5 Cognitive and Language Development

In 11th standard we studied what is cognition and tried to understand different processes involved in cognition along with Piaget's basic concepts and first stage of Cognitive Development in children. We also learnt some interesting facts about Language Development in children. Before continuing our journey of understanding Cognitive and Language Development further, let's have a quick look.

Cognition is "the mental action or process of acquiring knowledge and understanding through thought, experience, and the senses"

Cognition covers mental processes helping us to know and understand the world around us, make judgements, take decisions and describe our knowledge and understanding to others.

Activity :

Make a list of different mental processes involved in cognition.

1

2

3

4

5

6

We studied the first stage of the theory of Cognitive Development by Jean Piaget, the Sensory Motor stage. In this stage the children learn about the world, mainly through their senses and motor actions. They also develop object permanence in this stage. This stage extends from birth to two years.

Activity :

Discuss the different functions of language with your classmates.

List the pre speech forms

1

2

3

4

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5.1 Mental processes involved in cognition

Let's elaborate our understanding of the various mental processes involved in cognition.

A) Thinking

Let's do an interesting activity. Close your eyes and think about your first day of the college or what is your favourite food or what do you plan to do tomorrow. Now try to think about what you exactly did while thinking.

You used language, images, sounds, smells, memories, concepts, ideas, symbols, signs and mentally arranged and rearranged them, isn't it? This is what thinking is. Thinking consists of mental rearrangement or manipulation of information from the environment and symbols stored in your memory.

We use mental images as well as symbols in thinking. Most of the times thinking is a conscious process.

B) Reasoning and problem solving

Reasoning is mental activity used to solve a problem or to draw a conclusion. Reasoning also includes the ability to analyse the cause and effect relationship as well as goal directed thinking and drawing conclusions from available information.

It can be observed that in the beginning children learn problem solving by using trial and error method. e.g. If a one and half year old wants a toy kept on the high table, he/she might try to reach there, try to climb on the chair to reach the toy, pull the table cloth to get it, try to pull it with a toy racquet or finally may start crying to get an adult to help her.

As the child grows older, he/she gets a wide exposure to the environment, develops concepts, starts understanding how things work through trial and error, learns language and develops an understanding of various cause and effect relationships. For example, If I cry loudly, I get things I want, when I turn the tap on water flows, I press the switch and the light turns on.

Gradually the child generalises the rules. He/she understands that by pressing the switch not only the light but the fan or TV can also be turned on.

Piaget's theory gives us interesting facts about how reasoning ability of the child is facilitated by the cognitive development. We shall talk about it further in the chapter.

C) Perception

Perception is our primary source of knowledge.

We get to know about our world through our senses. Our five sensory organs are gathering information all the time. We extract meaningful information from the sensory stimulation. We attach meaning to the sensory information that we get.

For example :

I **see** a brown fruit and **perceive** it as a *'chikoo'*

I **taste** something sweet and I **perceive** it as chikki

While attaching meaning to the sensory information we use prior knowledge, concepts, experiences, beliefs, attitudes etc. Therefore, there could be individual differences in the perception of information.

> The word perception comes from the verb perceive, means to become aware of, especially through our senses.

D) Memory

It is the ability to record, retain and recall the information. It is the retention of what we have learnt over the period of time.Memory is thought to have three parts.

1. Sensory Register
2. Short Term Memory
3. Long Term Memory

Sensory register :

We acquire information through five senses. This information is passed on to the brain. Even after passing on to the brain our sense organs store it for a very short period of time. This function is called sensory register.

Short term memory :

It holds information for a very short period of time, for about 20 to 30 seconds.

Long term memory :

The information in the long-term memory is stored for a much longer time. It could be for weeks, months, years or even for an entire life time.

Do you think just storing the information is sufficient? Will it be any helpful if we are not able to use it, when needed?

To make this stored information accessible we retrieve it. Retrieve means to bring (something) back from somewhere. There are two ways of retrieving the information, Recall and Recognition.

Recall :

In recall we pull the information out from our memory.

Recognition :

Memorised information is not reproduced but chosen out from the list of possible alternatives.

E) Imagination :

It is the action of producing ideas, especially mental images of what is not present or has not been experienced by us. It is done by combining previous experiences and concepts and using our creative potential.

Imagination is extremely useful in thinking, reasoning, problem solving and creative expressions.

Picture 5.1 Imagination

F) Attention Span

We are continuously bombarded with numerous sensory stimuli. If every variation in sound, movement, smell, temperature is to be perceived it would be impossible to make sense of the world around us. By paying attention to selective stimuli and ignoring others we select from all the possibilities what exactly we want to perceive.

Attention is concentrating on something for certain period of time without distraction or fatigue.

It is the amount of time that we focus on any task.

Very young children can sustain attention for a short time. They get easily distracted. The normal attention span is 3 to 5 minutes per year of a child's age. Therefore, a 2-year-old should be able to concentrate on a particular task for at least 6 minutes, and a child entering kindergarten should be able to concentrate for at least 15 minutes.

Children are usually able to maintain a longer attention span while performing the tasks that match their abilities and interests! An adequate attention span is an important aspect of learning in the classroom.

G) Concept Formation :

Concepts emerge from the elaboration and combination of various sensory experiences. We receive stimuli and information through our sensory organs. These are integrated or combined together to form an idea about any object or experience.

For example, concept of a banana would include: It is a fruit, it is green when raw, yellow when ripe, its smell, taste, different ways in which we eat it, where do we get it from, what it its texture so on and so forth….

H) Decision Making :

This is an important mental process and a crucial life skill. It refers to the process of identifying and choosing alternatives based on values, prefernces and beliefes of the individual.

Activity :

Explore your concept of a garden. Write down all the things that you associate with the word garden. Try including all related sensory experiences and ideas.

Share it with your classmates. Do all of you have exactly the same concept? If not, why different aspects are a part of your concept? Discuss.

Concepts form basis of understanding. The different sources of concepts are sensory stimuli, motor manipulation, reading, learning, media etc.

5.2 Cognitive Development in preschool years - Piaget's 2nd stage of Cognitive Development

Cognitive Development is the gradual process and it involves refinement of all mental processes involved in cognition.

Piaget was a Swiss theorist and he developed an influential theory of cognitive development.

Piaget's (1936) theory of cognitive development explains how a child constructs a mental model of the world. He viewed children as active explorers who interact with the environment to gain knowledge. He proposed that cognitive development takes place in four stages. Amongst these the second stage of cognitive development is from 2 to 6 years.

It is called **Preoperational Stage.**

Interesting fact!

Piaget studied the intellectual development of his own three children and created a theory that described the stages that children pass through in the development of intelligence and formal thought processes.

Characteristics of preoperational child's thinking

1. Symbolic Function :

It is the ability to use symbols or mental representations. It includes the words, numbers and images to which the person has attached meanings.

Picture 5.2 Symbolic play

Children show symbolic function through

- **symbolic play**
- **language.**

In symbolic play the child makes an object stand for something. For example, a doll for a baby or a stick for a horse.

Language is use of common system of symbols. There is beginning of thought and the child thinks internally by using words and signs.

2. Difficulty with Hierarchical Classification :

Children in this stage can classify the objects into groups, such as animals, flowers, birds, vegetables, vehicles, but they cannot organize them into classes and subclasses on the basis of similarities and differences.

In Piaget's experiment the children are shown 6 blue flowers and 12 yellow flowers and are asked "what is more, yellow flowers or flowers?" The child apparently answers that the yellow flowers are more unable to understand that both yellow and blue flowers belong to the same higher category of flowers.

3. Transductive Reasoning :

Have you ever come across children making the following statements?

"It gets dark because we sleep"

"I got hurt because you scolded me"

In these cases, the child feels that sleep is the cause of getting dark or scolding by mother is the cause of getting hurt.

It is interesting to see how children view one situation as the cause of other situation, when they occur at the same time.This is called trasductive reasoning.

Can you think of some examples of transductive reasoning?

4. Animistic thinking :

The child regards that even inanimate objects do have life like qualities like feelings and intentions and they are alive. Child might feel that anything that moves is living. Have observed children hitting the table if they are hurt by it. They really feel that the table should be punished for hurting them.

Picture 5.3 Animistic Thinking

5. Egocentrism :

When the term egocentrism is used in reference with the preoperational children it refers to the inability of these children to view the things from other's point of view.

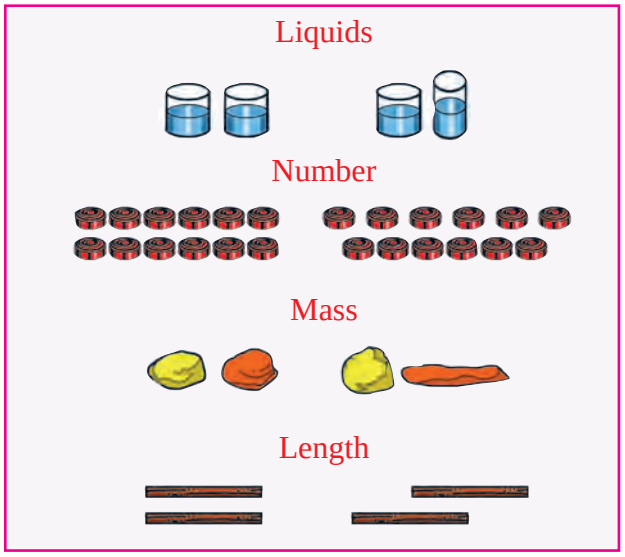
For example, a child closes his own eyes and asks the mother to find him. The child feels that as he is not able to see anything, the mother is also not able to see anything.

6. Conservation :

The sensory motor infant eventually understands that the objects continue to exist even when they are out of sight. But there are many other aspects of objects that remain constant despite apparent changes. This is called conservation of objects.

Conservation is the concept that people and many things basically remain the same even if they change in form, size or appearance.

Certain physical characteristics of objects remain same even when their outward appearance changes.



Picture 5.4 Conservation

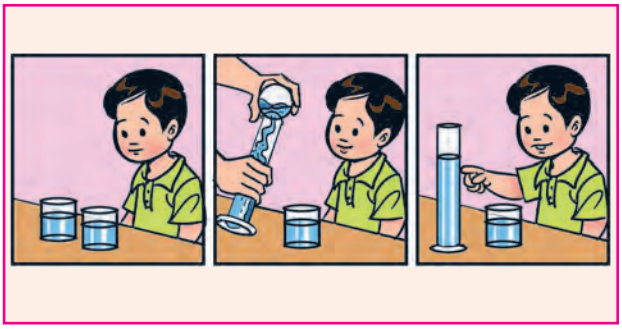
- **Conservation of Quantity :**

The child is shown two equal sized balls of clay. The child is asked whether the two balls have same quantity of clay. The child agrees that both balls have same quantity of clay. Then in his view one ball is patted flat like a pan cake and then asked the same question. The child in this stage of cognitive development will say that the flat one has more quantity (because it looks more) only after 7 years of age the child will answer that both have equal amount of clay. When the child understands that the quantity remains same though there is change in the shape or look, he is able to give correct answer and he is said to conserve 'quantity'.

- **Conservation of Liquids :**

The child is given same amount of liquid in two similar containers. The child agrees that both the containers have same amount of liquid. The liquid from one container is poured in to a tall, narrow container. The water level in the narrow container looks higher than the water level in the original container. When the child is asked which container has more liquid in it, he says the tall container has more liquid.

The child will be able to correct answer only when he will understand that amount of liquid remains same though they do not look same. Children in this age are not able to conserve 'liquids'.



Picture 5.5 Conservation of Liquids

- **Conservation of Numbers :**

The child is given 2 sets of same number of marbles. They are arranged in two similar rows.

Then the marbles in the second row are spread far from each other. Now the second row looks longer than the first row. The child is asked "Which row has more marbles in it?" The preoperational child answers that the row that looks longer has more marbles on it. The child in preoperational stage of thinking cannot conserve 'numbers'.

In the similar way children in the preoperational stage are not able to conserve 'area or weight'.

Why does the preoperational child have difficulty in conservation? It is because of the following characteristics of preoperational thought that are the limitations of the thinking in this stage.

Characteristics that are limitations of preoperational thought.

A. Perception bound understanding :

A child in this stage gets influenced by the perceptual appearance of the object. He feels that the flat ball of clay has more quantity of clay because it looks more. Similarly, the liquid level in the narrow container looks high so he decides that it has more liquid in it.

B. Centration :

The preschool child's thinking tends to focus at one feature at a time. He is unable to combine various features into integrative patterns. This is known as centration.

When the child is comparing the two water containers in the above experiment there are two crucial factors. First is the liquid level and the other is width of the container. The narrow container will obviously show a higher level of liquid. If the same liquid is poured in to a wider than original container, the level will drop further down. The preoperational child cannot take these two aspects into consideration and focuses only on one single aspect i.e. the water level.

7. The child focuses on states rather than transformation :

In the experiments of liquid, numbers as well as quantity conservation there are stages of transformation between the first and last stage. These stages of transformation are patting the clay into flat pan cake, pouring the liquid in to narrow container and spreading the marbles in the row. Though these are performed in front of the child the child is unable to consider them while answering the question.**The preoperational children tend to focus on the first and last states rather than the transformation stage.**

8. Irreversibility of thought :

It is the inability to mentally go through a series of steps in the problem and then reverse the thinking direction and go back to the starting point. Let's take the example of the experiment of number conservation.

If an older child is presented with the same problem, his or her thinking would generally follows these steps:

- The two rows have same number of marbles.
- Marbles from the second row are spread out.
- So, the row is looking longer.
- If I again get the marbles closer then it will look similar.

The last step in thinking is called 'reversible thinking'.

The preoperational child cannot do reversibility of thinking.

Language development during preschool years.

We have seen how foundations of language development are laid in the first two years of life. On those foundations the language develops multi folds during preschool years.

There are two forms of language that develop during preschool years.

1. **Receptive language :** it is the child's understanding of spoken or written words.
2. **Productive language :** it is what the child says.

Productive and receptive language develops simultaneously. The receptive language develops a bit earlier.

Steps in Language Development in Preschool Years

Table 5.1 Language accomplishments in the preschool years.

Vocabulary	Pronunciation	Sentence formation	Comprehension
Up to three and half years the vocabulary increases as many as around 50 words in a month. The increase in vocabulary continues during the next years. By the age of 4, they understand around 1900 words and 2200 words by the age of 5 years. By the time they are 6 years old they can understand that the same word can have two meanings. Use more words than actions and gestures in their communication	In the preschool years the child's tonal expression and speech rhythm begin to take adult form. Children's pronunciation depends largely on the correctness of models to imitate and the guidance in correcting mispronunciations.	Children begin to form complex sentences using clause such as how, when, who as well as compound sentences. They can make long sentences. They can adjust their speech to suit listeners of different age. It was found that when preschool children talk to babies, they use simple language but while talking to adults they use longer sentences with more complex grammatical construction.	By 3 years they understand that many words change form to suit the circumstances. During third and fourth year their talk is full of questions. They can narrate a logical story They can respond appropriately to questions about quantity (how much, how many), duration (how long), distance (how far) and timings (when).

Acquisition of Language

How do we learn language? A great deal of research has been devoted to this question. There is a controversy as to how exactly it develops but there are three important components that are part of the process.

1. Imitation
2. Reinforcement
3. Innate Language Structure

Imitation

Imitation plays a large part in the development of language.The child keeps on adding new words by imitating the sounds they hear and learn the correct words. Children's first words are obviously learned by hearing and imitating.

Reinforcement

Reinforcement is a powerful learning device and is influential in certain aspects of language development. Smiles, hugs and increased attention by adults encourage language learning to certain extent.

The child makes some kind of sound and the parents joyfully respond to it. So the child is motivated to repeat the behaviour.

However both imitation and reinforcement do not explain the development of syntax. Even if some forms of language are encouraged or discouraged it is not possible to reinforce all correct forms and extinguish all incorrect forms.

Innate Language Structure

Linguist **Noam Chomskey** (1959) first talked about the limitations of the reinforcement theory. He proposed that every human being is born with a mental structure to acquire language. He called it **"Language Acquisition device"** (LAD)

This language acquisition device helps the child to process the linguistic data from their environment and generate the grammar rules by themselves.

That is, when children hear people talking, listen to story read to them, listen to a radio or listen to the TV or movies; everything they hear is a **'language input'**.

This is selectively processed in the LAD (language acquisition device) and children automatically induce grammatical rules for themselves.

Importance of stimulation in cognitive and language development

Language stimulation is fundamental to all areas of cognitive development.

The child's environment has a dramatic effect on cognitive and language development. It is this early stage of brain development that results in how, and how well, one thinks and learns both as children and as adults.

In the first years of a baby's life, the brain is busy building its wiring system. Activity in the brain creates tiny electrical connections called synapses. The amount of stimulation an infant receives directly affects how many synapses are formed. Repetitive and consistent stimulation strengthens these connections and makes them permanent.

When children are engaged in responsive, language-rich experiences, they are supported to continue building upon the language they can use and understand.

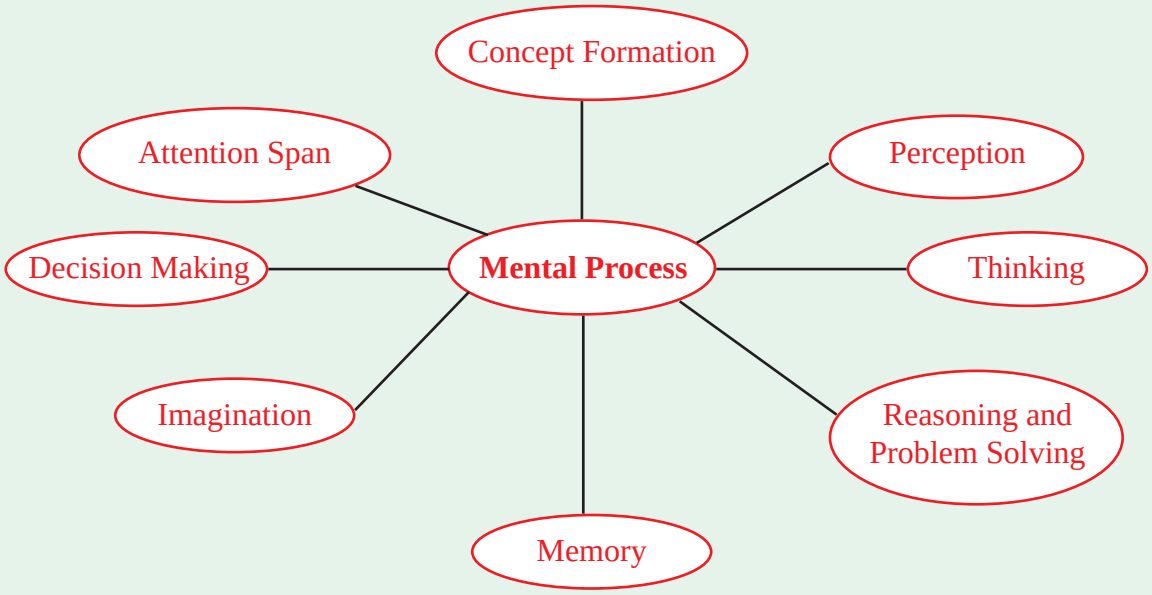
Language stimulation is a great way of building upon children's communication attempts and modelling how children can use more language.

Some suggestions for encouraging language development:

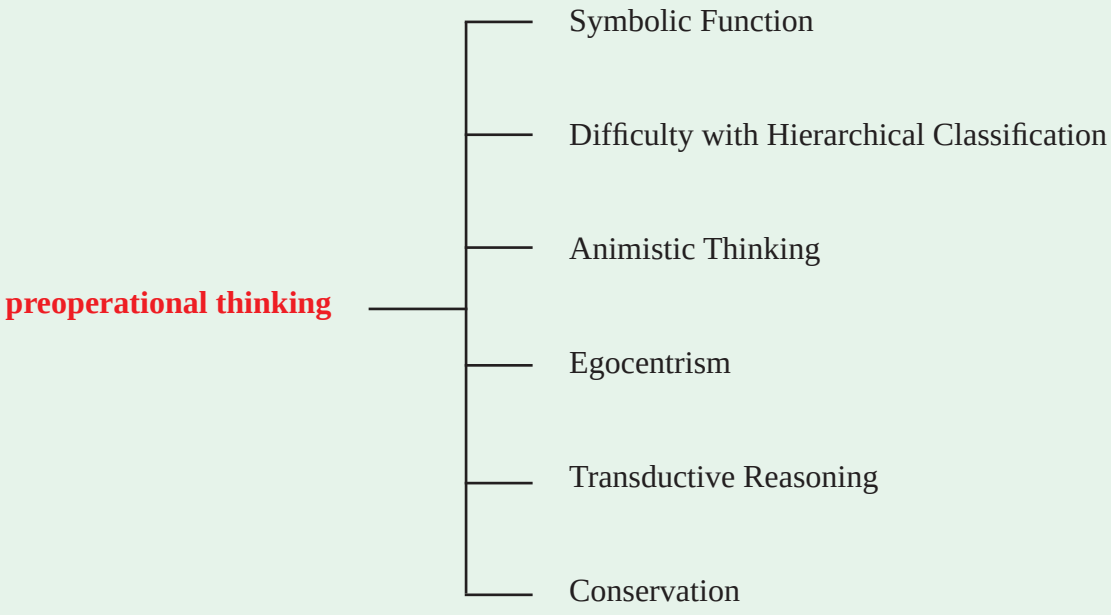
- Talking to them
- Rephrasing the sentences that they say
- Expanding and labelling things around
- Telling them stories
- Singing songs to them
- Reading stories
- Talking about on-going activities
- Talking about things in the environment
- Taking them to visit places or going on picnics and talking about the same
- Giving them opportunities to indulge in pretend or dramatic play
- Opportunities to play and interact with peers
- Field trips
- Asking them to describe what they see or when they draw
- Allowing them to express their feelings
- Creative drama

Revise the points

A) Mental Processes

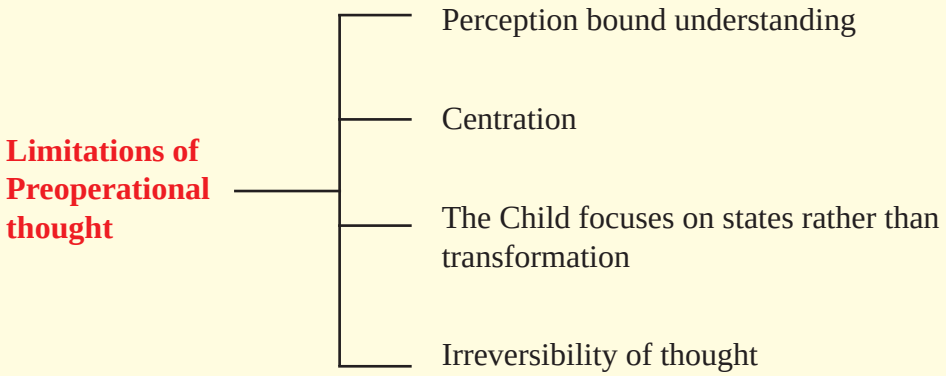


B) Characteristics of preoperational thinking

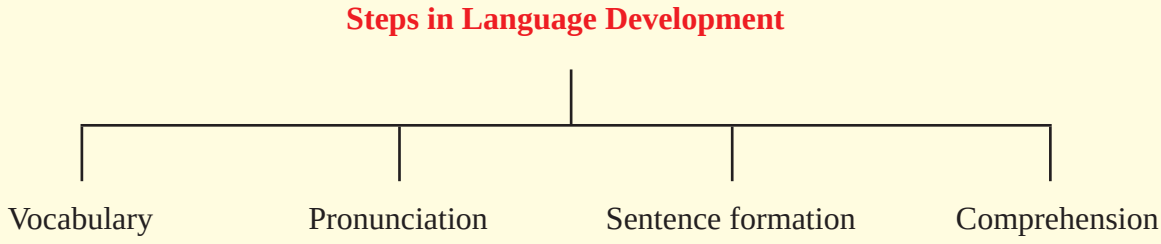


Revise the points

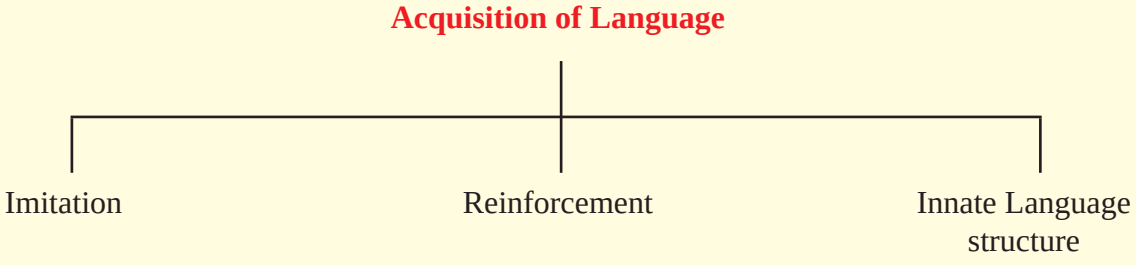
C) Limitations of Preoperational thought



D) Steps in Language Development in Preschool Years



E) Acquisition of Language



Glossary

Animism : The belief that non living objects have life like qualities

Attention : Ability to select and focus on an object, event.

Centration : The ability to focus only on one aspect at a time

Cognition : The process by which we know and understand our world

Cognitive Development : The growth and refinement of the various aspects of our intellectual capacity

Concept Formation : Tying together pieces of information and experiences received through the senses

Creativity : Generation of new ideas

Egocentrism : Ability to see things from only one perspective , usually self .

Irreversibility : Not having the ability to mentally go back and forth in action

Mental process : Functions of our mind

Memory : Ability to encode, retain and recall information

Perception : Is interpretation of information received through the senses

Exercises

Q. 1. Write Short Notes.

1. Memory
2. Attention Span
3. Concept Formation
4. Conservation of numbers

Q. 2. Explain the following terms.

1. Cognition
2. Perception
3. Egocentrism

Q. 3. Give examples related to the following.

1. Transductive reasoning
2. Animistic thinking
3. Imagination
4. Receptive Language

Q. 4. Write in details with examples how we can encourage language development in young children?

Project / Self Study

Design a few games and activities for children to enhance their memory, imagination, creativity and attention span.