1. What is cell differentiation/specialization? ***It is when stem cells differentiate into highly specialized cells with unique structures and functions. Ex: Stem cells → Nerve, muscle, and skin cells***

**Animal Systems Partner Test Review**

1. Why does cell specialization occur? ***Because specific genes in each cell are turned on and off in a complex regulated pattern. Influenced by the environment.***
2. What are the levels of organization in our body? ***Cell, tissue, organ, organ system and organism.***
3. What is a tissue and what are some examples of different types of tissues? ***A group of similar cells that work together to perform a specialized function. Examples are epithelial tissue, connective tissue, nervous tissue, muscular tissue.***
4. What’s the function of respiratory system and which major organs are involved? ***Its function is to exchange oxygen and carbon dioxide between blood, air, and tissues. Nose, mouth, trachea and lungs are the organs in this system.***
5. What’s the purpose of muscular system and how many different types of muscles do we have? ***To move the bones at joints and push substances through the body. 3 types- cardiac, smooth, and skeletal***
6. Why are eating and breathing important for cell processes? These are the reactants for what cell process? ***Eating gives us nutrients and breathing gives us oxygen. Sugar from our food and oxygen are the reactants for cellular respiration.***
7. What’s the function of the skeletal system and what major organs are involved? ***Provide structure for the body and protection and produce blood cells. Organs-Bones***
8. What’s the function of the circulatory system and what major organs are involved? ***Transport molecules throughout the body for example Oxygen, Carbon Dioxide, Hormones, Sugar and waste. Parts: Heart, Vessels (arteries, veins) red blood cells, platelets***
9. What’s the function of the reproductive system and what major organs are involved? ***To produce genetic variation in gametes and offspring. Organs- testes (male gonad), ovaries (female gonad), uterus***
10. What’s the function of the nervous system and what major organs are involved? ***The control center of our entire body. It is how all of our systems communicate. Organs- Brain, spinal cord, and nerves***
11. What type of cell is pictured below? What system is it a part of and what does it do? ***Neuron (nerve cell), part of nervous system, sends nerve impulses (messages) by releasing chemicals that pass quickly from neuron to neuron.***



1. If you put your hand on a hot stove, explain step by step how your reflex would work using these specific terms- sensory neuron, spinal cord, motor neuron, and effector. ***1. The skin senses heat. 2. The message is sent through a sensory neuron to the spinal cord. 3. The message is passed to the motor neuron. 4. The effector reacts pulling away your hand.***
2. What system is a reflex part of? Is the brain involved in a reflex? Why or why not? ***Part of the nervous system. The brain is not involved in the reflex because it would take too much time, but it does get a message after the reflex has occurred.***
3. What’s the function of the endocrine system and what major organs are involved? ***To help regulate homeostasis and transmit messages throughout the body. It is made of glands and organs that release hormones (chemical messages). It is highly connected with the nervous system. Organs: adrenal glands, thyroid, Pancreas, Pituitary gland among others.***
4. What is a hormone?***A chemical message sent throughout the body to a target organ***
5. What’s the function of the digestive system and what major organs are involved? ***Breaks down nutrients that are ingested. Organs: Mouth, esophagus, stomach, Pancreas, small and large intestine and rectum.***
6. What’s the function of the excretory system and what major organs are involved? ***Remove wastes from the body. Organs-kidneys, skin, lungs, large intestines***
7. What’s the function of the urinary system and what major organs are involved? ***Remove wastes from the body. Organs: Kidneys, ureters, urethra, sometimes lungs and skin***
8. What’s the function of the immune system and what major organs are involved***? Protect the body against pathogens. White Blood Cells (many variations), lymph nodes***
9. What are pathogens? ***Disease causing microorganisms and viruses***
10. Explain the 2 types of immune response: nonspecific and specific. Include specific types of cells or responses. ***Nonspecific is a general response to ALL pathogens. The first line of defense is skin and mucous membranes, second line of defense is inflammation (rise in temperature, swelling from increased blood flow bringing white blood cells to fight pathogens). Specific is when pathogens get past the nonspecific defenses. B cells produce antibodies against the antigen on the invader (pathogen). Other white blood cells, like T cells, destroy the specific pathogen.***
11. What system allows the body to obtain oxygen? ***Respiratory***
12. What system allows the body to transport oxygen? ***Circulatory***
13. What cells in the body need Oxygen? ***All of them***
14. Why do cells need oxygen? (Oxygen is the reactant in which formula?) ***The body uses oxygen and glucose to make ATP in cellular respiration. Also water and CO2 are byproducts***
15. What cells in the body need the most ATP? ***Muscles cells***
16. What are some adaptations for endotherms in high altitudes where there is not as much oxygen? ***Higher red blood cell count***
17. Why would having a high amount of red blood cells be beneficial in areas in high altitude? ***There is less oxygen in the atmosphere, because the animal has more red blood cells they’re able to obtain a large amount of oxygen molecules per breath***
18. What are allergies? ***Overreaction of the immune system to antigens (that aren’t necessarily harmful)***
19. What is an autoimmune disease? ***When the immune system makes a mistake and attacks the body’s own cells.***
20. What does skin do for our body? ***What are all of the systems it is involved it? Removes wastes, barrier to keep out pathogens, regulates body temperature. Integumentary system, Excretory system and Immune system***
21. How do endotherms and ectotherms differ***? Give an example for each. Endotherms can maintain a constant internal temperature and require more energy. Ex: mammals, humans. Ectotherms depend on heat exchange with the environment and their internal environment changes with the external environment. Ex: reptiles***
22. How do humans regulate their body temperature? ***Include the systems involved. The skin’s thermoreceptors (integumentary system) sends a message to the brain (nervous system) that it is hot or cold. The nervous system then sends signals to the skin or muscles. The endocrine system regulates how much water is released as sweat when hot.***
23. What are 2 things that happen when the skin senses it is too hot? Include what systems are involved. ***If it is hot, then the brain sends the message to cause 1- sweating (evaporation of sweat cools the body) and 2-vasodilation (blood vessels get bigger to release heat through the skin’s surface). Integumentary, muscular, nervous, excretory (kidneys release waste and water in sweat), endocrine (releases hormones to regulate how much water is released in sweat)***
24. What are 2 things that happen when the skin senses it is too cold? ***1-shivering/goosebumps and 2-vasoconstriction (blood vessels constrict)***
25. If blood pressure is low, how can the body change the blood vessel size to maintain homeostasis? ***The blood vessels need to constrict to cause blood pressure to rise to get to a normal blood pressure (homeostasis)***
26. What are some words associated with homeostasis? ***Equilibrium, feedback, balanced, stable, constant, normal level***
27. How does the word feedback relate to homeostasis? ***Feedback refers to the body responding to a stimulus. The body can undergo negative or positive feedback.***
28. What is negative feedback and how does it help maintain homeostasis? ***It counteracts (reverses) any change in the body that moves conditions away from a set point. It helps move the body back into homeostasis.***
29. Give an example of negative feedback in humans. ***Blood sugar regulation, blood pressure, body temperature, water levels in blood (plus many others!)***
30. What is positive feedback and does it help maintain homeostasis? ***It is a process that amplifies a change. It does not help maintain homeostasis, because it is trying to increase a change rather than reverse it.***
31. Give an example of positive feedback in humans. ***Childbirth-increasing speed of contractions or blood clotting.***
32. Can an organ be a part of more than 1 system? ***If so, give an example and what systems it is a part of. Yes. Some examples: Stomach-digestive, muscular, immune. Skin-immune, excretory and integumentary. Ovaries-reproductive and endocrine.(there are many more examples)***
33. What do organisms do to maintain homeostasis with oxygen levels when they go to higher altitudes? ***Produce more red blood cells to carry oxygen more quickly throughout the body.***

Identify what systems are working together in the following scenarios.

1. Delivers oxygen from lungs to cells and drops off carbon dioxide from cells to lungs. ***Respiratory and circulatory. Lungs and Diaphragm work together to obtain oxygen. Blood is pumped to the lungs, where it picks up oxygen, blood is them pumped to the rest of the body where it is delivered to body cells.***
2. Ingested food is broken down in the stomach. ***Digestive, nervous, endocrine, muscular. Mouth physically breaks down food (saliva starts to chemically break down starch using amylase). Food moved down the esophagus via smooth muscle, to the stomach. The stomach chemically breaks down food, food travels to the small intestine which absorbs nutrients (which is put in the blood stream), then the large intestine which absorbs water and the excess waste is removed from the body from the rectum***
3. Someone sneezes next to you. What systems protect you from the airborne pathogens? ***Respiratory, immune, integumentary, circulatory (sends white blood cells to site of infection)***
4. Rollerblading. ***Muscular, skeletal, nervous. The nervous system detects stimulus from the external environment to tell the muscle and skeletal systems to work together to move the body.***
5. If you are being chased by a bear, your body will defend you by going into the fight or flight response. Explain what systems are involved and in what way, and what will your body do? ***Nervous system-receives message of danger. Endocrine system-releases adrenaline to speed up your heart rate (circulatory system) and breathing rate (respiratory system).***
6. High blood pressure: ***cardiovascular/circulatory- involves the vessels and heart rate, nervous-detects pressure is out of homeostasis, endocrine-sends message to vessels , and muscular- dilates vessels to reduce pressure***
7. You have eaten 12 donut holes from Dunkin donuts and your blood glucose is too high. ***Digestive- breaks down nutrients and puts in blood stream, endocrine- pancreas detects glucose level and releases insulin , cardiovascular- insulin travels through vessels to reach target cells***