

7 Infancy - Cognitive and Language Development:



Reflection / Darpan

Use your imagination and thinking and give unique uses of the following objects.

News paper

Pen

Dupatta

The answer that you came up with indicates your ability to perceive the object, think about it, use your knowledge and experience. This is your cognitive ability.

COGNITIVE DEVELOPMENT

Cognition is a general term that refers to the mental activities involved in acquiring, retaining and using knowledge. It includes concepts such as learning, perception, memory and thinking. It is influenced by biological, environmental, experiential, social and motivational factors.

7.1 Meaning and Importance :

- Cognitive development refers to the growth and refinement of intellectual processes.
- It is concerned with the ways children acquire, develop and use mental capacities such as problem solving, memory and language.
- Cognitive development refers to a gradual and orderly change by which mental processes become more complex and advanced.
- It helps children to adapt to the changing environmental conditions.
- It helps them to acquire important cognitive skills such as thinking, reasoning, observation, memorizing, problem solving.

7.2 Mental Processes involved in Cognitive Development :

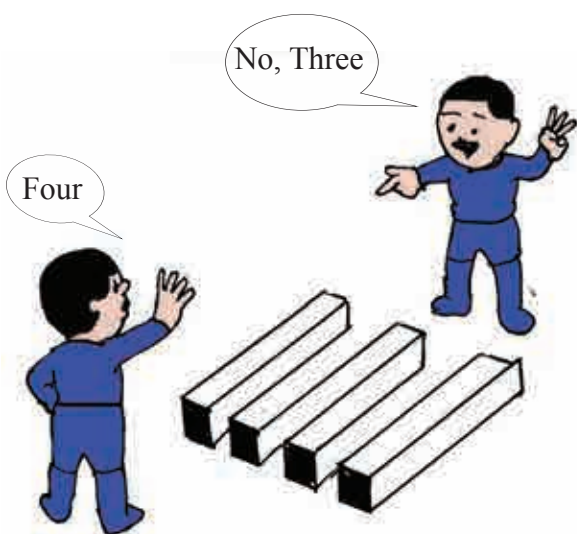
a) Perception :

Perception is the active process of interpreting information received from the senses. It means becoming aware of something through the five senses. It is our primary source of knowledge. Once a child gets information through his / her sensory organs it gets associated with prior information. The child then finds out the relationship between the two pieces of information. For example, when a child is fed a banana, he sees it, tastes it, smells it and feels it. With all these experiences he develops a perception of a banana i.e. a mental image of a banana.

Activity :

Observe the following picture and discuss what you see?

Fun Facts :



How many slabs do you see?

Visual Perception



What do you see ? An old woman or a young lady?

b) Thinking :

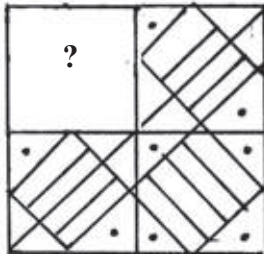
Thinking consists of mental rearrangement or manipulation of information and symbols stored in the memory. The symbols used in thinking are words and mental images using all five senses. Thinking takes place even in the absence of an object. It is an abstract process. For example : What will I wear to the wedding ?

c) Reasoning :

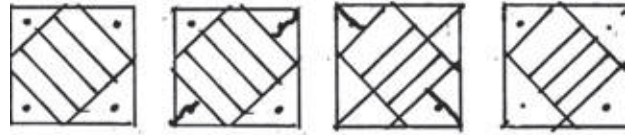
Reasoning is a method of solving a problem based on a set of rules. It consists of making new judgments on the basis of existing ones. It includes the ability to generalize and to make deductions. Reasoning also involves analysis of cause and effect relationship, goal directed thinking and drawing conclusion from other information. For example :

1. There are dark clouds in the sky - Observation
2. Dark clouds signify rain - Reasoning
3. It is therefore likely to rain - Deduction

Activity : Select the appropriate option.



Problem figure :



(A)

(B)

(C)

(D)

Answer figures

d) Memory :

Memory is the process of storing information that can be retrieved whenever required or needed. It is the retention of what is learnt over a period of time. There are three basic processes on which memory is built- acquisition, storage and retrieval. Acquisition is translating information into a form in which the brain can process. The facts are then placed in the memory. For example : observing an apple and observing that it is red (acquisition).

Storage is the retention of memorized material over a period of time. The information is stored under different headings, in different categories. Here the facts are retained in the memory. For example : Remembering that an apple is red (storage).

Retrieval is the process by which previously stored information is brought back for current use. Here the facts are recovered from storage. For example : Painting an apple red in colour as you remember (retrieval).

Activity : SPOT THE DIFFERENCES



Activity :

Lets try :

- 1) **Imagination :** Imagine a walk through the jungle. Write down the details that you visualized.
- 2) **Creativity :** Develop a new cartoon character.

e) **Imagination :**

Imagination is the act or power of forming a mental image of something not present in the immediate environment. It is the power of the mind to mould experiences into something new and unique. Imagination is generally considered to be the foundation for artistic impressions.

f) **Curiosity :**

Curiosity is the inborn desire or urge to ‘find out’. It is therefore a base instinct. It is also termed as a motivational drive to seek information from the world around. This desire helps to explore experiment and discover. Curiosity is a brain function. It is characteristic trait in people.

Promoting / Encouraging

- Keep age- appropriate toys and books
- Let baby feel the toys, work on grasping the bright toys
- Let them listen to a story, song or soothing music
- Let the baby play with common household objects
- Provide stimulation for sensory developement



Fig. 7.1 Curiosity

g) **Creativity :**

Creativity is a mental process involving the generation of new ideas or new associations. It is a product of experience, sensitivity, spontaneity and originality. To create something innovative, ‘out of the box’ thinking is essential.

h) **Attention Span :**

Attention is the process of selecting a stimulus from the environment that is going to be perceived. Therefore, attention span is the duration of time in which a child focuses and concentrates his attention on a given activity. Attention span is necessary for an individual to be able to learn new things. Children are usually able to maintain longer attention span when performing activities that match their abilities and interests.

Activity :

Put the story in the correct sequence

- | | |
|------------------------------|---------------------------------|
| 1. Mommy bird sees a stick. | 2. Mommy bird feeds the babies. |
| 3. Mommy bird builds a nest. | 4. Mommy bird sits on the eggs. |
| 5. Mommy bird sees a tree. | 6. Mommy bird sees a worm. |
| 7. The eggs hatch. | 8. It is spring! |

Now that definitely caught your attention isn't it?

i) Concept Formation :

A concept is an abstract idea or notion, which combines elements of an object or event into an idea. Eg. The concept of a circus includes a joker, a juggler, acrobats, animals and tent. Concept formation is the integration of varied images resulting from different sensory experiences.

7.3 Cognitive Development during Infancy and Toddlerhood :

- Swiss psychologist Jean Piaget has studied cognition in depth and developed a theory of cognitive development.
- According to him cognitive development proceeds through a set of stages from infancy to adolescence.
- The first stage, which lasts from 0-2 years is called the Sensorimotor stage.
- During the Sensorimotor stage, children use the abilities and skills that they are born with to understand and explore their environment.
- They explore and gain experience and knowledge through their senses and motor activities.
- **Schema :** Schemas are the basic building blocks of intelligent behaviour- a way of organizing knowledge and gathering information. They are like 'index cards' in the brain like the ones in a filing cabinet that tell an individual how to perceive the stimulus or information.

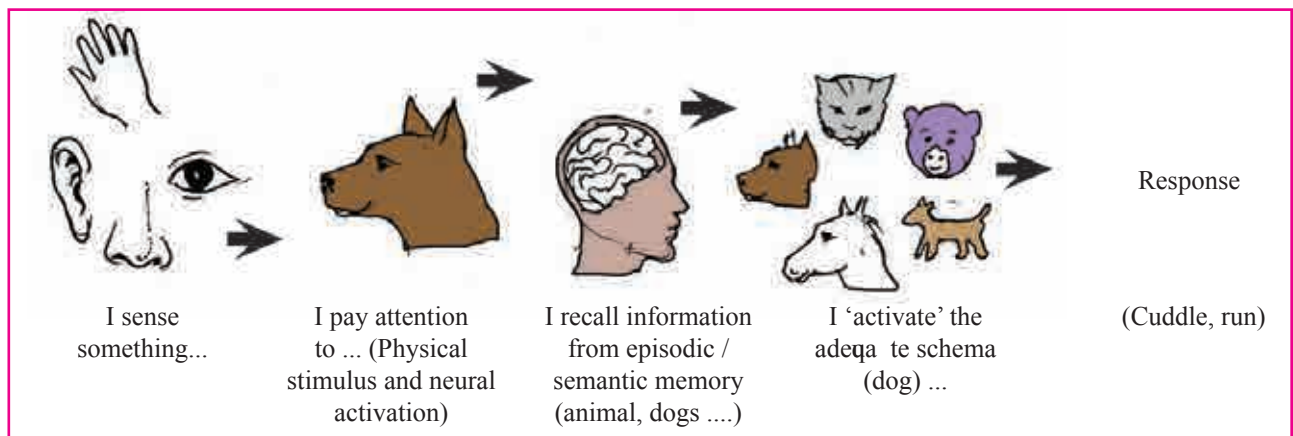


Fig. 7.2 Schema Theory







- **Object Permanence :** The major development during this stage is the development of the concept of object permanence. It is the ability to understand that objects and events continue to exist even when they cannot be seen or heard.



Fig. 7.3 Object Permanence

- There is an astonishing amount of development in the understanding of the children in the short span of two years. **The sensorimotor stage** is subdivided into six substages. Each substage is characterized by the development of certain new skills that enhances the child's understanding of the environment.
- The six substages are as follows :

Table : 7.1 Sensorimotor stage

Stages	Age	Example
Stage I	0-1 month 	Child understands the environment through inborn reflexes. eg. sucking, rooting
Stage II	1-4 months 	Child learns to coordinate sensations and new schemas. eg. child sucks his/her thumb by accident and then later intentionally repeats the action as it is pleasurable.
Stage III	4-8 months 	The child becomes more focused on the world and begins to intentionally repeat an action in order to trigger a response. Eg. A child purposefully shakes the rattle to make a sound.
Stage IV	8 12 months 	Child starts showing clear intentional actions. Eg. The child crawls to reach the toy.
Stage V	12-18 months 	Child begins trial-and-error experimentation. Eg. Child may try different ways of removing the ball from under the sofa.
Stage VI	18-24 months 	Child begins to develop symbols to represent events or objects in the world. Eg. Child uses the word "mumum" for food.

Do You Know?

- According to sociocultural theorist Lev Vygotsky, the way adults demonstrate the process of solving a problem helps children learn to think. Children's cognitive development is shaped by their interactions with their parents, peers and other members of the society. It is also influenced by cultural factors.

74 Infant Stimulation :

- Infants are active seekers of stimulation.
- They need people, sound and physical contact to stimulate their cognitive development and to give them a feeling of security in their world.
- Infant stimulation includes activities that can arouse or stimulate the infant's sense of sight, sound, touch, taste and smell.
- Infant stimulation is very important as it plays a crucial role in the development of their brain.
- In the first three years of life, the brain is busy building its wiring system. Recent researches in brain reported that the infant's environment has a dramatic effect on its brain building and healthy development. It is this early stage of brain development that results in how, and how well, one thinks and learns both as a child and as an adult. The amount of stimulation an infant receives directly affects the brain development.
- Infant stimulation can also improve curiosity, attention span, memory and perception. In addition, infants who are stimulated reach developmental milestones earlier, have better muscle coordination and a more secure self image.

Early Intervention:

Early intervention means identifying and providing effective support and services early, not only to children who are at risk (having challenges in the physical, mental, emotional and social aspects) of poor outcomes but also to their families. Early intervention will help promote in the child age- appropriate growth and development and lend support to families during the critical early years.

The purpose of early intervention is to identify any delay in development thus preventing disability. Prevention at the primary level is where we attempt to prevent the occurrence of any anomaly and at the secondary level we aim to minimize the magnitude of the anomaly.

The objective of early intervention is to ensure improved normal functioning. Only when we know and understand what is normal we would be able to recognize the delay in development.

Neurons that fire together, wire together. Children with developmental delays often experience the wiring of neurons together in a manner that is "unhelpful", causing them to struggle with communication, social skills and other activities. Intervention therefore is best during early years when there are 50 percent more connections between neurons than exists in an adult brain. Keeping this in view as parents / caregivers it is our responsibility to ensure that we provide a rich and stimulating our environment for infants. Let us now see what are the various types of stimulation.

Types of Infant Stimulation :

Infant stimulation is of five types which covers five major areas as shown below :

Vision / Visual Stimulation	Hearing / Auditory Stimulation	Touch/Tactile Stimulation	Taste	Smell / Olfactory Stimulation
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1 Visual Stimulation :

The development of sight is a complicated process and an infant has to learn to see. The infant needs to be stimulated from the time of its birth with numerous visual activities for visual stimulation:

Activities for Visual Stimulation :

Many activities can be given for visual stimulation. A few activities are mentioned below:

- Hanging mobiles within the infant's range of vision
- Provide colourful and a wide variety of toys and equipments to play
- Use picture books, pictures, colourful charts and such other visual materials etc.

2. Auditory Stimulation :

Auditory perception is the ability to understand and relate auditory impressions. It is the ability to be able to connect what one hears with previous auditory experiences. This ability develops slowly. The newborn infant can take in auditory impressions but cannot use them as it does not understand what these impressions mean. He/she is able to interpret the auditory signals when the central nervous system is more developed.

Activities for auditory stimulation :

Many activities can be given for auditory stimulation. A few are mentioned below :

- Use toys that make sound
- Conscious use of human voice
- Expose the child to various sounds of instruments, animal sounds and various other sounds to develop auditory perception.
- Encourage cooing, babbling and speech formation.

3. Touch/Tactile Stimulation :

Touch is critical to develop different types of sensory experiences. Touch helps the infants to know they are loved and is a source of comfort. Infants actively touch and explore objects. This is one way in which they learn about the world around them. Infants need gentle touching, holding and eye contact just as they need food to grow and develop. Research has proved that nurturing touch actually help infants to gain weight and develop healthy relationship with caregivers. Holding and stroking an infant stimulates the brain to release important hormones necessary for growth.

Activities for Tactile Stimulation :

- Oil massage for babies
- Gentle stroking
- Soft and smooth textured clothing, blankets and soft toys.
- Experience of lukewarm, slightly hot and cold water
- Gently stroking the infant's hair.

4 Taste :

Facial expressions reveal that newborn can distinguish several basic tastes. They relax their facial muscles in response to a sweet taste, turn their lips outwards when the taste is sour and pull their mouth downwards when it is bitter.

Activity :

Refer the types of stimulation and Collect pictures of the same
Make a chart and display the same in your classroom

Activities for stimulation of taste :

- 1) Introduce the taste of different foods such as:
 - Sweet : jaggery, honey, ripe mango, ripe banana
 - Sour : lemon, tamarind
 - Citrus/ Tangy : orange, sweet lime, pineapple
 - Salty : cheesed, wafers, salt
 - Bitter : bitter gourd ('karela')
- 2) Infants should be introduced to different fruits, fruit and vegetable juices and soft cooked foods and vegetables. Avoid strong tastes such as onion, garlic

5. Smell / Olfactory Stimulation :

The sense of smell is well developed among young infants. They can identify their mother on the basis of her distinct smell. They react to the smells of certain foods in the same way as adults. They can identify the direction from which they sense an odour and also turn away from it if unpleasant.

Activities for stimulation of the sense of smell :

- Introduce the smell of various foods
- Smells of various flowers
- Soaps with mild fragrance

Activity :

Team Triathlon

Find what each of the following word has in common. (Clue : Each group has a common prefix or suffix)

Group I

Food

Cars

Friends

Group II

Picture

Door

Car

Group III

Appear

Allow

Connect

7.5 Language Development : Meaning, Importance and Functions

Meaning and importance :

Language is a means of communication. Children express their thoughts, feelings and ideas by using their verbal and non verbal skills. Language is a complex phenomenon associated with auditory and vocal communication of thoughts, emotions and ideas. It includes different forms of communication such as listening, reading, writing, speaking, sign language, facial expressions, gestures and mime.

The study of language can provide a window into cognitive and socio-emotional development. Parents and other adults play a critical role as facilitators of a child's language acquisition. Speech is a form of language in which articulate sounds and words are used to convey meaning. It is a motor-mental activity.

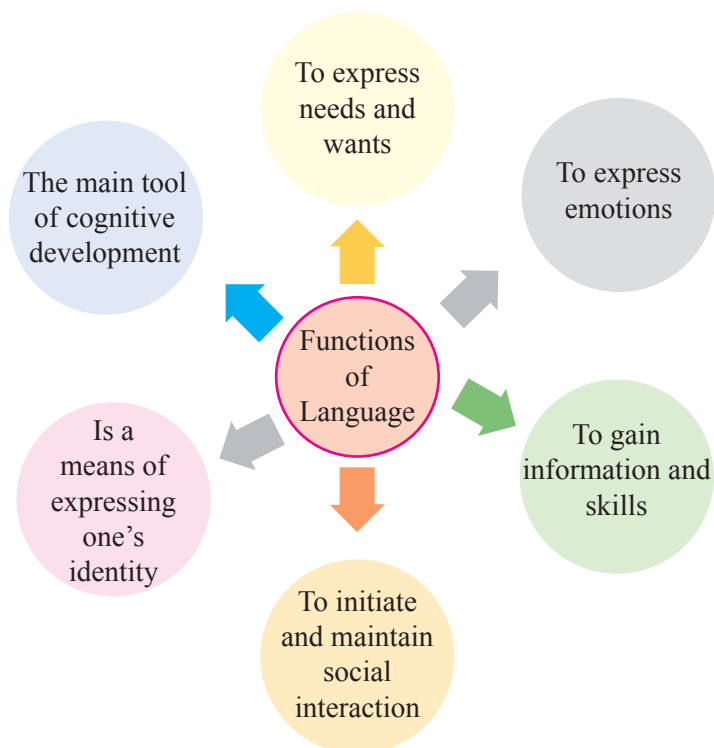


Fig 7.5 Functions of Language

Is language and communication the same? No! There is a difference between the two.

7.6 Communication and Prespeech forms

Communication means an interchange of thoughts and feelings. This can be in any form of language- verbal, non verbal, gestures, emotional expressions or written.

- To communicate effectively children must use a form of language that is meaningful to others. For example, pointing to an object that they want.
- They must understand the language used by others. For example, when an adult is shaking her head and saying 'no', the child must realize that he/she is being told not to do something

So, what are the abilities that an individual must have for effective language development? An individual must have the following two abilities :

i) Comprehension :

It is the ability to understand what others are trying to communicate. The ability to comprehend will not only depend upon the intellectual ability of the infant but also upon the stimulation and encouragement received from the environment.

ii) Communication :

It is our own ability to make others understand what we want to say. An infant is able to understand what others are saying much before he/she is able to put his/ her ideas and feelings into words.

Words need to be reinforced with gestures such as pointing out to objects until the age of 18 months in order to enhance comprehension and communication.

Learning to speak is a long and difficult task. The infant is not mature enough to perform these tasks in the first year of life. So children use other forms of communication. These are known as the pre-speech forms of communication.

Let us now understand the prespeech forms of communication.

Pre Speech Forms :

Before infants say their first words, they use substitute forms of communication in order to make their needs and wants known. These are known as "pre-speech forms of communication". The infant is not mature enough to speak in the first year of life. The child's early production of sound - the pre-speech forms of communication- follow an orderly sequence, beginning with crying, followed by cooing, babbling, gestures and facial expressions. All these patterns of speech end by the first year. The five pre-speech forms of communication are :

Crying

Cooing

Babbling

Gestures

Facial
Expressions

Recap :

- What is language?
- What is communication?

1. **Crying :**

- It begins at birth. It is the first way in which the infant is able to communicate with the external world.
- It is a reflexive vocalization when the infant is in discomfort such as hunger, pain, fatigue and other such unpleasant states.
- It also satisfies the infant's need for attention.
- It is possible to indicate what the cry signifies by the third or fourth week of life from the tone, pitch or intensity. Example, a loud shrill cry indicates pain; a loud cry with sucking movement indicates hunger.

2 **Cooing**

- Cooing involves vowels sounds especially 'uu' which start at the end of the first month.
- In addition to crying, babies make a simple sound of cooing.
- At around two months, infants make sounds expressing pleasure and contentment.
- Many of the cooing sounds disappear but some develop into babbling.

3. **Babbling :**

- Babbling includes a broad range of vowels and consonants and a variety of stress and intonation patterns.
- At the end of 3 months, infants begin to utter vowel- consonant combinations such as ba, da, ma. This is known as babbling.
- The expansion of babbled sounds results from the maturation of the vocal structures and from hearing language in the environment.
- At 6 months, the intonations are repeated by stringing them together such as 'ma-ma-ma-ma, or da, da, da, da. Infants produce these repetitively.
- Due to a growing ability to control the flow of air over the vocal cords, the infant can produce sounds at will.
- When the infants are stimulated to reproduce the sound, they can pronounce one word out of babbling like 'Baba', 'Dada'.

Babbling has long term values:

- a) It is a verbal practice that lays foundation for speech.
- b) It encourages the desire to communicate with others.
- c) It helps infants feel that they are a part of the social group.

Interesting information !!

- a) All infants whether deaf or with normal hearing babble.
- b) Infants need to move their tongues to distinguish between sounds.
- c) Psychologists and audiologists found that the use of a pacifier prevented 6 months old infants from moving their tongue. Thus they were not able to distinguish between sounds. Keeping the pacifier in the mouth hinders speech production and speech perception.



4. Gestures :

- They are the movements of the body, arms and limbs. They serve as a substitute to supplement speech. They take the place of words. They emphasize the meaning of a spoken word.
- Infants use gestures to point out to an object which they want. e.g. When parents ask the child, “Do you want a banana?”, the child replies by nodding his/her head.
- Some of the common gestures during infancy are pushing objects away, reaching out to a person, smiling and holding out arms.
- Children continue to use gestures to make their incomplete sentences meaningful until they build up a large enough vocabulary to express their wants and needs. As speech improves, the need for gestures decreases.

5. Emotional expression :

- Infants express their emotions through facial expression and bodily movements.
- Infants express emotions such as fear, anger, joy, love, rejection through facial expressions and gestures.
- The pleasant emotions are accompanied by cooing and chuckling sounds; while unpleasant emotions are accompanied by whimpering and crying.
- As child grows older they learn to express emotions in a socially acceptable way.

How do Children Develop Language?

There are different theories on how children develop language. Given below are a few theories that tell us how children acquire language:

- i) Behaviourist B.F. Skinner proposed that imitation and reinforcement contributes to language development. i.e. through **operant conditioning**. The infants repeat behaviors when they get positive reinforcement such as smiles, hugs and verbal response from the parents/ caregiver.
- ii) Linguist Naom Chomsky proposed that young children’s language skills are etched into the structure of the human brain. He believed that all children are born with a **language acquisition device (LAD)** which is an innate system that contains a set of rules common to all languages. It permits children to understand and speak in rule-oriented fashion (grammatically correct manner) as soon as they pick up enough words.

Table : 7.2 Language Development in Infancy

Approximate Age	Milestones
2 months	Infants coo,making pleasant vowel sounds
3 months	<p>Make cooing sounds</p> <p>Quieten or smile when spoken</p> <p>Seem to recognize caregivers or significant adult’s voice</p> <p>Cry differently for different needs</p>
4 months	Infants babble, adding consonants to their cooing sounds and repeating syllables
6 months	<p>Make gurgling sound while playing or when left alone</p> <p>Babble and make a variety of sounds</p> <p>Use voice to express pleasure or displeasure</p> <p>Move eyes in the direction of the sound</p> <p>Respond to changes in adult’s tone of voice</p> <p>Notice that some toys make sound and respond</p> <p>Pay attention to music</p>
7 months	<p>Babbling starts to include many sounds of mature spoken languages</p> <p>Infants and parents establish joint attention, parents often label what the child is looking at</p> <p>Interaction between parents and babies includes games such as pat-a-cake and peek -a- boo.</p>
8-12 months	<p>Infants start using preverbal gestures, such as showing and pointing to influence the behaviour of others</p> <p>Word comprehension appears first</p> <p>Infants actively participate in games such as peek-a - boo and pat-a-cake</p>

12 months	<p>Toddlers say their first recognizable words--holophrase</p> <p>Holophrasic speech is a form of speech where single words convey complex meanings. Infants while learning language express themselves in a single word where adults may use complex language/sentences. Eg. “mumum...” to express please give me food.</p> <p>Try imitating speech sounds</p> <p>Understand simple instructions such as “Come here”</p> <p>Recognize words of common items such as ‘shoe’</p> <p>Turn and look in the direction of sounds</p>
18- 24 months	<p>Vocabulary expands from 50 to 200 words</p> <p>Recognize names of familiar people, objects and body parts</p> <p>Follow simple directions accompanied by gestures</p>
20-26 months	<p>Toddlers combine two words--telegraphic speech</p> <p>Telegraphic speech is a form of communication consisting of simple two to three word long sentences. It can be a noun-noun, noun-verb or noun adjective combination. For eg. “Ria tata...”</p> <p>Follow simple commands and understand simple questions.</p>

7.8 Activities to enhance language development :

Listed below are some activities that adults

can use for language stimulation :

- *Pronounce words clearly.
- *Use meaningful gestures along with speech
- * Use facial expression with speech
- * Always give positive instruction
- * Point out to the picture or objects
- *Sing nursery rhymes to children
- *Recite poems for them
- * Tell stories to children
- *Play small word games with children
- *Encourage Informal talks on different topics
- * Give social experiences like visiting a market place, garden, fair etc.

Info Hub

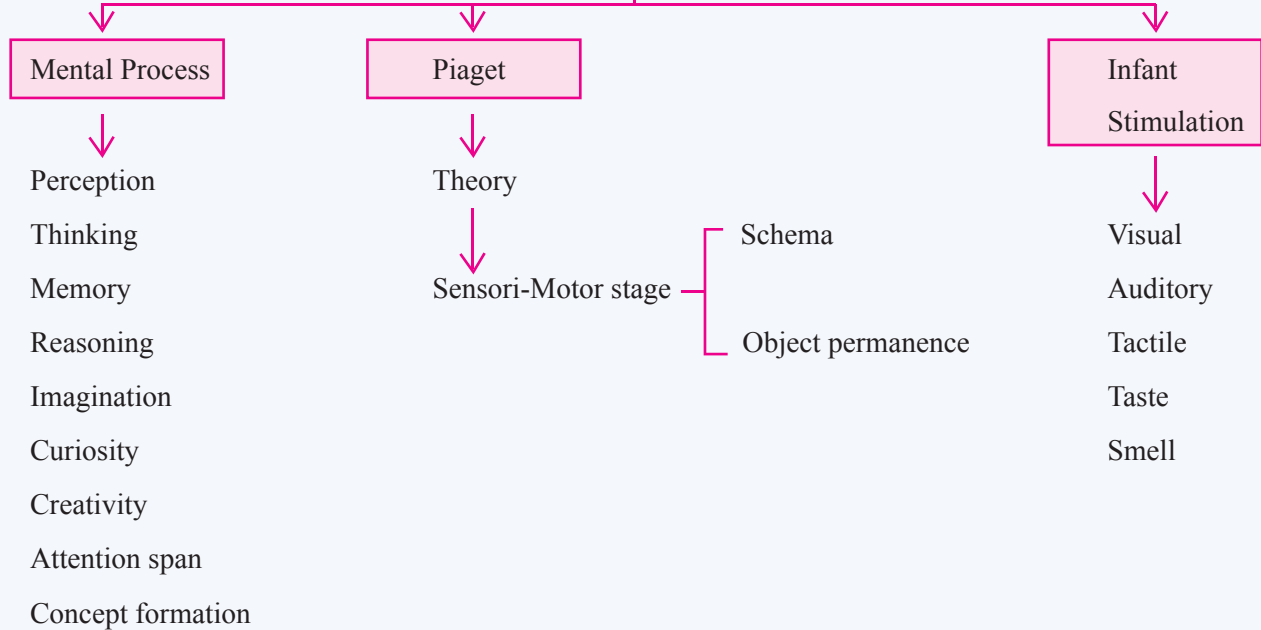
THEY START LEARNING IN THE WOMB.

The parts of a baby’s brain that process sound start working during the third trimester of pregnancy,

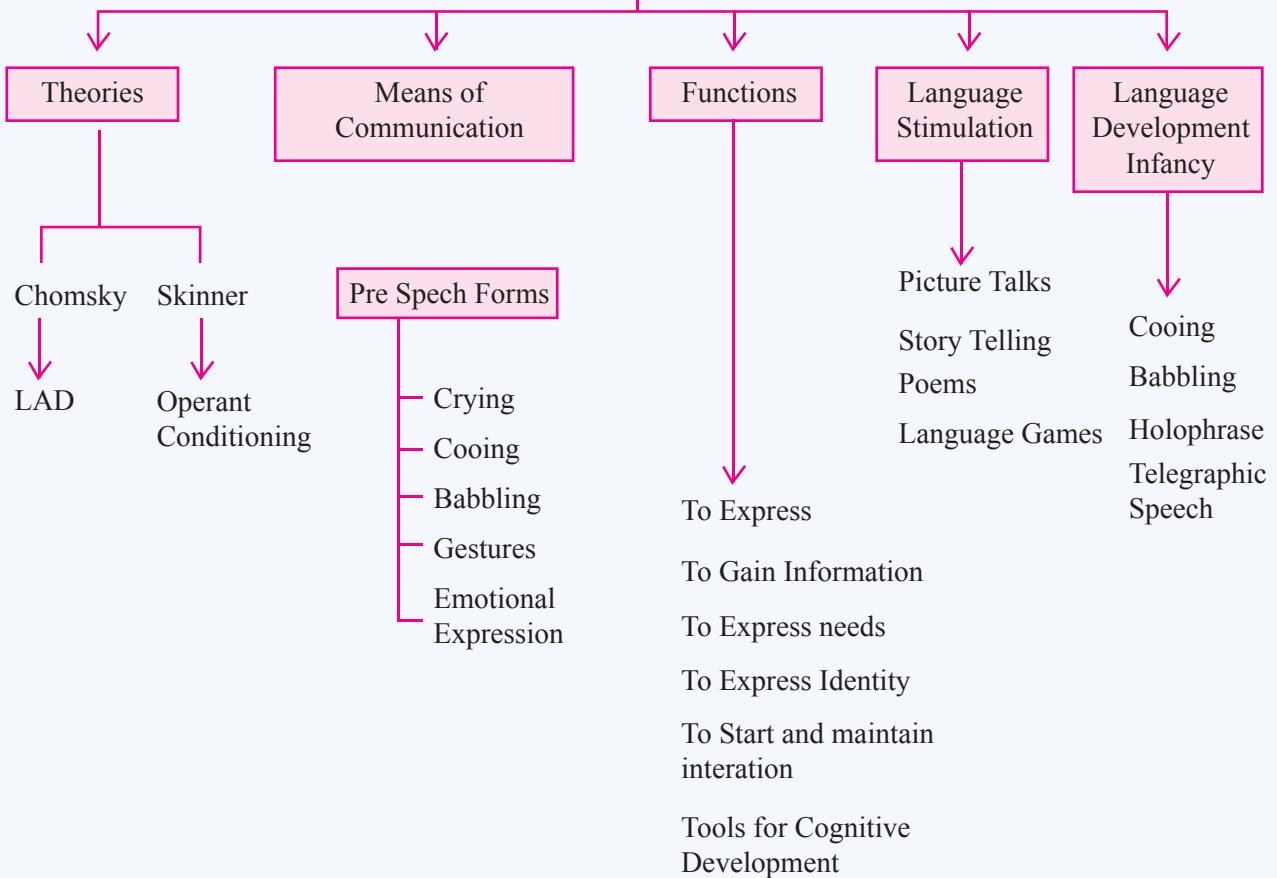
Infant can remember what it hears in the womb after it’s born. A study found that Swedish infants only 30 hours old could differentiate between Swedish vowel sounds and the unfamiliar vowel sounds of foreign languages. Another study found that when expectant mothers listened to a soundtrack with a made-up word, the infants recognized that word and its modified version after birth.

Revise the points

Cognitive development



Language development





Exercises

Q. 1. Select and write the most appropriate word from the given alternatives.

- Jean Piaget has studied development in depth.
a) Emotional b) Cognitive
c) Physical
- The time span of sensorimotor stage is
a) 0-3 years b) 2-6 years
c) 3-5 years
- are the building blocks of cognition.
a) Schemas b) Schemas
c) Thoughts

- is a means of communication.
a) Language b) Comprehension
c) Skill

Q. 2. Write whether the following statements are True or False, correct the false statement and rewrite.

- Cognitive development prepares children for critical thinking and problem solving.
- Retrieval is the process by which previously stored information is brought back.
- Child understands the environment through inborn reflexes.
- Infants are active seekers of stimulation.
- Auditory perception is the ability to understand and relate visual impressions.

Q. 3. Match the pairs.

A	B
1. Reasoning	a. Smell of various flowers
2. Visual stimulation	b. Solving problems based on a set of rules
3. Memory	c. Provide colourful pictures and variety of toys to the child
4. Concept formation	d. Storing information
5. Stimulation of smell	e. Transmission of knowledge
	f. An abstract idea

Q. 4. Complete the boxes.

1. Pre speech forms :

crying Gestures

2. Types of infant stimulation :

 Auditory Stimulation Smell

Q. 5. Explain the following terms

1. Perception
2. Thinking
3. Memory
4. Curiosity
5. Object permanance

Q. 6. Write short notes.

1. Meaning and importance of cognitive development
2. Piaget's approach to cognitive development
3. Influence of socialization and environment on cognitive development
4. Meaning and importance of language development.
5. Role of adult in language stimulation

Q. 7. Answer in detail the following questions.

1. What is cognition? Explain the mental processes involved in cognitive development.
2. What is language development? Explain the pre speech forms of language development.

Project / Self Study

- List out ways to stimulate infants or list different activities (other than the ones given in text) by which you would stimulate infants.
- Find out some memory games that you could play in your classroom.

