Station 1: The Circulatory System
Sometimes called the Cardiovascular System

**ORGANS**
HEART, VEINS, ARTERIES, AND CAPILLARIES

Even though the heart is the size of a clenched fist, it is a powerful **muscle**. The heart pumps blood through its chambers to all parts of the body by cycles of contracting and relaxing.

**Blood** is carried to and from the heart in tubes called **blood vessels**.

**Arteries** are blood vessels that carry blood **away** from the heart to the rest of the body. The blood is under **REALLY HIGH PRESSURE** from the heart at this time.

The blood then moves into smaller blood vessels called **capillaries** where gasses, nutrients, and waste are exchanged with cells.

Then the blood is carried back to the heart in blood vessels called **veins**. These have **valves** in them that keep the blood flowing in one direction against the force of gravity.

With every breath, **oxygen** mixes with blood in the **lungs** and then is pumped to all cells in the body through the blood vessels. Oxygen-depleted blood then returns back to the heart and the process is repeated.

**FUN FACTS ABOUT THE CIRCULATORY SYSTEM**

- Your heart pumps about 4,000 gallons of blood each day.
- An average human’s heart beats 30 million times per year.
- The sound of a heartbeat is created by valves in the heart closing as they push blood through its chambers.

The **blood** may look like a liquid to the unaided eye but if you were to look at it under a microscope, you would see that it has four different parts.

1. **Red blood cells**: give the blood its color and their job is to carry oxygen, carbon dioxide, and glucose around the body
2. **White blood cells**: attack invaders such as bacteria
3. **Platelets**: help stop the blood from flowing out of cuts by creating scabs
4. **Plasma**: liquid part of the blood; all the other parts float around in it

**MAIN FUNCTION**
The Circulatory System circulates blood through the body, supplies cells with oxygen and nutrients and removes waste products.
Station 2: The Respiratory System

ORGANS
AIRWAYS (LARYNX, TRACHEA, BRONCHIAL TUBES), DIAPHRAGM, LUNGS, ALVEOLI

Respiration is achieved through the mouth, nose, trachea, lungs, and diaphragm.

First, air enters the body through your nose or mouth, then travels through your larynx (voice-box), down your trachea (windpipe), and finally splits into two bronchial tubes entering your lungs.

Your lungs, located inside the chest cavity, carry oxygen into your body when you inhale, and carbon dioxide out of your body when you exhale.

Within the lungs are thousands of thin bronchial branches with endings composed of millions of alveoli. *This is where the exchange of oxygen and carbon dioxide occurs.* Around the alveoli are microscopic capillaries transporting carbon dioxide from the heart and delivering oxygen back to the heart.

Lastly, muscles near the lungs, including the diaphragm, help the lungs expand and contract. This allows breathing to occur.

FUN FACTS ABOUT THE RESPIRATORY SYSTEM
- There are approximately 1,500 miles of airways within the lungs
- The fastest sneeze on record is 102 miles per hour

MAIN FUNCTION
By breathing, the respiratory system supplies oxygen to the blood. When we breathe, we transfer *oxygen to the blood* and *remove carbon dioxide from it*. 
Station 3: The Skeletal System

ORGANS
BONES, *JOINTS, LIGAMENTS

Bones are hard, white, and mainly composed of a mineral compound called calcium phosphate. They are made of living bone cells. Inside the bones is bone marrow, a jelly-like substance where red and white blood cells form. Bone arrangement of the skeleton is important to provide a wide range of functions.

THESE FUNCTIONS INCLUDE:
- supporting and protecting delicate and soft organs (brain, lungs, heart, spinal cord)
- anchoring muscles for movement
- producing blood cells
- giving basic shape and structure to our bodies
- storing and releasing calcium and other minerals

FUNCTIONS OF VARIOUS BONES
- **Backbone (Vertebrae)**: provides structure, which enables you to stand up straight and protects the spinal cord
- **Skull**: acts as a hard safety helmet protecting the brain
- **Rib cage**: protects the heart and lungs

FUN FACTS ABOUT THE SKELETAL SYSTEM
- The human body’s longest bone is the femur, which is about 25% of your height
- 52 out of the 206 bones in the skeletal system are in both feet

Joints are where bones connect. There are six types of joints.
1. **Ball and Socket**: located at the shoulder and hip
2. **Hinge**: elbows, knees, fingers
3. **Pivot joints**: neck and two bones of lower arm
4. **Saddle joint**: base of thumb
5. **Gliding**: between bones of hands and feet
6. **Immovable**: skull and pelvis

Ligaments are tough tissues that hold bones together at joints.
Station 4: The Muscular System

ORGANS
MUSCLES (3 types: SKELETAL, SMOOTH, CARDIAC), TENDONS

There are approximately 639 skeletal muscles in the body, and they make up about 40% of body weight.

Smooth muscles make up the walls of hollow organs, specifically in the digestive, circulatory, respiratory, and reproductive systems.

Cardiac muscle is the muscle tissue of the heart.

Tendons connect your muscles to your bones.

FUN FACTS ABOUT THE MUSCULAR SYSTEM
- More than 30 facial muscles create smiles and frowns, among other expressions.
- Scientists estimate the eye muscles move more than 100,000 times a day.
- The largest muscle in the body is the muscle in the buttocks, the gluteus maximus.

Some of the body’s muscles are voluntary, meaning the muscles work because you specifically tell them to. You control these muscles. Some of the body’s muscles are involuntary meaning the muscles work automatically. Moving them does not involve any thought and you DO NOT have control over these muscles.

MAIN FUNCTIONS
The muscular system allows the body to move when attached to bone and permits movement in internal organs, such as the heart and intestines. It also provides strength, posture, balance, and heat for body warmth.
Station 5: The Integumentary System

ORIGANS
SKIN (3 layers: EPIDERMIS, DERMIS, HYPODERMIS), HAIR, NAILS, SWEAT GLANDS

The three layers of the skin are the **epidermis**, **dermis**, and **hypodermis**.

The **epidermis** is the visible outer layer where new skin cells form. **Finger nails** function to protect the surrounding soft tissues of the fingers from injuries.

The **dermis** contains **oil** and **sweat glands**. The sweat glands secrete sweat when the body is too warm, which cools the skin surface and the body. Oil glands moisten the skin and hair and adds flexibility.

The **hypodermis** helps the body stay warm and anchors the skin to all tissues beneath it. The hypodermis is mainly composed of fat, which also helps the body stay warm.

**Sensory receptors** on the dermis gather information about what is affecting the skin and sends the information to the brain. If something is not right, the brain is alerted and the body takes action.

- **Touch receptors**: very sensitive; respond to the slightest contact; about 500,000 touch receptors in the human body; found on the fingers, tongue and lips.
- **Pain receptors**: not as sensitive; do not react unless there is a very strong stimulus or pain; 3 to 4 million pain receptors scattered all over the body.

**FUN FACTS ABOUT THE INTEGUMENTARY SYSTEM**
- Your body is always making new skin cells and getting rid of old ones. Your body gets rid of 30,000 to 40,000 old skin cells every day! The skin you see now will be gone in about a month.
- Dead skin cells are on top. The top 18 to 23 layers of your skin are made of dead cells.

**MAIN FUNCTIONS**
- continuously receives information about the external environment (temperature, humidity, pain, pressure, sensations, etc.)
- protects the body’s deeper tissues from infection and injury
- excretes wastes (through sweat)
- regulates temperature
- synthesizes (makes) vitamin D
Station 6: The Nervous System

ORGANS

BRAIN, SPINAL CORD, NERVES

The brain uses information received from the nerves to coordinate actions. Thin threads of nerve cells, called neurons, carry messages throughout the body. Sensory nerves carry these messages to the brain through the spinal cord, while motor nerves carry them from the brain to all of the various muscles and glands.

A tiny electrical pulse generates when a neuron is stimulated by heat, cold, touch, sound or vibrations. Chemicals help carry the electrical pulse from the finger-like projections (dendrites) of one neuron to the next cell.

FUN FACTS ABOUT THE NERVOUS SYSTEM

- There are more nerve cells in the human brain than there are human beings on Earth.
- The left side of the human brain controls the right side of the body and vice-versa
- As we get older, the brain loses a gram of brain mass per year.
- Reflex signals don’t go all the way to your brain. The spinal cord handles those directly so they can happen faster.
- Neurons are the largest cells in the body, some with fibers a meter long

MAIN FUNCTION

Functions as a control center and coordinates all actions and reactions, sending immediate and specific information as electrical impulses.
Station 7: The Excretory System
(sometimes called the Urinary System)

ORGANS
KIDNEYS, URETERS, BLADDER, URETHRA

Waste collects in the center of the kidneys, where it is processed into urine and forced down through tubes (ureters) into a stretchy pouch called the bladder.

When the bladder becomes full, it sends a signal through the nervous system to your brain. The brain then signals your body to release the urine through the urethral opening.

The waste that your kidneys collect is UREA. This is combines with excess water to make urine and then goes to the bladder for temporary storage. UREA is also found in smaller concentrations in sweat.

FUN FACTS ABOUT THE EXCRETORY SYSTEM
- Inside the kidneys are millions of tiny structures that filter out liquids and wastes.
- About 440 gallons of blood flow in and out of the kidneys every day
- Your bladder can hold about one pint of urine.
- You have two kidneys and can function effectively with only one. People who lose function in both kidneys can artificially filter their flood using dialysis, but this is not a permanent solution.

MAIN FUNCTION
The excretory system filters excess fluids, chemicals, vitamins, minerals, salts, and other wastes from the BLOOD into the kidneys. The kidneys control your hydration by adding water back into your bloodstream after filtering. They also control the balance of certain salts and other blood parts.

Waste products from other parts of the body are removed by other systems.
- Carbon dioxide is a waste product produced by cells and is eliminated through your lungs.
- Food that is not digested and absorbed by your body is eliminated through your intestines.