Biology 5-1: Animal Systems II

Assignments:

<table>
<thead>
<tr>
<th>Description</th>
<th>Page(s)</th>
<th>Due Date</th>
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<tbody>
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<td>Feb 23</td>
<td>24</td>
<td>25</td>
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<tr>
<td>Test - Animal Systems I</td>
<td>Start Animal Systems II</td>
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<tr>
<td>Mar 2</td>
<td>3</td>
<td>4</td>
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<tr>
<td></td>
<td>Quiz 2: Regulation</td>
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<td>9</td>
<td>10</td>
<td>11</td>
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<td>Spring Break</td>
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<tr>
<td>16</td>
<td>17</td>
<td>18</td>
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<tr>
<td></td>
<td>Quiz 3: Defense</td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>24</td>
<td>25</td>
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<tr>
<td>Begin Botany</td>
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<td>30</td>
<td>31</td>
<td>Apr 1</td>
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<td>English EOC I</td>
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<td>Quiz</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>Test - Botany</td>
<td>Begin Ecology</td>
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<td>13</td>
<td>14</td>
<td>15</td>
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</tr>
</tbody>
</table>
Organisms are continually exposed to changes in their external and internal environments. To be healthy, an organism must maintain **homeostasis**, a “dynamic equilibrium” or “steady state”, which keeps their internal environment balanced. Failure to maintain homeostasis may result in disease or death. To maintain homeostasis, organisms use **negative feedback** mechanisms that detect changes from the **set point** (the normal state) and trigger appropriate responses that return their body systems to the set point.

1. Use the information in the box above to write definitions for the following words:
   - **Homeostasis**
   - **Negative feedback**
   - **Set point**

2. Why are feedback mechanisms important?
Driving Homeostasis
The process of homeostasis is like driving a car at the speed limit (55 miles per hour).

What is the set point for driving a car? ________________________________

If you detect that the speed of the car is above the set point, what response should you make? ________________________________

If you detect the speed of the car is below the set point, what response should you make? ________________________________

Arrange the green cards in the boxes on the Negative Feedback Graphic Organizer to illustrate how negative feedback mechanisms can be used to drive within the speed limit.

Cupples

Cupples are adorable little creatures that spend their lives doing two things, eating and exercising. When Cupples eat, the concentration of sugar in their blood increases. When Cupples exercise, they use food for energy and the concentration of sugar in their blood decreases.

To maintain homeostasis, Cupples need to keep the concentration of sugar in their blood at a normal level. If they have the normal concentration of sugar in their blood, they will be green.

1. What color is the Cupple blood when the concentration of sugar in its blood is at the set point? ______________
2. How does eating affect the concentration of sugar in the blood of a Cupple? ______________
3. How does exercising affect the concentration of sugar in the blood of a Cupple? ______________
4. What color represents the set point? ______________
5. What feedback response would be needed to maintain homeostasis when the sugar concentration in Cupple blood went above the set point? ______________
6. What feedback response would be needed to maintain homeostasis when the sugar concentration in the blood went below the set point? ______________
Homeostasis and Negative Feedback in Humans
Read the station cards and use them to place the cards in the Negative Feedback Graphic Organizer sheet. Then record your notes on this sheet.

**Body Temperature**
How does your body adjust if your temperature gets too low? __________________________

How does your body adjust if your temperature gets too high? __________________________

**Light**
How does your body adjust if it is too bright? __________________________

How does your body adjust if it is too dark? __________________________

**Blood Glucose Levels**
How does your body adjust if your blood glucose levels get too high? ____________

How does your body adjust if your blood glucose level is too low? ____________

Use what you know about the body to answer this question

**Carbon Dioxide Levels**
What does your body do if it detects that your carbon dioxide levels are too high? __________________________

What does your body do if it detects that your carbon dioxide levels are too low? __________________________
Fishbowl Analogy

Maintaining homeostasis in the body is similar to keeping conditions in a fishbowl balanced. The contents of a fishbowl represent a multicellular body. Fish represent the cells of a multicellular body. For fish to survive, the internal environment (fluids) in the fishbowl must be maintained to provide the proper temperature and the proper levels of nutrients, oxygen, carbon dioxide and waste.

Devices such as heaters/cooler, automatic feeders, air bubbler and filters can be used to maintain the proper internal environment.

Use the words from these lists of human body parts and functions to complete the fishbowl analogy table below.

<table>
<thead>
<tr>
<th>Human Body</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body fluids</td>
<td>* Barrier</td>
</tr>
<tr>
<td>Digestive tract</td>
<td>* Internal environment</td>
</tr>
<tr>
<td>Kidneys</td>
<td>* Maintain constant temperature</td>
</tr>
<tr>
<td>Lungs</td>
<td>* Maintain food level</td>
</tr>
<tr>
<td>Muscles</td>
<td>* Excrete nitrogen wastes</td>
</tr>
<tr>
<td>Skin</td>
<td>* Maintain oxygen</td>
</tr>
<tr>
<td>* Homeostasis</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fishbowl</th>
<th>Human Body</th>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fish</td>
<td>Cells</td>
<td>Need to stay alive</td>
</tr>
<tr>
<td>Glass bowl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air pump</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Filter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heater</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeder</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Everything working together</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Animal Systems: REGULATION**

**Nervous System & Endocrine System**

*Regulation* requires ___________________________ - the ability of the body or a cell to seek and maintain stability within its internal environment when dealing with external changes.

The *nervous system* maintains homeostasis by…

The *excretory system* regulates the concentration of water and other components of body fluids like salts and nutrients.

**The Excretory System**

*Function* - Maintains Homeostasis in 3 Steps:

1. ___________________________ - Filters substances from the blood
2. ___________________________ - Regulate the chemical composition of body fluids by retaining the proper amounts of water, salts, and nutrients
3. ___________________________ - Elimination of wastes in the form of urine

**Evolutionary Trends**

<table>
<thead>
<tr>
<th>Animal Taxon</th>
<th>Aquatic Invertebrates</th>
<th>Worms and Mollusks</th>
<th>Insects</th>
<th>Vertebrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Release Wastes By...</td>
<td>Use ____________ to remove waste across their cell membranes directly into the water</td>
<td>Use of ____________ - tiny pores along the body excrete waste</td>
<td>Using ____________ ____________ to collect and excrete wastes</td>
<td>Use of kidneys, ureters, and a bladder to collect and excrete waste</td>
</tr>
<tr>
<td><strong>Picture of system</strong></td>
<td><img src="image1" alt="Aquatic Invertebrates" /></td>
<td><img src="image2" alt="Worms and Mollusks" /></td>
<td><img src="image3" alt="Insects" /></td>
<td><img src="image4" alt="Vertebrates" /></td>
</tr>
<tr>
<td><strong>Examples</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Major Organs:
- **Kidneys** (renal = kidney)
  - Paired organs that receive blood via the ____________________________
  - The main filters are tissues called ___________ that separate the components of the blood
  - Every 45 minutes kidneys filter all the blood in your body
  - Filtered blood leaves kidneys and returns to circulation carrying nutrients, salts, and water via the ____________________________
  - Excess water and toxic waste in the form of urine leave the kidney via the ____________
  - Sometimes excess salts or minerals in the urine crystallize and form _________________. When kidney stones block the ______________, they cause great pain.
- **Ureters**—tubes that carry urine from _______________ to urinary _________________
- **Bladder**—muscular sac where _______________ temporarily before being excreted
- **Urethra**—tube that carries urine from _______________ to ________________

Structures of the Excretory System
(Add labels)

Levels of Organization
- cells
- tissues
- organs
- systems
- organism

Interactions with Other Body Systems for Regulation
- _______________ of the _________________ remove CO₂ from blood.
- The _________________ brings wastes to the lungs, kidneys, and skin for excretion.
- ___________ of the _________________ excretes water, urea, salts, and other wastes through sweat.
Animal Systems: REGULATION
Nervous System

Regulation requires ______________________ - the ability of the body or a cell to seek and maintain stability within its internal environment when dealing with external changes.

The nervous system maintains homeostasis by…

Functions of the Nervous System

1. __________________ - uses receptors to gather information from all over the body
2. __________________ - the brain then processes the information into possible responses
3. __________________ - sends messages back through the system of nerve cells to control body parts

Evolutionary Trends of the Nervous System

<table>
<thead>
<tr>
<th>Animal Taxon</th>
<th>Aquatic Invertebrates</th>
<th>Flatworms &amp; Roundworms</th>
<th>Segmented Worms &amp; Arthropods</th>
<th>Vertebrates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of Nervous Tissue</td>
<td>A simple system with interconnected neurons called ____________; contain specialized cells for touch and chemical detection</td>
<td>________ (a group of nerve cells) and nerve cords run along the body; can detect chemicals, touch, and some have eyespots</td>
<td>__________ occurs which is the concentration of nerve cells in a head region to form ________; intense senses in arthropods</td>
<td>A well-developed brain evolved from the spinal cord; the size and complexity increases from __________ _____________.</td>
</tr>
<tr>
<td>Picture of system</td>
<td><img src="image1" alt="Aquatic Invertebrates" /></td>
<td><img src="image2" alt="Flatworms &amp; Roundworms" /></td>
<td><img src="image3" alt="Segmented Worms &amp; Arthropods" /></td>
<td><img src="image4" alt="Vertebrates" /></td>
</tr>
<tr>
<td>Examples</td>
<td>sponges, jellyfish, hydra</td>
<td>planaria, flukes, tapeworm, hookworm</td>
<td>earthworm, ants, grasshopper, bees</td>
<td>mammals, birds, reptiles, fish, amphibians</td>
</tr>
</tbody>
</table>

Structure of the Nervous System:

Neuron – ______________________

1. ______________________ - the largest part of the neuron; contains the nucleus and organelles
2. ______________________ - short, branching extensions spreading out from the cell body; receive and carry impulses to the cell body
3. ______________________ - long, fibrous part of neuron; conducts nerve impulses away from cell body
What is a nerve impulse? ________________ sent from the dendrite, along the axon, to the terminal. A ________________, called a ________________, is released from the axon terminals into the ________________, where it travels to the next cell.

**Types of Neurons**

a. _______________ neurons carry messages from the _______________ to the ____________

b. ___________ neurons carry messages from the _________________ to the ____________

c. _________________ carry impulses ________________ sensory and motor neurons

**Divisions of the Nervous System**

I. **Central Nervous System (CNS)**

A. **Brain** - “control center” - receives and analyzes information;
   processes and sends back instructions

   1. ________________ controls thought, language, learning, judgment, & voluntary action
   2. ________________ – controls involuntary functions of muscles and maintains balance and posture
   3. ________________ - controls homeostasis- temperature, hunger, thirst, fight or flight response

B. **Spinal cord** - link between the brain and PNS; also controls REFLEXES
   1. Reflex: a simple, automatic response

II. **Peripheral Nervous System (PNS)**

A. Consists of __________

B. Gathers information and delivers it to and from CNS
Levels of Organization

Interaction with other systems for Regulations

➢ Bones of the ___________________________ protect the spinal cord and brain.

➢ The brain controls heart rate, blood pressure, and breathing via the ________________________ and ____________________________.

➢ Glands in the brain control the release of hormones of the __________________________ and __________________________ systems.

➢ The brain controls muscles both in __________________________ and __________________________.

Diseases and Disorders of the Nervous System

1. Polio- a virus that attacks the spinal cord; eventually causes paralysis
2. Multiple Sclerosis (MS)- affects neurons; slows nerve impulses, causing muscle weakness, possibly paralysis.
3. Alzheimer’s- brain tissue deteriorates; severe memory loss
4. Stroke- a blockage in a blood vessel in the brain, causing brain damage
5. Concussion- a bruise to the brain when the brain hits the inside of the skull

Fun Facts

❖ A human body contains more nerve cells than there are stars in the Milky Way
❖ Neurons are the largest cell in the body and do NOT undergo mitosis
❖ Nerve impulses move at 100 meters per second or more
❖ Longest axon of a neuron is 15 ft! (in the giraffe)
Label and Color the Excretory System

**Color** the following parts of the excretory system using the assigned color

**Label** the parts next to the line

**Describe** the function next to its name

1 & 2. Right Kidney and Left Kidney – GREEN
3. Vena cava (vein) – DARK BLUE
4. Aorta (artery) – RED
5. Right renal vein – LIGHT BLUE
6. Left renal artery - PINK
7. Bladder - YELLOW
8. Urethra - ORANGE
9. Ureter - PURPLE
EXCRETORY SYSTEM WORKSHEET

VOCABULARY

<table>
<thead>
<tr>
<th>excretory system</th>
<th>urinary bladder</th>
<th>dialysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>kidney</td>
<td>nephron</td>
<td></td>
</tr>
<tr>
<td>ureter</td>
<td>glomerulus</td>
<td></td>
</tr>
</tbody>
</table>

MAIN IDEA: The excretory system eliminates nonsolid wastes and helps maintain homeostasis.

Fill in the blank with the word or term that best completes the sentence.

1. The main organs of the excretory system are the _____________________,
   _____________________, kidneys, ureters, urinary bladder, and urethra.
2. The _____________________ eliminates nonsolid wastes.
3. _________________ and _________________ are waste products removed by the lungs through exhalation.
4. Excess water and salts are released through _____________________ in the skin.

MAIN IDEA: The kidneys help to maintain homeostasis by filtering the blood.

Circle the word that best completes the sentence.

5. The inner layer of the kidney is called the medulla / cortex and the outer layer is called the medulla /
cortex. The outer layer is packed with nephrons / hormones, which filter the blood.
6. Kidneys help the body maintain homeostasis by removing waste products from the blood,
maintaining fluid balance, and releasing nephrons / hormones that help keep bones healthy, produce
red blood cells, and regulate blood pressure.

MAIN IDEA: Nephrons clean the blood and produce urine.

Fill in the blank with the word or phrase that best completes the sentence.

7. In each nephron, small molecules diffuse out of the blood from a ball of capillaries called the _________________.

8. Label the steps in the process diagram to summarize the three steps in which blood is filtered and urine
is formed in the nephron.

<table>
<thead>
<tr>
<th>Step 1: __________</th>
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<tbody>
<tr>
<td>• Blood enters glomerulus</td>
</tr>
<tr>
<td>• Small molecules diffuse into Bowman’s capsule, forming filtrate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 2: __________</th>
</tr>
</thead>
<tbody>
<tr>
<td>• filtrate enters nephron tubule</td>
</tr>
<tr>
<td>• most materials are reabsorbed into the blood</td>
</tr>
<tr>
<td>• materials not reabsorbed form the urine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Step 3: __________</th>
</tr>
</thead>
<tbody>
<tr>
<td>• water is reabsorbed to reduce urine volume</td>
</tr>
<tr>
<td>• urine moves into the ureter</td>
</tr>
</tbody>
</table>
Nervous System Practice

1. What is name of cells found in the nervous system called? ___________________

2. Label the following structures on the neuron below: axon, dendrite, and nucleus. Color each of these parts a different color.

VOCABULARY

<table>
<thead>
<tr>
<th>nervous system</th>
<th>central nervous system (CNS)</th>
<th>stimulus</th>
</tr>
</thead>
<tbody>
<tr>
<td>endocrine system</td>
<td>peripheral nervous system (PNS)</td>
<td></td>
</tr>
</tbody>
</table>

MAIN IDEA: The body’s communication systems help maintain homeostasis.

Circle the letter of the word or phrase that best completes the sentence.

3. Your body’s ability to maintain __________ depends on the ability of different systems in your body to communicate with one another.
   a. stimulus       b. nervous        c. homeostasis       d. endocrine

4. The __________ system is a collection of physically disconnected organs that helps control growth, development
   a. stimulus       b. nervous        c. homeostasis       d. endocrine

5. A __________ causes a chemical, cellular, or behavioral change in an organism.
   a. stimulus       b. nervous        c. homeostasis       d. endocrine

6. The __________ system is a physically connected network of cells, tissues, and organs that controls thoughts, movements, and simpler life processes.
   a. stimulus       b. nervous        c. homeostasis       d. endocrine
MAIN IDEA: The nervous and endocrine systems have different methods and rates of communication.

Fill in the blank with name of the system that best completes the sentence.

7. The _____________________ system includes the brain and spinal cord.
8. The _____________________ system works quickly and controls processes that occur over short periods of time.
9. The _____________________ system works slowly and controls processes that occur over long periods of time.
10. The _____________________ system transmits messages to and from the central nervous system.

Vocabulary Check

Use the vocabulary terms from this section to complete the sentence.

11. You jump when you hear a nearby truck honk its horn. In this example, the honking horn is the _______________.
12. The _____________________ sends chemical signals through the bloodstream.
13. When your brain wants to make your legs move so that you can run, the _____________________ carries the message from your spinal cord to your leg muscles.
14. Your _____________________ is the communication system that sends its signals through a highly connected network of specialized cells and tissues.

KEY CONCEPT
The nervous system is composed of highly specialized cells.

VOCABULARY

<table>
<thead>
<tr>
<th>neuron</th>
<th>action potential</th>
<th>dendrite</th>
</tr>
</thead>
<tbody>
<tr>
<td>synapse</td>
<td>axon</td>
<td>terminal</td>
</tr>
<tr>
<td>resting potential</td>
<td>neurotransmitter</td>
<td>sodium-potassium pump</td>
</tr>
</tbody>
</table>

MAIN IDEA: Neurons are highly specialized cells.

Circle the letter of the word or phrase that best completes the sentence.

15. A specialized cell that stores information and carries messages within the nervous system and between other body systems is a(n) ________.
   a. cell body   b. axon   c. neuron   d. dendrite

16. A branchlike extension of the cytoplasm and the cell membrane that receives messages from neighboring cells is a(n) ________.
   a. cell body   b. axon   c. neuron   d. dendrite

17. A long extension that carries electrical messages from one cell in the nervous system to another cell is called a(n) ________.
   a. cell body   b. axon   c. neuron   d. dendrite
18. Fill in the blanks in the Concept Map with the names of the different types of neurons.

<table>
<thead>
<tr>
<th>Neurons types</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>Detect stimuli; transmit signals to brain and spinal cord</td>
</tr>
<tr>
<td>5.</td>
<td>Make up brain and spinal cord; receive signals from sensory neurons</td>
</tr>
<tr>
<td>6.</td>
<td>Pass messages from nervous system to other body tissues</td>
</tr>
</tbody>
</table>

**MAIN IDEA:** The PNS links the CNS to the muscles and other organs.

Fill in the blanks in the chart with the parts of the peripheral nervous system.

<table>
<thead>
<tr>
<th>Division of the PNS</th>
<th>Voluntary or Involuntary?</th>
<th>Examples of Tissues It Stimulates</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.</td>
<td>voluntary</td>
<td>muscles</td>
</tr>
<tr>
<td>20.</td>
<td>involuntary</td>
<td>digestion, heartbeat</td>
</tr>
<tr>
<td>21.</td>
<td>involuntary</td>
<td>blood vessels, heart rate, fight or flight response</td>
</tr>
<tr>
<td>22.</td>
<td>involuntary</td>
<td>blood pressure, heart rate, relaxation</td>
</tr>
</tbody>
</table>
23. Draw a picture to illustrate the types of neurons.

   a. Draw a human being around this spinal cord that is touching a hot plate or stove top.
   b. Add some nerves that extend to and from the brain cord to the hand that is touching the hot plate.
   c. Your coloring should trace the nerve signal to and from the brain that occurs when a person
      1. Feels the hot plate (sensory neurons)
      2. Sends a signal from the brain to say “Remove your hand! That’s hot!” (motor neurons).
   d. Use arrows to show the direction that the impulse is traveling.
   e. Label the following structures in your drawing: sensory nerves, motor nerves, and interneurons.
      Color each of the labeled structures a different color.
DEFENSE AND SUPPORT: Muscular and Skeletal Systems

How do these systems provide defense and support?

**Skeletal System**: produces immune cells to protect against disease-causing ____________ and ________________.

**Muscular System**: coordinates with the nervous system to help animals ________________________________.

The Muscular System:

I. **Purpose**:
The main organs of the muscular system are the _______________. There are _____ types of muscles made up of individual muscle cells called ____________.

II. **Types of Muscles**:

1. ________________: these muscles are usually attached to _________ and allow for the movement of ______________. Since these muscles can be controlled by an organism, they are known as ________________ muscles.
   a. Muscles are attached to bones with a special connective tissue known as a ________________.

2. ________________: this type of muscle is found within the walls of organs like the ________________, ________________, and the ________________ allowing these organs to ________________ and ________________. Smooth muscle is not under conscious control, so it is known as ________________ muscle.
   a. Smooth muscle also helps move food through your digestive tract via the process, ________________.

3. ________________: this type of muscle is not under your control, so it is also considered ________________. It is only found in the ________________ which is why it is called ________________ muscle.
III. Characteristics and Functions:

a. Skeletal muscles work in ______________.  
   ______________ cause joints to bend while your  
   ______________ causes joints to straighten out.  
   EX) In your arms...

b. Muscles use a large amount of ______________.  This requires them to produce large amounts  
   of the energy molecule called ______________.  These molecules are produced in the  
   ______________ through the process of cellular respiration.  This is why there are a  
   greater than average number of mitochondria in ______________ cells.

c. Cellular respiration requires the body to absorb ______________.  When ________cannot  
   be absorbed fast enough, the body produces a compound known  
   as________________________.

IV. Organization of Life: Muscular System

V. Muscular Body System Interactions:

a. _______________________: smooth muscle found in the stomach and intestinal tract  
   helps move digested food through the body.

b. _______________________: products of cellular respiration (CO₂, Lactic Acid) from the  
   muscular system are removed via the blood stream.

c. _______________________: signals muscles to contract for movement and response to  
   environmental stimuli.
The Skeletal System:

I. Purpose:
The main organs of the skeletal system are the ________________. Bones work with muscles to ________________, ________________, and ________________ sensitive internal organs.

II. Evolution of the Skeletal/Muscular Systems:

III. Characteristics and Structures:

a. Bones are attached to other bones with special connective tissues known as _________________.

b. A place where one bone attaches to another is called a _________________.

c. Bones are a living part of your body that contain ________________ tissue to send and receive information, as well as blood vessels to bring the ________________ and ________________ gas that is necessary for the bones’ health and growth.

d. Bone is composed of ________________ types of tissue:
   i. ________________: soft, interior layer of bone tissue.
      1. Site of ________________ production.
      2. Less dense
      3. Contains ________________
   ii. ________________ : outer layer of tissue surrounding bone
      1. Stores minerals – ________________
      2. Extremely dense and strong

e. Bone _________________ is found inside of bones. This tissue is responsible for creating new _________________ cells in animals. These cells are a vital part of the ________________ system.

<table>
<thead>
<tr>
<th>Skeleton</th>
<th>Hydrostatic</th>
<th>Exoskeleton</th>
<th>Endoskeleton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of support</td>
<td>Have muscles surrounding a fluid-filled cavity.</td>
<td>A hard external skeleton, made of __________ and is continually shed as the organism grows - __________.</td>
<td>Have a well developed Endoskeleton or ________________ made of calcified plates.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Picture of system</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Skeleton" /></td>
<td><img src="image" alt="Hydrostatic" /></td>
</tr>
</tbody>
</table>

| Examples | Annelids (worms) and Jellyfish | ___________ (Insects) and Crustaceans | mammals, birds, reptiles, fish, amphibians |
IV. **Organization of Life: Skeletal System**

V. **Skeletal Body System Interactions:**

a. _________________: bones help produce new blood cells in addition to storing minerals transported by the circulatory system.

b. _________________: bones and muscles work in opposing pairs to perform body movement. Muscles and bones support, protect, and maintain posture for the human body.

c. _________________: bones protect many vital organs of the nervous system – Skull (brain), Vertebrae (spinal cord).
DEFENSE - Integumentary System

How do the integumentary, immune and lymphatic systems work together to defend the body?

**Functions of the Integumentary System**

1. Acts as a _________ barrier for internal organs and tissues.
2. Prevents ___________ like bacteria and viruses from entering the body.
3. Helps to regulate the body’s ___________ by sweating or forming “goose bumps”.
4. Makes ___________ when exposed to UV light.
5. Prevents the body from becoming ___________ due to excess water loss.
6. Aids in ________________, like urea and salts.
7. Acts as a _____________ by detecting heat, cold, pressure, and pain

**Evolutionary Trends of the Integumentary System**

<table>
<thead>
<tr>
<th>Animal Taxon</th>
<th>Invertebrates</th>
<th>Fish</th>
<th>Amphibians</th>
<th>Reptiles</th>
<th>Birds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adaptations</td>
<td>_____________ secrete mucous; shells and _____________ made of chitin; stinging or sharp outer cells</td>
<td>Mucous secreted over _____________ decreases friction in the water</td>
<td>Have mucous glands to keep skin moist; to help with respiration and body temperature</td>
<td>Dry, scaly skin made of _____________ to prevent water loss and regulate body temperature</td>
<td>_____________ to fly; glands secrete oily substances to keep feathers waterproof; colorful for communication</td>
</tr>
<tr>
<td>Picture of Adaptation</td>
<td><img src="image1.png" alt="Jellyfish, worms, insects, crustaceans" /></td>
<td><img src="image2.png" alt="Fish" /></td>
<td><img src="image3.png" alt="Frogs, Toads, Salamanders" /></td>
<td><img src="image4.png" alt="Alligator, Lizards, Snakes" /></td>
<td><img src="image5.png" alt="Birds" /></td>
</tr>
<tr>
<td>Examples</td>
<td>Jellyfish, worms, insects, crustaceans</td>
<td>Fish</td>
<td>Frogs, Toads, Salamanders</td>
<td>Alligator, Lizards, Snakes</td>
<td>Birds</td>
</tr>
</tbody>
</table>
Skin:

The main organ of the integumentary system is the _____.

It contains three layers known as the_______, ______, and the______________, which is the underlying layer of _____ for insulation.

1. **Epidermis**
   - outer layer approximately 10-30 cells thick
   - covered in __________
   - Hair and nails protude from this layer
   - contains melanin pigment that gives skin its color

2. **Dermis**
   - thickest layer
   - contains blood vessels, muscles, nerves, hair follicles, ______ glands and subaceous (_____) glands

Levels of Organization

```
  ___________  
  ___________  
  ___________  
```

*Fun Fact: Believe it or not, the integumentary system is the ______ organ system and your _____ is the largest organ in your body.*

**Interactions with Other Body Systems**

❖ Skin is the first line of defense in the ____________________ response.

❖ The ____________________________ and skin regulate body temperature.

❖ Skin and the ___________________ excrete water, urea, salts, and other wastes through sweat.

❖ Receptors of the ___________________________ are located in skin.
**Immune/Lymphatic System**

**Immune System Functions:**
- Body’s ___________ against _________________ (disease causing agents)
- Recognizes, ___________, destroys and “remembers” each type of pathogen that enters the body
- ___________ of an organism to ________________, ________________, or other unwanted biological invasion (________________) — this process is called _________________

**Defense Mechanisms:**
- __________—keeps pathogens out of body--pathogens can only enter and multiply where skin is _________________
- Mucus, saliva, tears, oil and sweat contain _______________ that _________________
- Mucus in throat traps pathogens
- Acid and _________________ in _________________ destroy pathogens
- If pathogens do enter body they _________________ and _________________
- _________________—millions of _________________ are produced to engulf and destroy pathogens (pus and swelling)
- Body produces _________________ that cause _________________—increased body temperature slows down or stops ________________ of _______________
- _________________—identifying molecule on _________________ of pathogens (specific)
- _________________ and _________________ recognize specific antigens and respond to them in order to _________________ the pathogen
- _________________ are _________________ carried in the bloodstream that are produced to recognize and bind to specific antigens in order to _________________
- Injection of a _________________ of a pathogen to _________________ is known as a _________________ (vaccine)
Lymphatic System:

- Plays a critical role in the ____________ system by producing, storing, and circulating white blood cells

- Collects fluid lost by the blood and returns it to the ____________ system

- Network of vessels and associated organs
  - ____________ – fluid in lymph vessels
  - lymph vessels – move the lymph throughout the body
  - ____________ – act as filters to trap bacteria and other organisms that cause disease

- Tonsils, thymus and spleen are all composed of lymphoid tissue

- ____________ – filter and destroy bacteria

- ____________ – produces hormones that aid in maturation of white blood cells

- ____________ – removes worn-out red blood cells, platelets, bacteria from the blood

**Comparative Immune Systems:**

The immune system is well developed and is very complex in ____________ and higher forms of ____________. The complexity of the immune system decreases as we go down the evolutionary scale. Organisms such as birds, reptiles, amphibians, fish, etc. have comparatively simple types of immune systems. There is no immune system in ____________ such as starfish, jellyfish, earthworms, insects, etc.
Animal Systems: REPRODUCTION
Endocrine System & Reproductive System

Endocrine System:

Function:

- The endocrine system _____________________ long-term changes in the body such as growth and development. It is made up of __________________ that release their products into the bloodstream.
- It also controls many of your body’s daily activities

Endocrine Glands

- The ______________________ system is made up of a group of organs, called endocrine glands.
- An _________________________________ produces and releases chemical substances directly into the bloodstream that signal changes in other parts of the body.

Structure:

______________________ – chemicals released in one part of the body that travel through the bloodstream and affect the activities of cells in other parts of the body.
  - You can think of a hormone as a _____________________.
  - The endocrine system is kept in balance by the coordinated action of various hormones.

__________ – an organ that produces and releases a substance or secretion

1. ______________________ - controls other endocrine glands and regulates growth rate, reproduction, and metabolism
2. ______________________ - Hormones released by the thymus gland help the immune system develop during childhood. By adolescence, this gland has shrunk considerably in size
3. ______________________ - regulates hunger, thirst, sleep, body temperature, and most involuntary mechanisms
4. ______________________ - These glands release several hormones such as adrenaline, which triggers the body’s response to sudden stress (fight or flight). Other hormones affect salt and water balance in the kidneys and general metabolism
5. _________________ – releases a substance involved in rhythmic activities, such as the sleep-wake cycle
6. ________________ - regulates the body’s overall metabolic rate and controls calcium levels in the bloodstream

7. ________________ - a large gland, located behind the stomach, that controls sugar levels in the blood (insulin)

8. ________________ - The female reproductive glands release sex hormones that regulate egg maturation and control changes in a female’s body at puberty (estrogen, progesterone)

9. ________________ - The male reproductive glands release a sex hormone that regulates sperm production and controls changes in a male’s body at puberty (testosterone)

The Endocrine system working together with other systems:

- ________________: Hormones provide feedback to the brain to affect neural processing.
- ________________:: hormone production for sexual development to make offspring
- ________________:: endocrine system controls the growth of both bone and muscles
- ________________:: the development is controlled by the endocrine system
- ________________:: The endocrine system controls the rate of metabolism

Reproductive System:

**Purpose:** The reproductive system combines genetic information from both parents (in most animals) to produce new life forms. This system produces sex cells (gametes), delivers them, and protects a developing fetus until birth.

<table>
<thead>
<tr>
<th>Involves ____ parent. As a result, the offspring tend to have the same ___________ and phenotype as the parent.</th>
<th>Involves the fusion of ____ gametes. Sperm and eggs are sometimes produced by the same individual and sometimes produced by different individuals.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ex: _______________ can divide into 2 halves; each half grows into a separate organism.</td>
<td>Ex: ________________</td>
</tr>
<tr>
<td>Cnidarians undergo ________ where a new individual grows from and then breaks off of the parent individual.</td>
<td></td>
</tr>
</tbody>
</table>

Genetically ________________ Genetic ___________________
In most animals, individuals are either definite males or females; however some species are **hermaphrodite**. This is when one organism produces both egg and sperm. Ex: earthworms and garden snails

**There are 2 major mechanisms of fertilization:**

1. **external** fertilization: Used by many aquatic invertebrates. Eggs and sperm are simultaneously shed into the water, and the sperm swim through the water to fertilize the egg.

2. **internal** fertilization: The eggs are fertilized within the reproductive tract of the female, and then are covered with egg shells and/or remain within the body of the female during their development.

**Parts of the Reproductive System:**

**specialized sex cells (sperm and egg)**

Female:

1. **ovary** - produce female gametes (ova or egg)
2. **oviduct** - transport egg to uterus (= oviduct)
3. **uterus** - organ where fertilized egg develops
4. **fallopian tube** - birth canal
5. **uterus** - serves for gas exchange and metabolic products with mother
6. **placenta** - attaches embryo to placenta
7. **amnion** - keeps the embryo moist and protected

**Female Reproductive Cycle**

- Regulated by **hormones** produced by the endocrine system.
- Begins at puberty and ends at menopause.
- Cycle repeats about every **28 days**.
- **Ovulation** is the releasing of a mature egg into the fallopian tube and occurs around **midcycle** of the cycle.
- **Menstruation** is the discharge of the uterine lining, blood, and unfertilized egg and occurs between **cycle** of the cycle.
Male:

1. ____________ - produces male gametes (sperm)
2. ____________ - carries sperm to penis
3. ____________ - external sex organ, delivers sperm to female
4. ____________ - protects testes and helps maintain sperm temperature
5. ____________ - produces semen

The Reproductive system working with other body systems...

- Reproductive hormones affect brain development and sexual behavior.
  - The brain controls mating behavior.
- Endocrine Glands produce hormones (ovary and testis)

Fun Facts

- Seahorse reproduction is unusual because the male is the one that becomes pregnant. Seahorses are monogamous and will only mate with one partner.
- Clownfish can change gender. If the female dies, the male will change sex and become the female.
- The only mammals to lay eggs are the platypus and the echidna. The mothers nurse their babies through pores in their skin. A baby platypus remains blind after birth for 11 weeks.
- A baby octopus is about the size of a flea when it is born.
- Gestation periods (period of time between fertilization and birth) vary from one animal to the next:

<table>
<thead>
<tr>
<th>Animal</th>
<th>Average Gestation Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elephant</td>
<td>624 days (~2 years)</td>
</tr>
<tr>
<td>Horse</td>
<td>336 days (~11 months)</td>
</tr>
<tr>
<td>Human</td>
<td>266 days (~9 months)</td>
</tr>
<tr>
<td>Pig</td>
<td>115 days (~4 months)</td>
</tr>
<tr>
<td>Rat</td>
<td>21 days (less than a month)</td>
</tr>
</tbody>
</table>
Muscular Labeling & Coloring

DIRECTIONS: Label each line with the correct muscle. Use the textbook, notes, or the internet for help. Also, color the following muscles the indicated color below.

Color the following muscles the indicated colors: (Use map pencils!)
- Gastrocnemius – Red
- Quadriceps – Orange
- Hamstrings – Yellow
- Pectoralis Major – Red
- Rectus Abdominis - Orange
- Gluteus Maximus – Dark Blue
- Deltoid - Yellow
- Trapezius - Light Blue
- Latissimus Dorsi - Purple
- Achilles Tendon – White
- Biceps – Orange
- Triceps - Green
Testing Your Knowledge
Muscular System

A. Decide if the following statements are true or false. CORRECT THE FALSE STATEMENTS!

1. Bones are moved by muscles.

2. Extensor muscles bend joints.

3. Voluntary muscles can be controlled by thought.

4. Tendons attach muscles to bones.

5. Involuntary muscles can be contracted at will.

6. The heart is an involuntary muscle.

7. Most internal organs contain skeletal muscle.

8. A muscle cell is called a muscle fiber.

9. Your bicep contains cardiac muscle.

10. Skeletal muscles do work by working in pairs- contracting and relaxing.

B. Identify the muscle responsible for the following actions:

1. The muscle used to talk is the ________________.

2. The muscles used to do sit-ups are the __________________.

3. The muscle used to raise your shoulder is the ________________.

4. The muscles used to “make a muscle” are the _______________ and ______________.

5. The muscles used to squat down or lunge are the _________________ and ______________.
**MAIN IDEA:** Humans have three types of muscle.

Fill in the chart with the names of the three different types of muscle.

<table>
<thead>
<tr>
<th>Type of Muscle</th>
<th>Attaches to/Found in</th>
<th>Moves</th>
<th>Voluntary or Involuntary?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>attached to bones by tendons</td>
<td>limbs, hands, feet, eyelids, spinal cord</td>
<td>mostly voluntary</td>
</tr>
<tr>
<td>2.</td>
<td>arteries, intestines</td>
<td>food through digestive system</td>
<td>involuntary</td>
</tr>
<tr>
<td>3.</td>
<td>heart</td>
<td>blood through the circulatory system</td>
<td>involuntary</td>
</tr>
</tbody>
</table>
Skeleton Labeling & Coloring

**DIRECTIONS:**

**Label** the bones shown below. Use the textbook, notes, or the internet for help. Also, **color** the following bones the indicated color below. Use map pencils, not markers!

**USE MAP PENCILS! Color the following bones the indicated colors:**
- Clavicle – Red
- Scapula – Orange
- Ribs – Yellow
- Sternum – Green
- Humerus – Dark Blue
- Radius – Purple
- Ulna – Light Blue
- Phalanges – Black
- Carpals – Brown
- Metacarpals – Pink
- Tibia – Orange
- Fibula – Yellow
- Femur – Red
- Patella – Green
- Tarsals – Dark Blue
- Metatarsals – Light Blue
- Skull – Purple
- Vertebrae – Black
- Pelvis Bone - Brown
Testing Your Knowledge Skeletal System

A. Decide if the following statements are true or false. **CORRECT THE FALSE STATEMENTS!**

1. Most blood cells are produced by the spongy bone layer.
2. The place where two bones join is called a joint.
3. Bones that surround organs, like the heart, function primarily in support.
4. The skeleton provides support and shape to the body.
5. Surfaces of joints and the ends of bones are lined with ligaments to provide “cushion.
6. All joints are movable.
7. Pivotal joints allow bones to move backward and forward in one direction.
8. Ligaments are bands of tissue that connect bones to other bones.
9. Bones, such as the ribs, sternum, and cranium, are called axial bones.
10. Bones are hard because their cells store the mineral iron.

B. Rank the five pictured joints according to their freedom of movement and give an example in the human body of each. Start with the joint that allows the least freedom of movement.

<table>
<thead>
<tr>
<th>Joint</th>
<th>Example in Human Body</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. (least range of motion)</td>
<td>Immovable (Fixed) Joint</td>
</tr>
<tr>
<td>2.</td>
<td>Ball-and-Socket Joint</td>
</tr>
<tr>
<td>3.</td>
<td>Hinge Joint</td>
</tr>
<tr>
<td>4.</td>
<td>Gliding Joint</td>
</tr>
<tr>
<td>5. (greatest range of motion)</td>
<td></td>
</tr>
</tbody>
</table>
INTEGUMENTARY SYSTEM WORKSHEET

KEY CONCEPT: The integumentary system has many tissues that protect the body.

VOCABULARY

<table>
<thead>
<tr>
<th>integumentary system</th>
<th>epidermis</th>
<th>hair follicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>keratin</td>
<td>dermis</td>
<td></td>
</tr>
</tbody>
</table>

MAIN IDEA: The integumentary system helps maintain homeostasis.

Fill in the blank with the word or phrase that best completes the sentence.
1. The _____________________ is an organ system that surrounds and protects all other organ systems.
2. Acidic oils that help prevent bacterial and fungal infections are secreted by _____________________ in the skin.
3. A tough, waterproof protein called _____________________ forms hair and nails.
4. _____________________ glands in the skin help maintain homeostasis by helping to control body temperature.
5. _____________________ contains water, salts, and urea.

MAIN IDEA: The integumentary system consists of many different tissues.

Complete the chart below with the correct name of each layer of skin.

<table>
<thead>
<tr>
<th>Layer of Skin</th>
<th>Structures It Contains</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.</td>
<td>dead skin cells covering constantly dividing living cells</td>
<td>first layer of protection for deeper layers of skin</td>
</tr>
<tr>
<td></td>
<td>pores through which sweat, salts, and oils are released</td>
<td>production of keratin, melanin, and other protective proteins</td>
</tr>
<tr>
<td></td>
<td>cells that produce keratin and melanin</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>sweat glands</td>
<td>produces sweat and oils that helps lubricate skin, help prevent friction when parts of the body rub together, make skin waterproof</td>
</tr>
<tr>
<td></td>
<td>oil glands</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hair follicles</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cells that produce elastin and collagen</td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>fat cells</td>
<td>cushions blood vessels and neurons, insulates muscles and organs from temperature changes</td>
</tr>
<tr>
<td></td>
<td>connective tissue</td>
<td></td>
</tr>
</tbody>
</table>

9. The epidermis contains cells called melanocytes / hair follicles that produce a pigment called melanin / keratin. This pigment causes tanning and helps protect cells from harmful sweat / ultraviolet radiation.
KEY CONCEPT: The immune system consists of organs, cells, and molecules that fight infections.

VOCABULARY

<table>
<thead>
<tr>
<th>immune system</th>
<th>B cell</th>
<th>passive immunity</th>
</tr>
</thead>
<tbody>
<tr>
<td>phagocyte</td>
<td>antibody</td>
<td>active immunity</td>
</tr>
<tr>
<td>T cell</td>
<td>interferon</td>
<td></td>
</tr>
</tbody>
</table>

MAIN IDEA: Many body systems protect you from pathogens.

Fill in the blank with the term that best completes the sentence.

1. The ________________________ enables the body to fight off infection and pathogens.

Complete the chart below with the correct tissue or body system.

<table>
<thead>
<tr>
<th>Tissue or Body System</th>
<th>How It Protects the Body from Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>surrounds and protects the entire body, physically blocks invading pathogens</td>
</tr>
<tr>
<td>3.</td>
<td>use hairlike cilia and sticky liquid to trap pathogens trying to enter the body</td>
</tr>
<tr>
<td>4.</td>
<td>coordinates attacks on pathogens that manage to enter the body</td>
</tr>
</tbody>
</table>

MAIN IDEA: Cells and proteins fight the body’s infections.

Fill in the blank with the word or phrase that best completes the sentence.

5. ________________________ and ________________________ are white blood cells that release chemical signals that attract other white cells to the site of an infection.

6. ________________________ are white blood cells that help rid the body of parasites by injecting them with toxic substances.

7. ________________________ help fight infection by binding to a pathogen’s membrane proteins, clumping pathogen cells so they can be engulfed by phagocytes, or activating proteins that weaken the pathogen’s cell membrane.

MAIN IDEA: Immunity prevents a person from getting sick from a pathogen.

Fill in the blank with the word or phrase that best completes the sentence.

8. ________________________ prevents infection without an immune response.

9. A species that cannot become infected with a pathogen that is adapted for another species has a type of passive immunity called ________________________.

10. Immunity passed from mother to infant is a type of passive immunity called ________________________.

11. Immunity that requires a response from your own body’s immune system is called ________________________.
<table>
<thead>
<tr>
<th>Name of Gland</th>
<th>General Location of Gland</th>
<th><strong>Hormone Produced</strong></th>
<th><strong>Target Tissues</strong></th>
<th><strong>Function of Hormone</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Thyroid</td>
<td></td>
<td>thyroxin</td>
<td>All Tissues</td>
<td>Regulation of metabolism</td>
</tr>
<tr>
<td></td>
<td></td>
<td>calcitonin</td>
<td>Bone</td>
<td>Regulate Calcium</td>
</tr>
<tr>
<td>Parathyroid</td>
<td></td>
<td>parathyroid hormone</td>
<td>Bones &amp; Nerves</td>
<td>Regulates Calcium</td>
</tr>
<tr>
<td>Adrenal</td>
<td></td>
<td>cortisol</td>
<td>All Tissues</td>
<td>Regulates Swelling</td>
</tr>
<tr>
<td></td>
<td></td>
<td>adrenaline</td>
<td>Muscles &amp; Organs</td>
<td>Stimulates to respond to emergencies</td>
</tr>
<tr>
<td>Pituitary</td>
<td></td>
<td>antidiuretic (ADH)</td>
<td>Kidney</td>
<td>Regulates water in urine</td>
</tr>
<tr>
<td></td>
<td></td>
<td>human growth hormone (HGH)</td>
<td>Bones &amp; Organs</td>
<td>Growth</td>
</tr>
<tr>
<td>Pancreas</td>
<td></td>
<td>insulin</td>
<td>All Cells</td>
<td>Regulates Blood Sugar (LOW)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>glucagon</td>
<td>All Cells</td>
<td>Regulates Blood Sugar (HIGH)</td>
</tr>
<tr>
<td>Testes</td>
<td></td>
<td>testosterone</td>
<td>Sex Organs, Skin, Muscles, Bones</td>
<td>Secondary Sex Characteristics</td>
</tr>
<tr>
<td>Ovaries</td>
<td></td>
<td>estrogen and progesterone</td>
<td>Sex Organs, Skin, Muscles, Bones</td>
<td>Secondary Sex Characteristics</td>
</tr>
</tbody>
</table>
# GUILTY GLAND: PATIENT DIAGNOSIS

Please fill in the charts below with the proper patient diagnosis.

<table>
<thead>
<tr>
<th>Patient</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs &amp; Symptoms</td>
<td></td>
</tr>
<tr>
<td>Disorder</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs &amp; Symptoms</td>
<td></td>
</tr>
<tr>
<td>Disorder</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Signs &amp; Symptoms</td>
<td></td>
</tr>
<tr>
<td>Disorder</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Patient</th>
<th>D</th>
</tr>
</thead>
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Endocrine & Reproductive System
Worksheet

Endocrine System Matching

a. gland b. adrenal glands c. thyroid gland d. hormones
e. thymus gland f. pancreas g. ovaries/testes h. pituitary gland
i. pineal gland j. hypothalamus

1. ________ Creates insulin, which regulates blood glucose levels
2. ________ Makes adrenaline, which prepares for a fight or flight reaction
3. ________ Chemical signals that send messages through the blood
4. ________ Glands that secrete hormones to regulate egg & sperm maturation & secondary sex characteristics
5. ________ The master gland, controls growth and metabolism
6. ________ Gland that controls sleep/wake cycles
7. ________ Gland that regulates metabolism (how your body uses energy) & blood calcium levels
8. ________ Regulates hunger, thirst, sleep, and body temperature
9. ________ An organ that produces and releases a substance or secretion
10. ________ Hormones released by this gland help the immune system develop during childhood

Answer the following questions

11. Why does the endocrine system need the circulatory system? 

12. How does the endocrine system relate to the muscular/skeletal system? 

13. How does the endocrine system relate to the reproductive system? 

14. What is the function of the endocrine system? 

15. The endocrine system is made up of ____________ that secrete ________________ into the bloodstream.

16. What is a hormone? 

17. You can think of a hormone as a ________________.
Match the function to the part of the reproductive system

<table>
<thead>
<tr>
<th>A. Testes</th>
<th>B. Prostate Gland</th>
<th>C. Uterus</th>
<th>D. Ovaries</th>
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<tbody>
<tr>
<td>E. Urethra</td>
<td>F. Scrotum</td>
<td>G. Vagina</td>
<td>H. Fallopian Tube</td>
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<tr>
<td>I. Umbilical Cord</td>
<td>J. Placenta</td>
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18. carries sperm and urine out of the body
19. attaches the embryo to the placenta
20. adds fluid to sperm (this fluid carries and nourishes the sperm)
21. ______________________ makes sperm cells
22. ______________________ serves for gas exchange and metabolic products with the mother
23. external sac that holds and protects the testes; helps maintain sperm temperature
24. where an embryo develops
25. birth canal
26. where eggs are made
27. carries eggs to the uterus
28. What are sex cells called?
29. Females produce; Males produce
30. What is the difference between internal and external fertilization?
31. What is the difference between asexual and sexual reproduction?
32. What is the purpose of the reproductive system? List four functions:
   (1) ___________
   (2) ________________________________
   (3) ________________________________
   (4) ________________________________
Body Systems 2 Test Review

Questions 1-5: Write the main functions of the following body systems.

1. Endocrine:

2. Reproductive:

3. Circulatory:

4. Respiratory:

5. Digestive:

6. Excretory:

Questions 7-11: Identify the following structures on the diagram of your respiratory system: Diaphragm, trachea, bronchi, bronchioles, alveoli.

Questions 12-16: Write the functions of the following respiratory structures.

12. Alveoli: ____________________________

13. Larynx: ____________________________

14. Epiglottis: _________________________

15. Diaphragm: _________________________

16. Trachea: ____________________________

17. How does the respiratory system work with the circulatory system to provide oxygen to the cells in your body?

18. What are the two pathways of blood in the body? Which side of the heart is oxygen-rich? oxygen-poor?

19. How does blood flow through the heart and then through each pathway in the body? Be sure to include all valves and vessels.
Questions 20-27: Write the following terms next to the lines in the provided diagram of the circulatory system: right atrium, right ventricle, left atrium, left ventricle, septum.

28. (Arteries / Veins) bring deoxygenated blood back to the heart.
31. Liquid part of the blood? ______________________
32. Part of blood that bonds to blood vessels to form clots? ____________________
33. Chamber of heart that receives blood from body? ______________________
34. Chamber that pumps blood out to lungs and body? ______________________
35. What is the muscular structure that separates the 2 sides of the heart? What are the function of valves?

Questions 36-39: Write the following terms next to the lines in the provided diagram of your excretory system: kidney, ureter, urethra, urinary bladder.

Questions 40-44. Write the functions of the following structures in the excretory system.

40. Kidney (nephrons): ________________________________

41. Ureter: ________________________________

42. Skin: ________________________________

43. Lungs: ________________________________

44. Urethra: ________________________________

45. Using the diagram above, trace the flow of urine through the excretory system.

46. How do the kidneys work with the endocrine system to maintain homeostasis? What other organs are involved?

47. What is the function of the hypothalamus and pituitary gland? What hormones does the pituitary secrete?

48. How does the endocrine system regulate the functions of the other systems? Give examples.
Questions 50-56: Write the following terms next to the lines provided in the diagram of your digestive system: Small intestines, large intestine, stomach, salivary glands, mouth, esophagus, rectum.

57. (Peristalsis / Villi) moves food down esophagus to stomach.

58. Peristalsis / Villi) increase surface area for absorption in the small intestine.

59. The organ that secretes bile to help digest fat in the body is called the ________________.

60. The large intestine uses peristalsis for what purpose? ______

____________________________________________________________________

____________________________________________________________________

61. The __________________________ is the organ where ____________ digestion takes place, and where the body absorbs most of the nutrients from food.

62. What enzymes digest (breakdown) carbohydrates? Where are they located?

63. What enzymes digest (breakdown) proteins? Where are they located?

64. What enzymes digest (breakdown) carbohydrates? Where are they located?

65. What substance is secreted by the stomach to protect the lining against the hydrochloric acid?
66. Label the parts of the male reproductive system: seminal vesicle, prostate gland, vas deferens, urethra, penis, urinary bladder, epididymis, seminiferous tubules. Using the diagram as reference, state the flow of sperm through the reproductive structures.

67. Briefly describe the function of each part you identified. How is semen created?