38-1 Food and Nutrition
A. Food and Energy
1. One calorie is equal to the amount of energy needed to raise the temperature of ________________
2. The energy in food is measured ________________________________.
3. One Calorie is equal to 1000 calories.
4. The number of Calories you need depends on your ____________________________.
5. ____________________- substances in food that supple the body with energy and raw materials needed for growth, repair, and maintenance.

B. Nutrients
The nutrients that the body needs are water, carbohydrates, fats, proteins, vitamins, and minerals.
1. Water - ____________________________.
   a. Humans need to drink at ____________________________.
   b. Water makes up a large part of the blood and other body fluids.
   c. ____________________________ in order to cool the body by evaporation
2. ____________________________ - simple and complex; are the body’s main source of energy.
   a. ____________________________ - monosaccharide and disaccharides; do not need to be digested or broken down.
      i. Examples: ____________________________.
   b. ____________________________ - polysaccharides; do need to be broken down into simple sugars to be used for energy
      i. Example: ____________________________.
   c. ____________________________ - complex carbohydrate made of cellulose; helps move food through your digestive and excretory system.
      i. Example: ____________________________.
3. Fats- formed from fatty acids and glycerol.
   a. Function:
      i. Fats ____________________________
      ii. help make up cell membranes
      iii. ____________________________
      iv. help body absorb fat soluble vitamins
   b. ____________________________ - usually solid at room temperature.
      i. Example: ____________________________
   c. ____________________________ - usually liquid at room temperature; have at least 1 double bond
4. ____________________________ - supply raw materials for growth and repair of the body
   a. ____________________________ form proteins.
   b. The human body can produce 12 of the 20 amino acids; the rest must be consumed and are called ____________________________.

Big Idea/Questions/Notes:
i. Example: __________________________________________________________

contain the 8 essential amino acids

ii. People who don’t eat animal products must eat __________________________
to obtain these essential amino acids.

5. __________________________________ - organic molecules that help regulate body processes.
   a. ____________________________ vitamins can be stored in fatty tissues
      i. Example: ____________________________
   b. ____________________________ vitamins can’t be stored and should be in foods eaten every day.
      i. Example: B1, B2, niacin, B6, folic acid, B12, C, biotin
   c. Some diseases result when the body does not receive a sufficient supply of vitamins.

6. __________________________________ - inorganic nutrients.
   a. Your body usually needs minerals in ____________________________.
      i. Example: calcium, iron, sodium, zinc, potassium, fluorine
   b. The body looses minerals in ____________________________, so they must be replaced by eating foods.

C. Nutrition and a Balanced Diet

1. The new food pyramid – My Pyramid- classifies food into 6 categories:
   a. ____________________________
   b. ____________________________
   c. ____________________________
   d. ____________________________
   e. ____________________________
   f. ____________________________

Analyzing Data, p. 977

Federal regulations require that labels on packaged foods display the nutrients each food contains and the percentage of daily value each nutrient represents for a person, as well as serving size, number of servings per container, and Calories per serving. Answer the following questions about the cereal label provided. Don’t forget to include your units.

1. If you ate 2 cups of this product, how many grams of fat would you eat? How many grams of protein?
   _________________________________________________________

2. How many Calories are in a gram of fat? Of Protein? Of Carbohydrate?
   _________________________________________________________

3. On a 2,000 Calorie diet, what is the Daily Value for total fat? For Sodium? For Fiber?
   _________________________________________________________

4. Advertising claims for this product say that it is a good source of iron. Is this promotional claim true?
   _________________________________________________________
38-2 The Process of Digestion

The digestive system includes the ____________________________________________________________

Other structures add secretions to the digestive system, and aid in digestion. These include the ________________________________________________________________

A. The Mouth
1. ______________ - tear and crush food into a fine paste to begin mechanical digestion.
   a. Mechanical digestion - the ________________________ breakdown of large chunks of food into smaller pieces.
2. ______________________ - secret saliva in the mouth, which contain enzymes that break down starches into sugars. This is called chemical digestion.
   a. Chemical digestion - large food molecules are broken down into smaller food molecules
      1. ______________________ - an enzyme found in saliva that breaks the chemical bonds in starches and release sugars.

B. Esophagus
1. ______________ - chewed clump of food
2. ______________________ - flap of connective tissue that covers over the trachea to prevent choking.
3. ______________ - back of throat
4. ______________ - food tube that leads to the stomach
5. ______________________ - rhythmic muscular contractions that squeeze food through the esophagus into the stomach.
6. ______________________ - a thick ring of muscle that closes the esophagus after food has passed into the stomach and prevents the contents of the stomach from coming back up into the esophagus.

C. The Stomach
1. ______________ - a large muscular sac that helps with the digestion of food.
   a. Mechanical digestion - ________________________
      ______________________
      i. ______________ - mixture of stomach fluids and food produced in the stomach by contracting stomach muscles.
      ii. Process lasts ______________________
   b. Chemical digestion- the stomach ________________________
      i. ______________ - lubricates and protects the stomach wall
      ii. ______________ - pH of 2, makes stomach very acidic
      iii. ______________ - breaks down protein

D. Small Intestine
1. Small intestine- ________________________

Explain heartburn-
2. Pancreatic enzymes help with digestion
   a. Amylase - breaks down
   b. Trypsin - breaks down
   c. Lipase - breaks down

3. ____________ - enzyme released from the ___________ that breaks down ___________.
   a. Bile is stored in the _______________________.

4. Tiny fingerlike projections called __________________ of the small intestine.
   a. These provide an enormous surface area for the ____________
   b. Most products of carbohydrate and protein digestion are absorbed into the capillaries in the villi.

E. The Large Intestine
1. When the chyme leaves the small intestine, it enters the _______________________.
2. The large intestine ______________________ from the chyme.
3. Water is absorbed quickly, leaving undigested materials behind.
4. Concentrated waste material passes through the ________________ and is eliminated from the body.

Label the diagram with the following words.
Anus
Appendix
Esophagus
Gallbladder (behind liver)
Large intestine
Liver
Mouth
Pancreas (behind stomach)
Pharynx
Rectum
Salivary glands (2)
Small intestine
Stomach
F. Digestive System Disorders

1. Stomach acids sometimes damage the organ’s own lining, producing a hole in the stomach wall known as a _________________________________. Most peptic ulcers are caused by the ________________________________.

2. Diarrhea - when the large intestine ________________________________

3. Constipation - when the large intestine ________________________________

REVIEW

<table>
<thead>
<tr>
<th>Active Site</th>
<th>Enzyme</th>
<th>Effect on Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouth</td>
<td></td>
<td>Break down starches into disaccharides</td>
</tr>
<tr>
<td>Stomach</td>
<td></td>
<td>Break down proteins into large peptides</td>
</tr>
<tr>
<td>Small intestine (from pancreas)</td>
<td></td>
<td>Continues the breakdown of starch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Continues the breakdown of protein</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Breaks down fat</td>
</tr>
<tr>
<td>Small intestine</td>
<td></td>
<td>Breakdown the remaining disaccharides into monosaccharides</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Breaks down dipeptides into amino acids</td>
</tr>
</tbody>
</table>

38-3 The Excretory System

A. Functions of the Excretory System

1. Every cell produces ________________________________.
2. ________________________________ - the process by which these wastes are eliminated.
   a. The skin excretes excess water and salts in the form of ________________________________.
   b. The lungs excretes ________________________________.

The kidneys play an important role in maintaining homeostasis. They:

• ________________________________.
• ________________________________.
• ________________________________.

Big Idea/Questions/Notes:
B. The Kidneys

1. ____________________ - on either side of the spinal column near the lower back.
2. ____________________ - tube leaving each kidney, carrying urine to the urinary bladder.
3. ____________________ - a saclike organ where urine is stored before being excreted.
4. Blood enters the kidney through the ____________________.
5. The kidney removes urea, excess water, and other waste products and passes them to the ureter.
6. The clean, filtered blood leaves the kidney through the renal vein and ____________________

I. Kidney Structure

1. A kidney has two distinct regions:
   a. The inner part is called the renal ____________________.
   b. The outer part is called the renal ____________________.
2. The functional units of the kidney are called ____________________.
3. Nephrons are located in the ____________________, except for their ____________________, which descend into the ____________________.
4. Each nephron releases fluids to a collecting duct, which leads to the ureter

II. Kidney Filtration

1. ____________________ - passing a liquid or gas through a filter to remove wastes.
2. The filtration of blood mainly takes place in the glomerulus.
3. The ____________________ is a small network of capillaries encased in the top of the nephron by a hollow, cup-shaped structure called ____________________.
4. The materials filtered from the blood include ____________________.
5. ____________________ in the blood because they are too large to pass through the capillary walls.

III. Reabsorption

1. ____________________ - the process in which liquid is taken back into a vessel.
2. Almost ____% of the water that enters Bowman’s capsule is reabsorbed into the blood.
3. Remaining material, called __________, is emptied into a collecting duct.
4. Urine is primarily concentrated in the ____________________.
5. As the kidney works, purified blood is returned to circulation while urine is ________________.
6. Urine is stored here until it is released from the body through a tube called the urethra.

Big Idea/Questions/Notes:
E. Kidney Disorders
1. __________________________________ - made up of calcium, magnesium, or uric acid salts; they block the ureter causing great pain.
2. Humans have two kidneys, but _____________________________________.
3. If both kidneys are damaged by disease or injury, there are two options:
   a. ______________________________
   b. ______________________________

F. Kidney dialysis works as follows:
• Blood is removed by a tube and pumped through ___________________________________________________________.
  • ___________________________________________________________.
  • Wastes diffuse out of the blood into the fluid-filled chamber, allowing purified blood to be returned to the body.
Concept Map

Using information from the chapter, complete the concept map below. If there is not enough room in the concept map to write your answers, write them on a separate sheet of paper.

1. Uses Mechanical and chemical means to Begin digestion with chewing and saliva excretions

2. Uses Mechanical and chemical means to Transfer chewed food to the stomach

3. Uses Mechanical and chemical means to Produce enzymes and bile for chemical digestion

4. Uses Chemical means and absorption to Complete chemical digestion and absorb nutrients from chyme

5. Uses Absorption to

6. 

Organs of the Digestive System

- Esophagus
- Stomach
- Liver and pancreas
- Large intestine

© Pearson Education, Inc. All rights reserved.
Matching  On the line provided, write the letter of the description that matches each term or structure.

1. Calorie  a. hole in the stomach wall caused by bacteria
2. proteins  b. functional unit of the kidney
3. vitamins  c. mixture of partly digested food and stomach fluids
4. amylase  d. section of a nephron that conserves water and minimizes the volume of urine
5. peristalsis  e. enzyme contained in saliva
6. peptic ulcer  f. organic molecules that are needed by the body to help regulate body processes
7. chyme  g. unit equal to 1000 calories of heat energy, or 1 kilocalorie
8. nephron  h. contractions that squeeze food through the esophagus into the stomach
9. Bowman’s capsule  i. cup-shaped structure found in the upper end of a nephron
10. loop of Henle  j. nutrients that provide the body with the building materials it needs for growth and repair

Labeling Diagrams  On the lines provided, label the parts of the digestive system that correspond with the numbers in the diagram.
Multiple Choice  On the line provided, write the letter of the answer that best completes the sentence or answers the question.

17. Sugars and starches are the two kinds of  
   a. fats.    c. carbohydrates.  
   b. proteins.  d. minerals.  

18. What nutrients are made up of fatty acids and glycerol?  
   a. carbohydrates  c. fats  
   b. proteins  d. minerals  

19. Inorganic nutrients that the body usually needs in small amounts are called  
   a. minerals.  c. vitamins.  
   b. proteins.  d. fats.  

20. The small intestine is covered with projections called  
   a. villi.  c. chyme.  
   b. nephrons.  d. peristalsis.  

21. The main organs of the excretory system are the  
   a. lungs.  c. small intestines.  
   b. kidneys.  d. large intestines.  

22. Each kidney is connected to the urinary bladder by a(an)  
   a. urethra.  c. villus.  
   b. renal artery.  d. ureter.  

23. The saclike organ where liquid wastes are stored before excretion is the  
   a. urethra.  c. ureter.  
   b. urinary bladder.  d. loop of Henle.  

24. As blood enters a nephron, it flows through a network of capillaries known as a  
   a. loop of Henle.  c. villus.  
   b. Bowman’s capsule.  d. glomerulus.  

25. The process by which the kidneys remove water, urea, glucose, salts and amino acids from the blood is called  
   a. excretion.  c. filtration.  
   b. reabsorption.  d. absorption.
Ulcers

An ulcer is a pit or hole in a skin surface or mucus membrane. Ulcers result from erosion of tissues. There are two types of digestive system ulcers: stress ulcers and peptic ulcers. Peptic ulcers are quite common. It is estimated that between 1 and 20 percent of the population in developed countries have peptic ulcers. Stress ulcers are much less common.

Peptic ulcers usually occur in the duodenum. They can also occur in the stomach. When the defenses of the mucosal layer are not equal to the assault by acid or digestive enzymes, gastric juices may start to digest the wall of the digestive tract, causing an ulcer. Peptic ulcers are often chronic (prolonged or lingering). Researchers do not fully understand what factors lead to the imbalance that causes ulcers. However, they now think most peptic ulcers are caused by infection of the stomach lining by a bacterium called *Helicobacter pylori*. Peptic ulcers may be worsened by certain drugs, aspirin, smoking, and alcohol.

Stress ulcers differ from peptic ulcers. They usually occur in the stomach and are shallow, bleeding erosions. Stress ulcers may heal rapidly, but sometimes they perforate and cause serious bleeding. Despite their name, stress ulcers are associated with physical rather than psychological stress. Patients with stress ulcers have also had physical injuries, such as burns, trauma, or major surgery.

Peptic ulcer symptoms include pain, usually several hours after a meal. Stress ulcers are less painful than peptic ulcers, unless they become perforated. Both types are usually treated with medication. The use of antibiotics to treat peptic ulcers is usually successful. Stress ulcers may be treated with drug therapy to neutralize stomach acids and help regulate gastric secretions. When drug therapy is not effective, surgery may be necessary.

Evaluation  On the lines provided, answer the following questions.

1. What is the difference between stress ulcers and peptic ulcers? How are they similar?

   ____________________________________________

   ____________________________________________

   ____________________________________________

   ____________________________________________

2. Can you get ulcers from worrying about an exam? If so, what kind?

   ____________________________________________

   ____________________________________________

   ____________________________________________

   ____________________________________________