The Human Body
Videos

Human Facts -  
http://www.youtube.com/watch?v=v5Eo1YcLMC8&feature=related

Amazing Human Facts -  
http://www.youtube.com/watch?v=qFrRebVvj-w
The human body has 11 organ systems that function together to keep body working properly.

As we go through each system, your title page will need to include at least 5 pictures from 5 different systems.
Flip your booklet over.
  ▪ Write your name and class period.

It is your responsibility to keep up with your booklet. If you lose your booklet, it will $ to get a new one printed out.

As we go through each system, your title page will need to include at least 5 pictures from 5 different systems.
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<td>Fight foreign particles/infections</td>
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Integumentary System

S Ki N
Integumentary System

Major Organs/Parts Involved:
- Skin, Hair, and Glands (also Nails)

Functions/Roles:
1. Protection/Defense from foreign particles
2. Heat exchange (maintain homeostasis)
3. Sensation (stimulus/response)
Integumentary System

Skin has 3 Layers:

1. **Epidermis** – outermost layer
   
   a. **Hair** – provide warmth and protection
Integumentary System

Skin has 3 Layers:

2. **Dermis** – middle layer
   a. **Sweat gland** – produces sweat
   b. **Sebaceous gland** – produces oil
   c. **Hair follicle** – produces hair
Sweat glands in the dermis layer

Sweat glands secrete water, salts, calcium, and other metabolic waste.
Integumentary System

Skin has 3 Layers:

3. **Hypodermis (Subcutaneous)** – innermost layer
   a. Not considered a part of skin; connects skin to underlying bone & muscle
   b. Contains 50% of body fat

![Diagram of the skin layers with labels for Hypodermis, Dermis, Epidermis, Hair Follicle, Sebaceous Gland, and Sweat Gland.]
Integumentary System

Other Vocab:

1. **Pathogen** – infectious or disease-causing agent

**Bacteria, viruses, fungi**
Integumentary System

Diseases/Disorders:

1. **Melanoma** – skin cancer
   - Melanocytes are cells that produce the dark pigment, **melanin**, which is responsible for the color of skin.
Integumentary System

Diseases/Disorders:

2. **Acne** – common skin disease
   - Usually caused by increase in testosterone
   - Results in excess oil or dead skin cell getting trapped in pores
Integumentary System

Give a definition of **homeostasis**: Regulation of an internal and external environment to maintain balance

For example, how does the **integumentary system** help maintain homeostasis? Integumentary system regulates body temperature by either producing sweat if body is too hot or body shivers if it is too cold.
Seriously Long Ear Hair

The World’s Longest Ear Hair – 10.2 cm
B D Tyagi of Bhopal (India)
http://news.bbc.co.uk/.../newsid_1805000/1805342.stm
Muscular System
Muscular System

3 Types of Muscle Tissue:

1. **Skeletal Muscle**
   a. Attaches to skeleton (moves **bones**)
   b. Striations and under **voluntary** control
3 Types of Muscle Tissue:

2. **Smooth Muscle**
   a. Lines digestive tract; moves food through body
   b. No striations and under *involuntary* control
Muscular System

3 Types of Muscle Tissue:

3. **Cardiac Muscle**
   a. Pumps heart
   b. Striations and under *involuntary* control

3 Types of Muscle Tissue

- [Image of muscle cells]
  - **Skeletal Muscle**
  - **Cardiac Muscle**
  - **Smooth Muscle**
Muscular System

What type of muscles shown here?
Muscular System

Functions/Roles:

1. Movement of body, organs, and materials
2. Maintains posture
Muscular System

Connective Tissue Involved:
- **Tendons** - connect muscles to bones
Muscular System

Diseases/Disorders:

1. **Muscular Dystrophy** – group of muscle disease that weaken musculoskeletal system and decrease locomotion
Muscular System

Diseases/Disorders:

2. **Cramps** – painful sensations; commonly causes muscle fatigue, **buildup of lactic acid**, low sodium/potassium
Muscular System

Diseases/Disorders:

3. **Sprain** – injury to muscle or tendon where muscle fibers tears as result of overstretching (pulled muscle)
Skeletal System
Skeletal System

Functions/Roles:

1. **Support** – provides framework & gives shape
2. **Protection** – protects vital organs (brain, heart, etc)
3. **Blood Cell Production** - occurs in bone marrow
4. **Storage** – stores calcium in bones & iron in bone marrow
Skeletal System

2 Regions:

1. **Axial Skeleton**
   - contains skull, vertebral column, and rib cage

**Color Axial Skeleton in your booklet**
Skeletal System

2 Regions:

2. Appendicular Skeleton
   – contains upper & lower limbs and pelvis

**Color Appendicular Skeleton in your booklet**
Skeletal System

Connective Tissue Involved:

- **Ligaments** - connect bones to bones
Skeletal System

Other Vocab:

1. **Joint** – place where 2 or more bones meet
Skeletal System

Diseases/Disorders:

1. **Leukemia** – cancer of blood or bone marrow; abnormal production of white blood cells
Skeletal System

Diseases/Disorders:

2. **Osteoporosis** – disease of bones; bones losing density and easily fracture (break)
Skeletal System

Diseases/Disorders:

3. **Bone Fracture** – break in bone tissue; several types: Incomplete (hairline fracture) & Complete (bone broken completely)
Ouch!!
Skeletal System

Diseases/Disorders:

4. **Scoliosis** – medical condition where spine is curved
Skeletal System

Diseases/Disorders:

**Arthritis** – inflammation of joints

STOP POPPING YOUR KNUCKLES!
Circulatory System
Circulatory System

Major Organs/Parts Involved:

1. **Heart** – pumps blood

*** - 4 Chambers: **2 Atrium (Atria)** (top) & **2 Ventricles** (bottom)

** Color the chambers of the heart using **Red** (Carrying Oxygen) and **Blue** (Carrying Carbon Dioxide)

Basic Heart Structure:

<p>| | |</p>
<table>
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<tr>
<td>RA</td>
<td>LA</td>
</tr>
<tr>
<td>RV</td>
<td>LV</td>
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</table>
Circulatory System

Major Organs/Parts Involved:

2. **Blood Vessels** – transport blood
   
   a. **Artery** - carries blood AWAY from heart
   
   b. **Vein** – carries blood TOWARDS heart
   
   c. **Capillary** – site of gas exchange ($O_2$, $CO_2$)

** Color the diagram using Red (Carrying Oxygen) and Blue (Carrying Carbon Dioxide)**
Circulatory System

Major Organs/Parts Involved:

3. **Spleen** – organ that recycles red blood cells & stores blood
Circulatory System
Major Organs/Parts Involved:

4. **Blood** – bodily fluid that transports nutrients/waste
   a. **Erythrocytes** – aka Red Blood Cells; delivers $O_2$
   b. **Leukocytes** – aka White Blood Cells; fight diseases and foreign pathogens
   c. **Thrombocytes** – aka Platelets; blood clotting
   d. **Plasma** – liquid portion of blood
Circulatory System

Functions/Roles:

1. **Transport** – move nutrients, gases, hormones, blood cells, etc.

2. **Maintain homeostasis** – stabilize body temperature & pH
Circulatory System

4 Blood Types:  
_A_ , _B_ , _AB_ (universal recipient), and _O_ (universal donor)
Pathway of Blood:

Vena Cava → Right Atrium → Right Ventricle → Pulmonary Artery → Lungs → Pulmonary Vein → Left Atrium → Left Ventricle 

Aorta → Arteries → Capillaries (Body Cells) → Veins → Vena Cava

** Color flow of blood through the body using **Red** (Carrying Oxygen) and **Blue** (Carrying Carbon Dioxide)**
Circulatory System

Diseases/Disorders:

1. Heart Attack – interruption of blood supply to part of heart, causing heart cells to die; caused by blockage of coronary artery (plaque)
Circulatory System

Diseases/Disorders:

2. **Sickle Cell Anemia** – genetic blood disorder; RBC’s are sickled shaped due to mutation of hemoglobin; blood clots easily
Circulatory System

Diseases/Disorders:

3. **Heart Murmur** – pathologic heart sounds due to turbulent blood flow
Circulatory System

http://www.youtube.com/watch?v=LqhvmUEdOYY
Respiratory System
Respiratory System

Major Organs/Parts Involved:

1. **Mouth/Nose** – site of air intake
Respiratory System

Major Organs/Parts Involved:

2. **Pharynx** – connects mouth/nose to larynx
Respiratory System

Major Organs/Parts Involved:

3. **Larynx** – voice box
Respiratory System

Major Organs/Parts Involved:

4. **Trachea** – windpipe; C-shaped cartilage rings to hold open
Respiratory System

Major Organs/Parts Involved:

5. **Epiglottis** – thin covering over larynx to prevent food from getting in windpipe
Respiratory System

Major Organs/Parts Involved:

6. **Lung** – organ that transports O\(_2\) into bloodstream and releases CO\(_2\) to atmosphere
Respiratory System

Major Organs/Parts Involved:

7. **Bronchus** – left & right; passageway of air to lungs
Respiratory System

Major Organs/Parts Involved:

8. **Bronchioles** – left & right; lead air into lungs
Respiratory System

Major Organs/Parts Involved:

9. **Diaphragm** – muscle underneath ribcage; functions in breathing
Respiratory System

Major Organs/Parts Involved:

10. Alveoli – air sac; site of gas exchange with blood
Respiratory System

Functions/Roles:

1. **Gas exchange** – O₂ in & CO₂ out
Respiratory System

Diseases/Disorders:

1. **Asthma** – inflammation of airway; hard to breathe
Respiratory System

Diseases/Disorders:

2. **Emphysema** – lung disease; causes shortness of breath; most often by tobacco smoking
Respiratory System

Diseases/Disorders:

3. **Tracheotomy** – incision (cut) in trachea & inserting tube in trachea allowing person to breathe without use of mouth
4. **Cystic Fibrosis** – genetic disorder mostly affecting lungs; abnormal transport of Na & Cl across epithelium leading to thick secretions; causes chest infections, shortness of breath, etc.
Connection: page 7

Using pages 7-10 in booklet, how do circulatory and respiratory systems work together in gas exchange?

Respiratory system will bring in oxygen, and circulatory system will transport oxygen to cells.
Circulatory system will pick up carbon dioxide from cell, and respiratory system will get rid of it.
Respiratory System

http://www.youtube.com/watch?v=3nZaSrV6v6k&feature=related
Digestive System

Major Organs/Parts Involved:

1. **Mouth** – digestion starts here
Digestive System

Major Organs/Parts Involved:

2. **Teeth** – used to breakdown food
3. **Tongue** – used for chewing, speaking, & tasting
Digestive System

Major Organs/Parts Involved:

4. **Salivary Gland** – produces saliva; secretes amylase which breaks down starch
Digestive System

Major Organs/Parts Involved:

5. **Esophagus** – muscular tube that pushes food from pharynx to stomach
Digestive System

Major Organs/Parts Involved:

6. **Stomach** – muscular tube where digestion continues; very acidic (HCl inhibits/kills bacteria); proteases digest protein
Digestive System

Major Organs/Parts Involved:

7. **Liver** – makes bile; aids in fat digestion
Digestive System

Major Organs/Parts Involved:

8. **Gall Bladder** – stores bile; aids in fat digestion
Digestive System

Major Organs/Parts Involved:

9. **Pancreas** – secretes pancreatic juices which aid in absorption of nutrients & digestion in small intestine
Digestive System

Major Organs/Parts Involved:

10. **Small Intestine** – much digestion & absorption of food occurs here
Digestive System

Major Organs/Parts Involved:

11. **Large Intestine** – much absorption of $\text{H}_2\text{O}$ occurs here
Digestive System

Major Organs/Parts Involved:

12. **Rectum** – bottom portion of large intestine
13. **Microvilli** – finger-like projections found in small intestine to increase surface area for more absorption
Digestive System

Functions/Roles:

1. Breakdown food/nutrients
2. Removal of solid waste
Digestive System

Other vocab:

1. **Mastification** - chewing

2. **Peristalsis** – movement of food through digestive system by contracting smooth muscles
Digestive System

Diseases/Disorders:

1. Acid Reflux – stomach acid comes up into esophagus causing burning sensation
Excretory System
Excretory System

Major Organs/Parts Involved:

1. **Kidneys** - filter blood of liquid waste; regulation of pH and blood pressure (salt & H$_2$O balance)
Excretory System

Major Organs/Parts Involved:

2. **Ureter** – muscular tube that carries urine from kidneys to urinary bladder
Excretory System

Major Organs/Parts Involved:

3. **Urinary Bladder** – organ that collects urine
Excretory System

Major Organs/Parts Involved:

4. **Urethra** – connects urinary bladder with genitals
Excretory System

Major Organs/Parts Involved:

5. **Renal Artery** – carries blood to kidneys
6. **Renal Vein** – carries blood away from kidneys
Excretory System

Functions/Roles:

1. Filter blood of liquid waste
2. Removal of liquid waste from body
Excretory System

Diseases/Disorders:

1. **Kidney stones** – solid mass formed in kidneys due to low fluid intake and high intake of protein, Na, cokes, etc.
Excretory System

Diseases/Disorders:

2. **Urinary Tract Infection** – bacterial infection that affects part of urinary tract; painful urination; often due to excessive sexual intercourse
Excretory System

Diseases/Disorders:

3. **Dialysis** – process for removing waste and excess H$_2$O; artificial replacement for lost kidney function/renal failure
Connection:

How do digestive, excretory, and circulatory systems work together to transport nutrients and get rid of metabolic waste?

Digestive system will breakdown food, and circulatory system will transport nutrients to cells. Circulatory system will then pick up waste material from cells and transport to digestive and excretory systems so wastes can exit body.
Nervous System
Nervous System

Major Organs/Parts Involved:

1. **Brain** – control center of nervous system
Nervous System

Major Organs/Parts Involved:

2. **Spinal Cord** – long, tubular nervous tissue that carries message from brain
Central Nervous System VS Peripheral Nervous System

- Central Nervous System (Green) includes the brain and the spinal cord
- Peripheral Nervous System (Pink) is everything else

** Color the CNS and the PNS different colors
Nervous System

Major Organs/Parts Involved:

3. **Nerves** – enclosed, cable-like bundle of axons that carry electrical impulses
Nervous System

Major Organs/Parts Involved:

4. **Neuron** – nerve cell that processes information
Nervous System

Major Organs/Parts Involved:

a. **Dendrites** – branch-like projections from neuron; carries impulse to cell body
Nervous System

Major Organs/Parts Involved:

b. **Cell Body** – soma; contains nucleus
Nervous System

Major Organs/Parts Involved:

c. **Axon** – long, slender projection of neuron; carries impulses **away** from cell body
Nervous System

Major Organs/Parts Involved:

d. **Myelin Sheath** – usually around axon; increase speed of signal/impulse (like rubber around a cable)
Nervous System

Functions/Roles:

1. Controls action of body
2. Sends electrical signals to cells
Nervous System

Reflex Arc:

1. Sensory information does not go to brain for processing
2. Goes to spinal cord which send a QUICK motor response
Nervous System

Diseases/Disorders:

1. **Multiple Sclerosis** - inflammatory disease where fatty myelin sheaths are damaged; nerve cells in brain & spinal cord do not work properly; causes numbness, difficulty moving, speech impairment, etc.
Nervous System

Diseases/Disorders:

2. **Paralysis** – loss of muscle function in 1 or more muscles which can cause loss of feeling in affected area

Bell's Palsy
Nervous System

Diseases/Disorders:

3. **Concussion** – traumatic brain injury with temporary loss of brain function; causes headaches, feeling hazy, emotional changes, etc.
Endocrine and Reproductive Systems
Endocrine & Reproductive Systems

Major Organs/Parts Involved:

A. Endocrine

1. Pituitary Gland – gland that secretes 9 hormones to regulate homeostasis; found at base of brain
Endocrine & Reproductive Systems

Major Organs/Parts Involved:

A. Endocrine

2. **Hormone** – chemical messenger
   a. **Testosterone** – male reproductive hormone
   b. **Estrogen** – female reproductive hormone
Endocrine & Reproductive Systems

Major Organs/Parts Involved:

A. Endocrine

2. **Hormone** – chemical messenger
   
   c. **Insulin** – pancreatic hormone regulating blood sugar
Blood Sugar Regulation
Endocrine & Reproductive Systems

Major Organs/Parts Involved:

A. Endocrine

2. **Hormone** – chemical messenger
d. **Human Growth Hormone** – hormone that stimulates growth, cell reproduction, and regeneration
Endocrine & Reproductive Systems

Major Organs/Parts Involved:

B. Reproductive

- Female: **Ovary** – produces eggs
- Male: **Testis/Testes** – produces sperm
Endocrine & Reproductive Systems

Functions/Roles:

A. Endocrine

1. Controls body by releasing hormones
Endocrine & Reproductive Systems

Functions/Roles:

B. Reproductive

1. Reproduce (create life)
Endocrine & Reproductive Systems

Diseases/Disorders:

1. **Diabetes** – disease where person has high blood sugar due to low production of insulin
Fetal circulation/respiration video

http://www.youtube.com/watch?v=3IkAnVZpO5Y&feature=player_detailpage
Endocrine & Reproductive Systems

Diseases/Disorders:

2. Human Growth Deficiency – medical condition caused by pituitary gland not producing enough growth hormone; results in dwarfism
Endocrine & Reproductive Systems

Diseases/Disorders:

3. **Gigantism** – medical condition caused by pituitary gland over producing enough growth hormone; results in a “giant”
Connection:
How do *nervous* and *endocrine* systems work together to regulate homeostasis?

*Nervous* system interprets feedback from systems and sends signals to *endocrine* system or other system to ensure balance is restored in the body. *Endocrine* system will release hormones to maintain homeostasis.
Lymphatic System
(Immune System)
Lymphatic/Immune System

Major Organs/Parts Involved:

1. **Lymph Nodes** – organ that filters foreign particles from lymph and makes white blood cells
Lymphatic/Immune System

Major Organs/Parts Involved:

1. **Lymph Nodes** – organ that filters foreign particles from lymph and makes white blood cells
   a. **Tonsils** – back of throat; first line of defense
Lymphatic/Immune System

Tonsillitis – inflammation of tonsils
Lymphatic/Immune System

Major Organs/Parts Involved:

2. **Thymus** – organ that produces T-cells
Lymphatic/Immune System

Major Organs/Parts Involved:

3. **Spleen** – organ that produces antibodies and removes antibody-coated bacteria & cell by way of blood
Lymphatic/Immune System

Major Organs/Parts Involved:

4. **Leukocytes** – also known as White Blood Cells; fight diseases and foreign pathogens
Lymphatic/Immune System

Functions/Roles:

1. Fight foreign particles/infections
2. Clean blood of foreign particles/infections
Lymphatic/Immune System

Diseases/Disorders:

1. Lymphoma – cancer of lymphocytes; tumor in lymph nodes
Lymphatic/Immune System

Diseases/Disorders:
2. **Autoimmune Disease** – (i.e. Lupus) – body mistakes own cells/tissues as pathogens and attacks itself

![Normal vs Autoimmune Disorder](image-url)
Connection:
How do the **circulatory** and **lymphatic** systems work together to fight infection?

**Lymphatic** system makes white blood cells to fight infections, and **circulatory** system transports white blood cells and carries pathogens back to **lymphatic** system to rid body of these pathogens/infections.
Cell Differentiation – process where stem cell is given unique job/function (cannot go to being a stem cell)

Draw a basic diagram that shows Stem Cells differentiating into specialized cells like the picture