



Lesson Plan: The Digestive System & Nutrition

Grade Level: 8

Subject: Life Science

Duration: 45–60 min

NGSS MS-LS1-7: Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.

Learning Objectives

By the end of this lesson, students will be able to:

- **Identify** the six nutrients the body needs — carbohydrates, fats, proteins, vitamins, minerals, and water — and state what each one supplies.



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who is growing or physically active needs more of them each day.

- **Carbohydrates:** Nutrients made of carbon, hydrogen, and oxygen that are the body's main source of energy. Simple carbohydrates are sugars, such as the sugar added to soft drinks; complex carbohydrates such as starch and fiber are long chains of many sugars, found in foods like rice, pasta, and bread.
- **Digestion:** The process of breaking food down into molecules small enough for the body to absorb and use. In humans it begins in the mouth and ends at the anus.



- **Mechanical digestion:** The physical breaking of food into smaller pieces — biting and chewing with the teeth, and churning in the stomach. The pieces get smaller, but the food molecules themselves are not changed.
- **Chemical digestion:** The breaking down of food by chemicals in the digestive tract, such as saliva in the mouth and digestive juices in the stomach, that split large food molecules apart into smaller, usable nutrients.
- **Enzyme:** A protein that speeds up one specific chemical reaction inside a living organism. Each digestive enzyme works on only one kind of food molecule, the way a key opens only one lock; pepsin, for example, breaks proteins down into amino acids.
- **Villi:** Tiny fingerlike structures that line the inside of the small intestine and pass digested nutrients through the intestine wall into the bloodstream, where the blood carries them throughout the body.

 **Materials Needed:** (all links are included in this PDF)



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- Saltine crackers, two per student, for the chewing and saliva demonstration
- Vegetable oil, water, and a few drops of dish soap in a clear sealed jar, to model how bile breaks fat into droplets
- Nutrition-facts panels cut from packaged foods (cereal box, granola bar, soda bottle, yogurt cup)
- Desk-size labeled diagram of the human digestive tract, mouth through anus

Lesson Procedure



Step 1: Introduction (5 minutes)

- Open with the question: 'You ate breakfast hours ago — where is that food right now, and what has your body already taken out of it?'
- Project the digestive-tract diagram from the Study Guide and have students trace with a finger the route a bite of bread takes from mouth to anus.

(<https://newpathworksheets.com/api/guide/study-guide-science-grade-8-the-digestive-and-nutrition-1.pdf>)

- State the focus of the lesson: food cannot be used as it arrives, so the body must take it apart into molecules small enough to enter the blood and supply energy, growth, and repair.

Step 2: Direct Instruction (15 minutes)

- Use the Study Guide to name the six nutrients and what each supplies: carbohydrates for energy, fats for stored energy and insulation, proteins for building and repairing tissues, vitamins and minerals to run chemical reactions, and water to carry every process. Point out that only carbohydrates, fats, and proteins supply calories.



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- Work through the vocabulary matching worksheet as a class, checking the definitions for digestion, chemical digestion, carbohydrates, complex carbohydrates, and calorie; tell students the emphysema item on the sheet belongs to the respiratory unit, not this one. (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-8-the-digestive-and-nutrition-1-1.pdf>)
- Shake the sealed jar of vegetable oil and water so students see the oil re-form one layer, then add the dish soap and shake again until the fat breaks into tiny droplets — the same job bile does, the fat-splitting chemical the liver makes and the gallbladder stores, so enzymes can finish breaking the fat down.



- Complete the first half of Practice Worksheet 2 together, matching each organ to its job: saliva in the mouth, the wavelike muscle squeeze called peristalsis in the esophagus, pepsin in the stomach, and villi in the small intestine.
(<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-8-the-digestive-and-nutrition-1-2.pdf>)
- Have pairs read the nutrition-facts panels cut from packaged foods and decide which nutrient supplies most of the calories in each product, then report one surprise to the class.

Step 4: Independent Practice (15 minutes)

- Assign Practice Worksheet 0 for students to complete individually, covering food and energy, which substances count as nutrients, the definition of a calorie, and simple versus complex carbohydrates. (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-8-the-digestive-and-nutrition-1-0.pdf>)
- Assign Practice Worksheet 1, covering saturated and unsaturated fats, cholesterol and heart disease, amino acids as the building blocks of protein, fat-soluble versus water-soluble vitamins, and the food pyramid.



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the body where each type of digestion happens.

(<https://newpathworksheets.com/api/guide/study-guide-science-grade-8-the-digestive-and-nutrition-1.pdf>)



Differentiation Strategies

For advanced learners:



- Have students trace one bite of a cheeseburger through the whole tract and record where each nutrient is chemically broken down and by what: bun starch by saliva, patty protein by pepsin, and cheese fat by bile and pancreatic enzymes.
- Ask students to explain, using what they know about bile, why a person whose gallbladder has been removed is often told to eat smaller amounts of fat at a time.

For learners needing support:

- Give these students the desk-size labeled digestive-tract diagram with the five main organs already printed, so they add only the job of each organ instead of drawing and labeling from memory.
- Pair the cracker demonstration with a two-column sort card headed 'broken into smaller pieces' and 'changed into different molecules', and have students place each classroom demonstration under the correct heading.



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- Study Guide PDF 1 (https://newpathworksheets.com/api/guide/study_guide-science-grade-8-the-digestive-and-nutrition-1.pdf)
- Worksheet PDF 0 (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-8-the-digestive-and-nutrition-1-0.pdf>)
- Worksheet PDF 1 (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-8-the-digestive-and-nutrition-1-1.pdf>)
- Worksheet PDF 2 (<https://newpathworksheets.com/api/worksheet/worksheet-science-grade-8-the-digestive-and-nutrition-1-2.pdf>)
- Vocabulary PDF 1 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-8-the-digestive-and-nutrition-1-1.pdf>)



- Vocabulary PDF 2 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-8-the-digestive-and-nutrition-1-2.pdf>)
- Vocabulary PDF 3 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-8-the-digestive-and-nutrition-1-3.pdf>)
- Vocabulary PDF 4 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-8-the-digestive-and-nutrition-1-4.pdf>)
- Vocabulary PDF 5 (<https://newpathworksheets.com/api/vocabulary/vocabulary-science-grade-8-the-digestive-and-nutrition-1-5.pdf>)



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THE DIGESTIVE SYSTEM AND NUTRITION

Food and Energy

Food provides necessary materials for growth, tissue repair and activities that you do on a daily basis. Your body converts or changes the food that you eat into nutrients.

Six Essential Nutrients

Nutrients are the raw materials in food that serve the essential processes of the body. There are six different types of nutrients that the body needs.

They are **carbohydrates, fats, proteins, minerals, vitamins, and water**. Proteins, carbohydrates, and fats provide the body with energy that is needed. The energy that they provide is measured



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certain parts of the cells. Carbohydrates are divided into two separate groups: simple and complex carbohydrates. Simple carbohydrates are also known as sugars, of which there are many different types. These sugars are not found naturally in foods, but are added to foods like soft drinks and other sweets.



The sugar glucose is what our cells use for energy. Our body converts other sugars into glucose so that they can be used to make energy. Complex carbohydrates are like a chain made up of many different sugars. Starch and fiber are examples of complex carbohydrates.

Starch can be broken down into simple sugars and used for energy.



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~~Saturated fats~~ are normally solid at room temperature and are in food items like meat, dairy, and eggs. **Unsaturated fats** are normally liquid at room temperature like oils and seafood. If a food item contains saturated fat it usually also contains cholesterol.

Lesson Checkpoint: What is the difference between saturated and unsaturated fats?

Cholesterol is a fatlike substance that is found in animal products, but our body's liver produces cholesterol so it is not needed in our diet. Our body only needs a small amount of fats each day, but if you have a diet high in fats they will begin to build up in your blood vessels causing heart disease.



Proteins: Proteins are nutrients that contain carbon, hydrogen, oxygen, and nitrogen and are needed for the growth and repair of tissues. Proteins are a big part of foods like meats, dairy, nuts, beans, and fish.

Amino acids are the building blocks of protein molecules. There are twenty different amino acids that can make thousands of different



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Fat-soluble vitamins dissolve in fat where they are stored. Too much of these vitamins can be harmful to the body because they are stored in fat so there is a constant supply. Fat-soluble vitamins include vitamins A, D, E, and K.

Water-soluble vitamins dissolve in water and cannot be stored in the body. This is because they are excreted in urine. Water-soluble vitamins include vitamins C and B. Water-soluble vitamins are important to have in your daily diet because they are not stored in your body.

Water: Without water, the body would die within a few days. This makes it the most important nutrient of them all. Nutrients are broken and other important body processes take place in water. Without water these processes would be able to take place. The average body needs about two liters of water everyday.

Using the Food Pyramid for a Healthy Diet

The **food pyramid** was developed by scientists called nutritionists; it is a basic guide to a healthy diet. Foods are categorized into six separate groups and the pyramid indicates how many of servings of each group you should eat a day in order to maintain a healthy diet.

The illustration shows a colorful food pyramid with six segments (orange, yellow, green, blue, purple, and red) rising from a green base. Below the pyramid, a row of twelve diverse children stands on a green patch of grass. Above each child is a thought bubble containing various educational icons: a cube, a microscope, a protractor, a globe, a balance scale, a red ball, a compass, a molecular model, a pie chart, a bar graph, a pencil, and a calculator. The word 'PREVIEW' is written in large, bold, blue and orange letters below the children. Below the word, the text 'Please [Sign In](#) or [Sign Up](#) to download the printable version of this worksheet' is displayed in a dark grey font.

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The Digestive Process

There are three main functions of the digestive system. They are to break down foods into molecules that the body can use, absorb the molecules into the blood and send them all throughout the body, and eliminate wastes from the body.



Digestion is a process of breaking down different nutrients into molecules that the body can use. There are two different types of digestion.



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Mechanical digestion begins when you first bite into the food. Your teeth help to break the food up and grind it down to smaller pieces. Chemical digestion begins in the mouth also. Saliva is a chemical that begins to chemically break food down. Chemical digestion is achieved with the help of enzymes. An enzyme, as we learned in Topic 4, is a type of protein that speeds up a chemical reaction within a living organism. Saliva is a type of enzyme.

Enzymes only break down a specific chemical. This is similar to a key. Most keys are only able to open up one door or one type of door. Enzymes are only able to break down one type of chemical.

Esophagus: There are two openings at the back of the mouth. One takes in air and the other takes in food.

When you swallow food, a flap of skin called the **epiglottis** opens allowing the food to travel into the esophagus. The **esophagus** is a tube of muscle that connects the mouth to the stomach. There is a layer of mucus that lines the inside of the esophagus. **Mucus** is a slippery substance that your body produces. Mucus allows food to travel down the esophagus much easier.

The esophagus is lined with smooth muscle, which contracts in a wavelike motion forcing food to move down the esophagus in a process called **peristalsis**. Peristalsis keeps food moving in one direction and also occurs in the stomach and other portions of the digestive system.

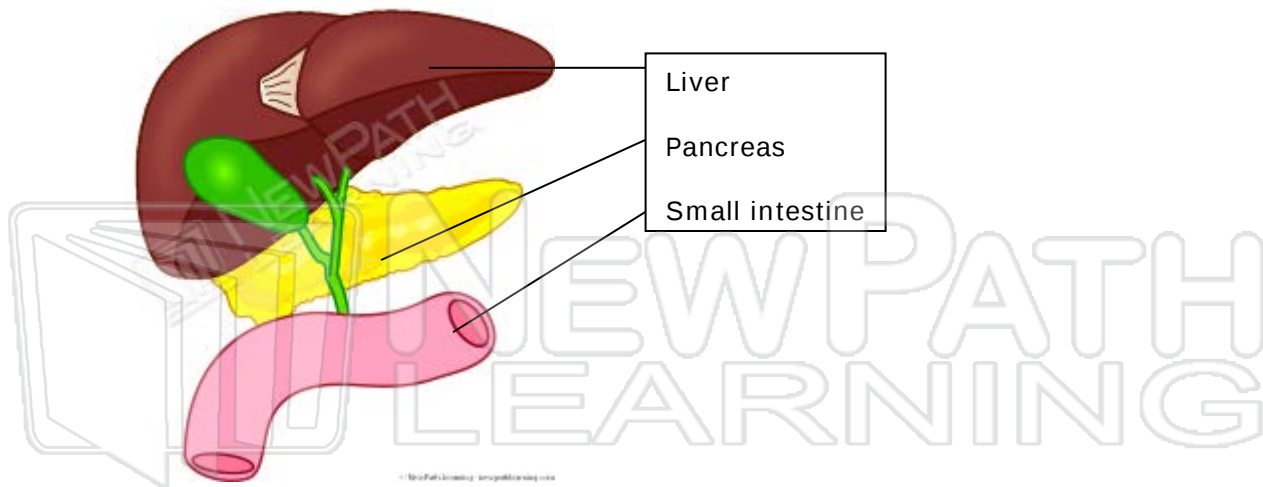


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digestion are produced by the small intestine, the pancreas, and the liver.





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to and supplies the body with vitamin K. water is also absorbed and put back into the body.

The rest of the materials are prepared to enter the **rectum**, where they are compressed into a solid. The solid exits through a muscle called the anus.

Lesson Checkpoint: What does the small intestine do?



Name _____ Class _____ Date _____

1

Food does not supply **materials** and **energy** for _____.

- A** growth
- B** tissue repair
- C** sports and activities
- D** microwaves

**2**

Your body **converts** or changes the **food** that you eat into _____.

- A** nutrients
- B** minerals
- C** diet
- D** calories

**3**

What is **true** about **essential nutrients**?

- A** they are made by the body
- B** you can only get them from food
- C** they can be absorbed from the environment

**4**

Which is **not** considered a **nutrient**?

- A** carbohydrates
- B** fats
- C** fiber
- D** minerals

**5**

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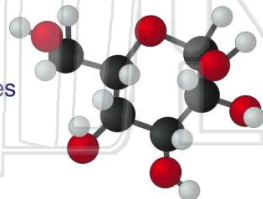
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9

What does the body convert **sugars** into?

- A** glucose
- B** amino acids
- C** carbohydrates
- D** fiber

**10**

Which is **not** an important fact about **fats in food**?

- A** they insulate the body
- B** they protect internal organs
- C** they store a lot of energy
- D** they give a person less energy





Name _____ Class _____ Date _____

1

Food does not supply **materials** and **energy** for _____.

- A growth
- B tissue repair
- C sports and activities
- D microwaves



D

2

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A

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C

5



B

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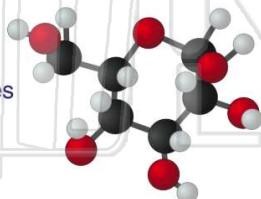
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C

9

What does the body convert **sugars** into?

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A

10

Which is **not** an important fact about **fats in food**?

- A they insulate the body
- B they protect internal organs
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- D they give a person less energy



D



Name _____ Class _____ Date _____

1

_____ fats are usually **solid at room temperature**, while _____ fats are usually **liquid at room temperature**.

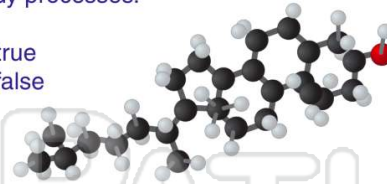
- A Saturated, unsaturated
- B Unsaturated, saturated
- C Fat-soluble, water-soluble
- D Water-soluble, fat-soluble



2

Cholesterol must be **eaten** in foods for body processes.

- A true
- B false



3

Having **too much cholesterol** in your diet can cause _____.

- A cancer
- B heart disease
- C bacterial infection
- D viral infection



4

What are the **building blocks** of **proteins**?



- A simple carbohydrates
- B glucose

5



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- foods and less or others
- C eat only fruits and vegetables
 - D eat the same amount of each food group

- limited amounts



9

Which is not a **function** of the **digestive system**?

- A absorb nutrients
- B absorb oxygen
- C eliminate waste
- D break down foods



10

Mechanical digestion is when food is broken down into smaller, useable nutrients.

- A true
- B false





Name _____ Class _____ Date _____

1

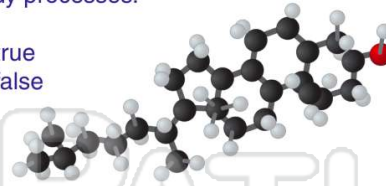
_____ fats are usually **solid at room temperature**, while _____ fats are usually **liquid at room temperature**.

- A Saturated, unsaturated
- B Unsaturated, saturated
- C Fat-soluble, water-soluble
- D Water-soluble, fat-soluble

**A****2**

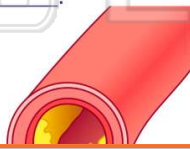
Cholesterol must be **eaten** in foods for body processes.

- A true
- B false

**B****3**

Having **too much cholesterol** in your diet can cause _____.

- A cancer
- B heart disease
- C bacterial infection
- D viral infection

**B****4**

What are the **building blocks** of **proteins**?



- A simple carbohydrates
- B glucose

D**5****B**

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B

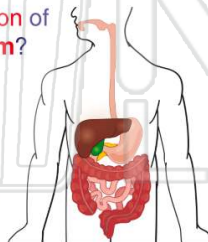
- foods and less or others
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- eat only fruits and vegetables
- D limited amounts

**9**

Which is not a **function** of the **digestive system**?

- A absorb nutrients
- B absorb oxygen
- C eliminate waste
- D break down foods

**B****10**

Mechanical digestion is when food is broken down into smaller, useable nutrients.

- A true
- B false

**A**



Name _____ Class _____ Date _____

1

What is the **function** of **saliva**?

- A It breaks down foods mechanically.
- B It assembles many different foods.
- C It directs foods to the cells.
- D It breaks down foods chemically.

2

Where does **digestion begin**?

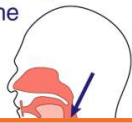
- A stomach
- B small intestine
- C mouth
- D esophagus



3

What is the **function** of the **epiglottis**?

- A to direct food into the esophagus
- B to direct food away from the esophagus
- C to churn food using mechanical digestion



4

What is the **process** of smooth muscle **contracting** in a **wavelike motion** forcing food to move down the esophagus called?

- A mechanical digestion
- B chemical digestion



5



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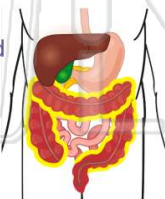
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9

What important **function** occurs in the **large intestine**?

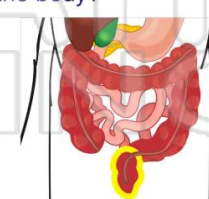
- A nutrients are absorbed
- B food is churned
- C waste is solidified
- D bacteria break down foods



10

What structure **solidifies** the **waste** that is about to leave the body?

- A large intestine
- B anus
- C rectum
- D small intestine





Name _____ Class _____ Date _____

1

What is the **function** of **saliva**?

- A It breaks down foods mechanically.
- B It assembles many different foods.
- C It directs foods to the cells.
- D It breaks down foods chemically.

D

2

Where does **digestion begin**?

- A stomach
- B small intestine
- C mouth
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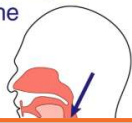


C

3

What is the **function** of the **epiglottis**?

- A to direct food into the esophagus
- B to direct food away from the esophagus
- C to churn food using mechanical digestion



A

4

What is the **process** of smooth muscle **contracting** in a **wavelike motion** forcing food to move down the esophagus called?

- A mechanical digestion
- B chemical digestion



D

5



C

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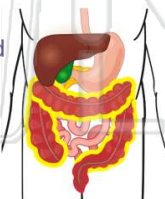
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B

9

What important **function** occurs in the **large intestine**?

- A nutrients are absorbed
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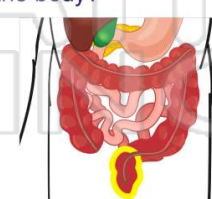


D

10

What structure **solidifies** the **waste** that is about to leave the body?

- A large intestine
- B anus
- C rectum
- D small intestine



C



Name _____ Class _____ Date _____

Match each of the following terms to its definition:

Carbohydrates

Emphysema

Digestion

Calorie

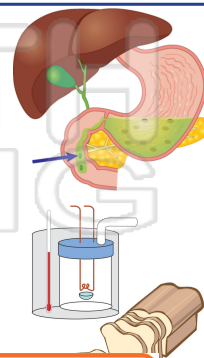
Epiglottis

Complex carbohydrates

Bile

Chemical digestion

1. - a chemical produced by the liver and stored temporarily in the gall bladder that is released into the intestines to help in fat digestion



2. - the amount of energy that is needed to increase one gram of water one degree Celsius

3. hydrocarbons

4. smaller

5. of marbles

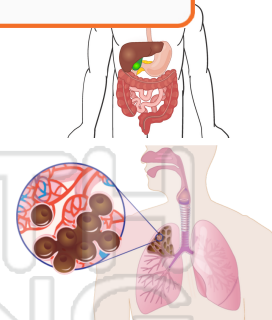
6. nutrients



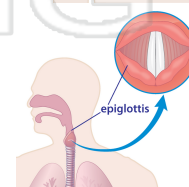
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7. - a disease of the lungs very common in smokers, where the air spaces enlarge to where they no longer function



8. - a flap of skin that opens, allowing food to travel into the esophagus





Name _____ Class _____ Date _____

Match each of the following terms to its definition:

Carbohydrates

Emphysema

Digestion

Calorie

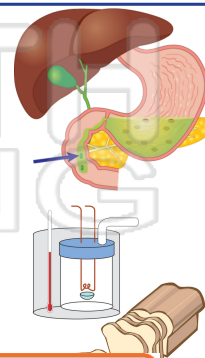
Epiglottis

Complex carbohydrates

Bile

Chemical digestion

1. **bile** - a chemical produced by the liver and stored temporarily in the gall bladder that is released into the intestines to help in fat digestion



2. **calorie** - the amount of energy that is needed to increase one gram of water one degree Celsius

3. **carbohydrates** - a group of organic compounds that are the main source of energy for the body

4. **chemical digestion** - the process of breaking down food into smaller molecules using enzymes

5. **complex carbohydrates** - a type of carbohydrate that is made of many simple carbohydrates joined together

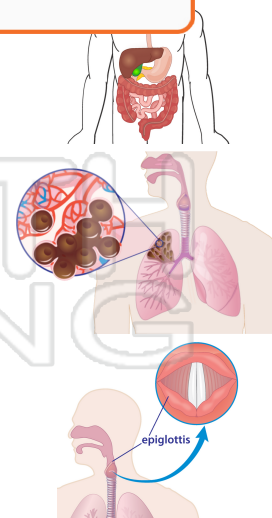
6. **digestion** - the process of breaking down food into smaller molecules that can be absorbed by the body



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7. **emphysema** - a disease of the lungs very common in smokers, where the air spaces enlarge to where they no longer function



8. **epiglottis** - a flap of skin that opens, allowing food to travel into the esophagus