Your body is made up of billions of cells. Cell – is the smallest living unit of the human body.

Each cell needs a supply of nutrients for:
- Energy
- Growth
- Repair

Digestion is the first step of supplying the cells with nutrients.

How the digestion system works:
The digestive system takes place in a series of steps as the food you eat moves through several different organs.

1. Mechanical digestion – chopping, tearing and grinding food
   Example: Teeth

2. Chemical digestion – breaks food down physically and mixes it with other material.

After nutrients are broken down, they pass into the blood stream and are taken to the body cells for use in metabolism and growth.

The Mouth:

- Produces saliva

- Saliva – a liquid that aids in digestion
  a. Consists mostly of water
  b. Moistens the food, to make it easier to chew and swallow
  c. Contains an enzyme that helps break starches down into sugars

- Enzyme – substances that help carry out chemical reactions in the body
• Digestive enzymes are essential for chemical digestion.
  a. Every enzyme acts only on one kind of nutrient
     Example: an enzyme that breaks down starches will
     not break down proteins or fats.

• Mechanical digestion takes place in the mouth

• Mechanical digestion helps prepare food for chemical digestion, because after food has been broken down into small pieces, it has a greater surface on which digestive enzymes can act
  Example: sugar cube in hot tea dissolves faster if broken into pieces.

• After food is chewed and mixed with saliva, the tongue helps form it into a small ball and moves it to the back of the mouth so it can be swallowed.

• As you swallow, a small flap of tissue automatically covers the opening to your windpipe (trachea) this small flap of tissue is called the epiglottis (2). This helps prevent food from entering your air passage.

The Esophagus (3):
• When you swallow food, it moves into your esophagus

• Esophagus – muscular tube that connects the mouth and the stomach
  a. 12 inches long
  b. Muscles of the esophagus wall pushes food down into the stomach this is called peristalsis

  c. Peristalsis – is a wave-like muscular action that pushes food through the esophagus and the rest of the digestive system
     Example: Squeezing toothpaste from a tube.

The Stomach (4):
• Is a muscular, sac-like organ with a circular band of muscles at each end

• Purpose of the circular bands
  a. Food will not leak back into the esophagus
  b. Food will not move forward into the small intestine until chemical and mechanical digestion is complete

• Layers of muscles in the stomach wall contact and relax, churning ad mixing food this is the mechanical digestion taking place in the stomach.
  When your stomach rumbles – this sound comes from you stomach contracting and relaxing but there is no food in the stomach for mechanical digestion to take place

• The stomach produces gastric juices
  a. Enzymes – these begin chemical digestion of proteins
  b. Hydrochloric acid – helps the enzymes and kills bacteria that maybe present in the stomach from the foods you have eaten.

• The stomach is coated with mucus
  This mucus protects the stomach from the hydrochloric acid

• Food mixes with gastric juices and forms a thick liquid called chyme.

• When the chyme is ready to leave the stomach. The lower band of muscle opens releasing the chyme into the small intestine.

  **Small Intestine (9):**
  • A long tube-like organ

  • Inch in diameter

  • Chemical digestion and absorption of nutrients are completed in the small intestine
- As chyme moves through the small intestine, enzymes are added

- Complex nutrients are broken down
  a. Simple sugars
  b. Amino acids
    - Chemical substances that make up proteins
  c. Simple forms of fat

- The small intestine is lined with villi

- Villi – tiny finger-like projections that contain tiny vessels

- When digestion is completed. The simple nutrients and water are absorbed through the villi into the blood stream

- Then the blood carries the nutrients to all the cells of the body.

The Liver (5) and Pancreas (6):

- Even though food never enters the liver and pancreas they are still considered part of the digestive system

- The liver and pancreas produce substances that flow through tubes into the small intestine which aid in digestion

- Liver
  a. A large organ that removes harmful materials from the body.
  b. Produces bile – which aids in digestion of fats
  c. Bile is stored in the gallbladder (7)
    - A sac attached to the liver that is also attached to the small intestine by a small tube

- Pancreas
  a. The organ that produces hormones and several digestive enzymes
- The digestive enzymes that is produce by the pancreas breaks down carbohydrates, fats, and proteins

Large Intestine (8):
- Some materials in food can not be broken down and absorbed by your body
  Example: fiber
- Indigestible materials along with water pass into the large intestine
- Tube-like organ that absorbs water and gets rid of waste
- Shorter than the small intestine
- 2.5 inches in diameter
- Part of the large intestine is called the colon (10)
- As a waste pass through the large intestine water is absorbed through the intestinal wall (watery chyme) becomes a solid material called feces.
- Rectum (12)– last few inches of the large intestine that holds the feces until it is released from the body.
- The circular band of muscles at the end of the rectum is called the anus (13) (opening to the rectum)
- Elimination – releasing of waste materials from the body.

Disorders of the Digestive System:
- Indigestion – inability to break down certain foods properly
  - Stress can also contribute to indigestion
  - Stress indigestion to dairy products is called lactose intolerance – is an inability to digest lactose (lactose is a sugar found in dairy products.
- Diarrhea – when food moves through the digestive system to
- fast it becomes a watery bowel
- Prolonged diarrhea can lead to dehydration
- Seek medical attention if diarrhea lasts longer than 48 hours or if you see signs of dehydration
- Signs of dehydration are dry lips, lack of tears, and little or no urination.

- Constipation – occurs when the large intestine removes too much water.
  - Food moves through the digestive system to slowly
  - To avoid constipation drink plenty of water, eat foods that contain plenty of fiber, limit your intake of high fat foods, and plenty of exercise.

- Food Poisoning – food that has been contaminated by bacteria
  - Symptoms are vomiting, cramps, diarrhea, and fever

- Salmonella bacteria – found in raw poultry, eggs, and meat
  - Kill this bacteria by cooking food thoroughly
  - Two other types: staphylococcus and botulism
  - Food poisoning can be prevented if food is prepared, handled and stored carefully.
  - Wash hands before and after handling food
  - Clean utensils each time you use them
  - Cook meats, poultry and eggs thoroughly
  - Do not let perishable foods set out at room temperature
  - Refrigerate leftovers
  - If canned food is dented or bulging discard it

- Ulcers – open sore that forms in the lining of the stomach or upper part of the small intestine
  - Stomach (gastric ulcer)
  - Small intestine (duodenal ulcer)
  - Peptic ulcer are formed when stomach acid damages the tissue that lines the digestive tract.(burning pain felt below the breastbone)
  - Contribute to the formation of ulcers
    1. Smoking
2. Caffeine
3. Alcohol
4. High fat diets
5. Stress

- Hemorrhoids – enlarged veins in the anal area.
  1. Pain
  2. Itching
  3. Bleeding
  - Caused by straining during bowel movements, chronic constipation, overweight or inactive, and pregnant women
  - How to help relieve symptoms: regular, daily exercise, diet of whole grains, fresh vegetables, and fruit

- Appendicitis – is an infection of the appendix (small pouch located near the place where the small intestine and large intestine met).
  - Symptoms: pain in the lower right side of abdomen, fever, nausea, vomiting.
  - Treatment: surgery to remove the appendix
  - Bursts appendix releasing the infection into the abdomen

- Crohn’s disease – ongoing inflammation of the lower part of the small intestine.
  - Common in people under the age of 40
  - Repeatedly symptoms are abdominal pain and diarrhea

Keeping a healthy digestive system:

- Avoid foods high in fat
- Eat a well balanced diet
- Avoid over eating
- Chew food slowly and thoroughly
- Eat when you are relaxed
- Drink water during your meals
- Exercise