NUTRITION DURING PRE SCHOOL, SCHOOL AGE AND ADOLESCENCE

Unit

OBJECTIVES

At the end of this lesson, the student will be able to

• Understand the growth and development associated with the different phases of life like the preschool, school age and adolescence.



- Understand the different nutritional factors that may affect the growth and development during preschool, school age and adolescence.
- Understand the nutritional requirements and nutrition related problems during preschool, school age and adolescence.



Parents look forward to being proud of strong, healthy, competent and happy sons and daughters. To grow and to function well in this adult world, children need a solid background of sound eating habits. Desirable food behaviors for a lifetime have their beginnings in childhood and adolescence. Nutrient needs change steadily throughout life into old age, depending on the rate of growth, gender, activities and many other factors.

3.1 Preschool Age

Early childhood is a stage in human development which includes toddlerhood (1-2 years) and preschool age(3-5 years). An

infant grows rapidly, doubling its birth weight by 5 months and triples it by 1 year of age. During the second year, the child increases not only in height by 7-8 cm but also gains 4 times of its birth weight. After the age of one year a child's growth rate slows but the body continues to change dramatically. At age one, infants have just learned to stand and toddle; by two years they can take long strides with solid confidence and are learning to run, jump and climb.

Preschoolers are curious about everything that they see and hear. This is a great time for caregivers, both parents and teachers, to mold the children's minds and encourage them to use their creativity and imagination

3.1.1 Nutritional requirements of Preschool children

During this stage, children need vital nutrients for their brain to grow properly and the foundation for a healthy lifestyle should be laid during the preschool age.

The RDA for a preschool child (1-6 years) is given in Table 3.1

 Table 3.1 ICMR recommended dietary allowances for pre-school children

Nutriont	Years		
Nutrient	1-3	4-6	
Weight (Kg)	12.9	18.0	
Energy (kcal)	1060	1350	
Protein (g)	16.7	20.1	
Fat (g)	27	25	
Calcium (mg)	600	600	
Iron (mg)	9	13	
Vitamin A (µg)	400	400	
Beta carotene (µg)	3200	3200	
Thiamine (mg)	0.5	0.7	
Riboflavin (mg)	0.6	0.8	
Nicotinic acid (mg)	8	11	
Pyridoxine (mg)	0.9	0.9	
Ascorbic acid (mg)	40	40	
Folic acid (µg)	150	150	
Vitamin B12(µg)	0.2 to 1	0.2 to 1	

Source: Dietary Guidelines for Indians -A Manual by Kamala Krishnaswamy, B. Sesikeran (Second Edition 2011), NIN, ICMR

Energy

The energy requirements of toddlers and children vary greatly based on differences in growth rate and level of physical activity. Insufficient food intake during this stage will not only result in under nutrition in terms of inadequate weight gain but will also hinder growth.

Protein

Protein is the primary component in many body tissues. Proteins build, maintain and restore tissues in the body such as muscles and organs. As a child grows and develops, protein is a crucial nutrient needed to provide optimal growth. Protein intake should be 1.5 to 2 g/kg body weight.

Fat

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Until the age of three years, dietary fat plays a role in brain development. Fat comprises approximately 60% of the central and peripheral nervous system that essentially control, regulate and integrate every body system; thus it is essential that growing toddlers obtain adequate fat from their diet. A diet consisting of 30% of total calories from fat will help the child to meet their daily calorie and nutrient requirements for growth.

Vitamins

Vitamin A is essential to support rapid growth and to help combat infections. Inadequate intakes of vitamin A may lead to vitamin A deficiency which can cause visual impairment in the form of night blindness and may increase the risk of illness and death from childhood infections, including measles and those causing diarrhea. Milk,eggs, carrots and green leafy vegetables should be included in the diet of the child. Vitamin C is important for the child's general health and immune system. It can also help their body absorb iron. Good sources of vitamin C include oranges, kiwi fruit, strawberries and tomatoes.

Minerals

Calcium is the principle mineral required by the body for the process of bone mineralization. Toddlers and young children have an increased need for calcium to promote the rapid bone growth and skeletal development that takes place during these early years of life. Around 600 mg of calcium per day is required during this age. Milk is the best source of calcium. Hence the diet of a preschool child should include 1-2 glasses of milk per day.

During periods of rapid growth the body's need for iron increases. Children 6- 24 months old are at the greatest risk of irreversible long-term consequences of iron deficiency like impaired physical and mental development. To meet this increased demand for iron, iron rich foods like rice flakes, dates, egg yolk and greens should be included in the diet.

3.1.2 Diet for the preschool child

The nutritional requirements of the child cannot be satisfied apart from an understanding of behavioral changes that occur. Toddlers begin to show independence and to assert themselves. They are alert to the attitudes of others and readily learn that they can use food as a weapon to gain attention. They mimic siblings and parents. They have short attention span and are easily distracted from eating. Their response to food is often inconsistent

Dietary guidelines for a preschool child

- The diet of the preschoolers should be adequate in quantity and quality of different nutrients. In addition to the amount of milk recommended, the preschool child should have two small servings of protein-rich foods like eggs and other non-vegetarian foods like pulses, paneer or cheese.
- When the child is about 18 months old finger foods such as carrots can be given.
- Proper elimination is usually maintained by a daily diet of fruits, vegetables and whole grain products.
- The diet should include a wide variety of foods. The child who is taught to eat everything on his plate is much more likely to enjoy optimal health than the one who picks and chooses
- Their food intake will improve if the food is interesting and attractive. e.g. chapathis, puris can be made into shapes or can be

served in attractive plates. Flavour or colour of the milk can be changed to encourage the child to drink milk.

- Foods should be slightly seasoned so that they taste better and the child takes it well.
- Food preferences of the child should be taken into consideration.
- Child should never be forced to eat more than he can take.
- The person feeding the child should not show any dislike of the food in front of the child.
- The child should never be hurried while taking the food. The atmosphere should be pleasant and lacking distraction
- Regularity of meal times is essential
- Unripe bananas and fruits should not be given as they are difficult to chew and may choke the child.

3.1.3 Common feeding problems in children

Avoidant/Restrictive Food Intake Disorder is a common eating disorder experienced by young children. Children with this disorder experience a disturbance in their eating which can include a lack of interest in food or a sensory aversion to certain foods

- Eating only certain types of foods
- Refusing vegetables
- Refusing to chew
- Taking a long time to eat and keeping food in the mouth (rumination)
- The toddler/child wants to choose his own food.
- **Pica** is a type of condition where a child might eat non-food or non-nutritional substances persistently. These substances often include dirt, soap, chalk, sand, ice, and hair.

These aversions and restrictions can lead to weight loss and nutritional deficiency among young children.

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Picky eaters are very selective about what they eat. They have a fear of new foods called "food neophobia", which is generally defined as the reluctance to eat, or even taste new foods. Children with neophobia often reject many 'new' foods.

3.1.4 Tips for feeding Picky or Fussy eaters

Get them involved

Children are more likely to try foods when they feel a sense of ownership. Include them in meal planning, grocery shopping and food preparation

Be Creative

Serve vegetables as finger foods with dips

Use cookie cutters to cut fruits and vegetables into fun shapes

Serve traditional meals out of order (for example, breakfast can be served for dinner)

Enhance Favorite Recipes

Blend, slice or shred vegetables into soups, pancakes, muffins or dosai

Serve fruit with yoghurt or ice cream

Be a Role Model and Share

Be a role model to children by eating healthy foods yourself.

Children may need multiple exposures to new food before they accept it, so do continue offering foods that a child initially rejects

Respect and relax

Children tend to eat sporadically. They have small stomachs and so tend to fill up fast and become hungry again soon after eating.

Focus on the child's overall weekly intake of food and nutrients rather than on daily consumption

3.1.5 Nutrition related problems in pre-school children

Malnutrition is harmful in children as it retards their physical growth and may cause mental disabilities. Deficiency of calorie and proteins may trigger a wide range of pathological conditions in the children. Protein Energy Malnutrition (PEM) is the most common nutritional disorder among children. About 1-2 percent of preschool children suffer from protein energy malnutrition like Kwashiorkor and Marasmus. This is the reason why parents should insist that children drink milk; eat pulses and other sources of proteins.

PEM can affect all age groups but it is more frequent among infants and young children whose rapid growth increases nutritional requirement

Marasmus

- The term marasmus is derived from the Greek work marasmus, which means withering or wasting
- Marasmus is a form of severe proteinenergy malnutrition characterized by energy deficiency and emaciation.
- Marasmus usually develops between the ages of six months and one year in children who have been weaned from breast milk or who suffer from weakening conditions like chronic diarrhoea.
- marasmus is characterized by stunted growth and wasting of muscle and tissue
- A typical case of marasmus can be described as **bonny cage** having nothing but "skin and bones"

Causes of Marasmus

- Seen most commonly in the first year of life due to lack of breast feeding and the use of dilute animal milk.
- Poverty or famine and diarrhoea are the usual precipitating factors

- Ignorance and poor maternal nutrition are also contributory factors
- Inadequate food intake
- Vitamin deficiencies
- Chronic starvation

Symptoms of Marasmus

- severe growth retardation
- extreme emaciation
- old man's or monkey's face
- loose hanging skin folds over arms and buttocks
- sunken eyes
- wrinkled skin
- temperature is subnormal
- loss or wasting of muscles,
- ribs become prominent, projected ribs
- digestion becomes weak
- body growth and development slows down.

It can be cured by ensuring mother's milk for infants, by delaying another pregnancy in quick succession and by having a diet rich in protein, carbohydrates, fats, vitamins and minerals.

Kwashiorkar

Kwashiorkor refers to an **inadequate protein intake with reasonable calorie** (**energy**) **intake.** This leads to decreased synthesis of visceral proteins. Kwashiorkor usually occurs at the age of about 12 months when breastfeeding is discontinued, but it can develop at any time during a child's formative years.



Fig 3.1 Symptoms of Marasmus



Fig 3.2 Symptoms of kwashiorkor

Causes

Kwashiorkor is most common in areas where there is:

- famine
- limited food supply
- delayed complementary feeding
- protein deficient diet
- infections

Symptoms

The three essential manifestation or signs of kwashiorkor are edema, growth failure and mental changes; in addition there may be changes in hair and skin.

The symptoms of this disease are

- enlargement of liver due to fatty infiltration,
- oedema due to water accumulation
- darkening of the skin with scaly appearance,
- hair becomes reddish-brown,
- legs become thin, and
- retardation of physical as well as mental growth

Eating a protein-rich diet that consists of milk, meat, groundnut, soyabean, jaggery can help in the treatment of kwashiorkor.

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Vitamin A deficiency in Children

Vitamin A deficiency (VAD) is a serious health problem among children in many developing or low-income countries. In fact, 250 million children across the world suffer from VAD. It could even result in death when left untreated. ۲

There are many animal sources (liver, whole milk, cheese, eggs, and oily fish) and plant sources (colorful fruits and vegetables as well as greens) of vitamin A. When we don't eat enough of these foods, VAD sets in, leading to various diseases. VAD can also be triggered by inefficient storage, transport, and absorption of vitamin A.

Vitamin A deficiency leads to xerophthalmia which covers a wide range of eye problems like

a) Night blindness is an early symptom of Vitamin A deficiency. When vitamin A is deficient, the formation of rhodopsin is impaired giving rise to night blindness. Children with night blindness are unable to see in poor light condition /darkness.

b) Bitot's spot- Bitot's spots are whitish deposits on the thin lining of the lower eyelid. They are usually spotted in children aged 3–6 years.



Fig 3.3 Bitot's spot

Without sufficient vitamin A, the conjunctiva becomes dull and dries (conjunctival xerosis). This leads to the buildup of keratin protein in the eye, manifesting as dry, triangular lesions with a foamy appearance called Bitot's spots.

If the symptoms of Bitot's spots are not addressed by treating vitamin A deficiency it can affect the cornea of the eye. Cornea is the clear front portion of the eye that allows light to enter and which is partially responsible for our eyes' ability to focus. Corneal xerosis is a drying up of the eyes. With corneal xerosis, the tear glands in the eye malfunction and no longer produce tears and mucus to keep the eye surface moist.



Wrinkling and dark colouring of the conjunctiva on one side, cornea dry and dull (Xerosis)

Fig 3.4 Corneal Xerosis

The cornea then becomes dry and hazy and takes on a parched appearance. It is also more prone to infections at this stage.

Prevention of Vitamin A deficiency

Eat foods which are rich in Vitamin A. Milk, egg, fish oil etc. are rich in vitamin A. Leafy vegetables like various types of greens, vegetables like carrot and fruits like papaya and mango are good sources of vitamin A. Liver, cod liver oil, butter and ghee also provide vitamin A

Based on research conducted by National Institute of Nutrition, Hyderabad, one spoon of Vitamin A syrup to children of 1-5 years age group once in 6 months also prevents vitamin A deficiency to certain extent.

When the children are given Vitamin A syrup once in six months up to five years of age, Vitamin A gets retained in the liver and is available in sufficient quantities till the next

dose is administered. This is presently followed throughout our country to protect children from permanent blindness caused due to vitamin A deficiency.

Pregnant women should take nutritious food that contains vitamin A. This helps the child in the womb to get vitamin A from its mother.

Recipes rich in vitamin A suitable for children

Boiled egg, egg custard, coriander and mint chutney with bread / chapathi, carrot halwa, carrot salad, carrot kheer, carrot juice, papaya, orange juice, tomato juice, mango juice, palak dal, palak paneer.

3.2 Nutrition for School Children (6-12 years)

The school- age period has been called the latent time of growth. School-age children grow significantly, but at slower rate, and are physically very active in general. As a result, their nutritional needs are high and critical.

Maintaining a balanced diet and regular exercise is important for school-aged children (6-12 years). These children are required to eat a variety of foods from each food group to ensure optimal intake of all vitamins and minerals. At the same time, they may face new challenges regarding food choices and habits. Decisions about what to eat are partly determined by the influences from friends at school and the media, especially television.

3.2.1 Nutritional requirements of School children

Poor nutrition not only compromises the quality of life of school-aged children but also their potential to benefit from education. Adequate nutrition of school aged children will also ensure that they grow to their full potential, and provide the stepping stones to a healthy life. The RDA of school children aged 7-12 years suggested by ICMR is given in Table 3.2

Table 3.2	ICMR	recommended	dietary
	allowand	ces for school child	dren

	Years		
Nutrient		10-12	
	7-9	Boys	Girls
Weight (Kg)	25.1	34.3	35.0
Energy (kcal)	1690	2190	2010
Protein (g)	29.5	39.9	40.4
Fat (g)	30	35	35
Calcium (mg)	600	800	800
Iron (mg)	16	21	27
Vitamin A (µg)	600	600	600
Beta carotene (µg)	4800	4800	4800
Thiamine (mg)	0.8	1.1	1.0
Riboflavin (mg)	1.0	1.3	1.2
Nicotinic acid (mg)	13	15	13
Pyridoxine (mg)	1.6	1.6	1.6
Ascorbic acid (mg)	40	40	40
Folic acid (µg)	120	140	140
Vitamin B12(µg)	0.2-1.0	0.2-1.0	0.2-1.0

Source: Dietary Guidelines for Indians -A Manual by Kamala Krishnaswamy, B. Sesikeran (Second Edition 2011), NIN, ICMR

Nutritional requirements of boys and girls are more or less the same till the first 9 years. After that, there is a variation in some nutrients.

The essential nutrients for optimal health during school age are:

Energy

Energy needs vary with the child's growth rate, body size and physical activity. The mean increase in body weight is 2.5-2.7 kg/ year. During periods of rapid growth, appetite increases and children tend to eat constantly. The brain needs energy to function properly and hence a constant supply of glucose is critical. Cognitively demanding tasks, such as schoolwork, require regular supplies of glucose to the brain in order to enhance

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cognitive functioning and improves memory and mood. Carbohydrates and fats provide energy for growth and physical activity.

Protein

Protein builds, maintains and repairs body tissue. It is especially important for growth. It's important that parents encourage children to eat two to three servings of protein daily. Good sources of protein for children include meat, fish, poultry, milk and other dairy products.

Essential fatty acids

Deficiency of essential fatty acids may have a negative impact on school performance



Fig.3.5 Role of Omega-3's in the Body

Minerals

Calcium is important in building strong bones and teeth. Bone density suffers when calcium needs are not met during childhood years. Osteoporosis, a disease associated with the softening of the bones affects a significant proportion of adults. This begins in childhood if diets do not provide adequate calcium-rich foods. Milk and dairy products and some dark green, leafy vegetables are good sources of calcium.

Children need iron because of rapidly expanding blood volume during growth. Meats,

fish, poultry, and enriched breads and cereals are the best sources of dietary iron.

Vitamins

A child needs vitamins for the body to function properly and to boost the immune system.



A variety of fruits and vegetables of different colours should be added in the child's food. Vitamin A is essential for vision and a deficiency of the same can lead to night blindness (difficulty in seeing in night). Dark green leafy vegetables, yellow, orange coloured vegetables and fruits such as carrots, papaya, mangoes are good sources of Vitamin A.

Vitamin D helps in bone growth and development and it is essential for absorption of calcium. Children get most of their Vitamin D from sunlight and a small amount from some food items like fish oils, fatty fish, mushrooms, cheese and egg yolks.

3.2.2 Snacking in school-aged children

During the primary school years, a greater proportion of meals may be eaten away from home in the school setting. Most of these snacks consumed are high fat foods. Snacks may contribute up to a significant proportion of total daily energy and nutrient needs of the school child. Salty snacks, such as packets of crisps or chips, may be of poor value as they give few nutrients.

Children who are both physically active and growing need to refuel periodically

throughout the day. Parents and other caretakers have the critical role in helping children to make nutritious snack choices. Frequent snacking may result in loss of appetite during the main meal. A healthy snack should be less in size or quantity to the amount of a regular meal and taken at least 2 hours before a regular meal.



Fig 3.6 Healthy snacks

3.2.3 Nutritional problems in schoolaged children

Many major risk factors for disease in developed countries (that is, blood pressure, cholesterol, overweight, obesity, low fruit and vegetable intake, and iron deficiency) are nutrition related. Provision of adequate diet during the school age period will enhance learning capacity as well as prevent adult onset diseases such as ischaemic heart disease, hypertension, some types of cancer and diabetes. In principle therefore, nutritional problems in the school aged child may carry into adulthood. Patronage for convenience and junk foods which tend to have a high fat content are a major determinant of nutritional problems. Some of the nutritional problems in this age group include the following:

Obesity

There is an increasing trend of school children being overweight and obese which is mainly attributable to reduced physical activity. Eating diets high in fat and being less physically active leads to obesity which may be a predisposition to lifelong health problems (for example, hyperlipidemia, cardiovascular problems, type 2 diabetes mellitus and obesity) in the later years.

Underweight

children Many school consume inadequate diet and so they are malnourished. Sometimes ignorance on the part of parents to know the requirements of children quantitatively or qualitatively may lead to malnutrition of children. When the child is in a hurry to go to school, he may miss breakfast or may not carry proper lunch to school or may become too tired after school activities and sleep off without taking night meal and thus skip meals. Emotional disturbances at school due to poor academic performance or problems with siblings at home may reflect on the consumption of food. Psychological factors contributing to depression or poor motivation to eat should be identified.

Constipation

Constipation in children is a common problem. A constipated child has infrequent bowel movements or hard, dry stools. Encouraging the child to make simple dietary changes such as eating more fiber-rich fruits and vegetables and drinking more fluids can go a long way toward alleviating constipation. Children may not relish vegetables and fruits particularly green leafy vegetables. Parents should make an effort to motivate the child to eat by serving fruits and vegetables in different forms.

Dental caries

Dental caries are caused by over indulging in sugary foods such as soft drinks and confectionery which predisposes school aged children to poor dental health. The risk of tooth decay is greatest with the consumption of large amounts of sticky, sugary and starchy foods that stick to the teeth (for example, sweets, sodas, lollies and candies)



Fig. 3.7 Dental Decay process

Anaemia

Iron-deficiency anemia may develop in children whose diet is iron-deficient. Iron is an oxygen-carrying component of blood. Anemia in school-aged children may result in deleterious effects including lower school achievement due to impaired cognitive development, poor attention rate and general fatigue.

A study involving 5398 children between the ages of 6 and 16 in the United States, found that lower Maths test scores were seen in children with Iron deficiency. Children deficient in Iron were twice as likely to score below average on Maths tests and this finding was more pronounced in girls.

3.2.4 Key points for good nutrition in school-aged children

Habits developed in the formative years of life have a lasting effect on health. As a result parents need to set positive food culture through meal planning, keeping a variety of foods in supply, and setting a good example. The key points to remember as a parent/ caretaker include the following :-

- Adequate nutrition will help the child develop maximal intelligence (IQ) and well-being.
- The child should be guided to make independent food choices and eat a variety of foods.
- Malnutrition and its consequences can be prevented by eating the right kinds and amounts of foods.
- Encourage the child to practice proper hygiene at all times.

3.2.5 Dietary guidelines to keep children healthy

- The child should eat a variety of foods in order to have adequate nutrient intake.
- Nutritional requirement should meet their increasing activity and growth
- The diet should contain plenty of grain products, vegetables and fruits.
- The diet should provide enough calcium and iron to meet their growing body's requirements.
- Teach children from an early age about nutrition and healthy eating. They should be taught what happens to the food they consume.
- The diet should be moderate in sugars and salt. Avoid giving large amounts of sweet desserts, soft drinks, fruit-flavored drinks, sugar-coated cereals, chips or candy, as they have little nutritional value.
- Children tend to be bored with foods easily. so menus need to provide variety, colour, texture, taste and flavor.
- Children have varying appetites and often prefer snacky meals at frequent intervals instead of a few large ones.
- Fruits and dry fruits can be served as snack item on returning from school
- If the child does not like salads, they can be incorporated in recipes like sandwiches.

• The young child should be encouraged to eat with the rest of the family.

3.3 Packed Lunch for School Children



Packed lunches have become a necessity for school going children as schools are either away or the lunch period is too short for the children to go home and have food. The packed lunch is a lunch that is packed in a tiffin box to be eaten by the child while away from home. Carrying food from home is less expensive, more convenient, more hygienic and meets the individual requirements. Eating in the middle of the day, several hours after breakfast, reenergizes the body.

3.3.1 Points to be considered in planning a packed lunch.

- The school lunch should meet one third daily requirement in calories, protein and other nutrients of the child, to boost concentration and energy for the rest of the school day
- Preferably the packed lunch should consist of all five food groups, though the number of dishes may be less
- Inclusion of one serving of green leafy vegetables would take care of one third requirements of mainly vitamins and minerals
- Some amount of good quality protein like milk or milk products like curd or

paneer would improve vegetable protein or a combination of vegetables protein like cereals and pulses can be given for better utilization. Addition of egg also improves the quality of protein besides meeting many protective nutrient needs.

- To make the food appetizing, pack foods like whole fruit or butter milk in a bottle
- Monotony should be avoided in packed lunch. There should be variety
- It is sensible to have a different food in packed lunch than what one had for breakfast
- Containers should be clean and dried before packing the food.

3.3.2 Tips to encourage the child to eat packed lunch

- Involve the child in planning, preparing or packing the lunch box
- Make the lunch simple. Most children eat lunch quickly so that they can spend more time socializing or playing with friends
- Send easy to open packages, cut up fruits and vegetables, roll chapattis with stuffing.
- Send small portions which he can complete during lunch period

3.3.3 Healthy packed lunches

- Vegetable pulao, boiled egg, tomato raita and orange fruit.
- Cheese sandwich or paneer sandwiches, with guava
- Stuffed idli with coconut chutney and potato
- Methi chapathi with thick dhal and buttermilk
- Chapathi, paruppuusili and carrot salad
- Cheese sandwiches or paneer sandwiches, guava
- Idli and kurma
- Curd rice, tomato or cucumber slices and lemon pickle

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- Kichdi, buttermilk, coriander chutney
- Adai with drumstick leaves and coconut chutney

3.4 Breakfast - the most important meal of the Day

A nutritious breakfast is a central feature of a child's diet that supports healthy growth and development. Breakfast is the first meal of the day. A healthy breakfast refuels the body and replenishes the blood sugar (glucose), giving the energy necessary to start a new day. It is proven that breakfast is good for both physical and mental health. Nutrients missed from a skipped breakfast won't be "made up" at lunch and dinner but will be left out completely that day.



Eating breakfast is important for all ages, especially for children and adolescents. It is observed that children who eat breakfast are more likely to have better concentration, problem-solving skills and eye-hand coordination. They may also be more alert and attentive in class. Eating breakfast every day will help to maintain concentration in class.

A good breakfast should be able to provide one third of the total daily energy requirement. A typical breakfast includes a cereal (for example, rice, wheat and ragi), protein-rich food such as egg, a glass of milk and vitamin C rich fruit e.g. orange, and papaya

3.4.1 Advantages of a healthy breakfast

Children who eat a healthy breakfast are more likely to:

- Have better concentration and be more productive throughout the morning : This may be due to replenishing glucose, the brain's main energy source.
- Control their weight: Eating breakfast may reduce hunger later in the day and it may help eaters to avoid junk foods at later meals.
- Have more strength and endurance: People who eat breakfast have higher energy levels, and may engage in more physical activity than many people who don't eat breakfast.

An overnight and morning fast among school children can have deleterious effects on memory and attention. Research shows that skipping breakfast can have adverse effects on both energy levels and cognition of school children.

THINK BEFORE YOU SKIP YOUR BREAKFAST

3.4.2 Tips for a healthy breakfast

A healthy breakfast should consist of a variety of foods. To make a healthy breakfast each day, choose one item from at least three of the following four food groups:

- Fruits and vegetables: Consider fresh, whole fruits and vegetables, or 100 percent fruit juice without added sugar.
- **Grains:** Choose whole-grain cereals, and not refined flour like maida.
- **Dairy**: Consider skim milk, low-fat yogurt or low-fat cheeses, such as cottage and natural cheeses.

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- **Protein :** Choose lentils and dals, hardboiled eggs, lean slices of meat and poultry, or fish.
- Avoid breakfast loaded with simple sugars (gets digested early and may feel hungry soon) or dripping in oil (may cause drowsiness throughout the day)



Choose one special day in the school calendar and decorate the classroom with balloons, tablecloths or student artwork and posters to highlight healthy foods and the importance of breakfast and invite the Principal or Headmistress of the school to eat Breakfast with the children



Have a breakfast poster competition among students and hang the posters around the school

Nutrition for Adolescents

3.5 Adolescence

Adolescent growth spurt starts at about 10-12 years in girls and two years later in boys. Adolescence is characterized by rapid increase in height and weight, hormonal changes, sexual maturation and wide swings in emotion. Development of critical bone mass is essential during this period as this forms the ground for maintaining mineral integrity of the bone in later life. Adolescent girls are at greater physiological stress than boys because of menstruation. Their nutritional needs are of particular importance as they have to prepare for motherhood.

3.5.1 Growth and Development in Adolescence

According to WHO, individuals between 10 and 19 years are considered adolescents. The period of transition from childhood to adulthood is called adolescence with accelerated physical growth.

Out of all the stages of life, the most fascinating is the adolescent age



During this phase, a child is going through many changes in his/her body – changes occur in hormones, skin, height and weight. The child observes these changes and makes amendments in his/her eating habits without appropriate guidance.

Adolescence is a significant period for physical growth and sexual maturation. Nutrition being an important determinant of physical growth of adolescents is an important area that needs attention.

Inadequate nutritional intake during adolescence can have serious consequences throughout the reproductive years and beyond. Poor nutrition during adolescence can impair the work capacity and productivity of adolescent boys and girls in their later years. Further, an undernourished girl is at the risk of developing complications during pregnancy and the chances of her giving birth to a low birth weight baby increases, thus perpetuating a vicious cycle of malnutrition and ill-health.

3.5.2 Physical, Physiological and Psychological changes

Body composition

Body composition changes during the period of maturation. The changes occur due to hormonal influences which regulate the development of sex characteristics. The skeletal growth continues for a longer period of time for boys than girls. Usually the skeleton reaches its full maturity by 17 years for girls and by 20 years for boys. As mineralization increases the water content decreases.

Girls tend to deposit more fat whereas boys add more muscle mass. The result of pubertal changes is that boys have more lean body mass, skeletal weight and less adipose tissue as a ratio of total body mass. This difference in body composition for boys and girls is reflected in their nutrient requirements.

Sexual maturity

The growth spurt is accompanied by sexual maturity. In girls there is development of breasts, auxiliary and pubic hair and menarche.

In boys the pubertal changes include deepening of voice, broadening of shoulders, development of auxiliary and pubic hair, growth of penis and testicles.

Psycho social changes

As this period is a transition to adulthood, they try to develop self-identity. The desire to be accepted in their peer group changes their food habits, dressing and group conduct. This in turn brings psychological, emotional and social stress.

3.5.3 Nutritional requirements

Adequate intake of nutrients during the adolescent period is critical in the phenotype expression of genetic potential of bone tissue

growth and mineralization. Insufficient intake of nutrients inhibits growth promoting hormones, impeding or delaying the onset of pubertal development, causes poor concentration on studies and may even lower height gain during this period.

The Recommended Dietary Allowance for adolescents is presented in Table 3.3

Table. 3.3 ICMR recommended dietary
allowances for Adolescents

	Years			
Nutrient	13-15		16-17	
	Boys	Girls	Boys	Girls
Weight (Kg)	47.6	46.6	55.4	52.1
Energy (kcal)	2750	2330	3020	2440
Protein (g)	54.3	51.9	61.5	55.5
Fat (g)	45	40	50	35
Calcium (mg)	800	800	800	800
Iron (mg)	32	27	28	26
Vitamin A (µg)	600	600	600	600
Beta carotene (µg)	4800	4800	4800	4800
Thiamine (mg)	1.4	1.2	1.5	1.07
Riboflavin (mg)	1.6	1.4	1.8	1.2
Nicotinic acid (mg)	16	14	17	14
Pyridoxine (mg)	2	2	2	2
Ascorbic acid (mg)	40	40	40	40
Folic acid (µg)	150	150	200	200
Vitamin B12(µg)	0.2-1	0.2-1	0.2-1	0.2-1

Source: Dietary Guidelines for Indians -A Manual by Kamala Krishnaswamy, B. Sesikeran (Second Edition 2011), NIN, ICMR

Energy

The metabolic demands of growth and energy expenditure increases the calorie needs. The ICMR committee has suggested that energy should be provided on the basis of ideal weight for age. The energy requirements for boys are more than that of girls which is 2750 kcal and 3020 kcal for boys 13-15 years and 16-18 years respectively and 2330 kcal

and 2440 kcal for girls of 13 -15 years and 16-18 years respectively. The difference in energy requirements can be attributed to the rapid increase in weight for boys.

Protein

The protein requirements are computed in the same way as for adults. The protein needs represent 12-14 percent of the total energy requirements. This meets the need for growth, for pubertal changes in both sexes and for developing lean body mass in boys.

Minerals

All mineral needs increase during adolescence. Adolescents at the peak of their growth velocity will require large quantities of nutrients. Adolescents require twice the amount of calcium, iron, zinc, magnesium and sodium during the years of the growth spurt compared with that during other years. Bone growth requires calcium. During adolescence 800 mg of calcium per day is needed. About 150 mg of calcium should be retained for increasing bone mass. Adolescents who have less bone mineral density are susceptible for osteoporosis later in their life.

The requirements for iron have been arrived at 32 mg/day and 27 mg/day for boys and girls 13 – 15 years of age, and 28 mg / day and 26 mg / day for boys and girls 16-18 years of age respectively. Iron requirements are generally high during adolescence due to the following reasons such as growth spurt, expansion of blood volume, increase in haemoglobin concentration, additional iron to compensate menstrual losses in girls and adding the basal loss of iron. Zinc supplements can also increase pubertal growth in adolescents.

Vitamins

The requirement for B vitamins namely thiamine, riboflavin and niacin increases

in direct proportion with increase in calorie intake. Folic acid and vitamin B12 requirements also increase when there is rapid tissue synthesis as they participate in synthesis of DNA and RNA.

Transamination to synthesize nonessential amino acids requires more vitamin B6. The structural and functional integrity of newly formed cells depends on the availability of vitamins A, C and E

3.5.4 NUTRITIONAL PROBLEMS

Obesity

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Obesity is a state in which there is a generalized accumulation of excess fat in adipose tissue in the body leading to more than 20% of desirable weight. Obesity has several adverse health effects and can even lead to premature death. Obesity leads to high blood cholesterol, high blood pressure, heart disease, diabetes, gallbladder stone and certain types of cancer.

Factors responsible for adolescent obesity

- Inactive life style
- Genetics and family history
- Junk food and over eating
- Psychological causes
- Environmental causes
- Diseases
- Drugs
- Tobacco and alcohol

The prevalence of adolescent obesity can be reduced by initiating programmes of health and nutrition education for school children, encouraging physical activity and healthy food habits.

Some of the factors contributing to adolescent obesity and solutions to prevent it are presented in Table 3.4

Contributors to adolescent overweight/obesity	Adolescent behavior objective	
Excessive TV, video, computer and mobile phone use	Limit the use of TV, computer and mobile phones to 1-2 hours per day and increase outdoor activities instead	
Lack of physical activity	Increase daily active play and other outdoor fun activities. one hour of active play every day is recommended as part of a healthy lifestyle.	
Over consumption of sugar sweetened beverages	Replace sugar sweetened beverages such as soda, carbonated drinks and soft drinks with water, tender coconut water, fresh fruit juices (without sugar) and butter milk	
Large portion sizes	Eat small meals and reduce portion sizes of foods	
High consumption of fast foods and junk foods	Eat fast foods no more than 1-2 times per week. Replace junk foods with healthier eating options	
Skipping breakfast.	Eat a healthy breakfast daily. If in a hurry to go to school pack your breakfast and eat it on the way.	
High consumption of fatty foods	Avoid deep fat fried items and increase the intake of steamed and boiled foods	
Low fibre intake in the diet	Consume 3- 4 cups of fruits and vegetables every day. Consume whole grains and pulses whenever possible.	

Nutritional Anaemia

Iron deficiency anemia is a major nutritional problem in adolescent boys and girls in India. The need for iron increases with rapid growth and expansion of blood volume and muscle mass. As boys gain lean body mass at a faster rate than girls, they require more iron than girls. The onset of menstruation imposes additional needs for girls.

Main causes of Anaemia

- Inadequate iron intake/absorption/stores
- Frequent dieting or restricted eating
- Meal skipping
- Substance abuse
- Heavy/lengthy menstrual periods
- Rapid growth
- Adolescent Pregnancy
- Parasitic infection

Signs and symptom

- Fatigue, lethargy, dizziness, headaches
- Shortness of breath, ringing in ears, taste disturbances
- Restless leg syndrome
- Pallor, Flattened, brittle nails (spoon nail)
- Angular stomatitis (cracks at mouth corners)
- Glossitis, Blue sclera (whites of eyes), Pale conjunctivae.



Fig. 3.8 Signs and symptoms of Iron Deficiency

Key risk of Anaemia

- Impaired cognitive functioning and memory
- Decreased school performance
- Compromised growth and development
- Increased risk of pregnancy related complications
- Decreased work capacity
- Depressed immune function

Preventive measures

Adolescents should be encouraged to consume iron rich foods (green leafy vegetables, jaggery, meat) complemented with a Vitamin C source like Citrus fruits (oranges, lemon) and Indian gooseberry (Amla). Adolescent girls need additional requirement of Iron to compensate for menstrual blood loss



India is home to 243 million adolescents – children aged 10 to 19 years – the most adolescents of any country. Sadly, a large proportion of India's adolescents are anaemic: 56 per cent of girls and 30 per cent of boys.

Anaemia among adolescents adversely affects these young people's growth, resistance to infections, cognitive development and work productivity.

3.5.4 Eating disorders in adolescence

Anorexia Nervosa and Bulimia

Anorexia is described as a state of emaciation that has been brought on by voluntary starvation. It is seen primarily in adolescent girls from middle and upper class families where the victim refuses to eat. Anorectic adolescents usually experience amenorrhea and sometimes fatal electrolyte imbalances. They deny that they are emaciated, inspite of a skeleton like appearance and usually continue to pursue thinness by refusing to eat.



Another related phenomenon known as "gorge and purge" or Bulimia is seen among adolescent girls in socio economic backgrounds similar to those who develop anorexia nervosa. These individuals consume enormous quantities of food and then immediately induce vomiting or take laxatives to purge themselves of the food and thus the nutrients they provide.



3.5.5 Nutrition and the Menstrual Cycle

One of the many challenges girls face as they become women is the onset of menstruation. These hormones that regulate

the menstrual cycle are powerful and they affect more than just the uterus and the ovaries. They alter the metabolic rate, glucose tolerance, appetite, food intake, mood and behavior. Most girls live easily with the cyclic rhythm of the menstrual cycle, but some are afflicted with physical and emotional pain prior to menstruation, a condition called Premenstrual syndrome or PMS

Premenstrual Syndrome (PMS) is a cluster of symptoms, including both physical and emotional pain, that some girls experience prior to and during menstruation.

The menstrual cycle may affect the adolescent girl's metabolism and appetites in a cyclic fashion. Premenstrual Syndrome (PMS) is probably a diverse set of conditions with no single cause. A sound diet is part of the recommended lifestyle to reduce symptoms of PMS

A girl suffering from PMS may complain of any or all of the following symptoms: cramps and aches in the abdomen, back pain, headaches, acne, swelling of face and limbs associated with water retention, food cravings (especially for sweets), abnormal thirst, pain and lumps in the breast, diarrhea and mood swings including both nervousness and depression.

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3.5.6 Acne Vulgaris

Acne is a common concern among adolescents and about 80 percent of teens experience it. The main culprit of acne is over activity of sebaceous glands in the skin. Blockage in a duct in the gland can lead to infection and localized pressure resulting in an acne lesion. Adolescents are warned to avoid junk foods like nuts, chocolates, pizzas, chips, candies and ice creams to prevent acne.

Acne

Chronic inflammation of the skin's follicles and oil-producing glands, which leads to an accumulation of oils inside the ducts that surround hairs; usually associated with maturation of young adults



3.5.7 Malnutrition due to teenage pregnancy

Teenage mothers are considered to be at high risk as maternal death and infant mortality rates are higher among them. The biological immaturity has a greater impact on pregnancy. Malnutrition sets in when the pregnant adolescent girl fails to meet the demands of not only her growth but also that of the foetus. This has a direct bearing

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on the outcome of pregnancy. Lactation failure is also common. Teenage mothers fail to breast feed their infants adequately resulting in high infant morbidity rate. Good nutrition and fostering healthy eating habits during adolescence paves way for a healthy adulthood. ۲

3.5.8 Changes in eating habits during adolescence

During adolescence, food habits change for the worse, and teenagers often miss out on the nutrients they need. They begin to skip breakfast; choose less milk, fruits and vegetables and consume more soft drinks each day. Skipping breakfast and eating fast foods contributes to weight gain and higher BMI values. Peer pressure is very high during adolescence. The need to be in step with the trends and belong to the peer group leads the adolescent to eating non-nutritious foods like pizzas, burgers, coffees, aerated drinks, chocolates and also other roadside junk foods which are nutritionally inadequate and rich in saturated fats and may skip meals at times.



Awareness about one's body and its appearance becomes the top priority. It is important for adolescents to realize that they are going through growth spurt and poor nutrition can lead to deficiencies which may cause metabolic disorders in adulthood.

Psychological pressures on adolescents' influence their eating habits. Boys generally

tend to have a better appetite than girls and this helps them to meet their nutritional demands. The adolescent girls are at a disadvantage due to the following reasons.

1. with considerable amount of fat deposits and less physical activity than boys, girls may gain weight.

2. figure consciousness due to social pressure may force her into a self-imposed crash diet for weight loss or self-starvation leading to eating disorders like bulimia and anorexia nervosa.

Hence adolescents should be educated to consume a balanced nutritional diet including iron rich, calcium rich, and protein rich foods and avoiding junk foods providing empty calories. The adolescents should be advised not to miss meals and that emotions should not dominate during meal times.





3.5.9 Dietary guidelines for adolescents

- Adolescence is the time to inculcate food and exercise habits which ensure good health forever. There are simple methods of taking care of health during this period.
- Eat at least two to three meals of fruits in a day for a glowing complexion and to keep constipation away.

I NUTRITION DURING PRE SCHOOL, SCHOOL AGE AND ADOLESCENCE

- Coconut water and fresh fruit juice will improve immunity and also provide vital vitamins.
- A minimum of two glasses of skimmed milk is a good midnight snack when it is exam time or when awake late for projects.
- Egg or chicken sandwich is a better option while meeting up with friends or after play.
- A milkshake is always a better choice as compared to an aerated drink.
- Breakfast is the most important meal, as it ensures minimum brain damage due to an overnight fast.
- A water intake of three-four litres per day clears all toxins from the body and keeps the skin healthy and glowing.
- A handful of raisins and almonds is a very good snack between during long hours of studies.
- Avoid foods that are processed or canned as they contain preservatives which can be carcinogenic in future life.
- Foods that are rich in sugar are responsible for obesity, gasse in the stomach and also cause skin eruptions.
- Fish, chicken, eggs are good sources of protein which help in growth and repair of worn out tissues.
- Always eat your breakfast and at least one meal with plenty of vegetables that is healthy and nutritious, at home.

- Sit and eat peacefully, because body absorbs nutrition under minimum anxiety and stress from the food we eat.
- Avoid crash diet and skipping meals to keep the metabolism high and also help in fat loss.
- Exercise daily for five days a week to ensure good health and a fit body.
- Whenever you happen to eat out in a restaurant, have a fresh pineapple juice along with your meal to prevent indigestion.
- Fried and oily foods and foods with cheese and cream take a long time to digest thus cause indigestion and are a very strong reason for pimples and obesity.
- Walnuts and dried apricots enhance brain function and concentration.
- Eat whenever you are hungry, not because everyone around is eating.
- Adolescents can be encouraged to cook their own healthy dishes

Thus from this lesson we have learnt that nutrient needs rise dramatically as children enter the rapid growth phase of the teen years. The busy lifestyles of adolescents add to the challenge of meeting their nutrient needsespecially for iron and calcium. Nutrition and lifestyle choices people make as children and adolescents have long-term as well as immediate effects on their health.



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Activity : 4

Student Resource Sheet "Changing my diet to improve my Health"		
e Student:		
to change	How will this improve my health?	How important is this to

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Example: I would like to drink more water instead of fruit juice	It will hydrate me more effectively and contains no sugar	I know I drink too much juice and water will help me stay hydrated and concentrate better

- On the school Annual day invite parents to join students for a fun space-themed breakfast in the school's auditorium. The children can set up MyPlate-theme "space stations," where other children can select foods from each food group to "help their day take off" – for example, milk at the dairy station, whole-wheat flour at the grains station, or apples at the fruit station. The student volunteers can explain the stations' connection to MyPlate.
- To emphasize the theme, students can dress in astronaut costumes or prepare a brief skit or presentation about how a healthy breakfast helps them "fuel up" like a rocket ship.
- Students can decorate stars with drawings of their favorite breakfast fruits, vegetables, low-fat dairy, protein foods, and whole grains, creating a starry sky of healthy food choices.

SUMMARY

Name of th

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- Nutrient needs change steadily throughout life into old age, depending on the rate of growth, gender, activities and many other factors.
- Childhood and adolescence are periods of continuous growth and development which places a great demand on nutrients.
- The energy requirements of toddlers and children vary greatly based on differences in growth rate and level of physical activity. Insufficient food will not only result in under nutrition in

terms of inadequate weight gain but will also hinder growth.

- Toddlers and young children have an increased need for calcium to promote the rapid bone growth and skeletal development that takes place during these early years of life.
- The school- age period (6-12 years) is called the latent time of growth. Schoolaged children grow significantly, and are physically active in general. As a result, their nutritional needs are high and critical.

NUTRITION DURING PRE SCHOOL, SCHOOL AGE AND ADOLESCENCE

- Maintaining a balanced diet and regular exercise is important for school-aged children. These children are required to eat a variety of foods from each food group to ensure optimal intake of all vitamins and minerals.
- At the same time, they may face new challenges regarding food choices and habits. Decisions about what to eat are partly determined by what is provided in school, at home, the influences from friends at school, and the media, especially television.
- Poor nutrition compromises both the quality of life of school-aged children and also their potential to benefit from education.
- Adequate nutrition of school aged children will also ensure that they grow to their full potential, and provide the stepping stones to a healthy life.
- Deficiency of essential fatty acids may have a negative impact on school performance.
- Bone density suffers when calcium needs are not met during childhood years
- Milk and dairy products and some dark green, leafy vegetables are good sources of calcium.
- Children need iron because of rapidly expanding blood volume during growth. Meat, fish, poultry, green leafy vegetables and millets are the best sources of dietary iron.
- A variety of fruits and vegetables of different colours should be added in the child's food.
- Dark green leafy vegetables, yellow, orange coloured vegetables and fruits (such as carrots, papaya, mangoes) are good sources of Vitamin A.

- Children get most of their Vitamin D from sunlight and a small amount from some food items like fish oils, fatty fish, mushrooms, cheese and egg yolks.
- Snacks may contribute up to a significant proportion of total daily energy and nutrient needs of the school child.
- Obesity, underweight, constipation, dental caries and anaemia are some of the nutritional problems during the school going period.
- Anaemia in school-aged children may result in deleterious effects including lower school achievement due to impaired cognitive development, poor attention rate and general fatigue.
- Packed lunches have become a necessity for school going children as schools are either away or the lunch period is too short for the children to go home and have food.
- The school lunch should meet one third daily requirement in calories, protein and other nutrients of the child, to boost concentration and energy for the rest of the school day
- A nutritious breakfast is a central feature of a child's diet that supports healthy growth and development. Breakfast is the first meal of the day.
- A healthy breakfast refuels the body and replenishes the blood sugar (glucose), giving the energy necessary to start a new day.
- According to WHO, individuals between 10 and 19 years are considered as adolescents. The period of transition from childhood to adulthood is called adolescence with accelerated physical growth
- The metabolic demands of growth and energy expenditure during adolescence

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increase the need for calories, protein, iron and calcium.

- Inadequate nutritional intake during adolescence can have serious consequences throughout the reproductive years and beyond
- Obesity and iron deficiency anaemia are major nutritional problems during the adolescent period and girls also suffer from eating disorders like Anorexia nervosa and Bulimia. Premenstrual syndrome and acne are some of the

GLOSSARY

other problems during this period

- Peer pressure is very high during adolescence. They begin to skip breakfast; choose less milk, fruits and vegetables and consume more soft drinks each day.
- Finally Adolescence is the time to inculcate good eating and exercise habits which ensure good health forever.

Toddler	- A toddler is a child 12 to 36 months old. The word is derived from "to toddle", which means to walk unsteadily, like a child of this age.
Bone mineralization	- Bone mineralization is the process of laying down minerals like calcium and phosphorus on matrix of the bone
Cognitive functions	- Cognitive functions encompass reasoning, memory, attention, and language and lead directly to the attainment of information and, thus, knowledge
Essential fatty acid	- An unsaturated fatty acid that is essential to human health, but cannot be manufactured in the body
Omega 3 fatty acids	- an unsaturated fatty acid of a kind occurring chiefly in fish oils
Ischemic heart disease	 e - Ischaemic (or ischemic) heart disease is a disease characterized by reduced blood supply to the heart
Hypertension	- Hypertension also known as high blood pressure, is a long-term medical condition in which the blood pressure in the arteries is persistently elevated
Diabetes	- A disease in which the body's ability to produce or respond to the hormone insulin is impaired, resulting in abnormal metabolism of carbohydrates and elevated levels of glucose in the blood.
Constipation	- Constipation is a condition of the digestive system characterized by hard feces that are difficult to pass.
Hyperlipidemia	- Hyperlipidemia is a term used to describe high levels of fat in the blood, such as cholesterol and triglycerides.

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Dental caries - Dental caries is the scientific term for tooth decay or cavities. Menarche - Menarche is the beginning of the menstrual function; especially the first menstrual period of an individual. **Transamination** - the transfer of an amino group from one molecule to another Restless leg syndrome - Restless leg syndrome is a disorder of the part of the nervous system that causes an urge to move the legs. **Foetus** - A foetus is the prenatal stage between the embryonic stage and birth **BMI** - BMI (Body Mass Index) is a person's weight in kilograms (kg) divided by his or her height in meters squared. Peer pressure - a feeling that one must do the same things as other people of one's age and social group in order to be liked or respected by them Carcinogenic - any substance or agent that tends to produce a cancer. Xerophthalmia - A condition resulting from deficiency of vitamin A affecting the eye, (Xero= dry, ophthalm= eye) **Bitot's spot** - shiny pearly spots of triangular shape occurring on the conjunctiva in severe vitamin A deficiency especially in children. PEM - Protein-energy malnutrition (PEM) is a potentially fatal body-depletion disorder. It is the leading cause of death in children in developing countries.

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Evaluation

I. Choose the correct answer

- 1. An infant grows rapidly, doubling its birth weight by _____ and tripling it by 1 year of age.
- a) six months b) two months c) three months
- Protein intake of a pre-school child should be _____ g/kg body weight.
- a) 2 to 3 b) 1.5 to 2 c) 3 to 4
- 3. _____ is the best source of calcium
- a) rice b) milk c) wheat
- 4. The calcium requirement of a preschool child is _____ mg.
- a) 600 b) 300 c) 400

5. _____ is a disorder which involves chronic ingestion of non-nutrient substances.



- a) Pica b) anaemia
- c) anorexia
- 6. The school- age period has been called the latent time of growth
- a) infancy b) school age c) adolescence
- 7. Nutritional requirements of boys and girls are more or less the same till the first _____ years
- a) six b) five c) nine
- NUTRITION DURING PRE SCHOOL, SCHOOL AGE AND ADOLESCENCE

- 8. _____ are essential fatty acids keep the brain healthy.
- a) Omega 4 b) Omega 3 c) Omega 6
- 9. _____ begins in childhood if diets do not provide adequate calcium-rich foods
- a) xerophthalmia b) anaemia c) osteoporosis
- 10. Children need iron because of rapidly expanding ______ during growth.
- a)Blood volume b)heart c)organs
- 11. Meat, fish, poultry, green leafy vegetables and millets are the best sources of dietary_____.

a)iron b) copper c) folic acid

- 12 _____ is essential for vision and a deficiency of the same can lead to night blindness
- a)Vitamin C b)Vitamin A c)Vitamin B
- 13. Children get most of their _____ from sunlight
- a) Vitamin C b) Vitamin A c) Vitamin D
- 14. Adolescent growth spurt starts at about _____ years in girls and two years later in boys
- a) 15-16 b) 10-12 c) 8-10
- 15. Adolescent girls are at greater physiological stress than boys because of _____
- a) menstruation b) constipation c) acne
- 16. According to WHO, individuals between 10 and 19 years are considered _____
- a) Children b) adolescents c) adults
- 17. Adolescence is a significant period for physical growth and_____.
- a) Sexual maturation b)muscle development
- c) tissue development

- 18. Adolescents who have less _____density are susceptible for osteoporosis later in their life.
- a) Bone mineral b) Skeletal c) Muscle
- 19. ______and vitamin B12 requirements also increase when there is rapid tissue synthesis as they participate in synthesis of DNA and RNA
- a)Niacin b) Folic acid c) Thiamine
- 20. Transamination to synthesize non-essential amino acids requires more _____.
- a)Vitamin B6 b)Vitamin C c)Vitamin D
- 21. Fatty liver is seen in _____
- a) Kwashiorkor b) Marasmus
- c) Anaemia

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- 22. Old man's face is a classical symptom of
- a) Kwashiorkor b) Marasmus
- c) Xerophthalmia
- 23. _____ is caused due to deficiency of vitamin A
- a) Acne b) Marasmus
- c) Night blindness

II. Short answers

- 1. Why is calcium very important during preschool period?
- 2. What is restrictive food intake disorder?
- 3. What is osteoporosis?
- 4. Give some examples of foods rich in Vitamin A
- 5. What is the major reason for overweight and obesity in school children?
- 6. What is a packed Lunch?
- 7. Suggest a few healthy packed lunch recipes.
- 8. What are the signs and symptoms of Anaemia?

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- 9. What is Anorexia nervosa?
- 10. What are Junk foods?
- 11. Define Obesity
- 12. What is the requirement for Iron and calcium for adolescents?
- 13. Define Adolescence
- 14. What is PEM?

III. Brief answers

- 1. Give the RDA for a 5 year old child
- 2. How does anemia affect school children?
- 3. What causes dental caries in school children?
- 4. Give the RDA for a 11 year old girl.
- 5. Why is a packed lunch important? Suggest a few tips to encourage this.
- 6. Why is breakfast the most important meal of the day?
- 7. List the physiological changes in boys and girls during adolescence.
- 8. Why do girls require more iron during adolescence?
- 9. Explain the factors responsible for obesity in adolescents
- 10. Define PMS. List its symptoms.
- 11. What is Acne? How is it caused?
- 12. Give the RDA of a16 year old boy
- 13. List a few dietary guidelines for adolescents.
- 14. List the causes and symptoms of Kwashiorkor
- 15. List the causes and symptoms of Marasmus.
- 16. What is Bitot's spot?
- 17. What causes night blindness?
- 18. List a few foods rich in Vitamin A
- 19. What causes dental caries in children?

IV. Detailed answers

- 1. Explain the common feeding problems in children.
- 2. Explain the factors to be considered in planning a diet for a preschooler.
- 3. Suggest five tips for feeding picky eaters.
- 4. Explain the dietary guidelines to keep school children healthy
- 5. Explain the nutritional problems in school aged children
- 6. Explain the points to be considered while planning a packed lunch.
- 7. What are the advantages of a healthy breakfast?
- 8. What are the harmful effects of skipping breakfast?
- 9. Explain the physiological changes during adolescence.
- 10. Explain the causes and complications of Anaemia in adolescents.
- 11. Explain the eating disorders of adolescent girls.
- 12. Explain the nutritional problems of adolescent boys.
- 13. What are the harmful effects of junk foods?
- 14. Explain the changes in eating habits during adolescence
- 15. List the causes and symptoms of Kwashiorkor
- 16. List the causes and symptoms of Marasmus
- 17. Explain vitamin A deficiency diseases.

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NUTRITION DURING PRE SCHOOL, SCHOOL AGE AND ADOLESCENCE



<u>ICT CORNER</u> NUTRITION DURING PRE SCHOOL, SCHOOL AGE AND ADOLESCENCE

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Let's check out the diet plan and know your nutrition.



Steps:

- **Step 1:** Use the **URL** or scan the **QR Code** to launch the page and get the activity downloaded to your device.
- **Step 2:** Complete the details on the left side of the window such as Age, Sex, Height, Weight and other.
- Step 3: Edit the calories by selecting the food items and drop it in the plate available below and activities on the right side of the window. Increase or decrease in Weight & Calories shall be done with the + , buttons found on the right bottom of the window.
- **Step 4:** Click the play button on the bottom of the page once after furnishing the details.



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To go inside the app directly you can either use **QR code** or the **given link** https://phet.colorado.edu/en/simulation/legacy/eating-and-exercise *Pictures are indicative only



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