UNIT–8: HEALTH AND HYGIENE

Content and specific topic	Comprehension	Analysis	Synthesis	Evaluation
Structure and function of the human body	Develop an insight into the structure and function of the human body	Analyse the role played by each organ system in our body.	Awareness of the need to maintain the basic levels of personal hygiene.	Worksheets, comprehension questions, discussion and activities.
Hygiene and sanitation.	Understand the importance of personal hygiene and sanitation in our day to day life.	Examine the ways of maintaining personal and food hygiene.	Realize the importance of sanitation and proper waste disposal.	Worksheets, comprehension questions, discussion and activities.
Infectious and contagious diseases and its prevention.	Understand about different infectious and contagious diseases.	Examine the causes of Infectious and contagious diseases	Appreciate the measures to be taken to prevent these diseases.	Worksheets, comprehension questions, discussion and activities.

Unit-8

Health and Hygiene

Health is a positive state of well-being, where every part of the body and mind is in harmony and in proper functioning balance with every other part. In other words, when every organ of the body is functioning normally, the state of physical well-being is known as health. It has been well said that, only that person can be called really healthy, who has a sound mind in a sound body. Health is the characteristic of life that enables a person to live longer. According to World Health Organisation (WHO): "Health is the state of complete physical, mental, spiritual and social well-being and not merely absence of disease". If a person is disease free or in a good physical state, but under stress, tension, anger, greed etc., then that person is not considered as a healthy person. Hence, in addition to physical health, we must consider the mental and emotional health also, only then spiritual and social health can be achieved and man can progress forward for the well-being of the society.

Hygiene and Sanitation are fields of medical science which aim to preserve and improve the health of the individual and of the community as a whole. Its study is aimed at making the cadets aware of the many preventable health hazards and to enable them to look after themselves and their community most efficiently. It seeks to develop in them the concept of healthy living.

Source:http://commons.wikimedia.org/wiki/File:CleanHandsGuardiansOfHealth.jpg

1. Structure and Function of the Human Body

The human body is the greatest of all complex machineries. It is imperative that a first aider, apart from having the knowledge about maintenance of good health and hygiene, has a basic idea of structure and function of every part of the human body. Many lives can be saved if proper and timely first aid is rendered.

Structure of the Body

Human body consists of:-

a) Skeleton (Bones of the body)

b) Muscles.

c) Blood circulatory organs.

d) Respiratory organs.

e) Digestive organs.

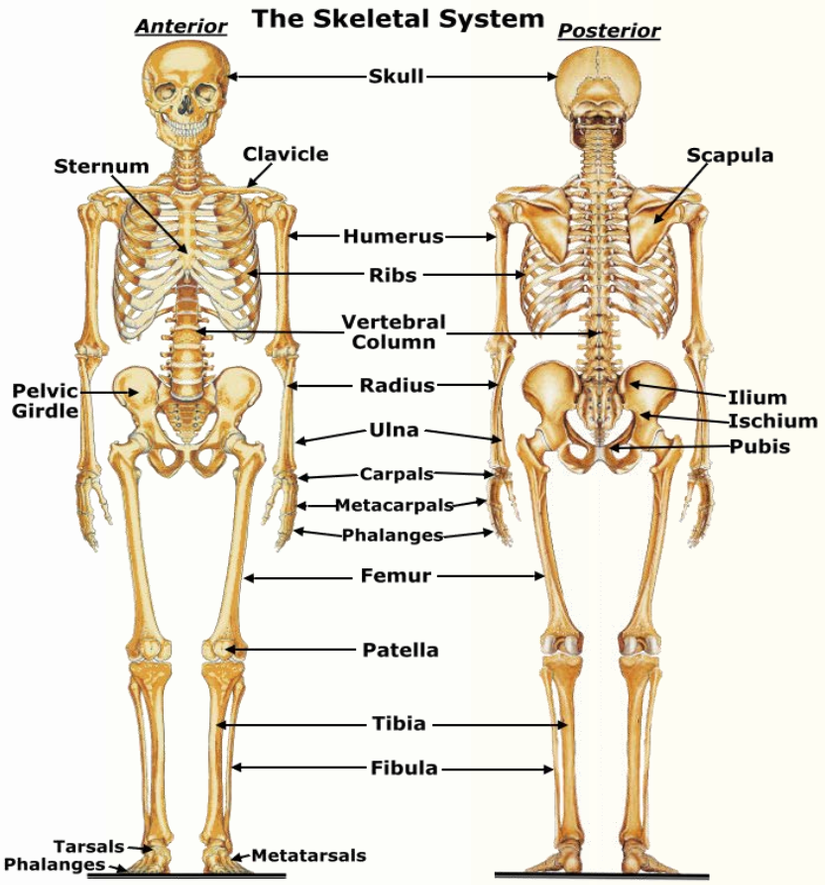
f) Excretory organs.

g) Nervous system organs.

1.1 Skeletal and Muscular System

Skeletal System

Structure of Bones: The human body has 206 bones of various shapes an sizes. The bones give shape and firmness to the body, as also it protects the vital organs like brain, heart, lungs spinal cord**.** Bones can either be *'loosely arranged'* or *'densely arranged'*. The loosely arranged bone is called *'spongy bone'* and densely arranged bone is called *'compact bone'*. Some bones are hollow from inside and filled with bone marrow.



Source: hairstyle-pictures.feedio.net

Classification of Bones: Bones can be classified according to their shape :-

a) **Long Bones:** These bones are long and tubular and are confined to upper/lower limbs.

b) **Short Bones:** These bones are short and tubular and are found in the ankle/wrists.

c) **Flat Bones:** These bones are flat like plates, e.g. bones of cranium (Skull), shoulder or hips.

d) **Irregular Bones:** Irregular or mixed shape, eg. vertebral column.

e) **Sesamoid Bones:** They develop in the tendons of the muscles around the joint. eg. patella.

Muscular System

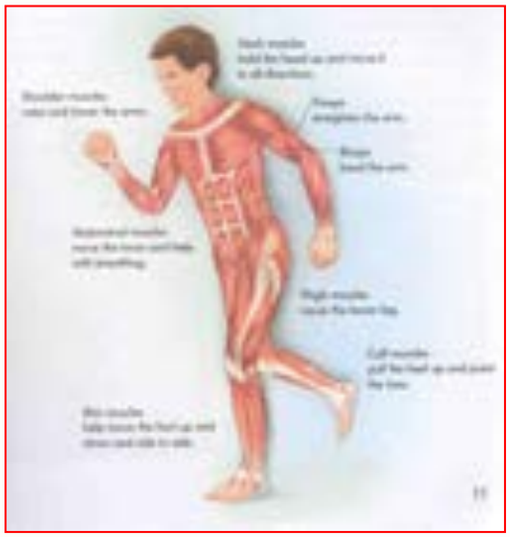
The muscle forms about half of the total weight of the body and are responsible for body movement. The muscles form the *'flesh'* of the body; they are under the control of nervous system.

Classification: The muscles of the body are classified into:-

a) **Voluntary/Skeletal Muscles:** Voluntary muscles or skeletal muscles are attached to the surface of bones. These muscles form about 47% of the body weight and are either fiber type or striated type. Most of the skeletal muscles pan from one bone to another across a joint and by contracting; they act upon the joints and produce movements.

b) **Involuntary Muscles:** These are called so, because they are controlled by the autonomic nervous system.

c) **Cardiac Muscles:** Though cardiac muscles are striated structurally, they form the main part of heart wall.



Source: http://www.stpeters.k12.nf.ca/ muscular_system.htm

1.2 Organ Systems

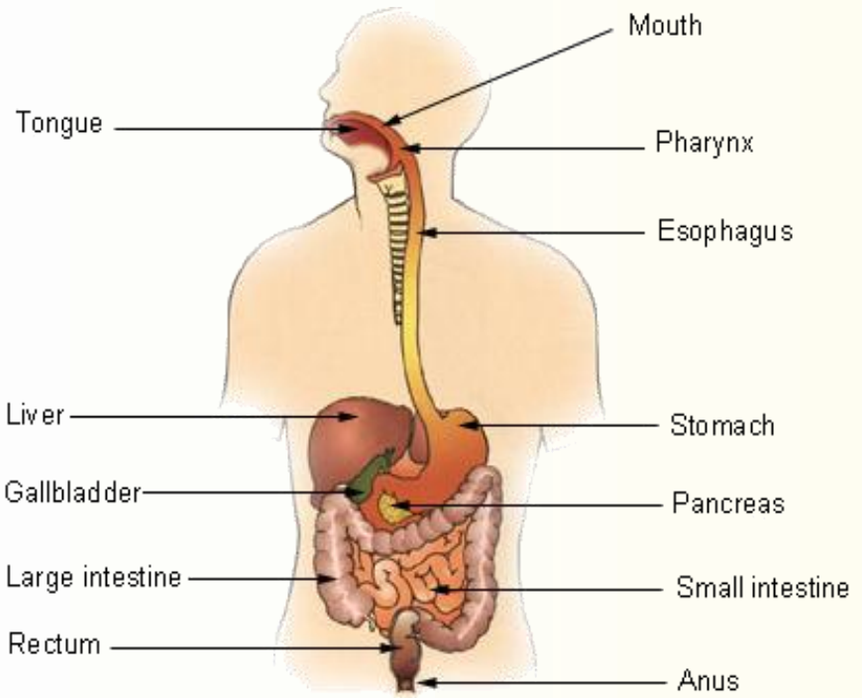
Circulatory System: The circulatory system consists of the Heart, Blood Vessels and Blood. Each time the heart contract, blood is pumped along the blood vessels. It is therefore kept in a state of continuous motion. Through the blood circulation, oxygen, nutrients and other substances are brought to the tissues and the waste products and carbon dioxide formed by the tissue are constantly removed.

a) **Heart:** The Heart is the most important organ of blood circulation. It is situated in thorax between the lungs and on to the left side of the body. The size of heart is equal to a closed fist and the average weight of heart in a male is about 300 gms, and in a female about 250 gms. It is divided into two compartments, the right and the left. The right side contains impure

blood while left side contains pure blood. Each side is again divided into AURICLEs and VENTRICLEs. Auricles are the receiving chambers. Ventricles are muscular chambers that pumps blood out of the heart and into the circulatory system.

Digestive System: Digestion is a mechanical and chemical process by which, complex food substances are converted into simple substances so that they can be easily absorbed by blood and utilized by various tissues of the body according to their requirements. The main organs of digestive system are mouth, salivary glands, pharynx, oesophagus, stomach, pancreas, liver, small intestine and the large intestine

Organs of the Digestive System



b) **Blood:** The blood is also known as the ***'transport system'*** of the body, and plays an important role in maintenance of life. The total volume of blood contains – haemoglobin, RBC, WBC and platelets.

c) **Blood Vessels:** Blood vessels are tube like structures which carry blood all over the body for circulation. These are of three types:-

(i) **Arteries:** These are the blood vessels which carry pure blood from the heart to all parts of the body.

(ii) **Capillaries**: These are tiny blood vessels which connect the small arteries and veins. The exchange of oxygen and nutrition with carbon di oxide by the tissue takes place in the capillaries.

(iii) **Veins:** These blood vessels carry impure blood to the heart. The main veins are called *'superior'* and *'inferior'* vena cava.

Respiratory System: Respiration or breathing is a process by which, oxygen, obtained from fresh air, is absorbed in to the blood stream and carbon dioxide formed by the tissue action, is removed from the blood and expelled into the air, that is then expired. It is a process essential to life. It involves the taking in of oxygen and giving out of carbon dioxide. The main organs of respiratory system are Nose, Pharynx, Larynx, Trachea, Bronchi and the Lungs.

Excretory System: Excretion is a process by which waste products are removed out of the body. Among the organs that contribute towards the elimination of waste products are the skin, lungs, kidneys and the gastro-intestinal tract.

a) **Skin:** The skin covers the external surface of the body. Waste matter in the form of sweat is removed through perspiration by the skin.

b) **Urinary System:** The main organs of the urinary system are:-

(i) **Kidneys:** There are two bean shaped organs situated on the posterior abdominal wall in the lumbar region. They act as filters in the body, to filter the waste.

(ii) **Ureters:** Ureters are two tubes, which carry the urine from kidney to Urinary bladder.

(iii) **Urinary Bladders:** It is a hallow muscular organ situated in the pelvic cavity. It is a freely movable organ. Its size and shape varies according to the amount of urine it contains. It stores the urine.

(iv) **Urethra:** It is a tube leading from the floor of the urinary bladder to the exterior. It is used for excretion of the urine from the body.

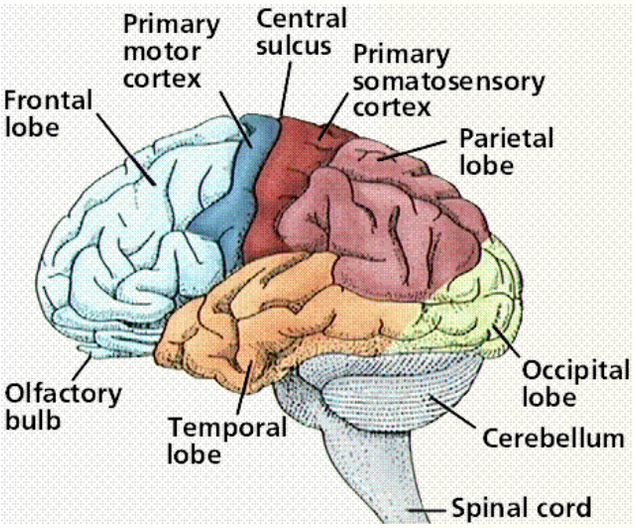
Nervous System: Internal balance of the human body is maintained within normal limits by the nervous system and the endocrine system. The nervous system may be sub divided into three main portions:-

(a) **The Central Nervous System:** This consists of brain and spinal cord.

(b) **The Peripheral Nervous System:** This forms the connection between the central nervous system and the various organs and muscles.

(c) **The Autonomic Nervous System:** It is an offshoot of the central nervous system, it controls the involuntary functions of the various internal organs such as the stomach, intestine, bladder and also the tiny muscles of the blood vessels and also controls the secretions of the liver and kidneys. A person is neither conscious of the normal activities of the autonomic system nor is he able to control them.

Nervous System



Source: http://www2.estrellamountain.edu/faculty/farabee/biobk/biobooknerv.html

2. Hygiene and Sanitation

Personal Hygiene

Hygiene is defined as the science and art of preserving and improving health. The purpose of hygiene is to allow man to live in healthy relationship with his environment. It deals with both an individual and a community as a whole. In order to be healthy one must realize that hygiene and sanitation play a very important role. This field has nothing to do with religion or social customs but it is simply based on scientific requirements. ***Personal hygiene*** involves all aspects of the health of an individual. Responsibility for the maintenance of personal health therefore lies with the individual. Every person must remain in perfect physical, mental and social health; only then can he serve the community and the country well.

2.1 Personal Hygiene:

Maintenance of personal hygiene is very important in preventing disease. It deals with the practices that help in the maintenance and promotion of a person's health. Personal Hygiene helps in the following:-

a) To maintain a good and clean physique.

b) To maintain good muscle strength.

c) To maintain clean mouth and teeth.

d) To maintain perfect physical, mental and social health.

Main Components of Personal Hygiene:

a) **Sleep:** Sleep means the periodical rest of both body and mind and it is extremely essential for a healthy body. The amount of sleep one requires varies with individual age. The average requirement of sleep is about 7 to 8 hours a day.

b) **Bathing:** Keeping the skin clean and in healthy condition is essential for good health. A bath with a mild soap with warm water in winters and cool water in summers are essential for body cleaning. While bathing, all parts of the body including folds in the skin must be cleaned well. After the bath, the body must be dried properly including the folds in the skin as wetness or dampness will lead to cuts /fungal infection.

c) **Eating and Drinking:** Properly cooked food with its full nutrient value is beneficial for health. Food should be eaten slowly and chewed well. It should not be swallowed hastily. Plenty of water should be consumed between meals and strenuous exercise should be avoided after a heavy meal.

d) **Care and Cleanliness of Skin, Hair and Teeth:** Our skin keeps on secreting sweat and hence it is necessary to keep it clean through bathing and by removing dust and dirt. Regular changing and cleaning of clothing is essential to keep the body fit. Digestive and other disorders take place when decayed teeth and unhealthy gums bleed giving foul smell in the mouth. Teeth should be regularly brushed after the last meal at night and early in the morning. Insufficient vitamins C and D are the cause of dental decay.

e) **Exercise**: Organized games and physical exercise are necessary for proper development of the body and mind.

2.2 Food Hygiene:

Food is a potential source of infection and is liable to contamination by micro–organisms at any point during its journey from the producer to the consumer. Prevention of contamination of food has to be observed from production to handling, distribution and serving. The following are the important components of food hygiene:-

a) **Milk Hygiene:** Milk is an efficient vehicle for many disease organisms. Contamination of milk may be due to infected animal, human handler or environmental factors. Following aspects should be ensured to obtain clean and safe milk:

(i) The animal and its surroundings should be healthy and clean. The animal should be properly washed before milking.

(ii) Milk handler should be free from any communicable disease.

(iii) Milk vessels should be totally clean, sanitized and kept covered.

(iv) Water supply must be safe.

(v) **Pasteurization:** It is the heating of milk to such temperature and for such periods of time, as are required to destroy any pathogens without destruction of nutritive value. It does not alter taste.

5 Tips to Avoid Summer Food-Borne Illnesses
Source: http://www.healthytimesblog.com/2011/08/5-tips-to-avoid-summer-food-borne-illnesses/

b) **Meat Hygiene:** The word meat includes various tissues of animal origin. The diseases which may be transmitted through meat are *'Tapeworm Infestation'* and *'Bacterial Infections'* like anthrax, tuberculosis or food poisoning. The **a**nimal intended for slaughter, must be subjected to proper ante mortem and post mortem inspection. Good meat should neither be pale pink nor deep purple nor should it be slimy. Good meat should be elastic to touch and should have agreeable colour.

c) **Fish Hygiene:** Fish for human consumption should be fresh. In fresh fish, the gills are bright red and the eyes are clear and prominent. Consumption of contaminated fish may give rise to fish poisoning.

d) **Egg Hygiene:** Though the majority of freshly laid eggs are sterile inside, the eggshell may become contaminated by foecal matter from the hen. The egg must be properly washed before cooking.

e) **Fruits and Vegetables Hygiene:** Fruits and vegetables are an important source for the spread of pathogenic organisms, protozoan and helminths. Fruits and vegetables consumed raw must be washed well before eating.

f) **Hygiene of Eating Places:**

(i) Eating places should not be located near filthy places, open drains, animal sheds, manure /soakage pits and other such places.

(ii) Floors should be easy to clean, and should be preferably tiled.

(iii) Rooms for storage of food should be well ventilated, insect and rat proof and should have adequate lighting.

(iv) Perishable and non-perishable items should be kept separately.

(v) Furniture should be strong and easy to clean.

(vi) Refuse should be collected in covered bins and removed regularly.

(vii) Water supply should be independent, adequate and safe.

(viii) Proper place for cleaning of utensils should be provided.

g) **Hygiene of Food Handlers:**

(i) Complete medical examination of food handlers must be done at the time of employment.

(ii) Regular health check-ups should be done.

(iii) Food handlers should be regularly educated on health and hygiene aspects.

(iv) They should be constantly reminded about hand washing, trimming of nails, covering of hair, wearing of overalls and covering mouth while coughing and sneezing during cooking.

2.3 Water Supply and Its Purification:

a) **Main Sources of Water Supply**:

(i) **Rain Water**: Most of the fresh water on earth comes from rains. However, most of this water is not fit for consumption due to impurities in the atmosphere.

(ii) **Surface Water:** Surface water is found mainly in rivers and streams or lakes. This water is unfit for human consumption without treatment due to discharge of various types of wastes into it.

(iii) **Underground Streams:** Bore Wells are a good source of potable water supply. However, even these need to be protected from contamination.

b) **Purification of Water**: Safe drinking water comes only from an authorized source. Purification provides good and safe water by eliminating the suspended matter, harmful salts in solution, bad taste/smell, undesirable colors and germs. The following methods are used for water purification:-

(i) **Boiling and Filtering Water**: Untreated or treated potable water from any unreliable source must be boiled at 100 degrees for 30 min, cooled and then filtered. Only then will it be fit for consumption.

Source: http://www.sswm.info/category/implementation-tools/water-purification/hardware/point-use-water-treatment/boiling

(ii) **Clarification**: This is the removal of suspended matter through filtration, by passing it though filter beds of gravel and sand or through properly sterilized filters.

(iii) **Sterilization**: This is done by using chlorine gas or bleaching powder.

(iv) **Pinking:** During cholera epidemic potassium permanganate is mostly used for pinking of wells.

(v) **Precipitation**. This is done by adding alum or some similar chemical to water, which makes all impurities accumulate at the bottom and leaves pure water. This water is then passed through a filter.

3. Sanitation

Sanitation means keeping the living area and its surroundings neat and clean. This involves removal of waste products and refuse.

Waste Products/Refuse:

Some types of the waste products are:

a) Human excreta - faeces and urine.

b) Stable litter - horses and cow dung.

c) Dry refuse and garbage - household, municipality, industrial and agricultural.

d) Liquid wastes: household spillage, municipal and industrial effluents.

e) Offensive trade wastes.

f) Dead animals, carcasses and offal of slaughtered animals.

Sources of Refuse:

a) **Street Refuse:** Refuse that is collected by street cleansing service or scavenging is called street refuse e.g. leaves, straw, paper etc.

b) **Market Refuse:** Refuse that is collected from markets is called market refuse. E.g. spoiled vegetable and animal matter.

c) **Stable Litter:** It contains mainly animal dropping and left over animal feeds.

d) **Industrial Refuse:** Industrial refuse comprises of a wide variety of waste.

e) **Domestic Refuse:** The domestic refuse consist of ash, rubbish and garbage.

Collection and Removal of Refuse:

a) **House Hold Refuse:** Covered galvanized iron bins are placed on brick / cement platforms at convenient distances from the house. These should be used for dumping house hold refuse. This refuse is then collected in covered wheel barrows or municipal vans to prevent blowing out by air.

b) **Special Refuse:** This is from stables and cowsheds. It is collected in carts and taken to disposal ground at frequent intervals.

c) **Street Refuse:** Covered dustbins should be placed at suitable intervals along the street and all the sweeping should be dumped in it. It is then collected early morning in covered vans.

3.1 Disposal of Waste Products/Refuse: Various methods are:-

a) **Filling**: In this method the refuse is generally utilized in filling up pits, unsanitary tanks or in reclaiming low land. The area selected should be at least 100-150 feet away from any habitation. No refuse should be left uncovered for more than 72 hrs.

b) **Controlled Tipping:** Controlled tipping or sanitary landfill is the most satisfactory method of refuse disposal where suitable land is available. Chemical, bacteriological and physical charges occur in buried refuse.

c) **Incineration:** Hospital refuse, which is particularly dangerous, is best disposed of by incineration.

d) **Composting**: It is a method of combined disposal of refuse and night soil or sludge.

e) **Manure Pits:** The garbage, cattle dung, straw and leaves are dumped into the manure pits and covered with earth, after each day's dumping.

f) **Burial**: This method is suitable for small camps. A trench 1-5m wide and 2m deep is excavated. When the level in the trench is 40 cm from ground level, the trench is filled with earth and compacted and a new trench is dug out. The contents may be taken out after 4-6 months and used in the fields.

Disposal of Waste Products

g) **Sorting**: This method consists of sorting refuse in three separate parts for easy disposal:-

(i) **Breeze**: Cinders and pieces of coal are used for making bricks.

(ii) **Soft Core**: Animal and vegetable organic matter, is used as manure.

(iii) **Hard Core**: Broken bottles and crockery is used for metaling of roads.

3.2 Disposal of Human Waste: Proper disposal of human waste/ excreta are very essential for prevention of various communicable diseases and also to prevent pollution / contamination of soil, water or food (through flies). Various methods are available for disposal of human waste / excreta as per the type of area i.e., area with a proper sewage system (sewered areas) and areas without proper sewage system (unsewered areas).

a) **Sewered Areas:** The latrines used in such areas are mainly the **Flush Latrines.** It implies that ample supply of water is available to flush the night soil away. It is simple and hygienic.

b) **Unsewered Areas:** There are various types of latrines for such areas:-

(i) **Domestic Latrines**: These are those latrines which are used in houses in areas not having a sewage system. These are of following types:-

a) **Bore Hole Latrine:** The latrine consists of a circular hole 30-40 cm in diameter dug vertically in the ground to a depth of 4 to 8 mtr. In loose sandy soil the hole is lined with bamboo matting or earthenware lining.

b) **Dug Well Latrine:** A circular pit about 75 cm in diameter and 3 to 5 cm deep is dug into the ground for the reception of the night soil. In sandy soil the depth of the pit may be reduced to 1.5 to 2 mtrs.

c) **Water Seal Latrine:** The water seal performs two important functions e.g. it prevents access to flies and it prevents escape of foul odour. Out of many designs of water seal latrines, the RCA type is widely adopted.

(ii) **Camp Latrines:** These are of following types:-

a) **Deep Trench Latrines**: A pit three feet wide, at least eight feet deep and of a length suitable to the requirement is constructed and wooden seats placed over it

with proper partitions and curtains. Soil may necessitate reverting of sides with sand bags, bamboos or wire netting. On vacation of camp, these are filled up with soil to assist in disintegration and prevent breeding of flies.

b) **Shallow Trench Latrines:** For camps of less than a week's duration, a row of trenches in parallel is dug, each trench being 3 feet long, 1 foot wide and 2 feet deep. Each trench should be 2 feet apart. The ratio is 5 trenches for the first hundred users and three for each subsequent hundred. After defecation, the excreta is covered with loose earth with a shovel or a scoop. These trenches are filled up after 24 hours and new trenches are dug up.

c) **Urinals:** The most common urinal used for camps is the **Funnel** Urinals which are constructed over a simple soakage pit.

(iii) **Soakage Pits:** These are essential for the disposal of liquid refuse like greasy water from kitchen and waste water from bathrooms. A pit of 4 feet by 4 feet and 5 feet to 6 feet deep is dug. It is filled with small stones and broken bricks. The top is covered with oiled sacking and earth or sand is put 6 inches above. In the centre, a perforated empty tin of kerosene oil is kept. This tin is filled with layers of gravel or sand and gravel. In this pit the strainer is removed daily and replaced with fresh one.

(iv) **Disposal of Garbage**: Disposal of solid refuse like kitchen garbage, bones etc,is done by burial or burning. The household refuse should be deposited in a covered bin placed outside. Improvised kerosene/oil tins are not advisable. Further disposal should be done under municipal arrangements.

3.3 Disposal of Sewage: Proper disposal and treatment of sewage has assumed great importance today. The disposal of sewage involves treatment and disposal as under:

a) **Treatment of Sewage**: Treatment of sewage is brought about by the action of anaerobic and aerobic bacteria. The different steps involved in this process are:-

i. Screening.

ii. Chambering.

iii. Primary Sedimentation.

iv. Trickling Filter.

v. Activated Sludge Process.

vi. Sludge Digestion.

vii. Disposal of Effluent.

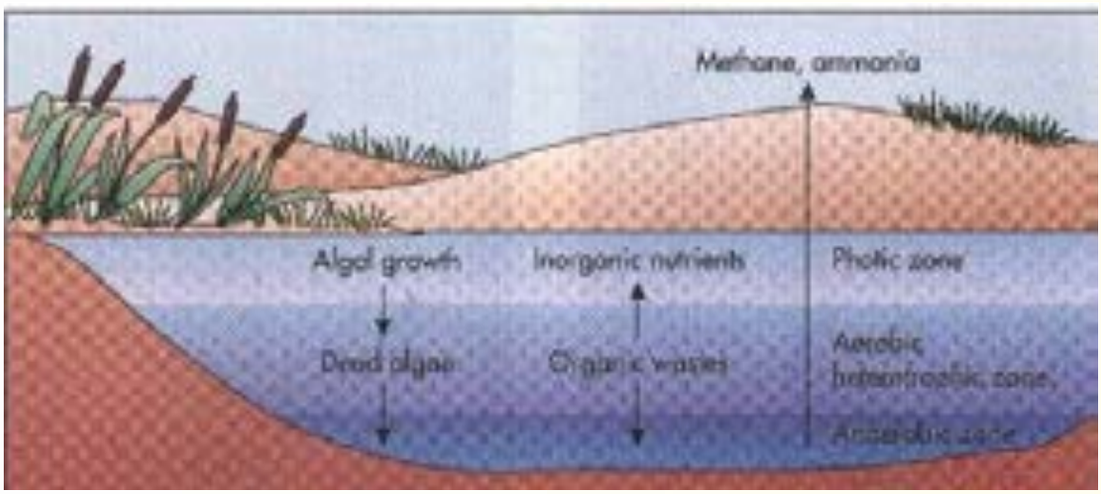
b) **Disposal of Sewage**: The sewage is collected by the water carriage system and where no treatment facility is available can be disposed of by:-

(i) **Sea Out Fall:** The sewage is drained into the sea. This is applicable mostly for coastal cities / towns.

(ii) **River Out Fall**: The sewage is drained into the river. This is applicable mostly for cities / towns situated along the rivers or connected by drains.

(iii) **Land Treatment**: Here the sewage is allowed to drain out on the earmarked land / pits. This is mostly applicable to small villages.

(iv) **Oxidation Pond:** A pond that contains partially treated wastewater which is then left to allow the growth of algae and bacteria which decompose the rest of the waste.



Oxidation Pond

Source:http://www.rpi.edu/dept/chem-eng/Biotech-Environ/FUNDAMNT/streem/methods.htm

4. Infectious and Contagious Diseases and its Prevention

Many of the deadly diseases can be prevented from spreading if, proper precautions are taken by checking infection and contagion of several diseases and by killing carriers of several other diseases.

4.1 Classification of Diseases

Communicable diseases can be classified as follows:-

a) **Excremental Diseases**: These are those diseases which are communicated or transferred through human excreta (urine and faeces). The excreta can contaminate food, water or hands of cooks and thus pass on the infection. Typhus fever, dysentery, diarrhoea, jaundice and intestinal worms are some of the important diseases belonging to this group.

b) **Droplet Infection**: These are those diseases which are communicated or transferred through germs which are sprayed out from the nose, throat or lungs in the air, in small droplets of saliva during coughing, sneezing or even while talking. These germs are inhaled by healthy individuals if they happen to be near the sick. Common cold, influenza,

diphtheria, meningitis, (inflammation of the brain) and tuberculosis are the common diseases in this group.

c) **Contact Diseases**: These are those diseases which are communicated or transferred when the germs pass from a sick person to a healthy person by actual body contact. Venereal diseases i.e. syphilis, gonorrhoea and skin infection are some common examples.

d) **Insect Borne Diseases**: These are those diseases which are communicated or transferred when the germs move from a sick person to a healthy person through Blood sucking insects known as ***'Carriers'***. These insects first bite a sick person and then bite a healthy person, transferring the germs of the diseases in the blood of the healthy person. These germs then multiply in the blood of the healthy person during the period of incubation, and at the end of which the person starts showing symptoms of the disease carried by the insect. Some of the carrier insects and their disease are:-

(i) Mosquito - Malaria, Dengue and Filaria.

(ii) Sand fly - Sand fly fever, Kala Zar, Oriental Sore.

(iii) Lice - Typhus, Relapsing Fever.

(iv) Flies - Diarrhea, Dysentery, Cholera, Typhoid.

(v) Fleas - Plague, Typhus.

(vi) Ticks - Relapsing Fever, Typhus.

e) **Water Borne Diseases:** Certain diseases spread due to infection carried through water. These are cholera, dysentery, diarrhoea, jaundice etc. These spread as water gets contaminated through vomits or faeces passing into it. Epidemics are likely to spread if immediate steps are not taken to disinfect water and to properly dispose off the excreta through efficient conservancy arrangements. All sources of the diseases ought to be eliminated.

f) **Animal Borne Diseases**: The germs are transmitted through the agency of animals by drinking milk or through the agency of insects. Rabies, plague, anthrax and tuberculosis are some of the common diseases.

4.2 Preventive Measures

Specific measures to prevent diseases are as under:-

a) **Prevention of Excremental and Water Borne Disease:**

(i) Control of water route is easy by disinfecting water or providing safe water in place.

(ii) Control of the milk route is easy by subjecting the milk to boiling or pasteurization.

(iii) Food born infection may be controlled by standards of food hygiene, exclusion of sick persons from food handlings, strict attention to personal hygiene, promotion of hand washing, protection of foods against flies and rodents and providing facilities for refrigeration.

(iv) Safe disposal of excreta will block the transmission of disease by the faecal–oral route.

b) **Prevention of Droplet Infection.** This can be achieved by:-

i. Use of mask.

ii. Bed spacing.

iii. Screening.

iv. Dust Control.

v. Avoid over-crowding.

vi. Proper ventilation.

vii. Avoid spitting in public places.

viii. Proper sunlight.

ix. Proper disinfection of air.

c) **Prevention of Contact Disease:**

(i) Complete segregation of patient.

(ii) No direct personal contact between patient and the staff.

(iii) The early diagnosis will help in preventing the spread.

(iv) Proper disposal of all the excreta and disinfection of all articles of the patient.

d) **Prevention of Insect Born Disease:**

(i) Filling, levelling and drainage of breeding places and water management will help in eliminating larvae. Adequate collection, removal and disposal of sewage and waste water are important in preventing culex.

(ii) Use kerosene oil, fuel oil, or special oil to prevent larvae breeding.

(iii) Use of residual sprays like malathion.

(iv) Use of mosquito nets, screening of doors and windows, mosquito repellant and following sun down sleeves.

(v) Control the presence of rodents and fleas in and around the home.

(vi) Avoid contact with any species of wild rodents, especially sick or dead rodents.

(vii) Not to handle sick or dead animals or animal waste.

The following preventive measures are necessary to ward off these diseases:

(a) **Segregation of the Patient:** Important points are:

1. Preferably shift patient to an isolated room.

2. Ensure room confirms to hygiene and sanitation standards i.e. adequate ventilation, sunlight and cleanliness.

3. Nominate one healthy person to undertake nursing and care of the patient.

4. Nominated person to take preventive measures like use of mask, gown, and gloves and avoid direct contact and wash hand before and after every visit.

5. Clothing and utensils used by patient to be cleaned washed separately.

6. Safe disposal of patient's excreta (Urine, Stool, Sputum etc.) and Refuse eg discarded dressings, garbage etc by burning.

(b) **Destroy Agents (Germs) Causing Infection in the Surrounding Area or Premises:**

Immediately on detection of a communicable disease, the source of agents/ germs causing infection should be destroyed by following actions:

(i) Removal/destruction of garbage.

(ii) Cleaning the drains and keep them covered.

(iii) Remove/ dry out waste water.

(iv) Spray malathion mixed in water (ratio: malathion - 1 ml, water 1000 ml) in and around premises. (Caution - malathion is highly poisonous direct breathing / touching should be avoided). Wash hands after use.

(v) Keep premises free of rodents (rats), stray dogs.

(vi) Use mosquito nets, long sleeves, screening of doors and windows.

(c) **Disinfection:** All articles in contact with the patient should be disinfected by following means:-

(i) **Natural:** Sunlight and air can be used to disinfect articles like blanket, mattresses, pillows and also the rooms. The micro–organisms thrive in darkness and need moisture for their survival; on being exposed to sunlight and air they die.

(ii) **Physical:** Physical agents like heat, cold radiation etc. can also be used for disinfection and sterilization.

a) **Heat:** Heat can be used in two ways for sterilizing.

(i) **Moist Heat**: Moist Heat in the form of *'boiling'* kills germs very rapidly. In addition, *'autoclaving or Steam under Pressure'* is the most effective method used to disinfect all hospital equipment which can be boiled like linen, bandage, dressing material, gloves and instruments.

(ii) **Dry Heat:** Dry heat like *'flaming'* or *'use of hot air oven'.* Sterilization by steam under pressure (autoclaving) is the commonest method for sterilization which is being used in the army.

b) **Cold**: Freezing or freeze-drying can inactivate bacteria. Some of them can however survive even at 0° C.

c) **Radiation:** It includes ionizing radiations like X-rays, gamma beta and ultraviolet radiation. These are expensive methods and are not suitable for small-scale procedures.

d) **Other Methods**: Disinfection and sterilization can also be done by using other methods like of infrared rays, filtration etc.

(iii) **Chemical Agents:** Chemical agents like Phenol, Savlon, Potassium Permanganate, Hydrogen peroxide etc. are commonly used for disinfection and sterilization. The strength of agent depends upon its concentration.

(iv) **Control of Food and Drink:** Salient points to be observed while feeding the patient:

(a) Clean water preferably boiled must be served to the patient. Water container must be kept covered.

(b) Balanced diet, well cooked, hygienically prepared food using less oil and condiments, should be served hot. Stale, cold and food exposed to flies and insects should not be served.

(c) Food items sourced from restaurants/dhabas must not be served.

(v) **Inoculation and Vaccinations:** Important inoculations and vaccinations are provided free of cost under various Government programmes. These are administered at Primary Health Centers/Hospitals. If not available, the same should be administered/ taken from market. Important inoculations and vaccination are as under:

Name of Vaccine	Disease Prevented
Inj. Rabipur	Rabies
Inj. TAB	Typhoid
Inj. Hepatitis 'B'	Hepatitis 'B'
Inj. TT	Tetanus
Oral Polio	Polio

SUMMARY

The human body is the greatest of all complex machineries. In order to carryout first aid, a first aider should have basic idea of structure and function of every part of the human body. Many lives can be saved if proper and timely first aid is rendered.

Basic knowledge of our body systems allows us to understand the field of health and hygiene with ease. This knowledge provides us the basic framework on which subsequent knowledge and skills dealing with medical science can be gained in a progressive manner.

Classification of Bones:

- ***Long Bones***
- ***Short Bones***
- ***Flat Bones***
- ***Irregular Bones***
- ***Sesamoid Bones***

Hygiene and Sanitation are two sides of a coin, which must be ensured together for best results. There are simple steps which, if taken regularly and correctly can be beneficial to both individuals and community as investing of time and effort in them can lead to saving of lives.

Communicable diseases as the name suggests are most easy to prevent if , timely measures are taken. As these diseases are communicated through some carrier or agent, their spread on occurrence is difficult to control. It is advisable to always follow the preventive measures to save precious human and animal lives and national resources.

Classification of Diseases:

- ***Excremental Diseases:***
- ***Droplet Infection:***
- ***Contact Diseases:***
- ***Insect Borne Diseases***
- ***Water Borne Diseases***
- ***Animal Borne Diseases***

All the above diseases can be prevented by adapting certain preventive measures such as keeping the atmosphere, water bodies, home surroundings clean by using various cleaning and safe disposal processes and periodical inoculation and vaccination right from infancy.

Comprehension Questions:

Q.1. Answer the following in about 15 words:

i. Write about the functions of bones.

ii. Write about the components of blood.

iii. Name the main vein of the body.

iv. What is forming *'flesh'* of the body?

v. What is digestion?

vi. What is excretion?

vii. Name the vitamins whose deficiency causes dental decay.

viii. Which organs are involved in excretion of toxic substances in human body?

ix. Which two body systems in humans are responsible for bringing about control and co-ordination?

x. How many bones are there in the human body?

xi. Write the functions of bones?

xii. What does circulatory system consists of?

xiii. How can bones be arranged?

xiv. What is pasteurization?

xv. What are excremental diseases?

xvi. Why is it important to maintain personal hygiene?

xvii. What is sanitation?

xviii. How do we purify water with the method of clarification?

xix. Name the vectors responsible for transfer of the diseases malaria and typhoid from a sick person to a healthy person.

xx. What are contact diseases?

xxi. What are animal borne diseases?

xxii. Write about any one prevention of excremental and water borne disease?

Q.2. Answer the following in about 50 words:

i. Give the differences between arteries and veins.

ii. How is the separation of the right and left side of the heart useful?

iii. What are the main components of the nervous system in man?

iv. Write the classification of muscles. Explain any two of them?

v. Write a short note on digestive system

vi. Explain the classification of bones

vii. What hygienic suggestions would you like to share with food handlers?

viii. What are the main sources of water supply? Why are they not potable for drinking directly?

ix. Write about any three things that should be taken care of with regard to hygiene in eating places?

x. Write about different types of waste products.

xi. What aspects should be ensured to obtain clean and safe milk? What is pasteurization?

xii. Write the preventive measures to control infectious diseases.

xiii. How can we prevent droplet infection?

xiv. a) Write a short note on inoculation and vaccination?

b) Write the names of five diseases and their related vaccine used for their prevention?

Q.3. Answer the following in about 75 words:

i. Write a short note on heart?

ii. What are different organ systems? Explain any one of them in detail?

iii. Explain the three sub divisions of the nervous system?

iv. What is meant by segregation of the patient? What important things are kept in mind while doing so?

v. How can we disinfect the articles in contact with the patient to avoid spread of diseases?

vi. Write short notes on

a) Insect borne diseases

b) Water borne diseases

vii. What are the different sources of refuse? Explain.

viii. What things should be done to maintain the hygiene in food handlers?

Q.4. Answer the following in about 150 words:

i) Which organs contribute towards the elimination of waste production from the human body?

ii) What is purification of water? Write about the different methods of water purification?

iii) Write a note on the importance of hygiene and sanitation.

iv) a) How can we destroy the agents (germs) causing infection in the surrounding area or premises?

b) What preventive steps can be taken to stop the spread of

i) Insect borne disease

ii) Droplet infection

Q.5. Answer the following in about 250 words

i. Write in detail about the various ways of disinfection to stop spread of diseases?

ii. In how many categories can we classify communicable diseases? Write in detail about them?

iii. "Some of the practices that are useful in preventing infectious diseases are maintaining personal hygiene and ensuring clean surroundings". List any two more practices other than the ones mentioned, you think are effective in preventing infectious diseases?

iv. Write in detail about the main components of personal hygiene.

v. a) What types of latrines are made in unsewered areas?

b) Explain the different types of camp latrines.

Let's Discuss:

HOTS (Higher Order Thinking Skills)

i) "Basic knowledge of our body system allows us to understand the field of health and hygiene with ease". How far do you agree with the system and why? Substantiate your answer with suitable examples.

ii) How can you contribute in making the uneducated masses aware of the threats of various communicable diseases and how would you prevent them?

iii) How will you encounter the various stereotypes related to some communicable diseases like chicken pox, measles, polio etc.?

iv) "Every person must remain in perfect physical, mental and social health, only then can serve the community and the country well." How far do you agree with the statement? Support your views with suitable examples.

Group Activities:

1. Plan a science exhibition along with the science department; Display the exhibits on the day of Parents Teachers Meet. Make models of Human body parts using any medium (clay, thermocol, waste material etc.) in groups of 4 and explain the working of that body part to the parents.

2. Conduct a survey with at least fifteen people on any one of the following topics:

- Personal Hygiene: (Pattern of sleep, bathing habits, eating and drinking water care and cleanliness, exercise habits.)
- Water supply and its Purification (Source of water used and purification methods)

3. Make a comparative study of sanitary condition in your area with the area around your school. Include details like:

   a) Waste products and their disposal

   b) Sources of Refuse and their disposal

   c) Human waste and its disposal

   d) Sewage and its disposal

   Write a report in about 150 words on the same.

4. On a picnic day you observed one of your friend giving excuses for not eating his/her lunch from his/her lunch box, as other classmates bought burger, pizzas and other fast food. How will you counsel him/her about the harmful effects of the junk food.

5. Have an Inter–House/Inter–class/Intra–class AD-MAD competition. Script and enact an advertisement on educating children about infectious and contagious diseases and their prevention. Each group may have 6-8 children. The advertisement should not exceed 3 minutes. Try and include Jingles, music, simple props.

6. Which life skills will make you more conscious towards the hygiene and sanitation for self and the community? Which life skills will help you to motivate others?

7. Write a poem or do a role play to highlight the main components of personal hygiene like sleeping, bathing, care and cleanliness of skin, hair and teeth etc.

8. Some diseases are listed below in column 1. Place them in the appropriate box depending on their mode of transmission.

Disease	Vector borne	Droplet/air	Contact	Contaminated food and water
Malaria				
Typhus				
Diarrhoea				
Tuberculosis				
Jaundice				
Skin infection				

9. Conduct a survey of at least five children (age 17-18 years) to find out the details of vaccines which have been administered.

S. No.	Name of the child	Vaccine administered	Age of the child when it was administered	Disease for which it was administered