulty with memory for words.

8. No integration or processing of combination of words occurs.

B. Moderate Comprehsion Difficulties

1. The child may understand simple words, such as nouns, but has difficulty with more abstract words.

2. The child often does not understand actions, feelings, or idea concepts.

3. The child may exhibit echolalia and use restricted vocalizations.

4. Minimal integration occurs.

C. Mild Comprehension Difficulties

1. The child may comprehend some basic structures (two word combinations) of language.
2. The child may exhibit some echolalia, with jargon also observable.
3. The child usually experiences word recall difficulties.
4. The child may have difficulty with abstractions (concepts of quality, feelings, etc.)
5. The child has difficulty with intetgration and with responding to question forms.

II. Expressive Involvement

A. Severe Expressive Difficulties

1. No meaningful verbal expression is apparent. Uses no language or speech.
2. The child may rely on gestures as a means of expression.

B. Moderate Expressive Difficulties

1. The child may repeat words and recognize them on a receptive level, however, recall is impaired.
   a. Spontaneous recall of words difficult; the child cannot initiate the verbal expression.
   b. Word meaning errors may occur (i.e. may say "shoe" for "sock").
   c. Articulation problems may be apparent.
2. The child may omit words; i.e., leaving out connecting words, modifiers, as in a telegraph message.
3. The child may delay in an expressive response.

C. Mild Expressive Difficulties

1. The child may distort word order, i.e. truck big, rather than big truck.

2. Grammatic difficulties may be apparent.

Language Component: Use, Content, Form

According to research in the area of language development, language is "a code for representing ideas about the world through a conventional system of arbitrary signals for communication." Language is composed of three basic dimensions: use, content, and form. Language use is the purpose or reason why individuals speak. Language content is the meaning or what individuals understand or talk about in messages. Language form is the shape or sound of messages and the ways elements in a message are combined. Specifically, language consists of some aspect of meaning or content that is represented by an accepted form for some use in a particular context. The interaction of these three components makes up a plan for the behaviors involved in understanding and speaking messages. Children learn language as they use language, both to comprehend and express messages. Specific aspects of these three components will now be presented. Each aspect has a level of understanding (reception) and a level of production (expression), and interacts with other component aspects to result in a total communcative process.

Language Use and Pragmatics

Language is used for a particular purpose in a particular context. This concept relates to the pragmatic aspect of language. For our purposes, the term pragmatic will be used in a rather restricted and simplified sense to refer to the communicative functions of language.

Social interactions play a vital role in a child's acquisition of language. Children first develop language as a means of expressing their needs. For this reason, we say that language use emerges from a child's socio-communicative development. In a communicative situation, there has to be an intent to communicate. Children learn to talk because, and only because, they have a reason to talk. Language use and pragmatics is the foundation of other aspects of language (i.e., semantic and syntax). That is, children learn to communicate before they learn the content and conversational forms for communication.

Use of language is observed in the early behaviors of infancy. Specific pre-cursors provide the groundwork for development of this component. The origins of language use begins in infants' earliest gazing and vocalizing exchanges with caregivers in the first few months.

Precursory goals of language use include:

1. reciprocal gazing - frequent exchange of gaze in the context of other interpersonal activities (greeting, showing, giving).
2. regulating the behaviors of others - infant, without words, requests attention, assistance, and objects by gesture, facial expression, and vocalization.
3. calling attention to objects and events - infant directs attention of others to objects or events, by showing, giving, or pointing.

As the child begins to develop early language, many communicative intents are understood and expressed. For example, language can be used to give information, to get information, to express feelings, to change the behavior of others, and to maintain or initiate conversation. There are also social rules that govern verbal interactions, such as the courtesy of only one person talking at a time.

Pragmatics, the practical use of language, is a foundation of communication development. Children must learn that language is a tool to control the environment, and that their needs can be met through expression. In addition to teaching form and content, it is necessary to teach the uses of language. The following guidelines regarding pragmatics should be helpful in teaching various functions of language.

1. Model the various uses of language for the child.
2. When the child uses gestures (pulling, pushing) to communicate, model appropriate words which will achieve the same end.
3. Provide practice and training in as many environmental contexts as possible, (e.g. individual training, classroom, playground, home).
4. Role play those contexts which are not readily available in training situations.

Language Content and Semantics

Language consists of meaning; what people understand when other people speak, and content; what people talk about. This concept relates to the semantic aspect of language. Semantics is meanings intended by the use of certain language forms. The content of a child's language and his ability to comprehend and express meaning depends on knowledge and the situation. For this reason, we say that language content emerges from a child's cognitive development. It derives from a child's memory and from capacities to think and feel.

Language content also develops in infancy. The precursors of language meaning develop as an infant learns about objects and relationships between objects. Specifically, infants learn about the permanence of objects - the fact that objects exist apart from their own movements and actions and apart from the time and space contexts in which they are perceived. The recognition of these relationships is critical for communicative development. Precursory goals of language content include:

1. Recurrence - infant searches for objects that disappear.
2. Causing objects to disappear - infant makes objects disappear.
3. Acting on different objects in similar ways (non-specific play) - child manipulates different objects in the same way.
4. Acting on different objects in prescribed ways (object-specific play) - child manipulates objects differently according to the properties of the object.
5. Acting on two objects in relation to each other. - child brings two or more objects into relation to one another with respect to a specific action.

Children learn these procedures without knowing the words. As language emerges, many semantic relationships, i.e., the meaning of words, are understood and expressed. Initially, the meanings the child understands and communicates are tied to concrete objects and observable actions that are immediately occurring. Later, he can describe attributes of objects and actions which occurred in the past or will occur in the future. Even later, he will learn abstract concepts.

The following charts characterize early semantic behaviors that appear with the emergence of one, two, and three-word utterances:

Major Function Words and Their Agreement Meanings as One Word Utterance -- From Bloom, 1973

General Relationship	Word	Function/Meaning
Existence	"There"	To point out objects
	"uh-oh"	To point out objects-- particularly those which startled.
Recurrence	"More"	First to request and later to comment on the recurrence of an activity or object.
Disappearance	"All gone"	To comment on the disappearance of an object which had existed in context.
	"gone"	(Same as above)
Nonexistence	"No"	To comment on nonexistence had been expected.
Cessation	"Stop"	To comment on the cessation of an activty.
Rejection	"No"	To protect undesired action or comment on forbidden object (e.g., stove).
Action	"Up"	To request the action of being picked up.
Location	"Up"	To comment on spatial location.

Major Two and Three Word Utterances Types

Two word Utterances*

Utterance Type-Semantic	Syntactic Structure	Example**
1. Agent-Action	Noun & Verb	"Eve read"
2. Action-Object	Verb & Noun	"Read book"
3. Demonstrative Entity		"That book"
Nomination	That/It/etc. & Noun	"It book"
Notice	Hi/See/etc. & Noun	"Hi belt"
4. Possessor--Possession	Noun & Noun	"Mommy lipstick"
5. Entity--Attribute:	Verb & Noun	"Fall 'gin"
Recurrence	More & Noun	"More milk"
Nonexistence	No/All gone & Noun	"No doggie"
		"All gone milk"
Attribute	Adjective & Noun	"Big train"
6. Entity--Locative	Noun & Noun	"Sweater chair"
7. Action--Locative	Verb & Noun	"Sit chair"
8. Agent--Object	Noun & Noun	"Mommy sock"
9. Conjunction	Noun & Noun	"Umbrella boot"

Three Word Utterances

1. Agent-Action-Object	Noun & Verb & Noun	"Mommy spill juice"
2. Agent-Action-Location	Noun & Verb & Noun	"Daddy sit chair"
3. Action-Object-Locative	Verb & Noun & Noun	"Throw ball here"
4. Agent-Object-Locative	Noun & Noun & Noun	"Daddy ball chair"

* Two word utterances types are listed in approximate order by frequency of occurence from most frequent (Agent-Action) to least frequent (conjunction). This order is derived from the data presented by Brown (1973) and MacDonald (1974).

** Examples of two word utterances are from Bloom, (1970).

In summary, comprehension develops as the child observes, acts upon, and understands objects in his environment. When the child develops imitative skills, the language learning process is further stimulated. The child can verbally imitate words and pair them with their referents. Adults play a significant role in the language process. Caretakers usually modify their language to assist the child in understanding and learning the language. Adults modify their language by: (1) initially choosing vocabulary items that are acoustically distinct and short; (2) presenting new items using repetition, stress, and slower rate; (3) devising situations to promote interpersonal interactions; (4) using shorter sentences; (5) using less grammatically complex sentences; (6) using vocabulary which refers to items that are present; (7) repeating the same message in a number of ways; (8) restating information when the child fails to indicate understanding; and (9) using gestures along with words to clarify the intent. These strategies may be equally helpful in stimulating language development with the delayed child.

Some recommendations are made in this manual for specific words to be taught to a child with which to control the environment. (Refer to Resources Section) Answers to the following questions can also aid in choosing initial vocabulary:

1. What things does the child like to play with?
2. What objects does the child frequently have contact with?
3. What activities are especially motivating?
4. Which people are important?
5. How does the child presently let others know that the above are enjoyable? These behaviors can serve as cues to teach a label to the child.
6. What environments are regularly encountered and what words do they require?

Language Form and A Conventional Code

Language is coded by a form. Specifically, form is the shape, configuration, or external appearance of the language content (for example, speech sounds, grammar, etc.). Phonology, morphology, and syntax are all basic aspects of form that will be discussed in the following paragraphs. Generally, we are talking here about the child's development of a conventional linguistic code, the structure of what he says. A child's linguistic development emerges from his experiences with mature speakers in his enviornment.

The production of the linguistic signal should be a goal related to early language learning. The precursors of language form are:

1. imitating movement and vocalization - infant imitates body movement and sound vocalization in useful and meaningful situations.

2. producing speech-like patterns in varying degrees of approximation to the adult model - child attempts to produce words in relation to goals of content and use.

Phonology, morphology, and syntax are all aspects of form that emerge with comprehension and production of the speech patterns. Just how they correlate with one another in normal development is not known, but children master these in varying degrees to approximate the adult language and speech code.

Phonology refers to the sounds that make up oral language and the ability to combine sounds into sequences of words and sentences. To communicate, the ability to form sounds correctly contributes to the intelligibility of speech and affects the formation of meaningful words and sentences.

The ability to produce sounds depends on motor capability, intact hearing, and sound stimulation within the environment. Cognitive processes are also important, since the ability to imitate sounds has a direct effect on the exactness of sound repetition. Immediately after birth, the child suckles and swallows liquid. This behavior is obviously vital to the child's existence. This very early motor behavior is also the first step in gaining control of the oral musculature which is later used in speech. As the child is able to progress from a liquid diet to textured foods, he is learning to control the more refined motor movements necessary for speech. Other motor developments, such as learning to maintain an upright aligned posture, further enhance the child's ability to produce sound. This upright aligned posture yields a larger lung capacity which in turn allows production of a greater number of syllables with each breath. At about four months, the child produces cooing sounds. These sounds result when the infant is in a relaxed and comfortable state: air passing across relaxed vocal cords produces sounds. As the child gains control of throat muscles and learns to change the positions of the lips, tongue, soft palate, and vocal cords, he can produce a greater variety of sounds. The babbling and syllable production of the infant are a means of practicing sound production. The infant finds it pleasurable to produce and hear these sounds and continues to do so, even when playing alone. At the phonology level, sounds, unlike words, have no meaning and are not symbols. The chart on the following page outlines the ages at which all speech sounds are acquired.

Articulation Behaviors

This chart shows the age level at which 75 per cent or more subjects correctly produced given phonemes from the Photo Articulation Test.

24 mo	t-(toy) n-(no) -n(on) k-(cup) g-(go) p-(pull) -p(up) b-(big)	m-(more) -m(ham) h-(house) au(cow) u(zoo) æ (rat) ɔ(dog) ə(about) ai(I)	ɛ-(heavy) a(hat) i(eat) e(bet) ʌ(up) ʊ(hood) o(oh) I(if) oi(boy)
28 mo	-s(bus) d-(dog) -d(bad)	-k(back) f-(for) -f(if)	-ŋ(long) j-(you)
32 mo	-t(bat) -r(car)	-b(cab) w-(will)	ɝ(her)
36 mo	s-(so) -l(tall)	-g(dog)	
40 mo	ʃ-(push) l-(long)	bl-(blue) r-(red) br-(brown)	tr-(try) -v(have)
44 mo	ʃ(shot) t-(take)	-t(catch) fl-(fly)	
48 mo	sp-(spot) st-(stop)	kl-(clean) ð(they)	θ(bathe) ʒ(beige)
48+ mo	z-(zoo) -z(goes)	θ(think) θ(path)	hw-(when)

FROM: Sequenced Inventory of Communication Development: Expressive Scale 1975 by Dona Lea Hedrick, Elizabeth M. Prather, and Annette R. Tobin

University of Washington Press
Seattle and London

The ages of sound acquisition listed on the chart reflect ages by which 75% of normal children acquire these sounds. There is considerable variation among children. Part of the developemental process includes the mispronunciation of sounds. If extreme discrepencies exist, a speech pathologist should be contacted. In stimulating correct sound production it should be noted here that speech concerns, other than with phonology, may surface during the teaching process. There may be a question of the child's fluency of speech, although a certain amount of dysfluencies (disturbances in rhythm) are normal during the preschool years, due to the emerging nature of language. Voice problems may appear with pitch (too high/too low), loudness (too great/too weak), or vocal quality (hoarse, harsh, breathy, spasmodic, hypernasal, hyponasal). In either case, consultation with a speech/language pathologist would be appropriate.

Morphology is the level at which sounds and strings of sounds have meaning. The sound "p" does not have meaning. The combination of sounds to produce "pat" represents a word. There are also sound combinations that when added change the meaning of a word. Examples of morphemes are "ing" to denote present action or "s" to mean more than one. As children develop cognitively and have experience with actions, objects, and events, they begin to understand the use of these morphemes.

Syntax is word order in the sense that an orderly arrangement of words conveys an exact meaning. The sentences "The boy hit the girl" and "The girl hit the boy" consist of the same words, but the arrangments convey different meanings. The sentence "He is going" can be changed to "Is he going" to make a question. Children begin to acquire skills with syntax when they begin to speak in two word phrases. Even at the two word level, children have specific patterns, methods, or procedures for ordering words.

The patterns they use are initially different from those of adults, but during the years from two to five, they learn patterns of adult syntax and produce sentences and questions in line with adult speech. At two a child would say "turtle crawl," later "turtled crawled?" "Why turtles crawled?" and finally "Why do turtles crawl?" Obviously, the patterns range from the very elementary to the very complex and acquisition is dependent upon the cognitive skills required to understand shifts in the meaning.

Principles of Language Intervention

Because language development in delayed children generally follows the same sequence as normal children, the following priniples should be observed in remediation strategies:

1. The content for language training should be taken from what is known about normal language acquisition.
2. The concept taught should also be based on normal development and sequenced by level of difficulty.
3. To the extent possible, language training should take place in a functional environment. Teach food names and applicable words at mealtimes; teach clothing names while dressing.
4. For first language, teach vocabulary that is relative to the child's natural environment and can be used to control that environment.
5. When teaching a new grammatical form, use it with words that the child already has to express concepts the child already knows. For example, if the child uses "my" to express possession, teach "my ball" as a two word utterance.

Resources for Facilitating Language

The following sections offer suggestions for those involved in stimulating early language behaviors. The focus is on vocabulary development and language experiences.

Beginning Vocabulary List

It is recommended that words that are meaningful, frequent, and efficient are good choices. Research has shown that young children first understand and use substantive words and relational words. The following chart suggests words to be emphasized, as they appear to emerge early in the interaction process of language content/form/use:

Concrete Words

These words represent particular objects or categories of objects, relevant to the child.

Labels of:

people	food
objects (common)	clothing
toys	pets

Relational Words

These words refer to a relationship between objects and include parts of speech such as verbs, adjectives, and prepositions. They are less specific than concrete words.

A. Not Specific to Object - can be used in reference to all objects

Word	Content
no	(rejection, nonexistence, prohibition of action)
all gone	(disappearance)
stop	(cessation of action)
more, again	(recurrence of objects
another	and actions on objects)
this, there, that	(existence)

B. More specific - but can still relate to many objects

Word	Content
give, do, make, get, throw, eat, wash, kiss, broke, close, open, fix, push, take, play, find, hold	Actions on Objects
put, go, up, down, sit, fall, out, come, away, stand, climb, fit	Actions involved in locating objects or self
big, hot, dirty, heavy	Attributes
see, look, at	Notice

Facilitating Language Experiences

Selection of activities which the child is familiar with, enjoys, and in which he can become involved serve to facilitate language development. Activities should involve the demonstration of relations, giving the child experience with entities and events in his environment. Specific relations should be selected according to the language content categories which the child is learning to code. Opportunities to strengthen language use and form should be maximized concurrently. Supportive teaching strategies may include repetition, exaggeration, or gesture.

Activities that best serve to demonstrate language concepts come from the child's everyday experiences. Some typical home and school activities (as outlined by Bloom and Lahey, 1978) are listed below according to language content categories.

1. Activities for Existence.

   After initially pointing out that an object exists, provide identification statements.

   a. Identify objects taken from a bag.

   b. Point out interesting objects at the zoo, fire station, store, etc.

2. Activities for Disappearance.

   After identifying an object, it can be hidden from view or, as the child finishes food or drink, comment on its nonexistence or disappearance.

3. Activities for Recurrence.

   Nonlinguistic demonstrations of recurrence should involve both the reappearance of multiple instances of objects as well as events. In a child's normal environment, such situations occur

all the time; eating is a continual process of repeated actions ("another cookie," "drink again," etc.) Other situations that lend themselves to the coding of recurrence are:

a. Playground--slides, seesaws, swings (up and down again).

b. Shop--bang again, another nail.

c. Art--another crayon, color more, cut another one.

d. Block and puzzles--another piece or block.

e. Gym--jump, throw, tumble again.

f. Looking at a book--another (object or person) in the picture, turn another page, turn again.

g. Sand table--make another one, pour more sand in.

4. Activities for Possession.

To teach possessor-possessed relationships (Mommy's coat, my hat) the demonstration of the concept should include objects the child associates with particular people. Brown (1973) reported that objects that could conceivably belong to a number of people were talked about in terms of possessive relationship before body parts (inalienable objects). It is possible that noting the owner of a bike or cookie is more important than the owner of a nose or an eye. Thus, clothing, art work, personal toys, lunches, assigned storage spaces, chairs, or desks provide opportunities for ownership illustration. To illustrate possessive relationship, it is important that the possessor and possessed object are, in fact, related in the child's world and not just temporarily assigned for the duration of the lesson.

5. Activities for Action.

Action is a major portion of a child's life, so there should be little problem finding actions in the child's natural environment. The following are activities that the child can both participate in and observe. The form to be presented may vary from single words to coordinate and subordinates complex sentences, depending on the content/form interaction of interest. For example, in an activity centered around cooking, "pour," "open," "mix," "stir," and so on could be presented as single word utterances or complex casual sentences with "because". For example, "We can't pour the pudding because the box is closed," "Don't touch the pan because it's hot." Thus, particular activities can form the core for learning many content/form interactions. Some likely situations are:

a. Playground--slide, run, hop, jump, swing, throw.

b. Sandtable--build, pour, pat, mix, stir, push, spill, make.

c. Water play--wash, pour, spill, splash, dry.

d. Cook--mix, bake, stir, pour, cut, make.

e. Art--cut, draw, color, paint, paste, tear, fold, make.

f. Shop--hammer, saw, bang, build, turn.

g. Snack--eat, drink, open, pour, cut, wash, clean, wipe.

6. Activities for Locative Action.

Children often locate objects in their environments. Many opportunities to learn to talk about such actions occur in the classroom and home.

a. Cleanup time--putting many objects in many different places.

b. Play with trains, trucks, or doll houses also involves much locating activity.

c. Dressing or undressing--putting clothes on and taking them off.

d. Form board and puzzles--putting pieces in board.

e. Telling another or self where to hide objects: "Dog goes there", "You put it there", or "You sit there".

7. Activities for Locative State.

Situations referring to the static location of objects are easy to design and certainly are numerous and varied in the child's life. To demonstrate this relationship, it is important to select objects and places that are familiar to the child. Static spatial relations follow learning about locative action. Searching activities can incorporate locative state, nonexistence, and where questions about locative state.

8. Activities for Internal State.

It is difficult to set up situations so that the child will change an internal state. Ideally, the teacher will have enough contact with the child to be with him or her when the child experiences and shares many states of being, such as "tired," "scared," "sad," "mad," "hungry," "thirsty," or "happy." When these situations occur, the descriptive language forms can be supplied.

Wanting is perhaps the easiest state to create and, in fact, the earliest state children learn to code. Desired objects can be made almost available and if the child reaches for the object, the form can be provided: "You want x.".

9. Activities for Time.

Arranging events to show time relations involves coupling the correct language form with the event as it happens. The events may be the same as those under action, locative action, and state. Ongoing activities need to be talked about as they are happening (jumping, drawing, walking, making, stirring, etc.). Intention should be noted as the child is about to do something (I'm gonna jump; now I'm jumping"). Reference to past time should begin with events that they have just finished. ("I jumped"), that is, events in the immediate past and events the child has just experienced. Time relations between events can first refer to combined sequential actions, "You put the milk in the bowl, and then you stir--you're pouring the milk/and now you're stirring/and it's all mixed." Simultaneous time events can also be coded, "I pour and I stir" or "I pour while I stir" (at the same time).

Communication-Related Skills

The following section is designed to assist the teacher throughout the language-learning process. Although the aspects of cognition, attention, and play are mentioned in relation to communication within the guide's narrative, this focus will offer specific suggestions and implications for language development.

Communication and Cognition

As has been stressed throughout this child development section, development in the cognitive area is essential to communication. Although precursory skills to language use, content, and form have been outlined in the language components section, further emphasis on critical cognitive landmarks for communicative acts is offered here. It is important for teachers to closely observe the children's behavior. Such observation will provide insight to language development. The following chart is intended to link the early parallels in cognition and communication so that teachers may target behavior.

CRITICAL COGNITIVE LANDMARKS FOR COMMUNICATION DEVELOPMENT

General Category of Schemas	Parallel Realizations in Language Behavior
Schemas for Relating to Objects Develop a) Indiscriminative mouthing, banging, etc. b) Activities begin to narrow for different objects. c) Activities become "appropriate" for objects.	Relational knowledge underlying referencing.
Means to Ends Schemas Develop a) Random actions produce results. b) Effective actions repeated to recreate interesting effects. c) Objects joined with other objects to produce efforts. d) Object/object acts used to reproduce effects. e) Tool use develops cause-effect planned actions.	Move from nonintentional acts to intentional acts to use communication socially. Non-intentional action becomes intentional in an effort to communicate.
Intentional Representations of Entities, Events Entities, Events, and Relationships a) Dropped object or one moved out-of-sight and it ceases to exist for child. b) Searches for object hidden or dropped.	Ideas of events, entities, and relationships are translated into purposeful language.

Communication and Attention

Attention is vital to the learning process. Although specific criteria include attention shaping as part of the language/speech skill, some children need additional support for this area. The following is a hierarchy of behaviors on attention, designed to aid the teacher in increasing attention skills.

Visually locates and attends to objects with sound.

Locates and attends to sounds made by another person.

Visually locates and follows an object without sound.

Touches an object in response to a verbal cue.

Reduces the amount of time or frequency of inappropriate behaviors.

Receives and responds to the stimulus within a _____.
(specify time)

Attends to a specific task for progressively longer periods of time.

Attends to a task for _____.
(specify time)

In the presence of a distracting stimuli (e.g. other children are on the playground outside the room).

Fixes attention to a chosen concrete task (e.g., picks a toy to play with).

Fixes attention to a task, stopping to listen to instructions and attempting to carry them out.

Fixes attention on a task while incorporating verbal direction (e.g., student manipulates puzzel pieces as directions are given by the teacher).

Follows group commands.

Communication and Play

Children's play provides numerous opportunities for language-building and enrichment. Observation can provide teachers with vital information related to a child's developmental level. Correspondingly, language input and expression stimulation can be structured to the specific level, with strategies to provide growth to the next. The following levels of play are outlined to aid interpretation of how the child views and represents his world. Language instruction should be modified to meet the child's interest and needs.

1. Exploring - The child does not play with the objects, but rather explores them in a variety of ways. He uses his different senses.
2. Functional Play - The child uses the object in a manner in which adults assume the object should be used.
3. Play with Two or More Objects - The child uses one object in relation to others (i.e., may use truck to knock down blocks).
4. Creative - Symbolic Play - The child uses some objects to represent other objects (i.e., a coat to represent a doll bed).
5. Imaginative Play - The child goes through an imaginary sequence of events with the play materials.
   a. Child as actor (i.e., he plays "Spiderman").
   b. Child as director, toys as actors (i.e., play with toy people).

Other Considerations

It should be noted that sound and grammar differences in individual children may exist due, for example, to use of Black English rather than Standard English. Research has shown consistent patterns of development in Black English, with the implication that these are to be viewed as differences rather than deficits. Sociolinguists confirm that nonstandard language and speech are highly developed and reflect a sound system and grammar that is merely different from that of a standard speaker. A child's language and speech must be functional and any teaching should take the child's social environment into account. If there is a question of language and speech discrepency, referral to a speech/language pathologist would be appropriate to determine whether an actual language and speech impairment exists, as opposed to a difference.

The content of this manual outlines the normal development process of spoken language. There are children who will not develop verbal communication skills and who will consequently be taught supplemental modes of communication. Many such systems presently exist, including sign language. A decision to use this type of communication should be made by qualified experts in the field, and teaching strategies for such systems should be developed by these experts.

Cognitive Development

Cognition is the process of knowing, and includes perception, memory, and judgment. Cognition is developed through a lifelong process by which the individual actively selects and interprets environmental stimuli. This selection and interpretation process results in the gradual changing of mental structures and behavioral patterns. The nature of the cognitive process is complex, and, for the most part, the existence of it must be inferred from behavior.

Prior to the work of Jean Piaget and others, it was commonly believed that cognition and language were synonymous, and that since infants could not talk, they could not think. Language and cognition have now been disentangled to some degree. Forms of thinking and other precursors to symbolic thought are now recognized in prelingual children. Piaget had a profound effect on the field of child development. His research and theories emphasize that intellectual growth begins at birth and continues in a recognizable progression throughout childhood. In addition, more recent investigations of perceptual development show that perceptual ability, the basis of cognitive development, does exist in infants.

Professionals concerned with child development have pieced together the nature of cognitive-perceptual skills, which are inherent and develop predictably over the first year. Very early, the infant combines motor capabilities with an ability to receive stimuli. This combination is the basis for the first stage of cognitive development defined by Piaget: the sensorimotor period. This stage extends from birth to twenty-four months and serves as the foundation for more complex cognitive functioning. The child gradually accomplishes new understanding and skills with which to respond to and manipulate his environment. The child progresses gradually,

exploring visually, tactually, and with other senses and becoming familiar with objects and stimuli. He then turns to fresh, more complex stimuli exploring and integrating into previous understandings. The child is building "schemata," models of his environment and of the people and objects in it. This process of approaching new experiences, relating them to earlier ones, exploring and modifying pre-existing concepts, and integrating new ideas into his system continues throughout his life. It forms, in its infant stages, the basis for cognitive functioning. Schemata have a stepladder effect: children build on previous experiences to exhibit new behaviors. Through sensory integration, the child is able to demonstrate cognitive abilities. The table on the following page shows Piaget's progression of a child's cognitive development.

An example of this progression can be observed in the child's infancy. Thumb-sucking, an important level in the development of prehension (the ability to grasp and bring objects to oneself), is one of the first indications that the child has modified a reflex, sucking, and can direct simple actions. This action is extended outside his body as the child begins to mouth the rattle, bottle, or blanket. The child progresses in purposeful manipulation as he explores new behaviors, such as using a spoon. The child will try to obtain a toy by pulling the blanket it lies on, beginning to apply learned manipulative abilities to new environmental tasks, such as finger-painting. The child internalizes these separate schemata to produce new methods of action without visual evidence of a trial-and-error approach. Manipulative abilities are combined with increased cognitive abilities to stack blocks, roll a ball, or scribble with a crayon.

Stage/Age	Characteristics
Stage One Birth-1 Month	Progresses from single spot focusing, to jerky movements, to smooth scanning of environment and tracking of objects.
	Begins to discriminate among sensory information - sounds, touch.
Reflexive Behavior	Becomes familiar with visual stimuli.
Stage Two 1-4 Months	Habituates to old stimuli and desires new stimuli. Repeats simple body movements - kicking, mouthing hands.
Primary Circular Reactions	Builds schemata - stores clusters of repetitive behaviors.
	Coordinates sensory impressions.
Stage Three 4-10 Months	Repeats actions with objects - rattle-shaking, spoon-banging.
Secondary Circular Reactions	Begins to understand object permanence - looks for hidden objects.
Stage Four 10-12 Months	Begins to comprehend means/end relationships - puts cubes in cup, imitates speech sounds.
"Purposeful" Intentional Behavior	
Stage Five 12-18 Months	Begins trial-and-error problem solving.
	Sees causality in his actions on objects and toward people.
Tertiary Circular Reactions	
Stage Six 18-24 Months	Invents new means to act on objects through mental combinations, without overt trial-and-error.
Internalization of Sensorimotor Schemata	Deferred imitation - watches something and practices it later.
2-5 Years	Uses symbols to represent objects, places, people. Understands past and future.
Beginning of Symbolic System	Thinks in pre-logical terms - actions are determined by what the child perceives.
	Understands object permanence and can locate one object among many.

During the first month of life, the child's entire repertoire of behavior is reflexive (see Motor Development). Almost immediately, these reflexes are modified by environmental stimuli, and the infant begins to respond to the surrounding world in a comparatively systematic fashion. During the second to fourth month in normal development, the child builds concepts of objects, space, and people and begins to prefer novel, moderately complex stimuli. These are the beginnings of the coordination of several senses, such as looking in the direction of a sound or touch. The child's perceptual skills continue to improve. By the fourth to tenth month, the normal child understands enough about object identity to discriminate between mother and stranger. He recognizes a familiar object (bottle, toy) on the basis of seeing only part of it. The infant is still repeating interesting actions, but now repeats actions on objects, such as a rattle or crib mobile. This is the beginning of intentional behavior. The attending, moving around, and exploring behaviors that increasingly engage the child contribute to his cognitive development. At four-ten months, the child begins to understand object constancy: tries to act on an object he had been reaching for that is now hidden. Toward the end of the child's first year, this concept is so refined that the child will search for an object, regardless of whether he was reaching for it when it was hidden. At ten-twelve months, the normal child exhibits a range of intentional actions, appearing to have goals and to organize actions to achieve them. For example, if a box is placed between the child and a desired object, the child will push the box away to get the object. Rudimentary concepts of causality are present. For example, the child will move an adult's hand to a toy in a gesture to make the toy work. The child is not limited to learned responses, but will copy new sounds or movements. This development of true imitation makes possible a new range of teaching strategies.

The period from 12-18 months is one of curiosity and exploration. The child spends a great deal of playtime experimenting with objects, mainly through trial-and-error processes. The result is an accumulation of many ideas for accomplishing goals, some which will be utilized in subsequent efforts. Attention has begun to "decentralize." The child observes that causality occurs outside of himself. The mobile moves without being acting upon. The child also has an elementary sense of categorization. He tends to select toys based on their similarity to those preferred in the past. This evidence strongly suggests that, in the preverbal or beginning-to-be verbal child, thought and speech do appear independently. The child need not be able to form words to select categories.

From 18-24 months, the child uses many new cognitive skills while at play. He recognizes objects in picture books and fits shapes into form boards. The object concept, the ability to identify representations of objects, is well developed. The child continues to search for a hidden object past the first trial and can even make some deductions as to where it might be. There is an increasing sophistication in understanding causal relationships. The child combines many learned strategies to provide an alternative if the first does not work. The one-and-a-half to two-year-old may point and cry for a cookie. If the caregiver says, "No," th child may bang the table and point again, or climb from chair to table to get the cookie.

At two years, the child begins to use sensory impressions for determining actions. Normal children have an abundance of natural curiosity during the years from two - five. Asking "why" questions is typical, and willingness to conquer new fields is evident. Many activities can be designed by a caretaker to capitalize on a preschooler's curiosity.

During these years of rapid development, the child can increasingly express himself symbolically. He can consider past and future events and engage in fantasy play.

At age two, symbolic capacity is seen in the child's enjoyment of simple stories in picture books and in the ability to associate pictures with objects. The child's internal symbols are highly individualized. Each may use different images to represent the same objects or actions. As a child approaches the third birthday, he develops spatial relationship concepts. This is seen in completion of a simple form board and five-ring stacking tower. In nearly all actions, the child carefully examines a task before completing it, rather than starting off in trial-and-error fashion.

During the third year, the normal child can count to two, understands the concept of big and little, can report his own sex, and relates a simple story. Although a sense of logic is still premature, he can relate one experience to another situation, tell more complex stories, and provide simple explanations for events. By four, the child counts to four, answers how many, categorizes familiar objects by function, and expresses temporal concepts, such as day and night.

The five-year-old has an increased capacity for concept and memory. He counts and understands numbers to ten, seriates objects by size, and has increased perceptual abilities. The child points out pictorial likenesses and differences. Temporal concepts include understanding of past, present, and future.

A great many changes occur in cognitive functioning from birth to five. Work with this group suggests that regardless of individual abilities, all children pass through the same sequences in cognition, although at varying rates. This applies to the handicapped children at whom this curriculum is targeted. Evidence also supports the idea that cognitive development in a

handicapped child is heavily influenced by experiences. The following are several strategies that are helpful for working with a handicapped child's cognitive development.

1. It is advantageous to allow a child, birth to two years of age, to learn through free exploration and trial-and-error and to experiment with processes. At this age, stacking toys in any pattern matters more than stacking them correctly.

2. It is important in teaching handicapped children to move gradually from concrete to abstract in introducing new concepts. For instance, when teaching object identity, the educator should be sure an object is familiar to the child before expecting him to recognize a picture of it.

3. Specific handicaps can prevent children from learning through play and exploration. Therefore, stimulating and varied activities must be presented frequently. A non-ambulatory child, for instance, should be moved through a variety of environments (different rooms and levels, inside and outside) and should be exposed to varying toys, people, and sounds.

4. A teacher must hold the child's attention when introducing a stimulus. If a child is visually impaired, his head may be turned, if necessary, in the direction of a sound stimulus to gain his auditory attention. Time spent on specific tasks should coincide with attention spans. As the span increases, instruction time will expand.

5. The development of cognitive abilities requires that the child use the world around him. Inactive children may need more direction in efforts to elicit vocalizations, social play, and interactions with others. These children will not necessarily practice on their environments independently and will need extra stimulation.

6. Teachers who work with handicapped children should be aware of and allow for "wait time." "Wait time" is using pauses of short duration (three-five seconds) between stimulation and the child's response. This pause allows the child to tune in and respond appropriately.

7. In allowing the child freedom to explore his environment, a teacher is also aiding the child to deal with challenge and frustration. Many problem-solving lessons can be gained from natural exploration. For example, fitting plastic lids to bowls is usually a pleasurable challenge. The child who becomes frustrated may be verbally guided or manually assisted. This is more beneficial than fitting the lids for him.

Self-help Development

Self-help skills include eating, toileting, dressing, undressing, and various other behaviors which enable the child to move readily from dependence to independence. It is through these skills that a child exhibits behaviors that are necessary for acceptance in society. The motivation to acquire such skills originates in the child's efforts in response to the specific expectations of significant people in his life.

The development of self-help skills, although interrelated with the development of language and cognitive skills, is strongly rooted in motor development. Within this area, the progressive refinement of gross to fine motor skills and the integration of perceptual skills will be crucial to the successful acquisition of self-help skills. The child must have mastered the manipulation of small objects, the coordination of eye-hand movements, and awareness of his body parts before dressing skills can be acquired. Language and cognition are also closely linked with the acquisition of self-help skills. The process of toilet training, for example, is made much easier if the child exhibits such prerequisites as sphincter control, comprehension of instructions, a reaction to sensation, and the use of memory skills to recall expected responses.

Self-help skills develop with very little structured "training" in the normal child. Motivation is a key to the child's initiation of tasks. This initiation is closely linked with the child's level of motor development. Finally, the child must be provided with the stimulation to expand self-help skills past their initial stages. For example, if a child is not provided with utensils and instructions for their use, that child may not learn to feed himself efficiently. Therefore, the acquisition of self-help skills is dependent not only on the child's state of readiness but also the skills needed to function in the immediate environment. These

environmental expectations vary so greatly that good normative data on the development of these skills are highly unreliable. Motor and motivational readiness levels are the determining factors in the introduction of skill sequences. That is, an attitude of readiness for toilet training should be considered rather than chronological age. Care should be taken not to introduce a skill beyond the readiness level of a child or to wait too long to challenge a child to the next level of skill acquisition. A child should not be expected to be fully independent in toileting unless the child is able to raise and lower his pants and position himself on the seat. Likewise, a child should not be expected to fasten buttons adequately before establishing a pincer grasp. While keeping these developmental sequences in mind, it is important to remember to challenge the child's ability to care for his own needs while avoiding frustrating experiences.

The following principles and techniques are relevant to the acquisition of self-help skills:

1. As in other areas of development, the sequence of self-help skills proceeds from gross to fine. The child masters control of and meets survival needs before beginning to learn other independence skills (e.g. learns feeding before dressing).

2. Children learn to "undo" a task before they learn to complete the full cycle of a task. The child undresses, for example, before dressing, unbuttons before buttoning, and unzips before zipping.

3. In the acquisition of self-help skills, the child should be allowed to become involved in exploratory as well as purposeful behaviors. A child learns by experimenting with his senses and perceptions, and activities such as manipulation of foods and eating utensils should be encouraged as long as such behavior is developmentally appropriate.

4. Be sure that the child has acquired all the prerequisite behaviors before demanding speed or exactness in performance. A child must be fully able to button a series of buttons before he can button with any speed or efficie y.

Although normative ages are not clearly delineated for the acquisition of self-help skills, the growth of these early independent behaviors does follow a basic maturational sequence. Many skills such as toileting and eating are dependent on the successful development of control of sphincter muscles and certain fine motor skills. Much variation can be observed among children in the acquisition of self-help skills. No child will follow the sequence with precision; in fact, it is common for a child to skip steps in the sequences. Given the influence of varying family practices and cultures, it is important when assisting self-help skills to determine whether failure is due to cultural influences or a learning delay.

Despite this variability in age of acquisition of some self-help skills, it is possible to describe a developmental trend, especially for those skills which are particularly dependent upon maturation. Though at birth the child appears essentially helpless, he does have reflexes, such

as the suck/swallow reflex, which aids in meeting most basic physical needs. With maturation, the child is able to reach for and hold a bottle and is able to finger feed for part of a meal. By the time the normal child is one year and mobile, a sense of accomplishment begins to develop, and the child wants to do more and more things for himself. During the upcoming year, the child will master the basic fine motor and cognitive behaviors that permit the use of a spoon (with some spilling), unzipping a zipper, drinking from a cup, and indicate in some manner when his diaper is soiled. At the age of three, the child is able to integrate perceptions and motor coordination. He can feed himself with little spilling, assume responsibility for toilet needs, and put on and take off simple clothing, such as shoes, coat, or other outer garments. During the fourth year, the child is considerably more mobile, independent, and self-supportive. The child can dress, wash his hands and face, and eat well with the family. At the ages of four and five, a child's self-help ability is largely dependent on the demands of the caretaker. The child is physically able to dress and undress, exhibits many table skills using many utensils, and meets many of his own needs, such as getting a drink and taking care of personal toys. Again, the ages at which these skills occur are largely dependent on the expectations of the child's caretaker and the influence of the culture.

When assisting the handicapped child in the acquisition of self-help skills, several principles should be adhered to beyond those mentioned above.

1. If a child is having difficulty in acquiring a desired skill, it may be necessary for the teacher to break down the task into smaller steps, praising each mastered increment. In the task of buttoning, if the child is only able to insert the

button in the hole and must be assisted to push it entirely through, the teacher should praise the initial mastery and continue to work on the remaining behavior.

2. Practice in the acquisition of self-help skills, such as those involved in eating, should occur outside of the normal daily routine as well as during regular activities. For example, a child should be encouraged to use a spoon other than at family mealtime.

3. Linked with the principles of step-by-step learning and outside practice is the importance of including the child in the family's daily routines despite his difficulties and of establishing a supportive environment in which self-help skills will be enhanced. In establishing washing behaviors, the teacher should encourage the child to practice the behaviors at times other than daily cleanup. Undue pressure should not be placed on the child to perform skills in exchange for privileges.

4. In case of extreme impairment, it will be necessary to provide adaptive equipment and functional alternatives for some self-help skills in order for the child to achieve even limited independence in caring for his own needs. One may need to consult an occupational therapist, physical therapist, or speech and language therapist for additional methods to meet criteria if the impairment interferes with self-care performance.

5. In more mildly impaired children, common sense can often be the best guide. A mild cerebral palsied child may need buckle snap shoes instead of laces or velcro fasteners instead of buttons.

The normal development of self-help skills depends on the interplay of motor readiness, cultural expectations, and instruction, and the age and manner in which they are acquired varies significantly. The curriculum considers these variables in its structure and implementation and offers alternative strategies for children with handicaps.

Social Development

The First Year

The social nature of the child colors all other areas of her development; it is with her constantly. The child's personality, those nuances of temperament, emotion, style and responsiveness, brings developmental skills and behaviors to life.

In the first year of life, healthy social development results in the infant being buoyed up by a sense of trust in her caregiver and an involvement in her role in making interesting and rewarding events happen. There is increasing respect being paid to the inherent or genetically endowed temperament of infants; a characteristic style of acting on and reacting to the environment. Researchers such as Dr. T. Berry Brazelton of Boston Children's Hospital Medical Center and Dr. Burton White of Harvard University have noted definite modes of operation peculiar to infants from the first hours and days of life. The infant actively carves out some of the ways that her parents respond to her. For example, observable differences among infants involve degree of spontaneous motor activity, irritability, and passivity.

Parents respond differently to a quiet, relatively self-sufficient baby than to a baby who is easily upset and motorically active. Usually the parent learns to interact to his/her baby in a manner responsive to the needs that the baby is signaling. A very active infant may need the parent's help in establishing periods of motoric calmness necessary for visual learning. Conversely, a very quiet infant may need parents to initiate frequent play interactions to stimulate learning.

The infant is soberingly vulnerable to social influences. Even when all apparent physical needs have been met, the infant will steadfastly refuse to develop without love, that powerful abstract and social

influence. This failure to thrive phenomena syndrome has been documented frequently in studies of normal and mentally retarded populations of institutionalized infants. Dennis and Najarian (1957, 1960) found marked developmental deficits in motor, cognitive, language, and social skills of infants reared in impersonal environments which were not warm and nuturing.

Babies who were placed in the charge of consistent caregivers, with increased opportunity to play with adults, peers, and interesting objects, showed dramatic progress in acquiring more age appropriate skills. In some instances, the suspected mental retardation disappeared completely as a result of the improvement in the social environment. Other children within the mentally retarded range remained below average in developmental achievement as compared to non-institutionalized normal peers but made encouraging improvement as compared to pre-intervention development.

Attachment to particular people is a critical social need for babies. They show this attachment by selectively approaching particular people, usually the parent(s), by being most receptive to them and by being least afraid when in their care. By the time a baby is four or five months old, she has clearly differentiated her caretaker from others and may not readily allow just anyone to comfort, feed, or rock her to sleep.

The social milieu of the first months teach the baby subtle messages about herself and the responsiveness of her caregiver. If cries of discomfort or delight are responded to often and rather promptly, she begins to realize the positive effect of her communication. On the other hand, if she is left wailing in discomfort frequently and for prolonged periods of time, she may become use to her rather powerless status and become more passive.

Child development experts today, such as B. White, M. Ainsworth, and B. Brazelton strongly urge parents to follow natural, commonsense guidelines in responding to their babie's needs for comfort, play, and love. The old fashioned fear of "spoiling" the baby by being too responsive and loving has been discredited.

Parents of handicapped infants frequently need special support in establishing this reciprocal interactive relationship. In many instances, the infant's handicap is apparent at birth and medical procedures disrupt the normal period of bonding between mother, father, and baby. Caregiving situations which bring parents and child close together are not always possible when the infant is hospitalized for long periods. The parents' anxiety, grief, and shock at this unexpected outcome of the long awaited birth may certainly jeopardize the initial relationship with their child. By nature of her handicap, the baby may be unable to produce those behaviors that parents instinctly find rewarding and reassuring. Early difficulty with feeding, lack of eye contact and alertness, and atypical muscle tone can diminish the parents' self confidence in performing nurturing tasks. Professionals, by helping parents find solutions to basic caregiving problems, are also helping to stablize the parent - child relationship.

The Second Year

From one to two years, children continue to expand their capabilities of doing things for themselves. They learn to mirror in themselves what others feel about their activities and accomplishments. The handicapped child will receive messages, either positive or negative, from her parents regarding what she can do and how well she can do it. Professionals can support parents in designing a home environment that is not overly

protective and restrictive and allows the infant to flex her wings safely. Parents may benefit from professional objectivity provided by a home teacher in setting expectations which are neither too limiting nor too lofty for their child.

Children develop a sense of ownership between one and two years and use their newly acquired words to brand objects as "mine". They are beginning to see themselves as individuals, as separate and important little people. They are loudly and persistently vocal about their needs and rights and protest vigorously when predictable occurances are not forthcoming.

They also like to play next to other children and participate in fierce squabbles over toys and territory. The child with restricted language and/or motor skills is still a candidate for a varied and exciting social life. The non-verbal toddler deserves respect for her possessions and teachers should be on the alert for gestures which mean "mine". Gestures and signals that the child transmits concerning her needs, wants, and observations should be responded to and reflected by the words of her caregiver: "Oh, you see that dog too; He's a big one."

The Third Year

By two, children are ready to form attachments to a wider circle of individuals than just the family. The handicapped two year old deserves to widen her social set just as her non-handicapped peers do.

The theme song of the two to three year period is, "I want it my way." This tune sometimes grates on the ears of weary parents by the end of the day. The child typically has clear notions about the way things should be and resents changes in routine and structure. She prefers to tackle tasks independently, regardless of complexity and effort involved. She becomes upset and frustrated when the results don't match her expectations. She has a hard time waiting and typically won't back down in her demands.

Child rearing specialists recommend that parents accept this period with understanding and patience. Give the child as much independence as she wants without infringing on the rights of others. Being consistent in setting limits acts in harmony with the child's need and respect for rules. However, this is not the time to be unnecessarily punitive. Parents and teachers are advised to pick their battles carefully and not burden themselves or the child with a plethora of "don't do this" and "don't do that."

Sometimes parents and teachers of handicapped children forget that this stage of "me do it" and the resulting frustration is normal. Professionals are frequently valuable in helping parents identify these trying behaviors as normal and see them as encouraging signs of maturation and progress in their child. Children usually respond well to firm but loving discipline, consistently offered in a predictable pattern. Handicapped children are no exception.

The Fourth Year

The three to four year old is usually a refreshingly reasonable companion. She is able to put herself in another's shoes and make accurate inferences about others feelings. Even better, she can modify her actions in response to how she thinks the outcome of her act will affect others.

The pretending and imaginative stage begun in the previous year has really blossomed. Her dramatic play acts out her increasingly broad world and demonstrates her understanding of the complex relationships in family, school, and neighborhood. She now delights in group play, cooperatively participating and exploring both leader and follower roles.

She usually will find an acceptable way to vent negative feelings and does not need to resort to kicking and fighting. As a competent speaker, she uses language as a tool to resolve social conflicts as well as initiating new play opportunities. She is demonstrating more and better ways of controlling her behavior, although lapses to earlier stages are still common.

The child's self-concept, developing since the first days of life, is still elastic. How she feels about herself is greatly affected by the attitudes and actions of those around her.

It is important that caregivers communicate positive expectations and messages of approval and worth towards children, regardless of the presence of a handicapping condition. Additionally, in disciplining children, parents and teachers are advised to specify that a particular action was unacceptable, not that the total child is bad. It is usually non-productive to prolong the unhappy disciplining session. The child should be eased back into the adult's good graces as soon as possible. Parents and teachers can train themselves to frequently catch the child being good and zero in on the many subtle positive behaviors that occur rather than the few glaring negative behaviors.

For some handicapped children, the three to four year old period is particularly sensitive as the child becomes aware of her disability and consciously compares her competencies with those of her age mates. Verbally competent children may pose painful questions to parents and teachers, such as asking why they are different from their siblings and when they can expect to walk and run. Children may understandably rebel against necssary medical procedures and tedious treatment sessions. Handicapped children, without sophisticated speech capabilities, may also be making similar comparisons between themselves and those around them but may be unable to seek the answers to their questions.

Parents of older handicapped persons and handicapped persons themselves agree that children deserve to be answered truthfully about their capabilities and limitations, using simple language and terms that can be understood. Children can be aided in realizing that everyone has special skills that they are good at and other areas that are very difficult for them. The handicapped child's feeling of self-worth and competency is perhaps the most dynamic factor in her habilitative process. Diminishment of these feelings will inevitably diminish the child's developmental potential.

The Fifth Year

From four to five years, the individuality of the child continues to unfold. She has learned to adjust to changes in routine and novel situations. She is able to accept a less than optimal situation because she can understand probable reasons and causes for it. She is able to internalize social rules that govern group behavior and to be an effective monitor of her own behavior. She can be very irate when peers ignore acceptable social standards.

Peer pressure, on the preschool level, operates as a powerful agent in shaping children's behavior and self-concept. There is a tendency to seek approval more from other children than from adults. They enjoy playing both cooperative and competitive group games, with adherance to local mores of how things should be done. When conflicts arise, encouraging signs of the willingness to compromise crop up.

Children at this age usually show growth in their ability to stick to a task and to pursue it until completion. They develop personal standards of satisfaction and are not as easily affected by adult praise. The child's

feeling of self-worth is expanded by being given more responsibility for taking care of herself and for contributing to the well being of the household and the classroom.

Work-jobs and appropriate standards can be individually tailored to suit the present abilities of the child. As abilities broaden, responsibilities expand with commensurate rights and priviledges. At times, parents and teachers of the handicapped inadvertantly baby their children, restricting their experiences and limiting their growth. Although anxiety producing for adults, handicapped children deserve the right to make mistakes, to take reasonable emotional and physical risks, and to learn first hand what is possible and impossible for them to do. Children should be given chances to do things on their own and to bask in the glow that results from successfully meeting a challenge.

In taking a developmental approach, the teacher must consider the following:

- The developmental approach is concerned with the whole child. Needs in one area of development should be met in other areas. For example, if a child's communication skills are at a two-year-old level, a teacher's verbal instructions in self-care must be geared to this level.
- The introduction of new behaviors is always based on the child's state of readiness, not chronological age. Presentation of any new task is contingent on successful completion of all prerequisite tasks.
- The acquisition of skills always progresses from the simple to the complex, from the concrete to the abstract. Each skill is built upon a simpler one until the child can accomplish an entire behavior.
- Activities should be child-initiated in an environment tailored to individual levels of development. Children are encouraged to react to environmental stimuli in ways appropriate to their abilities.
- Emphasis on process requires a teacher to be as concerned with how a child approaches and completes a task and its substeps as with the end result. The teacher needs to examine the degree to which a child is experiencing success and to determine the point at which his skills are insufficient.
- Using a developmental approach requires that the learning environment be one in which the child has time to experience and explore in his own manner. The teacher concentrates

on the expansion of child-initiated activities to make new concepts meaningful and introduces new tasks appropriate to developmental levels.

- The teacher should take a child-centered approach, one which takes into account the individual ways that a child perceives and acts on situations.

Structuring the Environment

Effective teaching not only requires that the teacher be aware of learning processes, but also of how to structure the child's environment and instructional sequences to enhance these processes. Following are suggestions for structuring the learning environment for young handicapped children.

1. Environmental Stimulation: The child's learning environment must contain a wide variety of concrete objects which provide an opportunity for spontaneous exploration or play. This does not imply that children must have a houseful of toys. The criterion is quality with variety, not quantity. To judge how many toys a child may effectively handle, watch the child's reactions to varying numbers of toys. Too few may prove sterile and unchallenging, and the child will quickly become bored. Too many will be confusing, and the child will quickly move from one toy to another, not really playing with any of them. Be mindful of what interests the child. Provide the child with an appropriate quantity and selection of toys that will meet the child's individual needs.

2. "Active" Learning: "Hands On" activities which involve the child's active participation with the learning materials are successful in teaching, since children learn by acting upon and interacting with their environment. Teaching is not "telling"; it is "doing with" the child. Be a model. Start building, playing, or painting and many times the children will benefit from joining or observing you. When the child is allowed to interact with stimuli in a self-directed, constructive manner, learning is more meaningful and relevant.

3. Exploration: The daily activities of the child must include exploratory as well as planned activities. It is through experimentation that the child tests perceptions and uses problem-solving skills. A teacher may still find opportunity to introduce new concepts during this exploratory time. For example, a teacher might point out new object words while a child is looking through a book. It's not necessary for the child to name all the pictures for the activity with the teacher to continue. This would be a restriction on exploration, when the adult should be simply adding new levels of understanding.

4. Altering the Physical Environment: The physical environment that surrounds the child should be expanded to maximize the child's opportunities for learning. It is particularly important with handicapped children that all aspects of the environment be made available. This includes varying the positions in which a child plays, the physical environment, and people who provide stimuli. Preschoolers play should not be restricted to a sitting position.

Allow children to lie on their tummies, or sprawl on a rug to play with toys. Also, it is essential to make objects and textures "reachable" for severely handicapped children. Specifically designed adaptive devices may need to be designed by the teachers or occupational therapist in order for the physically handicapped child to make maximum use of his environment.

Limiting the noise level is another consideration, particularly for some handicapped children who have difficulty processing auditory information. (Wachs et al., 1971). A typical example is a child exploring in a room with a television running. The preschool child is not likely to focus on the television for any more than a few sporadic moments. He tends to "shut out" the extraneous stimulation of the television. This can lead to the child's extending his selective inattention to other situations, thereby excluding useful stimuli from the environment. The end result is the child's setting limits to his environmental experiences. (Information regarding central auditory processing may be found in Section 2; Child Development).

In addition to creating an interesting physical environment, a teacher will find that preparation, attitude, and interactions with the child greatly influence the child's learning.

1. Adult Contact: From infancy, the child increasingly develops perceptions of people around him. Before one year of age, the child is able to accurately interpret changes in an adult's mood. Therefore, the adult's reactions to a child's outbursts of anger or discomfort should not convey that the adult is overly anxious.

As the adult becomes anxious, the child's anxiety and consequent crying may increase. Providing the child with comfort and support will aid in allaying the child's distress.

2. Exploratory Learning: In the process of exploration, children learn through trial-and-error experiments. Many errors in judgment will be made as the child's knowledge base grows. The teacher should handle mistakes with an accepting attitude. Some mistakes can be ignored. If an adult is always pointing out the child's mistakes, the child will begin to look to the adult to always tell him "right or wrong". Showing the child that mistakes are normal and acceptable will provide encouragement to try new tasks again without fear of disapproval for failure.

3. Correcting Behavior: The preschool child is unable to differentiate between who he is and what he does. This is due to the underdevelopment of identity patterns in language and cognition. To say, "You're a bad girl," to a child who has just hit a playmate conveys to the child that she is a "bad person," not that what she did was incorrect. Therefore, it is important to avoid such nebulous phrases. Instead, tell the child, "Tearing up the letters is not good," or "I don't like it when you ..." It also makes clear to the child precisely what behavior is undesirable.

4. Setting Limits: The young preschool child depends on adults for both support and structure. Although the importance of allowing children the time to explore their environments cannot be overemphasized, children should not be given full rein. They desire and require that physical and verbal limits be set. These limits serve as a framework for functioning in daily activities.

The young child looks to the adult to provide the guidelines for what he can and cannot do. Set these limits clearly and consistently.

5. Flexibility: The teacher of handicapped preschool children must be flexible in planning an approach to accommodate each child's individual and changing needs. It may be necessary to set a lesson aside momentarily to deal with a child's emotional crisis. It may also be more productive to set a planned lesson aside if a different teaching experience presents itself. The unexpected death of a pet may be an excellent opportunity to address the topic of death. The planned topic, neighborhood helpers, may be scheduled for another day when the child is more receptive.

6. Positioning: The consideration of appropriate physical positions for the teacher and the child when attempting tasks may be crucial to the experience. Teachers should consider any precautions related to a child's handicap when handling and positioning that child. In the cases of children with severe physical problems, the assistance of an occupational therapist or physical therapist should be obtained.

7. Motivation: The initial setting up of the lesson will affect the success of each subsequent step. The adult should provide the child with some type of motivation for attempting the task. This can take the form of verbal or physical rewards, presentation of favorite or familiar stimuli or situations, and also the presentation of novel, attractive stimuli.

8. Communicating Expectations: At the beginning of an instructional sequence, the teacher must make sure that the child is aware of what is expected in terms of behavior. This often helps the child to better focus on the tasks.

9. Perceiving Needs: It is important that the teacher be sensitive to the child's mood, needs, and interests. Often, slight modifications or changes will make the instructional period more meaningful. Be flexible and recognize the child's right to participate in arranging the program. This also applies to the duration of the instructional period. The teacher must be able to perceive cues from the children as to when they have tired of the activity.

10. Maintaining Interest: It is important that the teacher be able to maintain the child's involvement in a series of tasks. The teacher's ability to make the transition from one activity to another in a skilled manner will enhance the likelihood of this involvement. Stop one activity while you still have the child's interest and attention. Do not wait for the onset of boredom before changing to a new activity. The order in which activities are presented is also important. Alternating high and low preference tasks and high and low concentration tasks generally keeps the child's attention longer.

These considerations are not an all-inclusive account of how to work with young children. They are based on normal development with adaptation of strategies for handicapped children. The bibliography lists many volumes which detail adaptations for handicapped children. Many effective strategies for working with young handicapped children are gained from direct experience with the unique and individual problems that the children present.

Enhancing Self-Concept

A major objective of the teacher is developing and nurturing a child's positive self-concept. Self-concept refers to the way a child sees himself. It is important that all children experience feelings of self-worth and acceptance. This is true for the infant as well as the five-year-old. Positive feelings in regard to one's own abilities and a feeling of acceptance by others have an affirmative effect on a child's ability to acquire behaviors. The teacher or other significant adult is able to promote these feelings in many ways, such as:

1. Success-oriented activities enhance self-concept. These are tasks that are structured by the teacher so that the child cannot experience failure.
2. Use of appropriate verbal and physical reinforcement is necessary. The teacher should always choose ways to reward children for positive behavior in a way that they can understand. Statements such as "Good talking," "I like how you ate your sandwich," or "I am sure you are proud of your drawing" are explicit and meaningful to the child. Be cautious though, about becoming too repetitive or automatic in praising the child. It sometimes can become overdone and insincere.
3. Encourage independence and self-sufficiency so that the child will perceive himself as a competent individual. Give children a chance to make decisions and then accept those they make. "Do you want to wear your red pants or your blue pants?" Additionally, adults should only give a choice when they are willing to accept the child's answer. "Do you have to wash your hands?" will probably get an answer of "No." If the adult is unwilling to

accept this answer, presenting the situation in a different manner, "You need to wash your hands," will bring about less conflict and anxiety.

4. The adult should be aware of the number of negative and positive comments that they direct toward children. Many times comments can be presented in a manner which serve the desired purpose but which do not leave the child with a feeling of unnecessary reprisal and shame. "Don't throw the book" can be changed to "Hold the book in your hands." Care Should Be Taken To Insure That Positive Statements Outnumber Negative Ones.

Prescriptive Teaching and Task Analysis

In working with young handicapped children, it is essential that instruction be both goal-oriented and individualized. Prescriptive teaching is one effective instruction method. This involves the identification of a desired behavior and the specification of how to measure the behavior. This is called "pinpointing." Once the specific behavior is identified, strategies and sequences are outlined for the accomplishment of this goal based on the ability and learning style of the child.

If a nonhandicapped child is unable to name the color red, the teacher determines several strategies for aiding the child in acquiring the skill. These strategies may be very similar for different children. For handicapped children, the process is more involved, depending on how any individual handicapping condition affects learning ability. Often, it is necessary to begin at an earlier developmental step.

To a great extent, the methods in the manual for teaching prerequisite and criterion behaviors have been broken into very specific steps. When working with some handicapped children, these steps must be broken down even further, depending on the rate at which the child learns and the specific modifications needed in the learning environment. The teacher can have a substantial effect on the child's acquisition of a skill when these skills are appropriately sub-divided. Division of teaching goals into a series of sequential objectives is called task analysis, and each step is tailored to the individual needs of the child. On the next page is an example of task analysis for a prerequisite skill to grasping: reaching for an object.

Behavior: Reaching for an object placed 10-12 inches in front of the child.

1. Touches suspended object when hand is guided.
2. Touches suspended object when hand is partially guided.
3. Touches suspended object independently.
4. Touches object in front of child when hand is guided.
5. Touches object in front with no assistance.
6. Grasps object placed in front.
7. Grasps object placed five inches away.

Although it is not necessary to complete a task analysis for each desired behavior, it is important to design instructional plans so that skills are presented in a specified sequence and that no part of the sequence is introduced until the previous level has been successfully completed. In the example above, if Step five cannot be accomplished, the teacher should backtrack to the point where the child has achieved mastery and then proceed in sequence. This is called chaining and will be explained in more detail later in this section.

Types of Aid

The steps of a task analysis are based on the amount and type of aid that an individual child needs and are arranged in order of difficulty. Differing types of aid are a principle part of teaching handicapped children (Vulpe, 1979). For some individuals, certain skills will never be accomplished without some degree of assistance.

Physical Aid - Any type of aid in which the teacher is holding, supporting, or guiding the child's behavior in any manner. This aid should include, but not be limited to:

- physical support
- physical contact
- modification of the environment

Psychosocial Aid - Any type of aid in which the child is provided with modified social or emotional support, such as increasing the verbal support, limiting frustrations, using specific persons (such as a parent), or allowing inappropriate behavior for a specific reason.

Verbal Aid - any issuance of or modification to verbal instructions that increases the child's performance, such as

- cues ("look," "listen")
- directions
- feedback (praise at the end of a response)

Visual Aid - any visual stimulus from the teacher which increases the child's performance level, such as

- visual cues (dots, pictures to prompt a response)

These types of assistance can be coded (P/A, PS/A, V/A, VS/A) and recorded on the daily record sheet as a continuous monitoring of the type of assistance a child needs to complete a task. (See Daily Record Sheet)

Some methods for teaching and using these types of aid are outlined below. These techniques are used throughout the curriculum to facilitate the acquisition of various behaviors.

Fading - the gradual reduction of any type of aid as the child gains proficiency. In teaching a child to brush his teeth, the teacher starts by holding the child's hands, assisting each movement, telling the child what to do, and modeling for him. This aid is gradually reduced to modeling with verbal instructions and, finally, to modeling only.

Shaping - the initial acceptance of a response that approximates the desired one in any way. In teaching a child to indicate desires or needs, grunting or gesturing may be acceptable at first. Later, the child may be required to communicate more appropriately, such as with an approximation of a word, a one word, and, finally, a two word verbal request.

Chaining - the teaching of small pieces of behavior which, when mastered, will complete a whole task. In learning to cut, a child learns how to hold the scissors, how to move the scissors, how to snip paper, and, finally, how to cut across the paper. The reverse of this procedure, backward chaining, can also be used. This is sometimes desirable with children who need more frequent rewards, because they can see the end result immediately. For instance, in learning to zip clothing, the child is assisted in putting the zipper together and pulls the tab up by himself. The child will eventually add one step at a time until he can complete the procedure alone.

Modeling - a form of physical or verbal aid in which the child is shown what to do or say each time the response is requested. This is effective in teaching object names, such as, "This is a cow. What is it?" with the child responding. This greatly limits the child's chances of making an incorrect verbal response.

Behavior Management Procedures

Several methods have been outlined both here and in the curriculum units which aid children in the development of skills. Equally important for the teacher is the selection of behavior management techniques to ensure reoccurrence of acquired behaviors. The acquisition of new behaviors is only important in that these reoccur in a relatively permanent and consistent manner. The educator must not only provide an opportunity for these skills to be practiced but also provide some form of reward for their performance.

Following are some behavior management techniques that are useful with young handicapped children. They provide a few basic, but not all-inclusive considerations. Additional resources have been identified in the bibliography. Institutions of higher education also provide specific courses in behavior management.

Reinforcers

A reinforcer is any event that occurs subsequent to a behavior which serves to increase the probability of that behavior's occurring again. Reinforcement is a vital part of every learning activity. It conveys to the child that what was done was appropriate and should be repeated. Without reinforcement, inappropriate and appropriate reactions to any given stimulus may occur equally.

- A child points to a red block and says "red" and the teacher replies "Good! That block is red."
- Another child takes his first steps across the floor, and someone gives him a big hug and kiss.
- A child comes and sits down on the rug, and the teacher says, "I'm glad to see you sit here, Johnnie," and gives him a snack.
- An infant smiles at another person, and the person smiles in return.

In all of these situations, a reinforcer was given to the child to signify pleasure and approval. The type of reinforcement that is meaningful to a child can be as individual as the teaching strategy that one uses for skill development. The type of reinforcement used depends on the child's maturity and unique preferences. The lower the developmental level of the child and the more initially difficult the task, the more necessary direct or concrete reinforcement becomes. The teacher must take care to choose reinforcement that is rewarding to the specific child. One child may need a primary reinforcer (food or drink) every time a desired behavior occurs. Another child may need physical attention (pat on the shoulder or hug). A third may need only social reinforcement (a nod or smile). Before beginning a planned program using a reinforcer it is necessary to identify preferences the child has. One child works for

raisins, another for card flashes. You cannot assume preferences for sweets. In the use of reinforcement for desired behaviors, several considerations are important:

1. Set up an information sheet to collect baseline data. This will tell clearly what the child's performance was prior to any modification through reinforcement. You will need to know how a child performs something, how frequently it is done and under what circumstances.
2. Gradually decrease direct reinforcement when possible. If a child requires a primary reinforcer, the delivery of it should always be paired with a less direct form, so that the food will be withdrawn as the child responds to the less direct form.
3. Gradually decrease the frequency of reinforcement delivery as behavior becomes established, until behavior is wholly independent. In toilet training a child, it will be initially important to praise the child every time he uses the toilet. As the frequency of using the toilet at the appropriate times increases, the teacher can gradually reduce the reinforcement. Finally, the child is using the toilet when needed without any type of reward. Observation of the child's reaction is the best method of judging when to reduce the reinforcers. If the child decreases his appropriate responses when the reinforcement is not as frequent, then the behavior is not well established. It will often be necessary to experiment with reinforcement schedules.
4. The time of reinforcement is also important. Reinforcement occurring immediately after the desired behavior is most effective. Many young children are unlikely to make the connection between behavior and reward. If the reward is delayed, the child may associate the reinforcement with another behavior.

Reinforcing desired behaviors works in tandem with the withholding of reinforcement for undesired behaviors. Lack of reinforcement will eventually decrease undesired or inappropriate behaviors in a child. Some considerations for the teacher are as follows:

1. The teacher needs to pinpoint the behavior to be eliminated and what is reinforcing its reoccurrence. Identify what circumstances precede a behavior. These are called anteceedants.
2. The teacher needs to eliminate the reinforcer consistently. Even an occasional reinforcement may cause inappropriate behavior to reoccur.
3. The teacher needs to be prepared to see a sharp increase in the frequency of an undesired behavior in some instances. When the reinforcer is removed, the child may attempt with more perseverance to elicit the reinforcement. This increase will gradually level off until the behavior is extinguished.

For example, in teaching communication skills, a teacher may require that a child use the word "milk" rather than a gesture to ask for a drink. The teacher may choose to ignore the child's gestures, providing the word and withholding the beverage until the child gives the appropriate response. An important aspect of this strategy is in providing the child an alternative behavior: a word to replace a gesture.

Similarly, a child in a grocery cart may repeatedly pull items off the shelf and out of the cart. Providing idle hands with a task, such as helping to cross items off the list or playing with a toy or book from home, will aid in eliminating the unwanted behavior. Encouraging incompatible behaviors, those that do not allow for undesirable actions, can be used in many situations.

4. Reinforcing desired behavior and withholding reinforcement for undesired behavior may not be effective with children who exhibit self injurious behavior (S.I.B.) of self stimulatory behavior (S.S.B.) because the behavior the child is engaging in is in itself rewarding (e.g. masturbation, thumb sucking, rocking). A carefully designed program will need to be thought out by the teachers whereby S.I.B. or S.S.B. is replaced by more appropriate responses by the child.

Individualization

It cannot be overemphasized that the teaching strategies and curriculum units included here are only effective if they are individualized for the needs and abilities unique to the child. (Each child's program must reflect his abilities and progress at a rate commensurate with development.) The creativity, flexibility, and knowledge of the child possessed by the teacher or parent will be significant variables in the child's progress. Below are some basic considerations for children with particular handicaps.

Motor Impairments

Suggestions here concern adaptations in instruction for children who are nonambulatory or who have limited mobility. Where questions arise, the consultation of a therapist should be requested.

1. Provide for correct positioning of the child for a given activity before beginning instruction. The appropriateness of a position is partially determined by the nature of the task.
2. Arrange for the stability of the position which the child is to maintain. For example, if the child's feet do not touch the floor from a chair or the toilet seat, a box should be provided under his feet. This gives a sense of security and frees hands for management of materials.

3. In some situations, a child's sub-dominant hand (the hand not in use or preferred) must be stabilized in order for him to use the other hand effectively. The choice of the stabilizing system should be directed by the therapist. Often, requiring the child to grasp a stationary object will provide the stability needed.

4. When presenting language or cognitive development activities which require overt action, e.g. following commands, situate items so that the child can use a range of motor behaviors to demonstrate comprehension.

5. Recognize that children with limited mobility have limited motor experience. Too many handicapped children/babies are not jostled around as much as normal children are. All such normal experiences as being balanced on knees, riding straddle on a grown-up's foot, swung around, danced with, etc., help complete a child's experience. Create opportunities and move the child so that he can be "in" and "under" and "on top of" and "upside down." Present opportunities for tactile and kinesthetic experiences beyond those provided for motorically normal children. For example, establish chances for the child to touch snow, play with soap flakes, search through a drawer, or play with doorknobs or light switches.

6. For some activities, it is helpful to tie the objects involved to the table or to the child's hand, e.g. crayons, so that he may use them freely without dropping them to the floor where they cannot be retrieved.

7. In cases where the child has adaptive or prosthetic equipment, learn from the child's parent or therapist how this equipment is operated. It is essential that the teacher be able to lock and unlock braces and adjust protheses to instruct the child in self-care and provide for safety and comfort. In addition, plans must be made for storage of equipment when it is not in use. Crutches carelessly dropped on the floor are a hazard to children and staff.

8. Children should be allowed and encouraged to carry out as much motor behavior as possible. They should also be required to ask for assistance if it is needed. Opportunities for independence should not be eliminated for the sake of time saved by carrying children, placing objects in their hands, and, in general, anticipating every need.

Hearing Impairments

Suggestions here include basic considerations in teaching children with hearing impairments. Where questions arise, consultation with a speech and language therapist should be sought.

1. Look directly at the child while talking or gesturing. Be sure you have the child's attention before continuing an activity.
2. Have a peer helper alert the hearing impaired child as to when an adult is going to give a direction.
3. Place the child's hands on sound-producing objects, on your throat to feel the vibration, or on your mouth to feel the air blowing from your mouth to keep his attention.

4. Talk about the activity and describe actions while you and the child are experiencing a daily routine. Do not exaggerate lip movement or tone unless a speech and language therapist has recommended a particular strategy.

5. Wait for responses from the child. Also watch the child's hands for information to aid in teaching a strategy.

6. Teach the child to use signals or gestures to communicate his desires. Instead of anticipating a child's need, wait for the child to signal it. Gestures, partial gestures, combinations of gestures, and facial expressions can be signals.

7. Teach the child to use symbols, representations of objects, thoughts, and actions, after the child has learned to use signals. The ability to use symbols does not occur until the child is functioning at a developmental age of eighteen months. Signing and finger spelling are symbols which the child can use.

8. Encourage activities for listening. If the child has a hearing aid, be sure to determine if it is providing maximum service or if feedback is being produced. The correct number setting on the hearing aid can be determined by the audiologist, parent, or speech pathologist. Adjust hearing apparatus during learning activities. Follow-up on periodical hearing re-evaluations.

9 Have the child wear a harness or a headband holding the hearing aid in place while moving throughout the room.

10. Offer preferential seating during group activities.

11. Refer to following section.

Language/Speech Impairments

The following are basic considerations for children who have languge and speech impairments. Where questions arise, consultation with a speech and language pathologist should be requested.

1. Combine the word or phrase being taught by presenting it in a meaningful situation. (Content may be chosen according to the child's interest and participation)
2. Use real objects and experiences.
3. Repeat the response you desire three times when a child does not respond to your question.
4. Repeat what the child says and also expand on what the child says when the child makes efforts to speak.
5. Observe how a child processes language input.
6. Model new words and sounds. (Use many contexts for generalization of conept)
7. Sitting in front of a mirror with the child can be helpful when teaching new sounds. Also, you may hold thin paper in front of the child's mouth to show the child the air puff produced from the sound.
8. Help the child learn to recognize the source of a sound. Move the child to the source of the sound and place the child's hand on the object.
9. Use a tape recorder for immediate playback of sounds which the child has made. Allow the child time to respond to the tape. This activity should cease if it becomes stress producing.

Mentally Retarded

Suggestions here concern basic considerations for children who are mentally retarded. Where questions arise, consultation with a psychologist or other teachers who have worked with similar children is recommended.

1. Demonstrate the activity whenever possible.
2. Use very simple directions as the child imitates an activity. Describe the action being done by the child and what is going to be done.
3. Physically aid the child through portions of the task. Allow the child to experience success on his own; however, avoid frustrating challenges.

Understanding the Rate of Development

Severity of Mental Deficit	Expected Rate of Development	Example
Mild	75% of normal development	Chronological Age of 10 Mental Age 8
Moderate	50% of normal development	Chronological Age of 10 Mental Age 5
Severe/ Profound	25% or less of normal development	Chronological Age of 10 Mental Age 2 1/2

A child who is mildly impaired and is ten years old would be expected to have social and play skills like that of an eight year old. A moderately impaired ten year old would be more like a five year old, and so on. This is an important concept in choosing appropriate play or toy activities for the child to use.

Visual Impairments

Suggestions here concern basic considerations for children with visual impairments. Where questions arise, consult an ophthalmologist to aid in identifying the extent of probable vision loss or confer with professionals who have worked with the visually impaired.

1. Introduce activities that require manipulation of objects with various textures. Teach the child to discriminate among textures.
2. Teach the child to recognize where sounds are located and how far the sounds are from him.
3. Teach the child to reach for an object by a sound cue. This concept will aid the child in exploring and learning about objects. Attach bells to objects you want the child to explore. Use this sound cue consistently when a new object is being introduced.
4. Emphasize crawling, creeping, cruising, and walking. Encourage the child to be confident in self-initiating body movement.
5. Use finger walking to aid the child in locating parts of his body or objects nearby.
6. Watch the child's hands for information. When responding to a child's gesture, squeeze the hand lightly to acknowledge this gesture. Also, a similar gesture can be used to alert the child to a change in activity.

Emotional Problems

Suggestions here concern basic considerations for emotionally disturbed children. Where questions arise, consultation with professionals who have worked with the emotionally disturbed should be sought.

1. Note gradual behavioral changes. Some children's actions improve slowly.
2. State for the child when a change in class activity is going to take place. Alert the child to the next activity several minutes in advance and remind the child at intervals of changes which will take place.
3. Provide the child with a time to learn a new skill in a relaxed environment. Give the child an opportunity to practice a skill which may be needed during a stressful situation. A long car ride can be a stressful situation since children do not have activities to occupy them. Singing is both pleasurable for the child and an appropriate skill.
4. Engage in water play when the child has been under stress, allowing the child to initiate the direction of the play experience. Water can be a soothing medium. If the child is apprehensive, substitute puffed rice or similar materials.
5. Listen to the child's questions and comments. State your feelings and set limits for the child. Be consistent in responding to the child's behaviors. However, be prepared to change the rules if the rules become inappropriate for the activity.
6. Allow ample time for the child to respond to a new situation.
7. Change the level of activity from passive to active, gradually alerting the child to this change.

4. ASSESSMENT

Assessment as addressed within this Resource Manual is informal in nature. The specific device which accompanies this manual, the Criterion and Prerequisite List, is intended for use subsequent to the formal screening and assessment procedures conducted as part of the placement process for young handicapped children by the local education agency.

Formal tests are normed or standardized and yield scores reflecting a child's developmental level. (See Appendix A for references.) These tests usually comprise only a sample of child behavior in a given developmental area. Informal instruments, such as the Criterion and Prerequisite List, are designed to yield detailed information regarding a child's functional level in terms of skills accomplished and readiness for instruction in a given task. The following section details the use of the Criterion and Prerequisite List and the accompanying Record Sheet.

Criterion and Prerequisite List and Recording Sheet

The Criterion and Prerequisite List (CPL) is an informal device consisting of six composite scales which reflect the units of the Resource Manual. The scales represent major developmental milestones in the following areas: gross motor, fine motor, communication, cognition, self-help, and social. The list contains criterion and prerequisite behaviors which are identified and detailed in each unit of the Resource Manual. The results of the CPL are recorded on the accompanying Record Sheet.

The purpose of the CPL is threefold:

- o to identify those specific skills and concepts within the manual which the child has accomplished and those which require attention.
- o to determine the step at whi to begin teaching within the manual.
- o to maintain a continuous record of the child's progress.

Since many of the behaviors contained on the list are also included on formal assessment instruments, it is recommended that data derived from the formal screening and assessment procedures be used. This would obviously expedite the process of locating the child's point of entry within the manual.

The CPL was designed to be used by the teacher or other service provider. If recorded assessment data are not available, the following sources should be considered.

Observation: Data may be collected while the child is observed during one or more meetings. The child may be observed during normal daily activities. If the CPL is used after the child has been in a program for some time, the recorder may be able to complete some of the items on the basis of having observed the child in a variety of learning experiences.

Parental or caregiver report: Especially when working with very young or profoundly handicapped children, data may be gathered from other individuals who may spend greater amounts of time with the child. Questioning these individuals with regard to the child's ability can aid in completion of the CPL.

Administration: If data are not available from formal or other assessment instruments, the items on the CPL may be directly administered to the child. If this procedure is used, the emphasis should be on collection of data to determine the child's level of performance with regard to the manual. A minimal amount of time should be spent on administration of the CPL. If administration of the CPL is necessary, the steps which follow should be adhered to. For further clarification, a sample of a completed Criterion and Prerequisite List is also included.

Step One: The order of scales needs to be determined by the teacher. It is recommended that the fine motor and cognitive scales be administered first, since those are more interesting to young children.

Step Two: Descriptive information, such as the child's name and date of birth, should be recorded in the upper left-hand corner.

Step Three: A brief period of observation should follow where any abnormality in motor, communication, cognition, self-help, or social behavior is noted in the comments section of the Record Sheet.

Step Four: Each criterion within the selected scale should be administered. The results should be recorded on the Record Sheet. If the child is able to demonstrate the criterion, an "X" should be marked in the column labeled Initial Performance. If the child is unable to demonstrate the criterion, an "O" should be marked in this column. A " / " should be used to denote partial achievement. Then, the prerequisite behaviors which follow should be administered. Comments pertinent to the child's behavior should be recorded in the comments section. All criteria should be administered in the same manner as described above. Administration of the CPL should cease when the child is unable to demonstrate three criterion behaviors in any of the five scales. 173

Step Five: The date of initial testing should be indicated in the column labeled Initial Performance Date. This date will be used to monitor the child's progress if he cannot perform a specific skill. (The date will correspond to the "0" to its left.)

Step Six: Progress should be recorded on the Record Sheet on a continuous basis by marking a " / " for partial achievement or an "X" for full achievement in the Progress Column when the child accomplishes a criterion or its prerequisites. Subtle behavior changes which occur may be noted in the comments section.

Step Seven: The date when criteria or prerequisites are fully or partially accomplished should be marked in the Progress Date Column corresponding to the criteria or prerequisites which were addressed. (This date may then be compared to the initial performance date to show rate of progress.)

General CPL Administration Considerations:

- Review and practice CPL prior to first administration.
- Hurry yourself but not the child. (Bayley, 1969) Move quickly from one rating to another to avoid loss of attention but allow the child time to respond.
- If the rater is a stranger to the child, plan approximately five to ten minutes for spontaneous play prior to rating. Provide the child with interesting toys and participate in the child's play in a related manner.

- If the child becomes fatigued or distressed, the examiner may find it necessary to interrupt the process.
- Be alert. Watch for the child's loss of interest. Young children's attention spans are short.
- Make sure that the environment is conducive to the child's success. Place child on the floor if this will make the task easier to accomplish. However, there should be no additional verbal and physical assistance to obtain the child's baseline activities.

Appendix B contains the CPL and Appendix C contains the Record Sheet for all resource units.

CRITERION AND PREREQUISITE LIST
GROSS MOTOR UNIT

Developmental Age Range	Item No.	Page No.	Category	Performance Behavior
1 Mo.	1		Head Control	C - Lifts and holds head above adult's shoulder when being walked. P^1 - Rotates head to either side when placed in front and back lying positions. P^2 - Raises head when horizontally suspended/face down. P^3 - Lifts head to 90° when lying on front. P^4 - Lifts head to assist in coming to sitting from bake lying position. P^5 -Holds head erect and steady when propped in sitting position for at least 10 seconds.
2 Mo.	2		Symmetrical Posture	C - Simultaneously waves hands and kicks feet while on back for 15 seconds.
6 Mo.	3		Rolling	C - Rolls from front to back in a continuous movement. P^1 - Rolls from side to back.
6 Mo.	4		Rolling	C - Rolls from back to front. P^1 - Rolls from side to front.
4 Mo.	5		Feet Opposition and Hand Regard	C - Opposes soles of feet and regards hands when placed in a back lying position.
6 Mo.	6		Holds Feet With Hands	C - Reaches for and holds feet when in a back lying position.
6 Mo.	7		Prestanding	C - Lifts head, arches back, straightens hips, and lifts legs when held horizontally face down.
6 Mo.	8		Bearing Weight	C - Supports most of upper body weight on hands with extended elbows. P^1 - Pushes up from front lying position, and bears weight on forearms.
7 Mo.	9		Balance	C - Maintenance of balance when placed in sitting position for 1 minute. P^1 - Shows protective reaction if balance is suddenly disturbed while sitting. P^2 - Parachute reaction.

Toni T. Name

11/14/79 Date of Birth

Key
C - Criterion
P - Prerequisite
X - Behavior Accomplished
/ - Behavior Partially Accomplished
0 - Behavior Not Accomplished

RECORD SHEET

GROSS MOTOR

Item	Initial Performance	Date	Progress Rating	Date	Comments
1 C	X	5/15/80			According to parent, head needed support until 3 months of age.
P^1					
P^2					
P^3					
P^4					
P^5					
2 C	X	5/15/80			5/15/80 Stimulated by mother
3 C	0	5/15/80	X	6/5/80	6/15/80 Beginning to roll purp[illegible]ly towards toys and objec[illegible]
P^1	X	5/15/80			
4 C	0	5/15/80	X	7/15/80	
P^1	X	5/15/80			C
5 C	X	5/15/80			5/15/80 - Prefers back lying position. Resist Tummy posi-tion.
	0	5/15/80	/ X	8/2/80 8/25/80	Momentarily grasps feet.
7 C	0	5/15/80			
8 C	0	5/15/80			
P^1	/	5/15/80	X	8/2/80	
9 C	0	5/15/80			
P^1	0	5/15/80			
P^2	0	5/15/80			

GLOSSARY

ABDUCTION - Movement away from the midline of the body.

ACQUISITION - Successful performance of a skill under specified conditions.

ADDUCTION - Movement toward the midline of the body.

ALIGNED POSTURE - Having the body in a straight line, horizontally or vertically.

ANTERIOR - Located in the front.

ANTIGRAVITY - Against the force of gravity; e.g., when an infant raises the head in a prone position, it is in an antigravity position.

APGAR SCORE - Result of test given at one minute and five minutes after birth to assess the child's heart rate, respiratory rate, color, muscle tone, and reflex irritability. Scoring is a possible two points for each item with a total of ten points. A one minute apgar of seven or higher is considered normal and healthy; a five minute apgar of less than six is indicative of possible problems.

ARTICULATION - The formation of the individual speech patterns in a connected pattern. To be correct, it must be communicable.

ASYMMETRICAL - Out of midline; one side of body different from the other.

BEHAVIOR - Anything an organism does that involves an action or response to stimuli; in the curriculum, the action or response that is being stimulated through the specified methods.

BEHAVIORAL OBJECTIVE - A statement which describes an educational outcome. The three required components of a behavior objective are the conditions under which the behavior is to be observed, the behavior which the learner is expected to do, and the criteria for acceptable performance of the behavior.

BILATERAL - Having the ability to perform on both sides of midline.

BILATERAL PREFERENCE - The lack of distinct preference for either side of the midline, each side functioning equally.

BLACK ENGLISH - Phonclogical and graviatical differences in individual children. Should be viewed as differences rather than construed as deficits.

BLINDNESS - Central visual acuity of 20/200 or less in the better eye after correction; visual acuity of 20/200 or more if there is a field defect in which the widest diameter of the visual field subtends an angle distance no greater than 20°.

BODY IMAGE - The awareness of the body as it interacts with the external environment.

BONDING - Ongoing sequence of exchanges between a child and significant adult which results in the mutual reinforcement of attachment behaviors.

CATEGORY - Subdivision of a skill unit which describes the cluster of criterion and prerequisite behaviors of that item.

CEREBRAL PALSY - A condition occurring during the development years which is nonprogressive and results from damage sustained to the cerebrum (higher brain centers) by trauma, lack of oxygen, or poison during prenatal or postnatal periods or unknown sources. The result is total or partial loss of movement control. The four common types are:

1. Spastic - condition of high muscle tone (hypertonic).
2. Athetoid - condition of uncontrolled movement by varying degrees.
3. Rigid - condition of stiff movements and posture.
4. Ataxia - condition of jerky, uncoordinated movement; balance loss.

CHAINING - The procedure in which one response leads to another.

CNS - The central nervous system, consisting of the brain, spinal cord, and spinal nerves.

COGNITION - The collection of mental processes by which knowledge is acquired.

CONGENITAL - Present at or caused at birth.

CONDITIONED RESPONSE - A response which has increased in strength (frequency) because it has been succeeded by reinforcement.

CONDITIONED STIMULUS - A stimulus which has acquired the power to reinforce.

CONDITIONING - The process in which a reinforcing stimulus immediately follows an emitted response, resulting in an increased probability that the response will occur again.

CONTRACTURE - A condition of fixed high resistance to the passive stretch of a muscle.

CRITERION BEHAVIOR - Target behavior which describes the actions to be achieved.

DB - Decibel; the relative measure of intensity or loudness.

DEFERRED IMITATION - Repetition of a motion or sound that has been presented previously, not present at time of repetition.

DEGREE OF DEAFNESS -

1. Mild - Loss of 45 db - slight speech distortion or speech omission may be present.
2. Moderate - Loss of 55-60 db - speech distortion or speech omission likely to be present.
3. Severe - Loss of 75 db - speech and language likely to fail to develop spontaneously.

DEVELOPMENTAL DELAY - A slowdown or postponement in the growth of a child in any skill area.

DIPLEGIA - Physical condition aff[illegible]he whole body, in which movement of affected part (usually legs) [illegible]icult, if not impossible to control.

DISTAL - The parts of the body aw[illegible] the trunk, i.e. fingers are more distal than elbows.

ECHOLALIA - [illegible]tomatic reiteration of words or phrases, usually those which have ju[illegible] heard.

EGOCENTRIC - [illegible]escribing the inability to see events or situations from another's point of view.

EQUILIBRIUM - The ability to maintain balanced body orientation and positioning.

EQUILIBRIUM REACTION - An adjustment of body weight when the center of gravity of one's body is changed in order to maintain balance.

EXPRESSIVE LANGUAGE - The manual or verbal use of a symbol system to convey information (speaking, gesturing).

EXTENSION - The straightening of a body part.

EXTENSOR THRUST - An abnormal reflexive pattern seen in the cerebral palsied, involving the quick opening of the mouth, thrusting back of the head, and extension of spine, hips, knees, and ankles. The stimulus may only be light pressure on back of head or balls of feet.

EXTINCTION - The process where a response is lost.

EYE-HAND COORDINATION - The ability to combine visual stimulus with motor abilities to act upon an object.

FACILITATION - The act of making an action easier by stimulating a muscle response.

FLEXION - The bending of a body part.

FLOPPY - The condition of having weak or loose posture/movement.

FUNCTIONAL HEARING LOSS - A deficit in hearing where there is no indication of a loss appearing on an audiogram (cortical deafness).

HABITUATE - To become accustomed to; the decreasing of the amount of attention to a stimulus as the number of presentations or familiarity with it increases.

HEMIPLEGIA - Physical condition affecting one side of the body more than the other, in which movement of the affected part is difficult, if not impossible to control.

HYDROCEPHALUS - The condition where cerebrospinal fluid accumulates in the areas inside and outside of the brain, caused by blockage and over-production of that fluid, causing pressure and, in many cases, brain damage.

HYPERACTIVITY - An abnormal amount of activity.

HYPERTONIC - Describing abnormally high muscle tone.

HYPOACTIVITY - An abnormally low degree of activity.

HYPOTONIC - Describing abnormally low muscle tone.

IMITATION - Repetition of a motion or sound that has been presented.

INHIBITION - The process descreasing a muscular response.

INTEGRATION - A type of organization, to bring together or organize various parts into a whole.

JARGON - Sequencing of sounds with the inflection, rhythm, and rate of adult speech, although few, if any, words are distinguishable.

LABYRINTHINE - Pertaining to the labyrinth, the system of semi-circular canals found in the inner ear and associated with the vestibular system.

LACK OF INTEGRATION - An immaturity of the central nervous system which results in reflexes not being inhibited or modified by voluntary motor responses.

LANGUAGE - The transmission of information through symbolic means.

LANGUAGE CONTENT - The meaning or what individuals understand or talk about in messages.

LANGUAGE FORM - The shape or sound of messages and the ways elements in a message are combined.

LANGUAGE PRECURSORS - Lay the groundwork for development of language use, i.e., gazing and vocalizing exchanges with caregivers.

LANGUAGE USE - The purpose or reason why individuals speak.

LATERALITY - The internal awareness of the right and left sides of the body.

LEXICON - Vocabulary

MASTERY - The performance of a skill in a normal manner across differing times, materials, cues, and people.

MEDIALLY - Close to the midline of the body.

MIDLINE - An imaginary vertical line splitting the body exactly in half.

MODELING - A teaching procedure in which the teacher performs the correct behavior while the child attends. The child is then required to perform the same behavior.

MORPHEME - Sound combinations which are not words, but when added to a word change its meaning.

MORPHOLOGY - The level at which sounds and strings of sounds have meaning.

MOTOR PLANNING - Ability to organize the task intellectually and kinesthetically; brain analyzes task and sends messages to parts of the body involved to accomplish the task.

MYELOMENINGOCELE - (Meningomyelocele) A form of spina bifida in which the membrane covering the spinal cord and the spinal cord itself protrude through the back to the outside of the body.

OBJECT PERMANENCE - Awareness that objects do not cease to exist when they are out of signt.

PALMAR GRASP - A grasp involving the entire hand, beginning at about 28 weeks.

PARACHUTE REACTION - See Protective Extension.

PARAPLEGIA - Paralysis of the lower half of the body with involvement of both legs usually due to disease or injury to the spinal cord.

PASSIVE - Without any effort on the part of the individual, accomplished totally by use of assistance.

PERSEVERATION - Uncontrollable and unnecessary repetition of movements or speech.

PHONEME - The sound unit that constitute oral language; by themselves have no meaning.

PHONOLOGY - The sounds that constitute oral language and the ability to combine sounds into sequences of words and sentences. By themselves have no meaning.

PHYLOGENETIC - Development according to evolutionary process.

PHYSIOLOGICAL - Characteristic of, or appropriate to an organism's health or normal bodily functioning.

PINCER GRASP - A grasp involving thumb and finger(s), beginning at about 36 weeks.

POSITIVE REINFORCEMENT - The process in which the presentation of a stimulus as the consequence of a response will increase the frequency of the response.

POSTERIOR - Located behind a part or toward the rear of a structure.

PRAGMATICS - The use of language in different contexts and the functions it serves to those contexts. Also, includes the social rules that govern verbal interactions.

PREHENSION - The ability to reach, grasp for, or seize an object.

PREREQUISITE BEHAVIORS - Behaviors which describe the steps needed to achieve the criterion target behavior successfully.

PRONE - Describing the position of lying on the stomach.

PROPRIOCEPTION - The awareness of posture, changes in equilibrium, weight, and resistance of objects in relation to the body.

PROTECTIVE EXTENSION - The extension of the arm(s) to prevent falling when one's balance is upset.

PROXIMAL - Nearest to the midline.

RADIAL PALMAR GRASP - Hand grasp pattern used in grasping larger objects with the object held on the thumb side of the palm.

RANGE OF MOTION - Optimal movement permitted in any specific joint.

RECEPTIVE LANGUAGE - The comprehension of information presented in symbol form. (listening, seeing)

REFLEX - An involuntary response to a stimulus that is specific, predictable, and automatic.

REINFORCEMENT - Any event that will increase the strength/rate of a response.

RELATIONAL WORDS - Words that are not object specific, i.e., no, all gone, stop; words that are more specific but relate to many objects, i.e., actions on objects - give, do, make, actions involved inlocating objects or self - put, go, up, attributes - big, hot, notice - see, look.

REPRESENTATIONAL THOUGHT - Ability to retain the impression of a past event and to anticipate future events based on similar cues.

RIGHTING REACTION - Any reflex that aligns the head and body so that the individual is in a position for locomotion.

ROOTING REACTION - A head-turning response to stimulation applied to lip or facial area around mouth. This response is normal during the first four (4) months.

SCISSORING - Involuntary crossing of the legs at the knees in walking, sitting, or in supine position.

SCOLIOSIS - A lateral curving of the spine.

SEMANTICS - A word's specific and it's connotative meanings.

SENSORIMOTOR - Describing motor responses initiated by sensory stimulation; in Piagetian terms, that period of development from birth to two years in which the child is integrating information from the senses with increasing motor abilities equilibrium.

SHAPING - A procedure where reinforcement is given to responses that bring about closer approximations to the desired final behavior.

SCHEMATA - Mental models constructed by the child of his environment and of the people and objects in it.

SHUNT - A process of removing excessive cerebrospinal fluid from the cranial area by inserting a tube into the brain cavity and placing it through the skull under the skin behind the ear and then following the jugular vein to the heart or the intestinal cavity.

SOFT PALATE - The soft, fleshy part at the rear of the roof of the mouth.

SORTING - Ability to separate same from different and to group items accordingly.

SPHINCTER CONTROL - The ability to control the anal muscles.

SPINA BIFIDA - A condition where the vertebrae of the spinal column fail to enclose completely the spinal cord. Also see Myelomeningocele.

SPINA BIFIDA OCCULTA - A mild condition occurring in about 30% of all births where the vertebrae are not completely closed arund the spinal cord, but the cord is normal, covered with skin, and does not protrude.

SPINA BIFIDA MANIFESTA - A more serious form in which not only do the vertebrae fail to close completely, but the spinal cord does not form a tube and fails to send a sufficient number of nerve fibers to the lower extremities. Also, the spinal cord protrudes from the back, being covered only with the meninges.

STIMULUS - Anything causing or regarded as causing a response.

STRABISMUS - A condition due to a muscular imbalance where both eyes are unable to focus simultaneously on the same object.

SUBSTANTIVE WORDS - Words concrete and relevant to the child, i.e., people, common objects, pets.

SUCKLING - A licking type of sucking reaction, normal in infants for the first five or six months (as opposed to normal sucking).

SUPINE - Describing the position of lying on the back.

SYMBOLIC PLAY - Play in which the child uses objects and actions to represent or model real life occurrences; pretending.

SYMMETRICAL - In midline, both sides of body corresponding.

SYNTAX - Word order in the sense that an orderly arrangement of words conveys an exact meaning.

TACTILE SYSTEM - That portion of the nervous system concerned with the sensation of touch.

TASK ANALYSIS - The process of identifying and breaking down the steps in a skill so that each step may be taught separately.

TONIC BITE REFLEX - An abnormal pattern consisting of an excessively strong bite when lips, teeth, or gums are stimulated.

TONGUE THRUST - An abnormal pattern consisting of a strong protrusion of the tongue when stimulated.

UNITS - Subdivisions within the curriculum which specifically address the various areas of human development, e.g., gross motor, fine motor, communications.

VOLITIONAL MOVEMENT - Willed directed movements, not reflexive or involuntary.

WH - Question forms - questions beginning with who, what, when, where or why.

WORD RECALL - The ability to retrieve an intended word and initiate the verbal expression.

APPENDIX A

Bibliography

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