2 Principles of Development

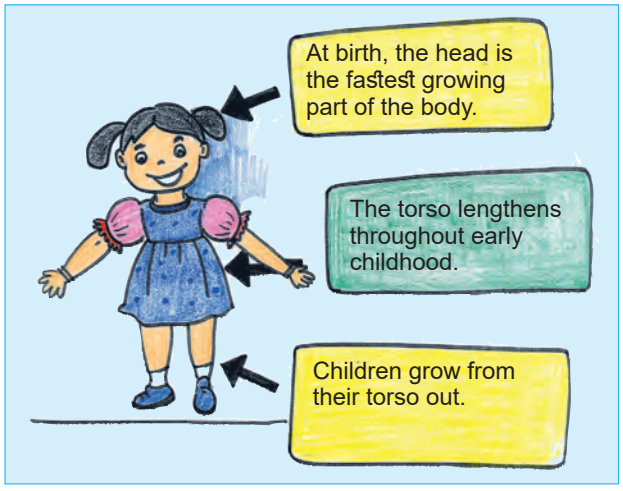
You have learnt about the "Principles of development" last year. You are aware that, like every living being, the human child also follows a certain sequence of growth and development involving several patterns and processes. For example in the process of the development of teeth, we find a typical pattern of tooth eruption. Knowledge of these patterns and processes help teachers and parents to guide the child in its learning and predict its growth. An understanding of child growth and development patterns is necessary for parents and caregivers to create a nurturing and caring environment. This will help to stimulate a young child's learning. The study of these fundamental facts regarding development are called "Principles of Development".

2.1 Principles of Development

We have understood that development follows a specific pattern which involves changes during the process of growth.

1. Development involves change

The changes that occur are both quantitative as well as qualitative. Physical changes in the body such as weight, height are measurable therefore are quantitative, where as qualitative changes are developmental changes such as motor ability, cognition, language acquisition or emotional development.

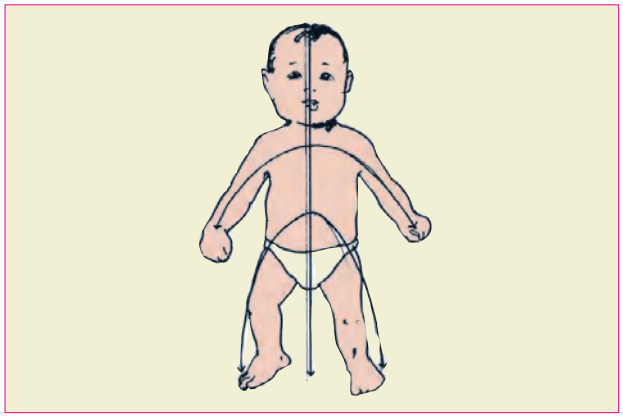


Picture 2.1 Patterns of growth

2. Development is continuos

Development is a continuous series of changes, qualitative and quantitative which continue from conception till death.

3. Development follows a predictable pattern



Picture 2.2

Developmental changes in children follow a specific pattern which is similar in all individuals. It takes place according to two laws of directional sequence. Cephalocaudal sequence and proximodistal sequence.

Cephalocaudal sequence : development proceeds from head to toe. According to this principle a child will gain physical control of its head first. This physical control will be followed by the neck, arms, torso and legs.

Proximodistal sequence : unlike the cephalocaudal sequence, the direction of development in proximodistal sequence is from the centre of the body to the extremities.

4. Development proceeds from general to specific

Development is a gradual process and varies from one individual to another. However, it proceeds from general to specific activities. If we have observed the behavior of young children we know that the baby waves his arms in general and makes random movements before he is capable of such a specific response as reaching out for a specific object. He makes random kicking movements with his legs before he can co-ordinate the leg muscles well enough to crawl or to walk. In emotional development, the baby first responds to most strange objects with general fear. Gradually, this fear becomes specific.

5. Development proceeds at different rates

As we have seen, development is a continuous process from conception till death. However, it is not uniform and varies from one individual to another. For example, boys and girls have a different rate of growth. The rate of development is also different for each body part depending on the stage of development.

6. There are individual differences in development

The pattern of development is more or less similar in all children. However, each individual child has its own way and pace of development. This means every child will not reach the same point of development at the same given time as another child. Additionally genetic and environmental factors also influence an individual's growth and development.

7. Areas of development are interrelated

Areas of development such as Physical, Emotional, Language, Social, Cognitive are interrelated and have their overall effect on growth and development of a child.

8. Development is a product of Maturation and Learning

Maturation is a process of development of characteristics in the individual from birth whereas learning refers to the skills and knowledge acquired by an individual and which result in changes in an individual. Learning takes place through observation, imitation, practice and training.

2.2 Interrelation between Maturation and Learning

Certain skills cannot be obtained without a required level of maturation even if a child is given a lot of learning opportunities. Maturation is a natural process which helps to acquire knowledge and skills by way of effective learning. Learning is dependent on the stage of maturity obtained. For example, a child can learn to walk when he is physically mature. As a result of maturation, phylogenetic functions are seen. e.g. crawling, walking. These functions are acquired with age and do not require any training. Ontogenetic functions are seen as a result of learning. e.g. swimming, cycling. These functions are influenced by training, practice and opportunities.

Do you know?

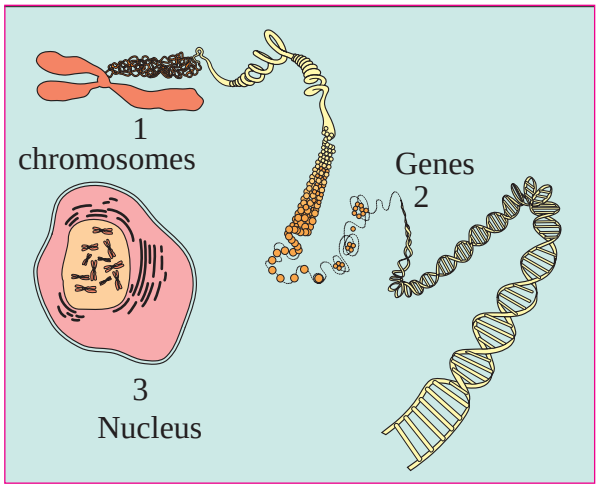
Sensitive period / Teachable moments

When a child shows physical and mental readiness or preparedness for acquiring certain skills, it is an ideal stage for teaching him or her, a particular skill. According to psychologists, there are three criteria which indicate teachable moments for a child or the child's state of readiness. 1. Interest in learning 2. Sustained interest 3. Shows improvement

2.3 Factors influencing growth and development

As we have learned that, no two individuals show the same rate of growth and development. This variation is physical as well as behavioural and a result of the interaction between biological and environmental factors. Various **biological and environmental** factors affect growth and development.

1. Heredity



Picture 2.3 Chromosomes and genes

Genetic inheritance (heredity) is the basic foundation for most of the physical and personality attributes of a child. It is genetic endowment inherited from the biological parents at the time of conception. A fertilized egg is formed by the union of ovum (female reproductive cell) and a sperm (male reproductive cell), each with 23 single chromosomes. These form 23 pairs of chromosomes (46choromosomes) in an embryo which contains genetic information passed down from parents.

Sex determination Women have an XX pair of chromosomes while men have an XY pair of chromosomes. If the chromosome in the ovum combines with another X chromosome from male sperm the combination results in a female offspring. When an X chromosome fuses with a Y chromosome from the sperm, it results in a male offspring. The sex of the offspring is always determined by the male chromosome.

Dominant and recessive genes Genes are responsible for the characteristics we inherit from parents. Characteristics of dominant genes are prominently seen in the immediate generation that follows, whereas, recessive genes usually remain dormant.

2. Maturation and Learning

We know that maturation and learning are two important and interrelated factors that influence growth and development. Maturation indicates the ability to learn skills and learning helps to acquire them.

3. Environment

Prenatal environment Environmental factors have great impact on development. Age, hormonal levels, diet, health, emotional state of mother are some of the prenatal factors which affect development of a fetus.

Postnatal environment : Post natal environmental factors such as home environment, socioeconomic status of the family, diet, health services, parenting are the most influential factors. These have long lasting effects on a child's behavior, personality, emotions and relationships. Parents, teachers, peers, society and social changes play an important role in development of a child and have positive or negative effects.

4. Nutrition

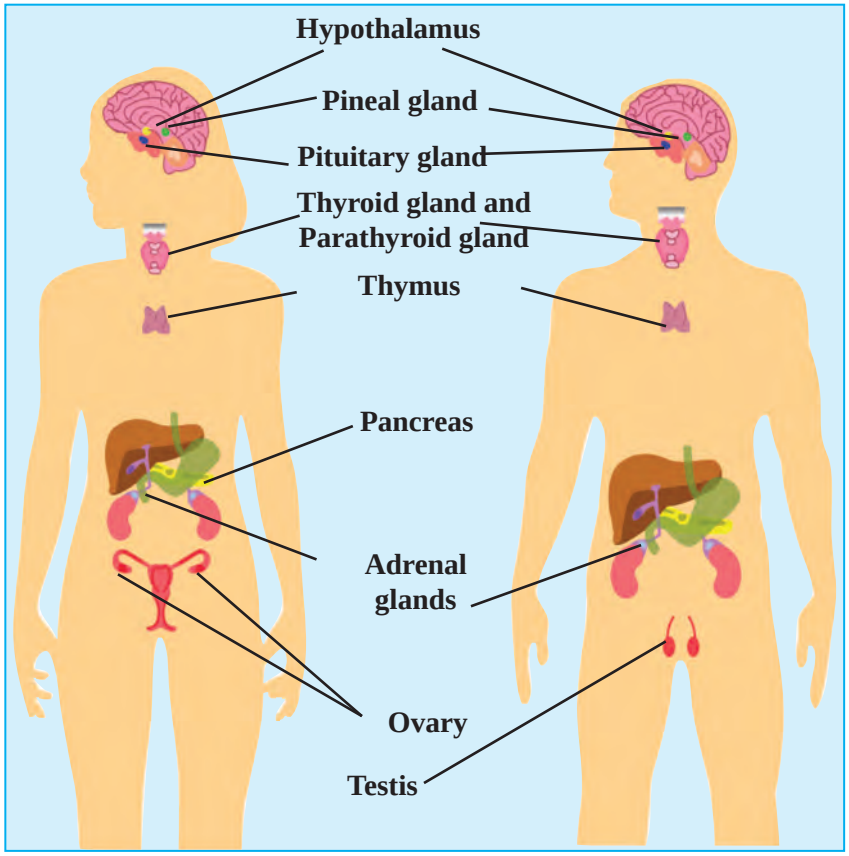
Picture 2.4

Every living human being requires proper nutrition for its growth and development. An adequate balanced diet with sufficient nutrients (protein, carbohydrates, fats, minerals and vitamins) is of prime importance during the early years when the rate of growth is rapid. Deficiency of a nutritionally balanced diet leads to malnutrition.

Malnutrition : Starvation, lack of sufficient nutrients and inability to digest food are some of the causes which result in malnutrition. Malnutrition causes stunted growth, poor health, diseases like anemia, night blindness, kwashiorkor and marasmus.

5. Endocrine glands

Endocrine glands are ductless glands that secrete hormones which are carried to particular organs or tissues through the blood stream. These glands control growth, development and reproduction. Endocrine glands secrete hormones in response to external and internal stimuli. The **Pituitary** gland also known as the master gland is located at the base of the brain and controls the functioning of all endocrine glands and regulates growth. The **Thyroid** gland located in the neck controls the rate of metabolism. The **Parathyroid** gland regulates calcium balance in the body. The **Adrenal** gland is responsible for the action of the body in an



Picture 2.5 Endocrine glands

emergency. The **Pancreas** are a digestive system gland and maintain sugar level in the blood. Testes and ovaries are responsible for growth and development of reproductive cells in males and females respectively.

6. Illness

Picture 2.6

Health status is an important factor in a child's health. If illness occurs during the period of rapid development the effect is more severe. Illness affects socio-emotional development of children, activity levels and opportunities to learn.

7. Physical Defects

There are different types of physical defects which are caused by a number of different conditions. Some defects are congenital which lead to serious impairment in development, while other defects are acquired after birth due to severe illness, malnutrition or accident. Children with disabilities are likely to explore less and may have fewer learning opportunities which may affect their all round growth and development.

8. Rest, Sleep and Exercise

Rest and sleep are necessary for normal functioning of the body. If a child does not get sufficient rest or sleep, he may suffer from fatigue, loss of energy, disoriented behavior and illness. Exercise is equally important for the development of a child. A child engaging in regular exercise is generally more healthy, active and adaptive.

Picture 2.7

9. Culture

Culture is a broad term which includes family environment, surrounding social environment, religion and value system. There are various patterns all over the world. Culture varies with the geographical location, socio economic strata, race and religion. These varieties of culture patterns is represented in the child rearing patterns of parents, experiences and opportunities provided to children and values inculcated in them. Culture is one of the factors that affect a child's Psychological Development.

Activity

Organize a debate between two groups of students.

Topic : Which one is more influential with reference to growth and development in young children. Heredity or Environment?

Table 2.1 Aspects of Development during Infancy

Physical Development

- **Height :** An infant is half as tall as his/her adult height at the end of their second year of life.
- **Weight :** At two years an infant is four times its birth weight
- **Body proportions :** The head of an infant is approximately one fourth the size of its body length.
- **Muscular development :** Muscle fibres are undeveloped at infancy, there is more of fat fibre
- **Skeletal development :** Ossification of bones.
- **Teeth development :** At the end of two years 16 to 20 teeth erupt.
- **Brain development :** At two years the brain is 75 percent of its adult size.

Motor Development

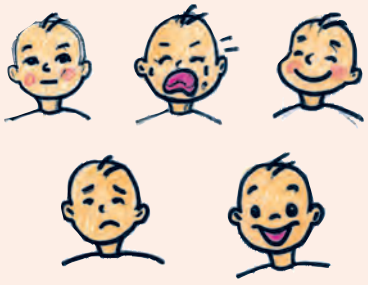
- Cephalocaudal and Proximodistal sequence
- Gross motor skills such as climbing,jumping,balancing are a result of large muscle development. Fine motor skills such as drawing, clay work or colouring are a result of fine muscle development.

Cognitive Development

- Infant stimulation is important.
- Learning takes place primarily through the five senses.

Language Development

- Achieves command over prespeech forms.
- Starts to express emotions verbally.

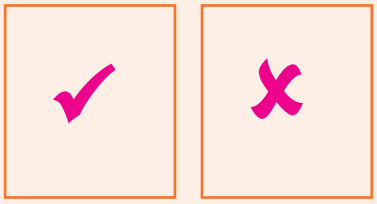


Emotional Development

- Stimuli, feelings, physiological arousal and behaviour are the four basic components of an infant's emotions.
- Infants show attachment, separation anxiety and stranger anxiety.
- Infants show different emotions such as love and affection,joy, fear and anger.

Social Development

- The process of socialization begins.
- Milestones of socialization during infancy are achieved eg. social smile, social referencing and social cues.



Moral Development

- Inability to distuinguish between right and wrong.

Reflection / Darpan

Make a presentation on the various aspects of development during infancy.

Glossary

Cue : Signal that encourages the infant to take action

Congenital : Disease or condition existing at birth.

Gross Motor Skills : Physical abilities and competencies which involve large muscle groups.

Infant Stimulation : Infant Stimulation includes activities that arouse or stimulate baby's senses of sight, sound, touch, taste and smell.

Ossification : Hardening of bones as a result of the deposition of the Minerals, Calcium and Phosphorus

Pre-speech forms : Substitute forms of communication used by infants before they say their first word.

Sensory-motor stage : First stage of cognitive development, a period from birth to two years, infants gain knowledge using their senses and movements.

Separation Anxiety : Infants become anxious or upset when they are separated from the primary caregivers.

Social Referencing : Process where an infant takes cues from other people in the environment.

Social Smile : Intentional gesture of warmth expressed by infants.

Stranger Anxiety : Infants become worried or fearful when someone unfamiliar approaches them.

Exercises

Note : It is suggested that you refer to your XI Std Child Development textbook in order to complete the exercises given at the end of this revision chapter.

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

1. Development that takes place in the body from the central axis of the body to extremities is known as ……

   (a) cephalocaudal pattern

   (b) proximodistal pattern

   (c) developmental pattern)

2. The unfolding of characteristics present in the individual from birth is known as ..…..

   (a) maturation *(b) learning*

   (c) teachable moment

3. The ductless glands are …… glands

   (a) endocrine *(b) thyroid*

   (c) harmones

4. The process of hardening of bones is called ……

   (a) synapse *(b) ossification*

   (c) cartilage

5. The process in which an infant takes cues from other people in the environment is known as ……

   (a) social referencing

   (b) social development

   (c) socialization

Q. 2. State whether the following sentences are true or false and give reasons.

1. Development can be predetermined
2. According to the 'Cephalocaudal' law development proceeds from the head to the toe.
3. Walking and sitting are ontogenetic activities.
4. Phylogenetic functions do not require training.
5. Heredity and environment are important factors for development.
6. Deficiency of nutritional elements required by the body are termed as 'Malnutrition'.
7. Children having regular exercise are healthier, active and show better motor co-ordination

Q. 3. Match the following characteristics with the stages of development :

GLANDS	FUNCTIONS
1) Pancreas	a) Control over growth and development of female reproductive system
2) Ovaries	b) Control the rate of metabolism
3) Pituitary	c) Maintains glucose level in blood
4) Testes	d) Control over growth
5) Thyroid	e) Control over growth and development of male reproductive system

Q. 4. List the following.

1. Principles of development
2. Factors affecting growth and development
3. Names of endocrine glands
4. Causes of malnutrition
5. Reflexes
6. Social cues

Q. 5. Fill in blanks in the box

1. A thread like structure carrying genetic material of an organism

c			o	m		s			e

2. An important stage in development.

m				s			n	

Q. 6. Write short notes

1. Prespeech forms
2. Social development during infancy
3. Prenatal environment
4. Motor development during infancy
5. Post-natal environment

Q. 7. Differentiate between the following :

1. Phylogenetic and Ontogenetic function
2. Cephalocaudal and Proximodistal sequence
3. Rest and exercise
4. Separation anxiety and stranger anxiety

Q. 8. Explain the terms.

1. Heredity
2. Malnutrition
3. Endocrine gland
4. Infant stimulation
5. Developmental milestones

Project / Self Study

Design and prepare a chart relating to the various factors affecting Growth and Development for the classroom display board.