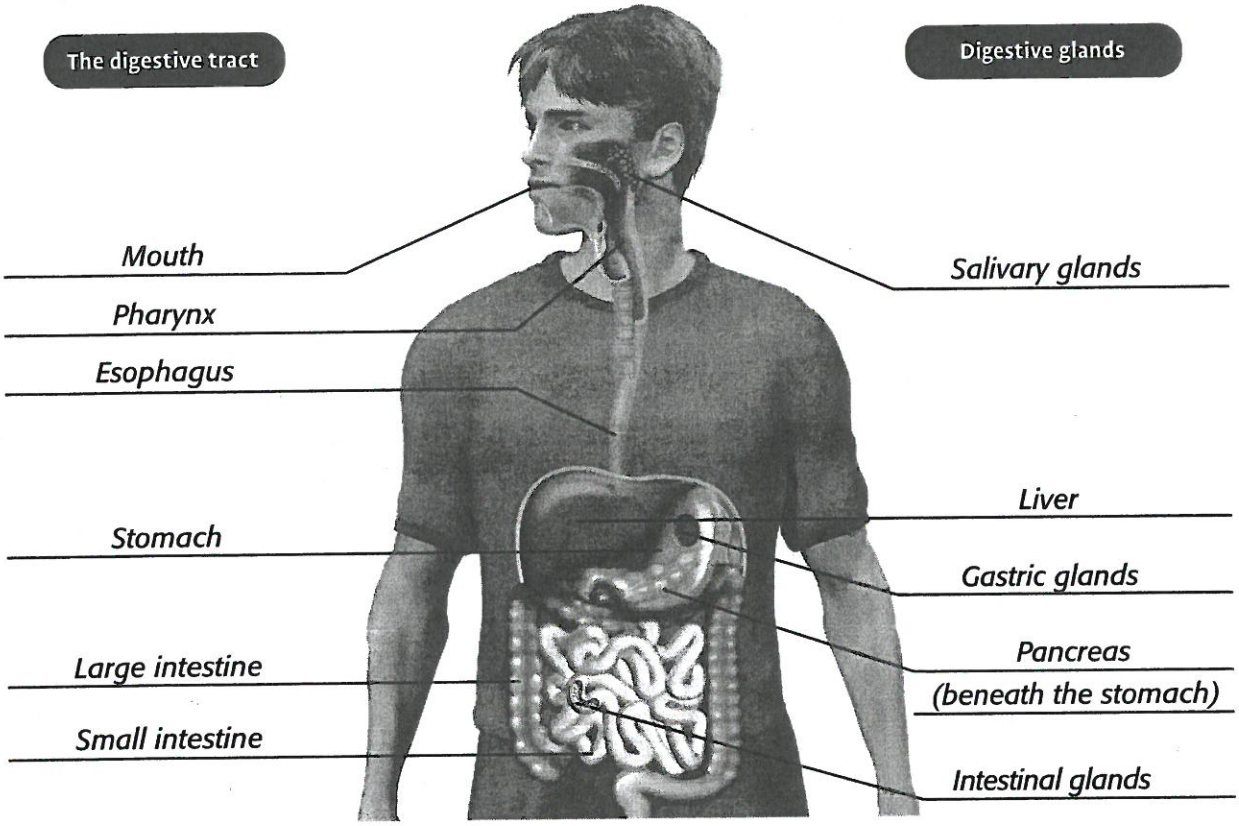
The Digestive Tract and Glands

1. Fill in the following diagram, writing in the names of the different parts of the digestive system:



The digestive tract and its components

2. Complete the following table:

Organ	Description
Mouth	Cavity through which food enters the body
Pharynx	Part of both the digestive system and the respiratory system
Esophagus	An elastic muscular tube that connects the pharynx to the stomach
Stomach	A muscular, J-shaped pocket
Small intestine	A muscular tube that is folded over itself many times. Its inner surface is lined with microscopic folds called *intestinal villi*.
Large intestine	A bumpy muscular tube. Its inner surface is made up of cells that secrete mucus.

Digestive glands

3. Define "gland." *Organ or group of cells that produces secretions (chemical or liquid substances that have different functions in the organism)*

4. Examples of secretions: *Hormones, perspiration, maternal milk*

5. The role filled by the secretions of the digestive glands: *To aid in the digestion of food*

6. Some digestive glands are located outside the digestive tract and are connected to it by a small duct. They are *accessory* to the digestive tract. The salivary glands, the liver and the pancreas are accessory digestive glands. Other glands, which are microscopic, are located directly in the walls of the digestive tract. In other words, they are *integrated* in the digestive tract. Gastric glands and intestinal glands are integrated digestive glands.

7. Summary table of the role of glands

Gland	Description	Secretions produced
Salivary glands	Three pairs of these glands are located in the mouth.	*Saliva*
Liver	The largest gland in the human body, it is located on the right side of the abdomen, under the diaphram.	*Bile*
Pancreas	A leaf-shaped gland. It is located on the left side of the abdomen, beneath the stomach.	*Pancreatic juices (and insulin)*
Gastric glands	Thirty-five million of these microscopic glands are scattered through the inner surface of the stomach.	*Gastric juices*
Intestinal glands	Fifty million of these microscopic glands are located at the bottom of the villi that line the inner surface of the small intestine.	*Intestinal juices*

Food Transformation

The physiology of the digestive system

1. The digestive system has four stages:
   - *Ingestion of food*
   - *Digestion of food*
   - *Absorption of nutrients*
   - *Elimination of substances that have not been absorbed*

Digestion

2. Define "digestion." *The transformation of the complex molecules in food into more simple molecules called nutrients*

Type of transformation	Mechanical transformation	Chemical transformation
Definition	*In a mechanical transformation, the nature of the substance remains the same; only its physical appearance changes.*	*In a chemical transformation, the bonds of the molecules are broken, which gives rise to new substances.*
Goal	*To decrease the size of the food particles and coat them with the secretions of the gastric glands in order to aid chemical digestion*	*To break the bonds of complex molecules in order to produce simple molecules*

3. Name for the substances in the secretions of digestive glands that break the bonds of the food molecules: *Enzymes*

4. Summary table of the transformation of complex molecules into simple molecules during digestion

Type of nutrient	Simple molecules obtained during chemical digestion (examples)
Carbohydrates	*Glucose*
Fats	*Glycerol and fatty acid*
Proteins	*Amino acid*

5. Summary table of transformations of food during digestion

Organ of the digestive tract	Transformation	Description
Mouth	Mechanical	• *Chewing* Definition: *Action of shredding and crushing food with teeth* Role: *To create smaller pieces of food, which facilitates chemical digestion*
		• *Insalivation* Definition: *Action of mixing food with saliva* Role: *To make food moist and soft and allow digestive enzymes contained in saliva to come into close contact with the food*
	Chemical	Beginning of the digestion of *carbohydrates* Enzyme that causes this transformation: *Salivary amylase*
Pharynx	Mechanical	• *Deglutition* Definition: *Action of swallowing food* Role: *To push food toward the esophagus*
Esophagus	*Mechanical*	• *Peristalsis* Definition: *The coordinated movement of the muscles surrounding the digestive tract* Role: *To push food toward the stomach*
Stomach	*Mechanical*	• *Churning* Definition: *Movement resulting from muscular contractions of the stomach wall* Role: *To soak the food and mix it with gastric juices*
		• *Peristalsis* Role: *To push the food to the small intestine*
	Chemical	Beginning of the digestion of *proteins* Enzyme that causes this transformation: *Pepsin*

Organ of the digestive tract	Transformation	Description
Small intestine	Mechanical	• *Emulsion* of fats by bile Role: *To increase the contact surface between the fats and the digestive juices in order to facilitate the chemical digestion of fat*
		• *Churning* Role: *To soak the food with digestive juices in order to facilitate absorption*
		• *Peristalsis* Role: *To push the food toward the large intestine*
	Chemical	End of the digestion of *carbohydrates* and *proteins* and complete digestion of *fats*. Digestive juices that cause these transformations: *Intestinal* juices and *pancreatic* juices.
Large intestine	*Mechanical*	• *Churning* Role: *To facilitate the absorption of simple molecules*
		• *Peristalsis* Role: *To move the food to the end of the digestive tract*

Absorption of nutrients

6. Define "absorption." *Nutrients passing from the digestive tract to the blood and lymph*

7. *a)* The small intestine absorbs most of the following nutrients:
Glucose, amino acids, fatty acids and glycerol

   b) The large intestine absorbs most of the following nutrients:
Water, vitamins and minerals

Elimination of waste

8. Organ where fecal matter is stored until it is eliminated:
The last section of the large intestine

9. Fecal matter is made up of:
   - *Undigested residue, which is primarily dietary fibre*
   - *Cellular debris*
   - *Nutrients that have not been absorbed (especially fats)*
   - *A large quantity of bacteria*
   - *Some water*