Lesson One: The Digestive System

-Digestive System at a Glance
  -Digestive System-the organs that break down food so that it can be used by the body.
  -digestive tract-includes mouth, pharynx, esophagus, stomach, small intestine, large intestine, rectum, and anus
    -can be more than 9 meters long
  -liver, gallbladder, pancreas, and salivary glands are also part of the digestive system (food doesn’t pass through these organs)

-Breaking Down Food
  -mechanical digestion-breaking, crushing, and mashing of food
  -chemical digestion-large molecules are broken down into nutrients
    -three major types of nutrients
      -carbohydrates
      -proteins
      -fats
    -enzymes break nutrients into smaller particles that the body can use

-Digestion Begins in the Mouth
  -Teeth
    -important for mechanical digestion by breaking down and grinding food
    -teeth are covered with enamel
      -enamel is the hardest material in the body and protects nerves and softer material inside the tooth
    -types of teeth
      -molars-grinding food
      -premolars-mashing food
      -incisors and canines-are for shredding food
  -Saliva
    -contains an enzyme that begins the chemical digestion of carbohydrates
    -changes complex carbohydrates into simple sugars

-Leaving the Mouth
  -tongue pushes it into the throat leading to a long, straight tube called the esophagus
  -esophagus squeezes the mass of food with rhythmic muscle contractions called peristalsis
  -peristalsis forces food into the stomach

-Harsh Environment of the Stomach
  -stomach-the saclike, digestive organ between the esophagus and the small intestine that breaks down food into a liquid by the action of muscles, enzymes, and acids.
  -stomach continues mechanical digestion by squeezing the food with muscular contractions
  -tiny glands in the stomach produce enzymes and acid
-enzymes and acids work together to break food into nutrients
-stomach acid kills most bacteria that you swallow with your food

-Leaving the Stomach
-chyme is released into the small intestine through a small ring of muscle that works like a valve
-valve keeps food in the stomach until the food has been thoroughly mixed with digestive fluids

-The Pancreas and Small Intestine
-The Pancreas-the organ that lies behind the stomach and that makes digestive enzymes and hormones that regulate sugar levels.
-pancreatic fluid flows into the small intestine to digest chime and contains bicarbonate which neutralizes the acid in chime
-pancreas also functions as a part of the endocrine system by making hormones that regulate blood sugar
-The Small Intestine-the organ between the stomach and the large intestine where most of the breakdown of food happens and most of the nutrients from food are absorbed.
-about 6 meters long; larger than a tennis ball court

-The Liver and Gallbladder
-liver-the largest organ in the body; it makes bile, stores and filters blood, and stores excess sugars as glycogen.
-can be as large as a football
-located toward right side, slightly higher than your stomach
-helps digestion by
- making bile to break up fat
- stores nutrients
- breaks down toxins

-Breaking Up Fat
-gallbladder-a sac-shaped organ that stores bile produced by the liver
-bile is squeezed from the gallbladder into the small intestine where the bile breaks large fat droplets into very small droplets

-Storing Nutrients and Protecting the Body
-nutrients are absorbed into the bloodstream and carried through the body
-nutrients not needed right away are stored in the liver and then released into the bloodstream as needed
-liver also captures and detoxifies many chemicals in the body

-The End of the Line
-Large Intestine-the wider and shorter portion of the intestine that removes water from mostly digested food and that turns the waste into semisolid feces, or stool.
-In the Large Intestine
-most material enters as a soupy mixture
-the water in the mixture is absorbed and the liquid is turned into feces or stool
-humans can’t digest cellulose (grains, fruits, and vegetables contain this carbohydrate); commonly known as fiber
-keeps stool soft and moving through the large intestine
Lesson Two: The Urinary System

-Cleaning the Blood

-Urinary System-the organs that produce, store, and eliminate urine

-The Kidneys as Filters

-Kidney-one of the pair of organs that filter water and wastes from the blood and that excrete products as urine.
  -filters about 2,000 L of blood each day
  -body only contains about 5.6 L so it filters about 350 times per day

-nephron-the unit in the kidney that filters blood

-steps to filtering blood
  -large artery brings blood into each kidney
  -tiny blood vessels branch off the main artery and pass through part of each nephron
  -water and other small substances (salt, glucose, amino acids, and urea) are forced out of the blood vessels and into the nephrons
  -as substances flow through the nephrons most of the water and some nutrients are moved back into blood vessels that wrap around the nephrons; a concentrated mixture of waste materials is left behind in the nephrons
  -cleaned blood (which has slightly less water and much less waste) leaves each kidney in a large vein to recirculate in the body
  -the yellow fluid that remains in the nephrons is called urine; urine leaves each kidney through a slender tube called the ureter and flows into the urinary bladder where it is stored
  -urine leaves the body through another tube called the urethra; urination is the process of expelling urine from the body

-Water In, Water Out

-Sweat and Thirst

-sweat is a way your body loses water to reduce temperature
-thirst occurs when mouth dries out because of a drop of water content in blood which makes you feel thirsty

-Antidiuretic Hormone-hormone released as body reacts to water shortage

-signals kidneys to take water from the nephrons
-nephrons return water to the bloodstream
-if there is too much water ADH hormone is released to have nephrons hold more water

-Diuretics-cause kidneys to make more urine which decreases the amount of water in blood

-Urinary System Problems
-bacterial infections: bacteria get into the bladder and ureters through the urethra and cause painful infections; these should be treated early before they damage the kidneys
-kidney stones: salts and wastes collect inside kidneys forming stones; can interfere with urine flow and cause pain; most pass naturally but some need to be removed by a doctor
-kidney disease: damage to nephron can prevent normal kidney functioning and can lead to kidney disease; if they don’t function properly a kidney machine is used to filter waste from the blood