MAMMOTH
SCIENCE

Biodiversity

The Study of Biodiversity & Evolutionary Change

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Table of Contents

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Student Expectations

Instructional Days: 8-10 days

- *Define biodiversity and explain why it is important to study and protect it.*
- *Describe the different levels of biodiversity (species, genetic, ecosystem) and give examples of each.*
- *Explain the theory of evolution by natural selection and how it relates to the origin of species.*
- *Understand the concept of adaptation and give examples of how it contributes to the survival of species.*
- *Describe the different types of evidence that support the theory of evolution (fossils, comparative anatomy, comparative embryology, molecular biology, and biogeography).*
- *Explain the concept of speciation and give examples of how it can occur.*
- *Understand the difference between microevolution and macroevolution and give examples of each.*
- *Explain the process of natural selection and how it can lead to the evolution of new traits and species.*
- *Understand the importance of genetic variation in natural selection and how it can lead to the adaptation of populations to changing environments.*

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Unit Vocabulary - page 1

Quizlet

antibodies	proteins that react to a specific antigen or that inactivate or destroy toxins
B cells	type of white blood cells, that when stimulated produce antibodies
cell	Basic unit of life
cellular reproduction	an original cell divides and produces two identical daughter cells
circulatory system	Transports oxygen, waste, nutrients, hormones, heat, etc... around the body
defense	protection from harm
digestive system	Breaks down food into absorbable units that enter the blood for distribution to body cells.
endocrine system	Consists of glands that control many of the body's activities by producing hormones.
excretory system	the system that removes waste from your body and controls water balance
feedback loop	a circular process in which a system's output serves as input to that same system
feedback mechanism	a loop system in which the system responds to perturbation in the same direction (positive feedback) or in the opposite direction (negative feedback
fertilization	a male sex cell and a female sex cell unite to form a new individual
homeostasis	balance or equilibrium maintained by the body
homeostasis	balance or equilibrium maintained by the body
hormones	chemical messenger that carries information from one part of the body to another part. Produced by the endocrine system

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Unit Vocabulary - page 2

Quizlet

immune system	A system (including the thymus and bone marrow and lymphoid tissues) that protects the body from foreign substances and pathogenic organisms by producing the immune response
integumentary system	Consists of the skin, mucous membranes, hair, and nail
interaction	the effect of one factor (such as environment) depends on another factor (such as heredity)
lymphatic system	Composed of a network of vessels, ducts, nodes, and organs. Provides defense against infection.
macrophage	type of white blood cell that surrounds, ingests, and destroys invaders of the body
molecule	a group of atoms bonded together, representing the smallest fundamental unit of a chemical compound that can take part in a chemical reaction.
muscular system	Allows manipulation of the environment, locomotion, and facial expression. Maintains posture, and produces heat.
negative feedback	A primary mechanism of homeostasis, whereby a change in a physiological variable that is being monitored triggers a response that counteracts the initial fluctuation.
nervous system	the body's speedy, electrochemical communication network, consisting of all the nerve cells of the peripheral and central nervous systems
nutrient absorption	the transfer of nutrients from the lumen of the GI tract to the circulatory system
nutrients	substances that supply organisms with energy. Also enable organisms to grow and maintain homeostasis.
organ	A collection of tissues that carry out a specialized function of the body
organ system	group of organs that work together to perform a specific function

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Unit Vocabulary - page 3

Quizlet

organelle	*specialized structure that performs important cellular functions within a eukaryotic cell*
organism	*An individual living thing*
pathogen	*A disease causing agent*
positive feedback	*A type of regulation that responds to a change in conditions by initiating responses that will amplify the change. Takes organisms away from a steady state.*
regulation	*measures that allow an organism to maintain equilibrium by responding to stimuli*
reproductive system	*Reproduce offspring- produce male sex cells (sperm) and female sex cells (oocytes)*
respiratory system	*system responsible for taking in oxygen and releasing carbon dioxide using the lungs*
response	*An action or change in behavior that occurs as a result of a stimulus.*
simulus	*any event or situation that evokes a response*
skeletal system	*Protects and supports body organs and provides a framework the muscles use to support movement. Made up of bones and joints*
T cells	*type of white blood cell that coordinate the immune system in its attack on invaders*
tissue	*A group of similar cells that perform the same function.*

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Slides

Here you will find the Google Slides Presentation for this Unit

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Notes and Notes Key

Here is the notes and **Notes Key** for this Unit

Google Docs

Unit 16: Animal Systems - Notes
SPRING SEMESTER 2023

INSTRUCTOR:

instructoreemail.com

Vocabulary / Key Terms/ Concepts	Unit 16: Animal Systems

Student Expectations:

- Demonstrate the levels of biological organization from its type of cell to tissue to organ to system.
- Describe how systems work together
- Identify the major functions of the body systems:
  - Immune
    - *Protects the body from illness and infection*
    - *Produces mucus antibodies, T-cells, and lymphocytes*
  - Digestive
    - *Breaks down foods into biomolecules for nourishment and to provide energy*
    - *Absorbs nutrients and vitamins into circulatory and lymphatic systems*
    - *Removes excess water in large intestines*
    - *Produces acid in stomach that destroys foreign bacteria*
  - Lymphatic

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Labs and Activities

Unit 16 - Animal Systems Article:
Talk Read, Talk Write

INSTRUCTOR:
no_reply@example.com

Directions:

- ***Talk 1 – (5 minutes)*** *With a shoulder partner, discuss all that you know about viruses, replication cycles, virus structure, etc.*
- ***Read 1 – (10-15 minutes)*** *read the article here: LINK*
- ***Talk 2 – (5 Minutes)*** *discuss with your partner the main idea, main points, and summary of the article you just read.*
- ***Write*** *In 3-5 sentences, write a summary of the article you just read.*

Infectious animals

Critters spread many germs that can sicken each other — and even kill people

Jonathan Epstein studies how diseases are transferred between animals and people. This bat, *Pteropus giganteus*, commonly carries Nipah virus. The germ killed hundreds of people and more than one million farm animals.

EDGEHEALTH ALLIANCE
By Amanda Leigh Mascarelli
April 17, 2013 at 1:50 pm

When people talk about catching the flu, most consider classmates, family members or neighbors as likely sources. So it might be

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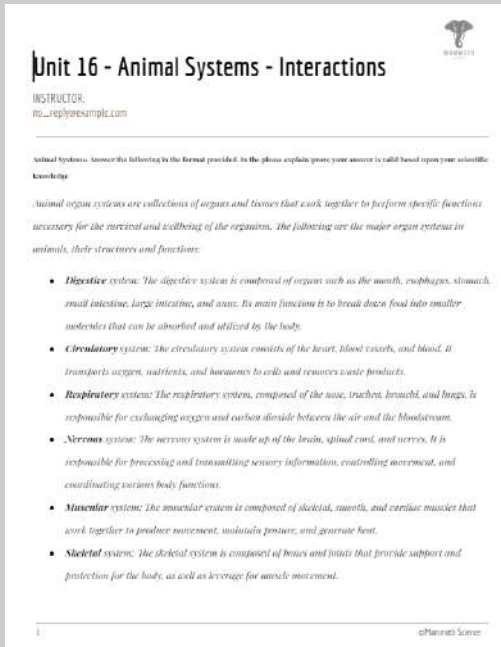
Animal Systems Article - Talk Read, Talk Write



Unit 16 - Animal Systems - Interactions

INSTRUCTOR:
no_reply@example.com

Animal Systems: Answer the following in the format provided. In the please explain/prove your answer is valid based upon your scientific knowledge

Animal organ systems are collections of organs and tissues that work together to perform specific functions necessary for the survival and wellbeing of the organism. The following are the major organ systems in animals, their structures and functions:

- ***Digestive*** *system: The digestive system is composed of organs such as the mouth, esophagus, stomach, small intestine, large intestine, and anus. Its main function is to break down food into smaller molecules that can be absorbed and utilized by the body.*
- ***Circulatory*** *system: The circulatory system consists of the heart, blood vessels, and blood. It transports oxygen, nutrients, and hormones to cells and removes waste products.*
- ***Respiratory*** *system: The respiratory system, composed of the nose, trachea, bronchi, and lungs, is responsible for exchanging oxygen and carbon dioxide between the air and the bloodstream.*
- ***Nervous*** *system: The nervous system is made up of the brain, spinal cord, and nerves. It is responsible for processing and transmitting sensory information, controlling movement, and coordinating various body functions.*
- ***Muscular*** *system: The muscular system is composed of skeletal, smooth, and cardiac muscles that work together to produce movement, maintain posture, and generate heat.*
- ***Skeletal*** *system: The skeletal system is composed of bones and joints that provide support and protection for the body, as well as leverage for muscle movement.*

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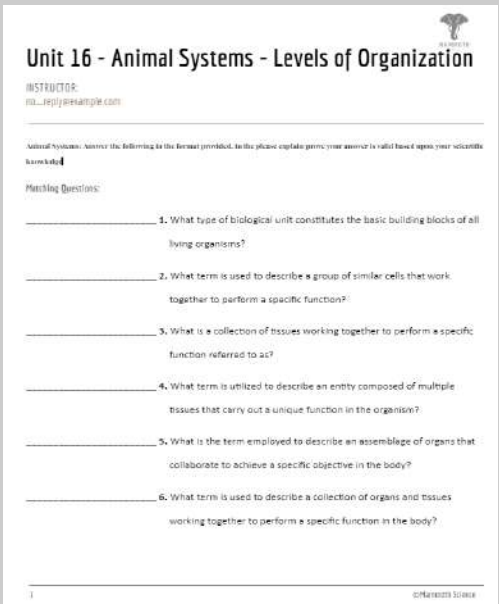
Animal Systems - Animal Systems - Interactions - KEY



Unit 16 - Animal Systems - Levels of Organization

INSTRUCTOR:
no_reply@example.com

Animal Systems: Answer the following in the format provided. In the please explain/prove your answer is valid based upon your scientific knowledge

Matching Questions:

_____ 1. What type of biological unit constitutes the basic building blocks of all living organisms?

_____ 2. What term is used to describe a group of similar cells that work together to perform a specific function?

_____ 3. What is a collection of tissues working together to perform a specific function referred to as?

_____ 4. What term is utilized to describe an entity composed of multiple tissues that carry out a unique function in the organism?

_____ 5. What is the term employed to describe an assemblage of organs that collaborate to achieve a specific objective in the body?

_____ 6. What term is used to describe a collection of organs and tissues working together to perform a specific function in the body?

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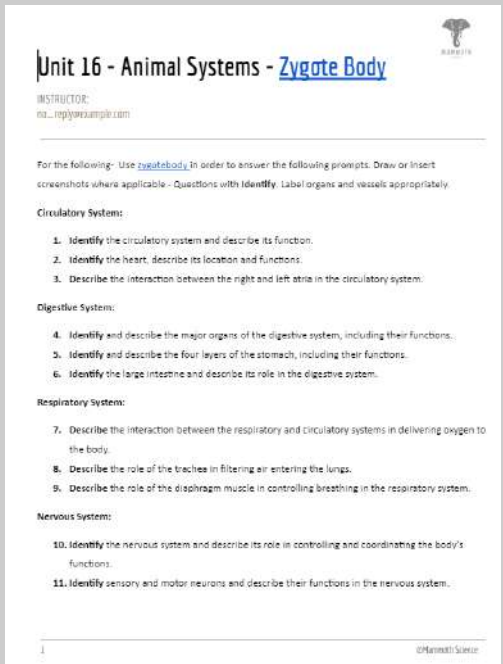
Animal Systems Animal Systems - Levels of Organization - KEY



Unit 16 - Animal Systems - Zygote Body

INSTRUCTOR:
no_reply@example.com

For the following- Use zygotebody in order to answer the following prompts. Draw or insert screenshots where applicable - Questions with **Identify**, Label organs and vessels appropriately.

Circulatory System:

1. **Identify** the circulatory system and describe its function.
2. **Identify** the heart, describe its location and functions.
3. **Describe** the interaction between the right and left atria in the circulatory system.

Digestive System:

4. **Identify** and describe the major organs of the digestive system, including their functions.
5. **Identify** and describe the four layers of the stomach, including their functions.
6. **Identify** the large intestine and describe its role in the digestive system.

Respiratory System:

7. **Describe** the interaction between the respiratory and circulatory systems in delivering oxygen to the body.
8. **Describe** the role of the trachea in filtering air entering the lungs.
9. **Describe** the role of the diaphragm muscle in controlling breathing in the respiratory system.

Nervous System:

10. **Identify** the nervous system and describe its role in controlling and coordinating the body's functions.
11. **Identify** sensory and motor neurons and describe their functions in the nervous system.

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Animal Systems Zygote Body

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Animal Systems PBL

Unit 16 - Animal Systems - PBL

INSTRUCTOR:
no_reply@example.com

Project Question:

How can we, as biology students, comprehend the intricacies and connections of our body systems by utilizing the concept of levels of organization, and create a functional model that displays the anatomy and physiology of these complex systems in our bodies?

Objective:

To understand the anatomy and physiology of a chosen animal body system and to demonstrate this knowledge through the creation of an electronic presentation and working model.

Instructions:

1. Choose an animal body system: Students will choose one of the following animal body systems to research and build a model of: digestive, circulatory, respiratory, nervous, muscular, skeletal, endocrine, immune, reproductive, excretory, or lymphatic.
2. Conduct research: Students will conduct research on their chosen body system using a variety of sources, such as books, articles, and websites. They will take notes and make an outline of the information they find.
3. Create an electronic presentation: Students will create an electronic presentation using a tool of their choice (e.g. PowerPoint, Prezi, Google Slides) that includes the following:
    - An introduction to the body system, including its function and importance
    - A detailed description of the structure and function of the different components of the body system
    - A description of how the body system interacts with other systems to maintain homeostasis

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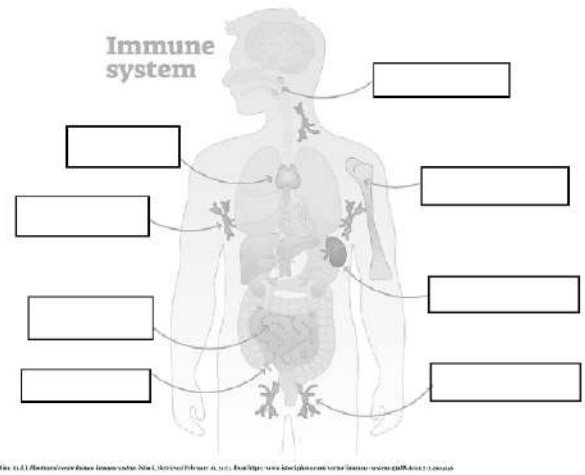
Animal Systems - Coloring Book

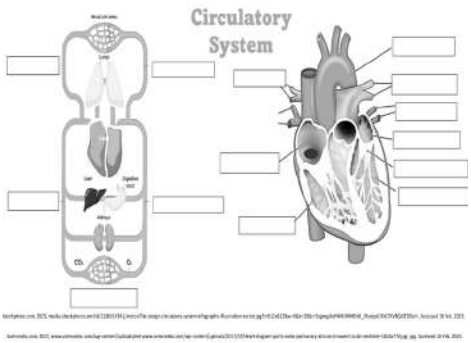
Unit 16 - Animal Systems - Coloring Book

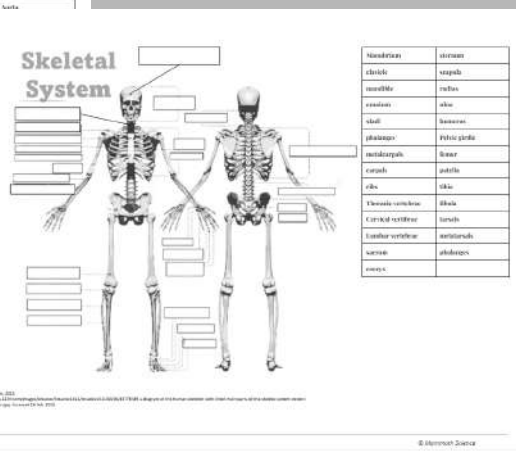
INSTRUCTOR:
no_reply@example.com

For the following Body Systems - Color each organ present a different color and label appropriately.



Inguinal lymph nodes
Spleen
Appendix
Peyer's Patches
Bone Marrow
Auxillary Lymph Nodes
Thymus
Tonsils and Adenoids





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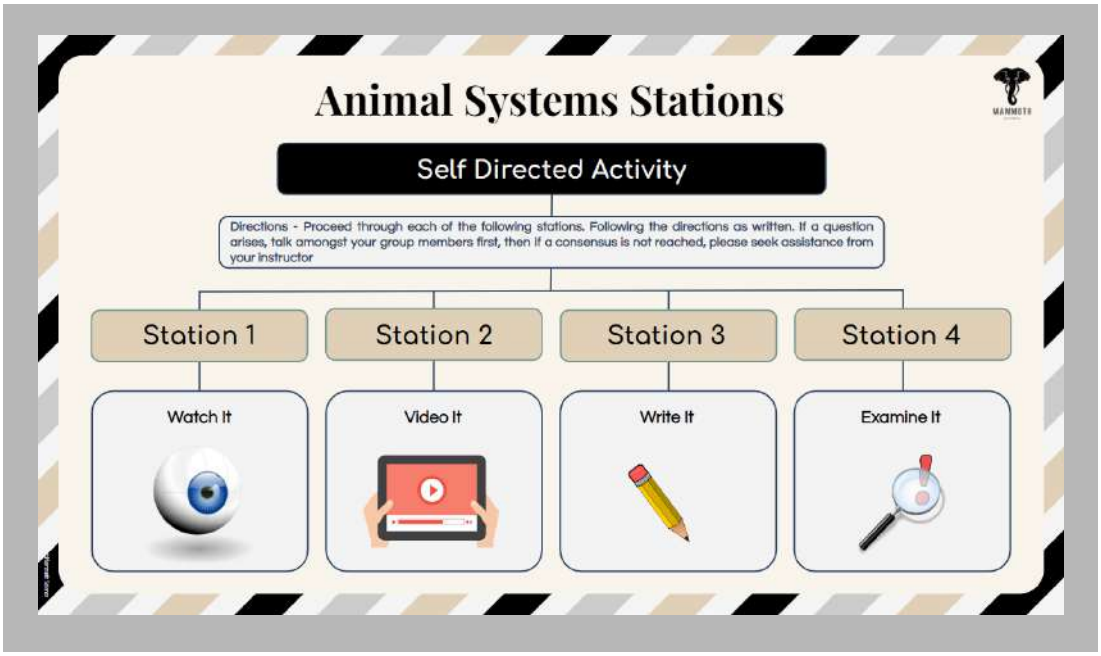
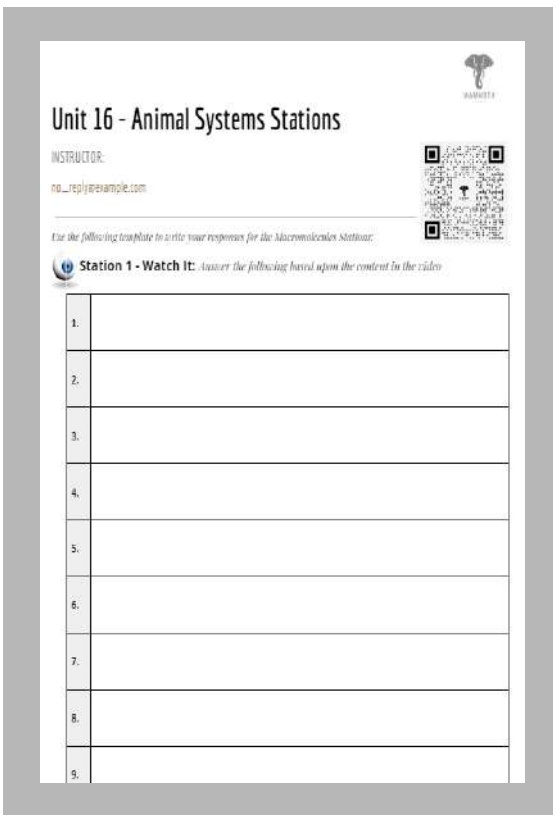
Animal Systems - Stations





Animal Systems Stations Answer Doc

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Video Resources

Here are the curated Video links from Youtube for this Unit

HOMEOSTASIS

- *Homeostasis* - Bozeman Science
- Amoeba Sisters - *Homeostasis*
- Khan Academy - *Homeostasis*
- Armando Hasudungan - *Hormones in body fluid homeostasis (ADH/vasopressin, Aldosterone and Natriuretic peptides)*
- Armando Hasudungan - *Temperature Homeostasis:*
- Armando Hasudungan - *Insulin & Glucagon Homeostasis*

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Video Resources - page 2

IMMUNE SYSTEM

- Bozeman Science - *The Immune System*:: LINK
- Crash Course - *Immune System*: LINK
- Khan Academy - *Types of Immune Responses*: LINK
- Handwritten Tutorials - *Overview of the Immune System* : LINK
- Handwritten Tutorials - *Cells of the Immune System*: LINK
- Armando Hasudungan - *Immune System Overview*: LINK
- Armando Hasudungan - *Adaptive Immunity*: LINK
- Armando Hasudungan - *Innate Immunity*: LINK
- Armando Hasudungan - *Introduction to Antibodies*: LINK
- Armando Hasudungan - *Antibodies Function* : LINK
- Armando Hasudungan - *Mucosal Immunity*: LINK
- Armando Hasudungan - *Organs & Tissues*: LINK

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Video Resources - page 2

RESPIRATORY SYSTEM

- Bozeman Science - *The Respiratory System*: LINK
- Crash Course - *The Respiratory System*: LINK
- Khan Academy - *The Lungs and Pulmonary System*: LINK
- Armando Hasudungan - *Mechanism of Breathing* : LINK
- Armando Hasudungan - *Control of Breathing*: LINK
- Amoeba Sisters - *The Respiratory System* : LINK

BLOOD

- Armando Hasudungan - *Hematopoiesis - RBC Production*: LINK
- Armando Hasudungan - *RBC Life Cycle*: LINK
- Armando Hasudungan - *RBC Introduction*: LINK
- Armando Hasudungan - *Anemia* : LINK
- Armando Hasudungan - *Clotting* : LINK
- Armando Hasudungan - *Hemostasis* : LINK

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Video Resources - page 2

CIRCULATORY SYSTEM

- Bozeman Science - *Circulatory System & The Heart*:: LINK
- Crash Course - *Circulatory System*: LINK
- Khan Academy - *Circulatory System & The Heart*: LINK
- Armando Hasudungan - *Anatomy* : LINK
- Armando Hasudungan - *Physiology*: LINK
- Armando Hasudungan - *Membrane Potential*: LINK
- Armando Hasudungan - *Contraction*: LINK
- Amoeba Sisters - *The Circulatory System* : LINK

DIGESTIVE SYSTEM

- Armando Hasudungan - *Digestive Physiology*: LINK
- Amoeba Sisters - *The Digestive System*: LINK
- Crash Course - *Digestive System*: LINK
- Crash Course - *Digestive: Part 1* : LINK
- Crash Course - *Digestive: Part 2* : LINK
- Bozeman Science - *The Digestive System* : LINK

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Video Resources - page 2

EXCRETORY SYSTEM

- Bozeman Science - *Excretory System*:: LINK
- Crash Course - *Excretory System*: LINK
- Khan Academy - *The Kidney & Nephron*: LINK
- Armando Hasudungan - *Nephrology*: LINK
- Armando Hasudungan - *Nephron Function*: LINK
- Bozeman Science - *Osmoregulation*: LINK
- Armando Hasudungan - *Kidney Overview*: LINK
- Armando Hasudungan - *Glomerular Filtration* : LINK

ENDOCRINE SYSTEM

- Armando Hasudungan - *Endocrinology*: LINK
- Amoeba Sisters - *The Digestive System*: LINK
- Khan Academy - *Endocrine System*: LINK
- Crash Course - *Endocrine* : LINK
- Armando Hasudungan - *Female Reproductive Hormones*: LINK
- Armando Hasudungan - *Male Reproductive Hormones*: LINK
- Bozeman Science - *Thyroid Control* : LINK

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Video Resources - page 2

NERVOUS SYSTEM

- Crash Course - *Nervous System*: LINK
- Khan Academy - *Structure of the NS*: LINK
- Armando Hasudungan - *Anatomy of the Neuron*: LINK
- Armando Hasudungan - *Neuromuscular Junction*: LINK
- Armando Hasudungan - *Divisions*: LINK
- Handwritten Notes - *Nervous System Divisions* : LINK

INTEGUMENTARY SYSTEM

- Amoeba Sisters - *The Integumentary System* - LINK
- Crash Course - *Part 1* - LINK
- Crash Course - *Part 2* - LINK
- Armando Hasudungan - *Skin Anatomy*: LINK
- Bozeman Science - Integumentary System: LINK

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Video Resources - page 2

MUSCULO-SKELETAL SYSTEM

- Crash Course - *Muscular System*: LINK
- Khan Academy - *Structure of the Skeletal System*: LINK
- Armando Hasudungan - *Overview - Skeletal*: LINK
- Armando Hasudungan - *Skeletal Muscle Intro*: LINK
- Armando Hasudungan - *Contractions*: LINK
- Handwritten Notes - *Joints*: LINK
- Bozeman Science - *The Muscular System*: LINK
- Armando Hasudungan - *Skeletal System Intro*: LINK
- Crash Course - *Skeletal System*: LINK
- AMoeba Sisters - *Body Systems*: LINK
- Bozeman Science - *Skeletal System*: LINK

REPRODUCTIVE SYSTEM

- Crash Course - *Reproductive System*- LINK
- Khan Academy - *Reproductive System*- LINK
- Armando Hasudungan - *Reproductive System*: LINK
- Bozeman Science - *Reproductive System*: LINK
- Crash Course - *Part 1* / *Part 2*

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Lesson Planning

Monday	Tuesday	Wednesday	Thursday	Friday

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Lesson Planning - Template

Unit: Key Learning Objectives	Date: Time to Complete:

Day 1

Phenomena:			
Time:	Instructional Strategies	Practice	Modification

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Lesson Planning - Template

Unit: Key Learning Objectives	Date: Time to Complete:

Day 2

Phenomena:			
Time:	Instructional Strategies	Practice	Modification

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Lesson Planning - Template

Unit: Key Learning Objectives	Date: Time to Complete:

Day 3

Phenomena:			
Time:	Instructional Strategies	Practice	Modification

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Lesson Planning - Template

Unit: Key Learning Objectives	Date: Time to Complete:

Day 4

Phenomena:			
Time:	Instructional Strategies	Practice	Modification

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Lesson Planning - Template

Unit:	Date:
Key Learning Objectives	Time to Complete:

Day 5

Phenomena:			
Time:	Instructional Strategies	Practice	Modification

Duplicate this slide to add more days for planning

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Notes to Consider

Duplicate this slide to add more days for planning

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