**Digestion and Nutrition Jigsaw Project**

**Background**

Digestion is the mechanical and chemical breakdown of foods and the absorption of the resulting nutrients by cells. The digestive system consists of the alimentary canal, which extends about 8 meters from the mouth to the anus, and several accessory organs, which secrete substances used in the process of digestion into the canal. Nutrition is the study of nutrients and how the body utilizes them. Nutrients include carbohydrates, lipids, proteins, vitamins, minerals, and water. Nutrients provide energy as well as the raw materials for all cellular functions in the human body.

**Focus Questions – Initial Thoughts**

What are the anatomical structures of the digestive system?

How is food broken down and nutrients processed and absorbed?

What are some common disorders of the digestive system?

**Procedure**

1. You will be a member of an expert team. The expert team will consist of 1 or 2 members – each working on the same anatomical part of that system.
2. You will work in your expert teams, using Chapter 15 in the your textbooks and available computers to research the required questions in your expert field.
3. You will make (12) copies of your answers/diagrams – one for each member of your class.
4. You will re-convene as a class to share the expert data from all six anatomical structures, answer one analysis question and to prepare for a quiz.
5. You will then return to your expert team to take a group quiz on the entire system.

**Reference**

Hole’s Essentials of Human Anatomy and Physiology Chapter 15 pp. 385-427

**Class Objectives (these will be presented by your teacher)**

1. Name, describe, and state the function of the 4 layers of the gastrointestinal tract.
2. Describe the process of mechanical digestion, chemical digestion and absorption for carbohydrates, fats and proteins.
3. Identify the hormones responsible for blood glucose homeostasis, and describe negative feedback as a homeostatic mechanism.

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| **Expert Teams** | |
| **Group 1: Oral Cavity, Salivary Glands and Esophagus**   * Make a labeled diagram illustrating the anatomy of the oral cavity * Make a labeled diagram of the salivary glands * Explain the process of deglutition (swallowing) * Explain the role of the oral cavity and salivary glands in mechanical digestion * Explain the role of the oral cavity and salivary glands in chemical digestion * Explain the role of the oral cavity in the absorption of nutrients * Describe the anatomy of the esophagus * Explain the function of the esophagus * Explain peristalsis in the esophagus * Describe a medical disorder that affects the oral cavity or esophagus | **Group 2: Stomach**   * Make a labeled diagram illustrating the macroscopic anatomy of the stomach; include divisions, openings, layers and musculature * Explain the function of the stomach * Explain the role of the stomach in mechanical digestion * Explain the role of the stomach in chemical digestion * Explain the role of the stomach in the absorption of nutrients * Describe a medical disorder of the stomach |
| **Group 3: Small Intestine**   * Make a labeled diagram illustrating the macroscopic anatomy of the small intestine (including the measurements of diameter and length) * Explain the functions of the small intestine * Describe the motility of the small intestine and the factors that control it * Explain the role of the small intestine in mechanical digestion * Explain the role of the small intestine in chemical digestion * Explain the role of the small intestine in the absorption of nutrients * Describe a medical disorder of the small intestine | **Group 4: Large Intestine**   * Produce a labeled diagram illustrating the macroscopic anatomy of the large intestine (including measurements of diameter and length) * Explain the functions of the large intestine * Explain the role of the bacteria that inhabit the large intestine * Explain the role of the large intestine in mechanical digestion * Explain the role of the large intestine in chemical digestion * Explain the role of the large intestine in the absorption of nutrients * Describe a medical disorder of the large intestine |
| **Group 5: Liver**   * Make a labeled diagram illustrating the macroscopic anatomy of the liver * Explain 5 digestive functions of the liver * Describe the composition and function of bile * Explain the role of the liver in protein metabolism * Explain the role of the liver in mechanical digestion * Explain the role of the liver in chemical digestion * Explain the role of the liver in the absorption of nutrients * Describe a medical disorder of the liver | **Group 6: Gall Bladder and Pancreas**   * Make a labeled diagram illustrating the macroscopic anatomy of the gall bladder and pancreas * Describe the microscopic anatomy of the pancreas * Explain the function of the gall bladder and pancreas * Identify all components and functions of pancreatic juice * Explain the role of the gall bladder and pancreas in mechanical digestion * Explain the role of the gall bladder and pancreas in chemical digestion * Explain the role of the gall bladder and pancreas in the absorption of nutrients * Describe a medical disorder of either the gall bladder or the pancreas |