TEACHER NOTES

Guided Notes: B2.2 – THE DIGESTIVE SYSTEM *(textbook pages B45-B50)*

Digestive System – The structures in the body that work together to transform the energy and materials in **food** into forms that the body can use.

Digestion – The process of breaking down food into **usable** materials.

Body parts important to the Digestive System - Mouth, Salivary Glands, Esophagus, Stomach, Small Intestine, Pancreas, Liver, Gall Bladder, Large Intestine, Colon, Rectum, Anus

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THE BODY NEEDS ENERGY AND MATERIALS

The body requires **food** and the **nutrients** in food in order to function.

Nutrients – Important substances that enable the body to **move**, **grow**, and maintain **homeostasis**.

Some of the nutrients needed by the body are: Proteins, carbohydrates, fats, and water.

- Water: Yes, water is considered to be a nutrient! All **living** things require water. More than **half** of the human body is made up of water.

- Proteins: The material that the body uses for **growth** and **repair**. Cells are built of proteins.

- Carbohydrates: Make up "cellulose," which helps move materials through the digestive system.

- Fats: Store **energy** for the body to use later.

The body cannot use the nutrients directly; the nutrients must be **broken down** into smaller substances that the body can use.

Digestive "enzymes" help break down food into usable materials.

THE DIGESTIVE SYSTEM MOVES AND BREAKS DOWN FOOD

Material is moved through the digestive system by **peristalsis** (wave-like contractions of smooth muscles).

Peristalsis – Wavelike contractions of smooth **muscles** in the organs of the digestive tract which move food through the digestive system. (Similar to how you squeeze toothpaste from the bottom of the tube.)

The digestive system processes food in two ways: Physically (Mechanically) and Chemically.

- Mechanical (Physical) Digestion – Breaking food into **smaller** pieces (physical change). Examples: Chewing, peristalsis.

- Chemical Digestion – Changing food into **different** substances (chemical change). Examples: Saliva, enzymes, stomach acids.

MATERIALS ARE BROKEN DOWN AS THEY MOVE THROUGH THE DIGESTIVE TRACT

1. Food enters the **mouth**.
    a. Chewing (mechanical) – **Teeth** break food into smaller particles.
    b. Saliva (chemical) – Salivary glands release saliva which **softens** the food and begins chemical digestion.
    c. Swallow (mechanical) – The **tongue** pushes food to the back of the mouth and down the throat into the esophagus.

2. Food travels down the esophagus by **peristalsis** and into the stomach. (Mechanical)

    Esophagus – The tube that leads from the back of your throat to your stomach. (About the length of your forearm; wrist to elbow.)

3. In the stomach:
    a. Muscles in the stomach **mix** and mash food particles (mechanical).
    b. Stomach **chemicals** (such as "stomach acid") break down food.

        DID YOU KNOW… Stomach acid is so strong that it could eat through the stomach itself! The stomach lining is covered with thick **mucus** to protect the tissues. The cells of the stomach lining are replaced about every **three** days.

4. In the Small Intestine:

    a. Partially-digested food moves from the stomach into the **small** intestine. (The small intestine is about the length of a small bus.)

    b. Chemicals released by the pancreas, liver, and gall bladder break down nutrients.

    c. Finger-like structures called "**villi**" are throughout the small intestine. Villi contain folds that **absorb** most of the nutrients from proteins, carbohydrates, and fats as the food material passes through the small intestine.

    d. Nutrients absorbed by villi in the small intestine enter the circulatory system and are **transported** around the body.

5. In the Large Intestine:

    The remaining digested food continues into the **large** intestine. Here, **water** and some other nutrients are absorbed from the digested material. (The large intestine is about as long as a car's back seat.)

6. Most of the solid material that remains is **waste**, which gets compacted, stored, and then released (eliminated) through the rectum and anus. (Yes, this is your "poo.")

OTHER ORGANS AID DIGESTION AND ABSORPTION

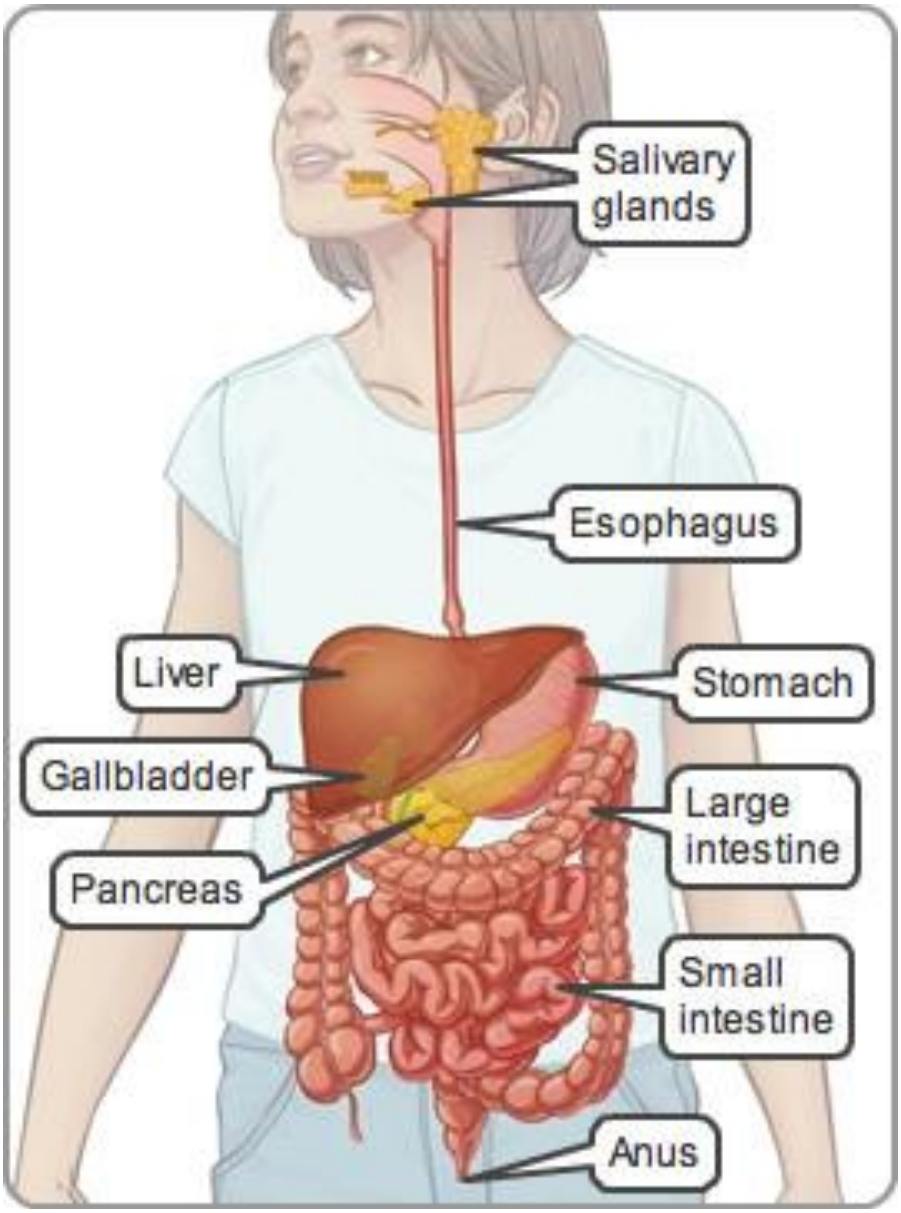
Food does not actually travel through these organs, but they each aid in chemical digestion: **Liver**, **Gallbladder**, and **Pancreas**.

- Liver – The **largest** internal organ of the body. The liver filters **blood**, cleansing it of harmful substances, and stores unneeded nutrients for later use. It produces "**bile**," a yellow substance that breaks down fats (similar to how soap breaks down oils). The liver also breaks down medicines and produces important proteins.

- Gallbladder – A tiny pear-shaped sac connected to the **liver**. Bile produced in the liver is concentrated and **stored** in the gallbladder. Bile is then secreted to the **small** intestine from the gall bladder.

- Pancreas – Produces important **chemicals** that are needed as digested material moves from the stomach to the small intestine. The pancreas quickly **lowers** the acidity in the small intestine and breaks down proteins, fats, and starches.

Without these chemicals from the pancreas, your body could die of **starvation** even with plenty of food in the system. *** Your body would not be able to process and use the food for energy without the pancreas. ***



(Image is from http://www.aboutkidshealth.ca/En/ResourceCentres/Nutrition/Digestive-system-conditions-and-special-diets/Digestive-system/Pages/default.aspx)