

Digestive Trek

Game Theme

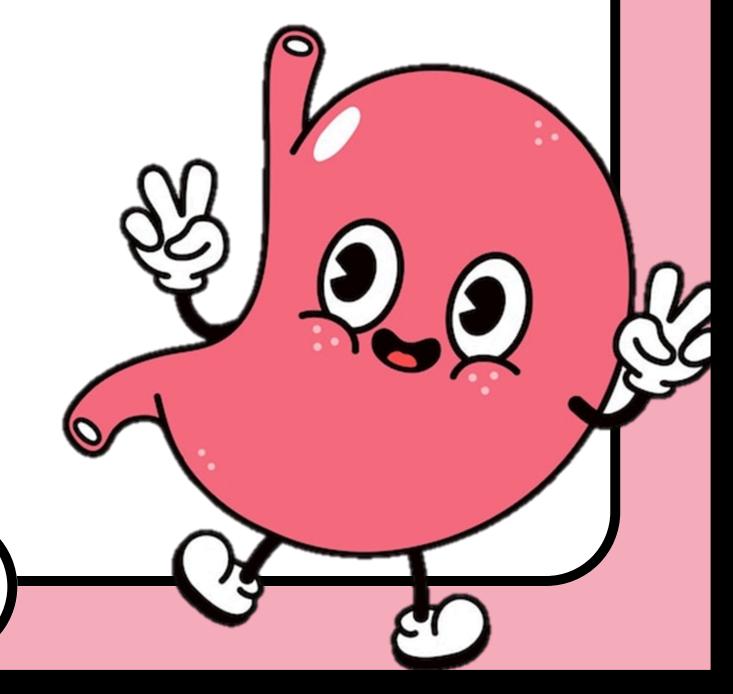
Digestive System Grade Level

Game TypeBoard Game



Game Overview

- Digestive Trek is a biology-based board game designed to help students explore and understand the human digestive system. Through a storyline-based movement game, students draw cards that involve organ identification, enzyme functions, process-based questions, and challenge scenarios. As they advance along the board, players respond to conceptual, analytical, and applied questions, collecting stars as rewards for correct answers.
- The game aims to strengthen understanding of digestive anatomy, enzyme action, and common digestive disorders through a mix of structured questions and critical thinking tasks.
- By the end of the gameplay, learners will be able to identify the major organs of the digestive system and their functions. They will also be able to explain the process of digestion and analyze symptoms of common digestive disorders.
- A complete game set, for one group, includes the following materials:
 - Game board
 - \circ Cards = 35
 - Guessing cards = 25
 - Challenge cards = 10
 - Answer key
 - Organ collection centre document
 - Digestive organs and empty human torso



Gameplay Instructions

- Explain to all students that the group's collective goal for this game is to assemble a complete digestive system by earning stars and 'buying' organ cards from the Organ Center.
- Divide the class into small groups of 3-5 students.
- Provide each group with a Digestive Trek board, a single counter for the group, a die, a set of guessing and challenge cards. All guessing cards should be arranged in numerical order and placed face down in their own separate pile, with card 1 in the flipped position on top. Similarly, all challenging cards should be arranged in numerical order and placed face down in a separate pile, ensuring the two types of cards are not mixed.
- Each group places their counter on the 'Start' space of the board.
- Each group takes turns rolling the die, with group members alternating as the roller for each turn. The group's counter moves forward based on the number rolled on the die.
- When the counter lands on a 'Pick a Card' or 'Pick a Challenge Card' space, the group works together, but the player whose turn it is must respond to the task.
- After responding the student can check the answer using he provided answer guide. If the answer is correct, the group earns a star. Stars are collected and used to 'buy' organ cards from the Organ Center.
- Once the group believes they have enough stars, they can visit the Organ Center to 'buy' the organ cards needed to assemble their digestive system.
- If a group does not have enough stars to buy all the required organs, they should continue to play by reading and completing the remaining task or challenge cards to earn additional points. This ensures that every group eventually completes their digestive system.
- The game continues until one group successfully completes their digestive system by collecting all necessary organ cards and placing them on the empty torso.

Debriefing and Reflection

Ask students to reflect on what did they find most interesting or surprising about the digestive system during the game? Which organ or process was the most challenging to understand, and why? If they could connect any of the symptoms or disorders discussed in the game to real-life situations? Clarify any mistakes made during the game, such as incorrect answers or confusion about tasks.

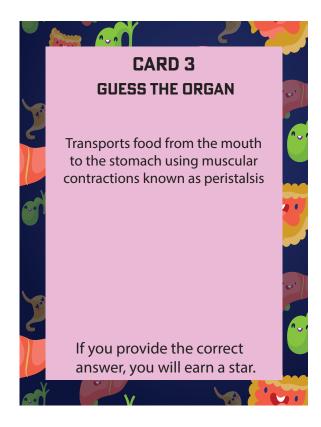
Adaptations for Gamplay

- **For Lower Grades:** Simplify tasks to focus on basic identification of organs and their primary functions. For example, use pictures of organs instead of written clues and avoid questions about disorders.
- For Higher Grades: Incorporate advanced questions that require students to analyze symptoms and link them to specific organs or disorders. You can also include tasks that involve sequencing the digestive process or solving case studies.

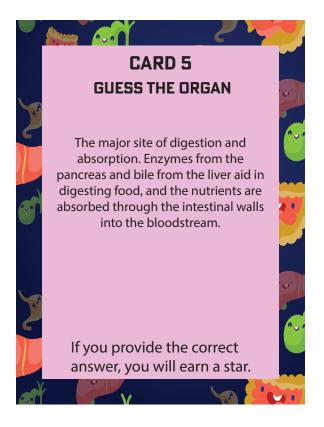


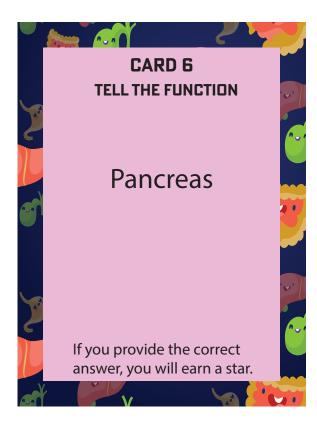


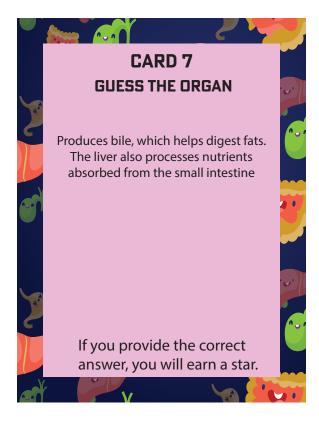




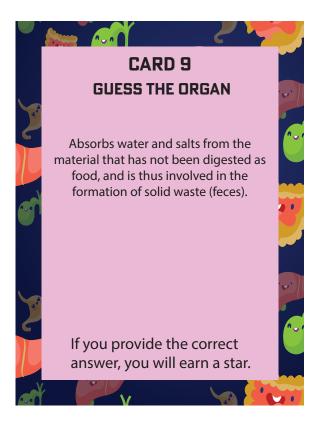


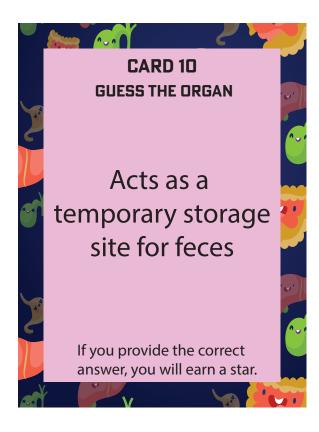


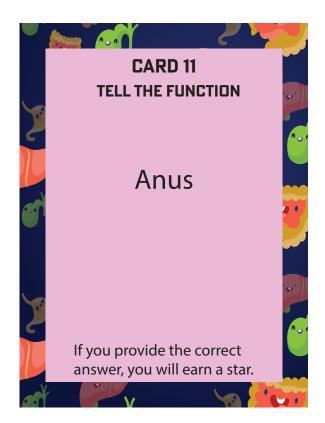




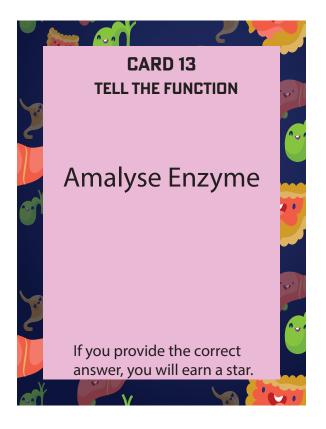


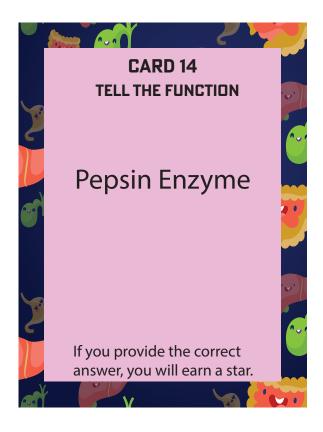


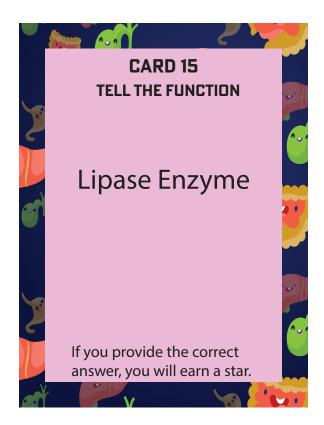


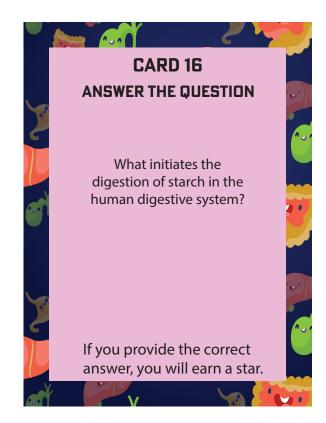


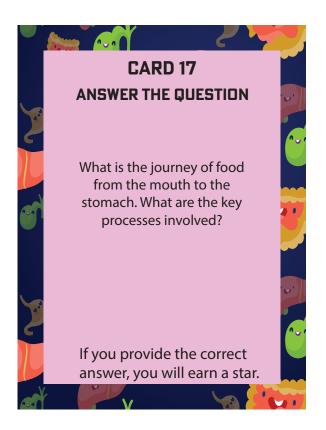


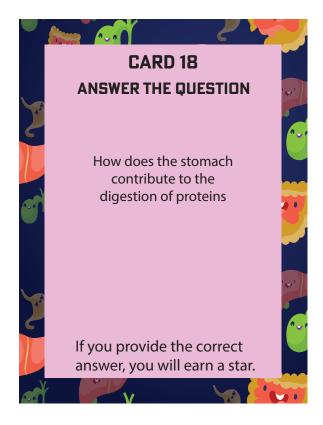


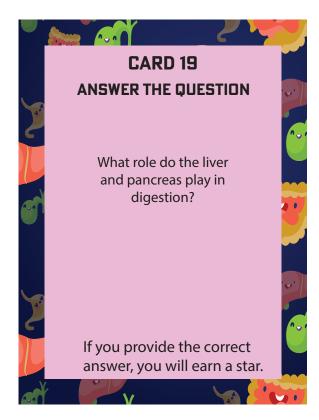




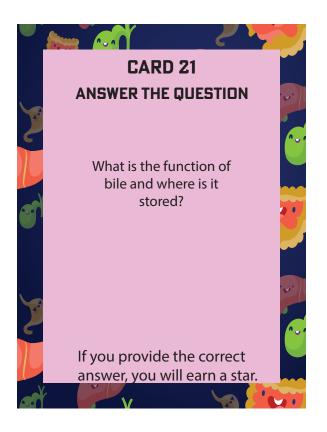


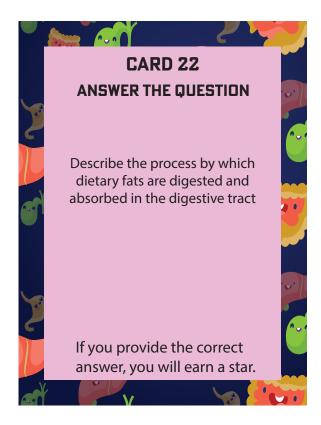


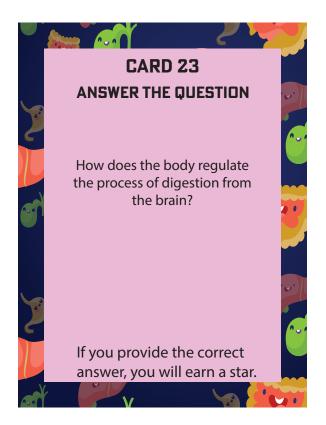


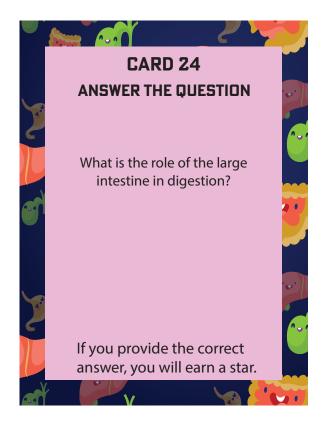


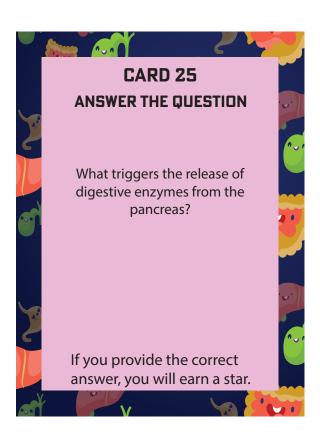








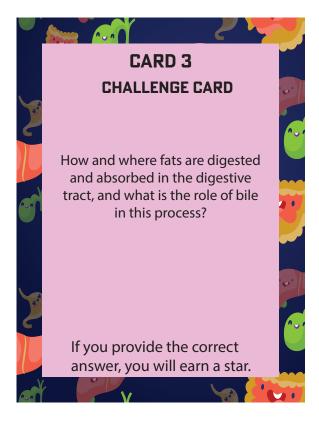




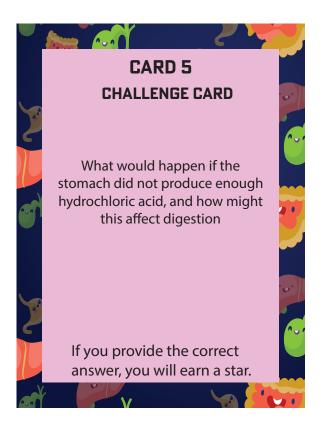
CHALLENGE CARD

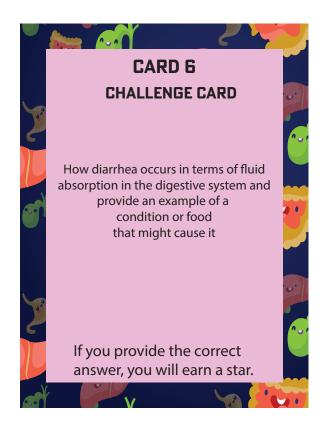


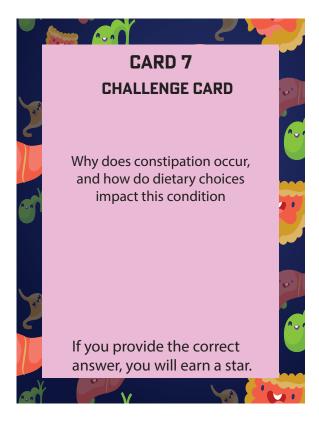




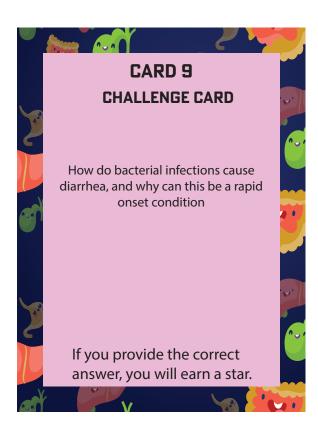














ANSWER

Card # 1: Mouth

Card # 2: Produce saliva, which moistens food to aid in swallowing, and contains enzymes that begin the digestion of starches.

Card # 3: Esophagus

Card # 4: Further breaks down food using strong muscular contractions, gastric acid, and enzymes. The stomach churns food into a partially digested liquid called chyme.

Card # 5: Small Intestine

Card # 6: Produces digestive enzymes and bicarbonate, which are released into the small intestine to aid in the digestion and neutralization of stomach acid. The pancreas also has an endocrine role, producing insulin and glucagon.

Card # 7: Liver

Card # 8: Stores and concentrates bile from the liver, releasing it into the small intestine to aid in fat digestion.

Card # 9: Large Intestine (Colon)

Card # 10: Rectum

Card # 11: The final segment of the digestive tract, through which feces are expelled from the body during the process of defecation.

Card # 12: Villi are tiny, finger-like projections in the lining of the small intestine. They increase the surface area for absorption, allowing nutrients to be absorbed more efficiently into the bloodstream.

Card # 13: Amylase is an enzyme found in saliva and pancreatic juice that helps break down starches into simpler sugars

Card # 14: Pepsin is active in the stomach and breaks down proteins into smaller peptides

Card # 15: Lipase is an enzyme that helps break down fats into fatty acids and glycerol, primarily in the small intestine.

Card # 16: The digestion of starch begins in the mouth with the enzyme amylase, which is found in saliva

Card # 17: Food is chewed in the mouth, mixed with saliva, and formed into a bolus. It then travels down the esophagus via peristalsis, a series of wave-like muscle contractions, until it reaches the stomach.

Card # 18: The stomach contributes to protein digestion by secreting gastric juice, which contains hydrochloric acid and the enzyme pepsin. Pepsin breaks proteins down into smaller peptides

Card # 19:The liver produces bile, which helps emulsify fats, making them easier to digest by pancreatic enzymes. The pancreas produces digestive enzymes like lipase, amylase, and protease, which help digest fats, carbohydrates, and proteins, respectively.

Card # 20: Nutrients are absorbed in the small intestine through the lining, which contains tiny hair-like structures called villi and microvilli that increase the surface area for absorption. Nutrients pass through these structures into the bloodstream.

Card # 21: Bile aids in the digestion and absorption of fats. It is produced by the liver and stored in the gallbladder

Card # 22: Dietary fats are first emulsified by bile salts in the small intestine. Then, pancreatic lipase breaks down the fat into fatty acids and monoglycerides, which are absorbed by the intestinal cells and reassembled into triglycerides, before being transported into the bloodstream.

Card # 23: The brain regulates digestion through the autonomic nervous system, specifically the parasympathetic branch, which stimulates digestive activity, and the sympathetic branch, which can inhibit it. Hormones and neural signals also communicate feelings of hunger and satiety

Card # 24: The large intestine absorbs water and salts from the remaining indigestible food matter and compacts it into feces. It also houses a large number of bacteria that play a role in fermenting any undigested carbohydrates

Card # 25: The release of digestive enzymes from the pancreas is triggered by hormones released in response to the presence of food in

Challenge Card 1: They might experience symptoms like bloating, diarrhea, and gas due to the undigested lactose fermenting in the colon, producing these symptoms.

Challenge Card 2: High-fiber foods help bulk up the stool and stimulate peristalsis (the contractions of the digestive tract), which helps to move stool through the colon more efficiently and relieve constipation.

Challenge Card 3: Fats are primarily digested in the small intestine with the aid of lipase enzymes from the pancreas and bile from the liver. Bile emulsifies fats, increasing the surface area available for lipase to act, thus aiding in the efficient digestion and absorption of fats.

Challenge Card 4: Recommendations might include eating smaller, more frequent meals, avoiding spicy and fatty foods, not lying down immediately after eating, and perhaps elevating the head of the bed.

Challenge Card 5: Insufficient stomach acid could lead to poor digestion of proteins, as the enzyme pepsin, which requires an acidic environment, would not function optimally. This could also increase the risk of infections as stomach acid helps kill harmful bacteria in food.

Challenge Card 6: Diarrhea occurs when the intestines do not absorb fluids adequately, often due to inflammation or irritation. This can be caused by infections (like those from bacteria or viruses), food intolerances (such as lactose intolerance), or diseases (such as Crohn's disease). The excess fluid results in loose, watery stools.

Challenge Card 7: Constipation occurs when stool moves too slowly through the digestive tract, causing it to become hard and difficult to pass. Inadequate fiber or fluid intake, a lack of physical activity, or certain medications can contribute to this slow movement, leading to constipation.

Challenge Card 8: Vomiting is the body's way of expelling harmful substances or relieving pressure in the stomach. It can be triggered by various factors, including infections (like gastroenteritis), food poisoning, motion sickness, or even intense pain.

Challenge Card 9: Bacterial infections cause diarrhea by producing toxins that irritate the intestinal lining, leading to inflammation.
These toxins can also draw water into the intestines, increasing stool liquidity.
The rapid onset is due to the direct action of these toxins and the body's immediate response to remove the irritant.

Challenge Card 10: During stress, the body diverts blood away from the digestive system as part of the "fight or flight" response, which can slow down intestinal movement, or motility. Additionally, stress can lead to the overproduction of certain hormones like cortisol, which further reduces bowel activity, leading to constipation.

ORGAN COLLECTION CENTER

Stars	Organ
5 stars	Mouth
5 stars	Esophagus
5 stars	Stomach
5 stars	Liver
5 stars	Pancreas
5 stars	Small Intestine
5 stars	Large Intestine
5 stars	Rectum
5 stars	Anus
10 stars	Empty human body

