SKELETAL SYSTEM



Complete anatomy Unit

13 day unit

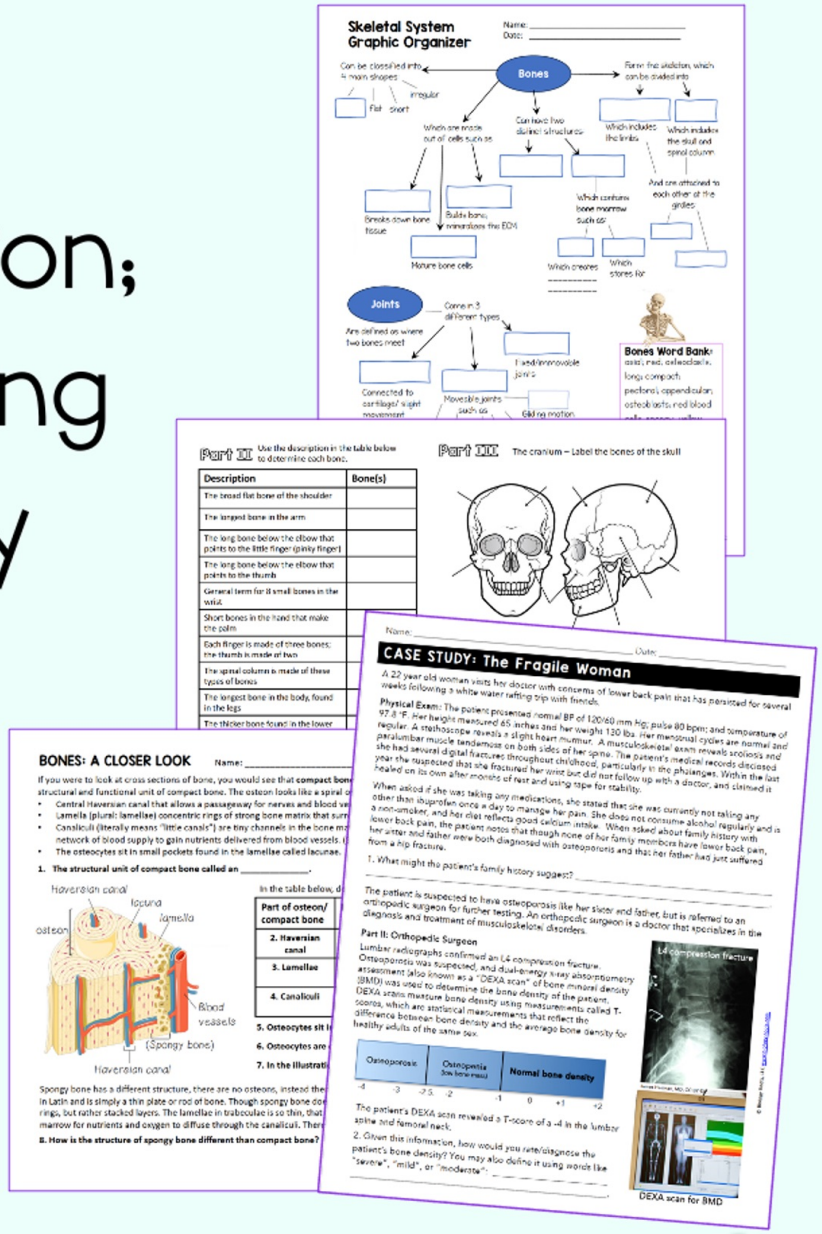
Includes print and digital

biology roots

Skeletal System

Topics include:

- ✅ Types of bones
- ✅ Parts of the skeleton; girdles; bone labeling
- ✅ Long bone anatomy
- ✅ Bone cells
- ✅ Joints
- ✅ Bone growth



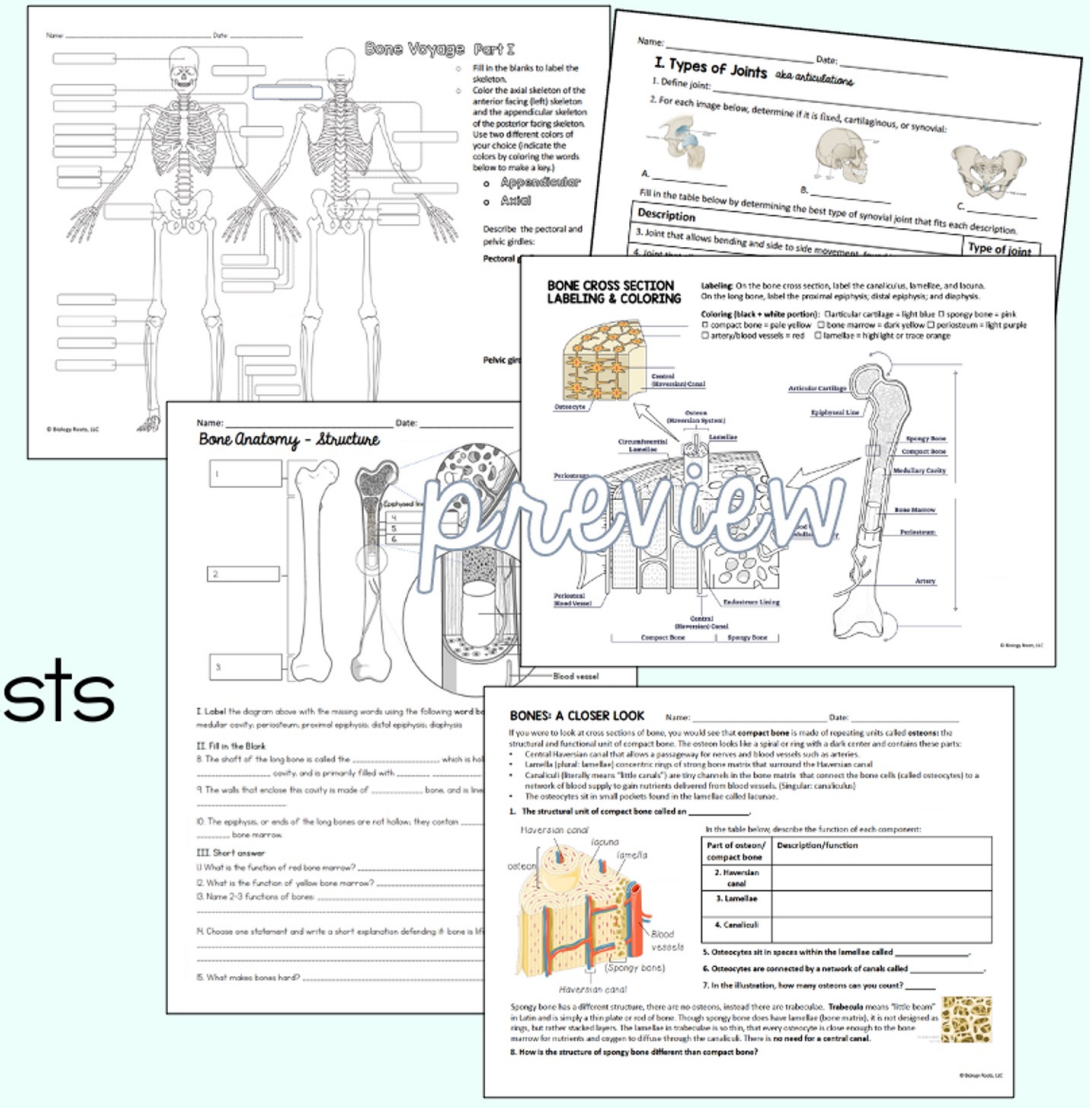
biology roots

Skeletal System

Types of resources included:

- ✅ Editable PowerPoint with 2 types of student notes to choose from, plus an open note quiz
- ✅ Graphic Organizer
- ✅ Coloring
- ✅ BINGO!
- ✅ Bone Bisection
- ✅ Stations
- ✅ Case Study
- ✅ Practical
- ✅ Differentiated tests

... plus more!



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Skeletal System

Osteons - the functional unit that makes compact bone



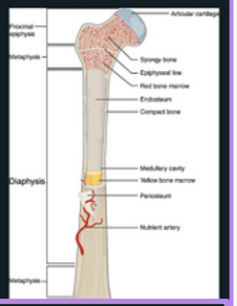
Osteons are concentric rings of bone matrix

Anatomy of a Bone

Long Bone Example

- Epiphysis (end)
  - Proximal end = top
  - Distal end= bottom
- Diaphysis (shaft)

Articular Cartilage- padding
ttached to bone surfaces at
able (synovial) joints
line cartilage)
eriosteum

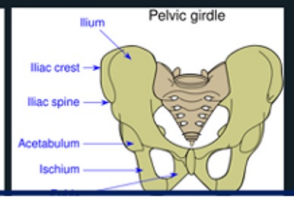


Girdles

Pectoral



Pelvic

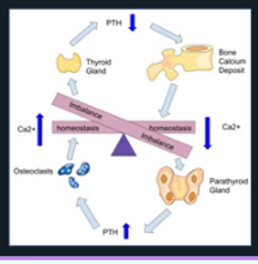


EDITABLE POWERPOINT

Calcium is needed to build bones.

- Calcium is also needed to send nerve signals, for muscle contractions, and blood clotting.

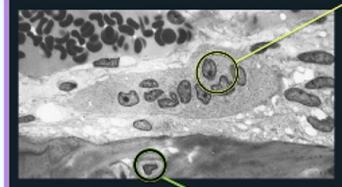
The parathyroid gland regulates the amount of calcium in the blood- if too little calcium is present, it can **stimulate bones to release calcium to replenish blood calcium levels for other functions.**



Bone Cells

Osteocyte: a mature bone cell.

Osteoclast

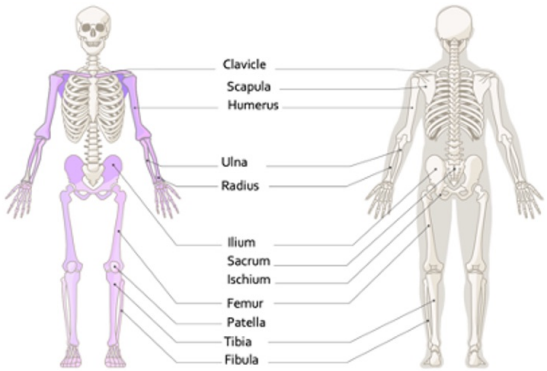


Osteoclast: a cell that breaks down bone for remodeling, reabsorption, repairing.

Osteoblast

Osteoblast: a cell that is responsible for making bone by mineralizing the extracellular matrix. osteoblasts build bone.

Appendicular Skeleton –girdles; upper and lower limbs



MODELS & LABS



Bone Tissue Investigation

osteocyte osteoblast

In the circle below, provide a detailed sketch of what you see in the field of vision under the microscope at 100x. When you are done, zoom in to 400x to find an osteon to sketch.

Bone Tissue 200x

osteon
canaliculi
Haversian canal

Bone Tissue 400x

1. Bone cells are called **osteocytes.** On the illustration above, osteocytes are depicted as
2. Label the osteocyte on the image accordingly.

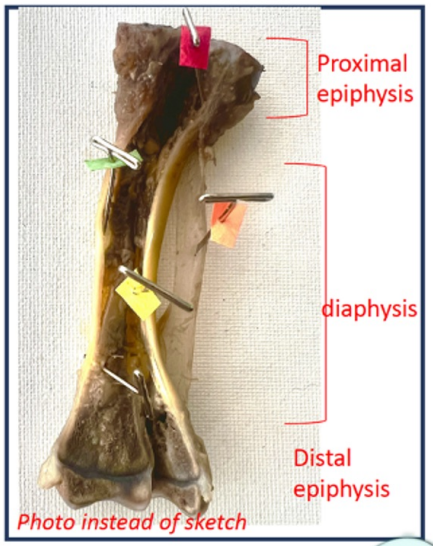
Other bone cells include **osteoblasts**: specialized cells that build bone ; and **osteoclasts**: specialized cells that break down and sculpt bone.

3. Label the illustration above accordingly.
4. One on of your sketches, label an osteon, Harversian canal, and canaliculi.



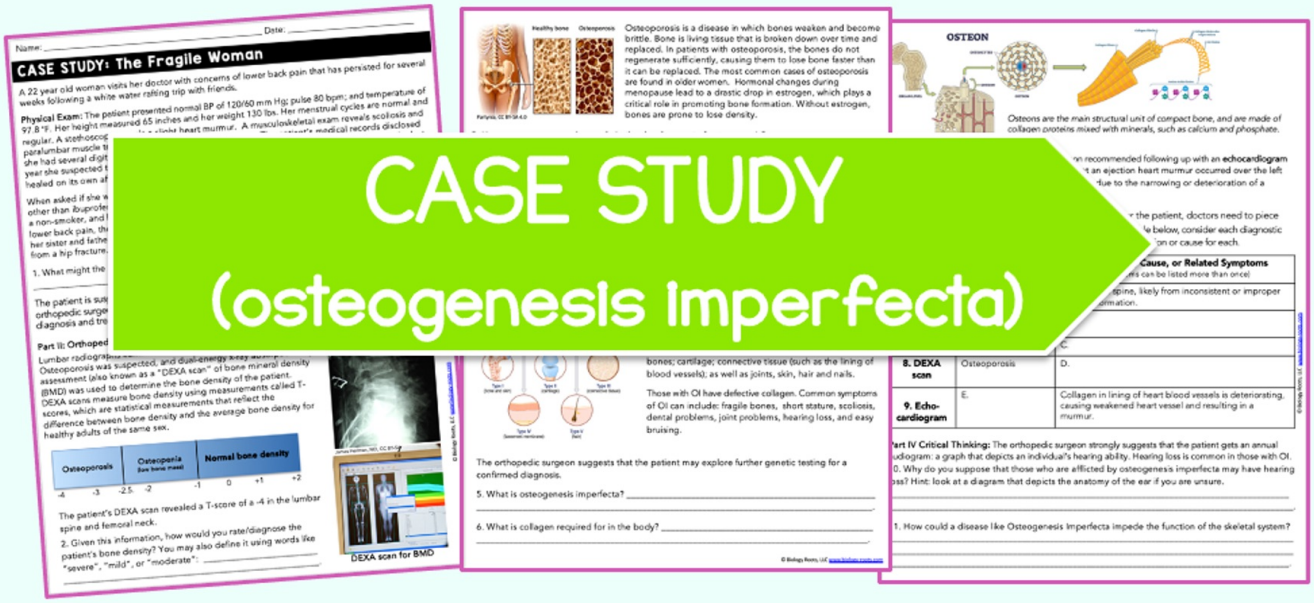
Investigating a chicken drumstick prior to bone bisection

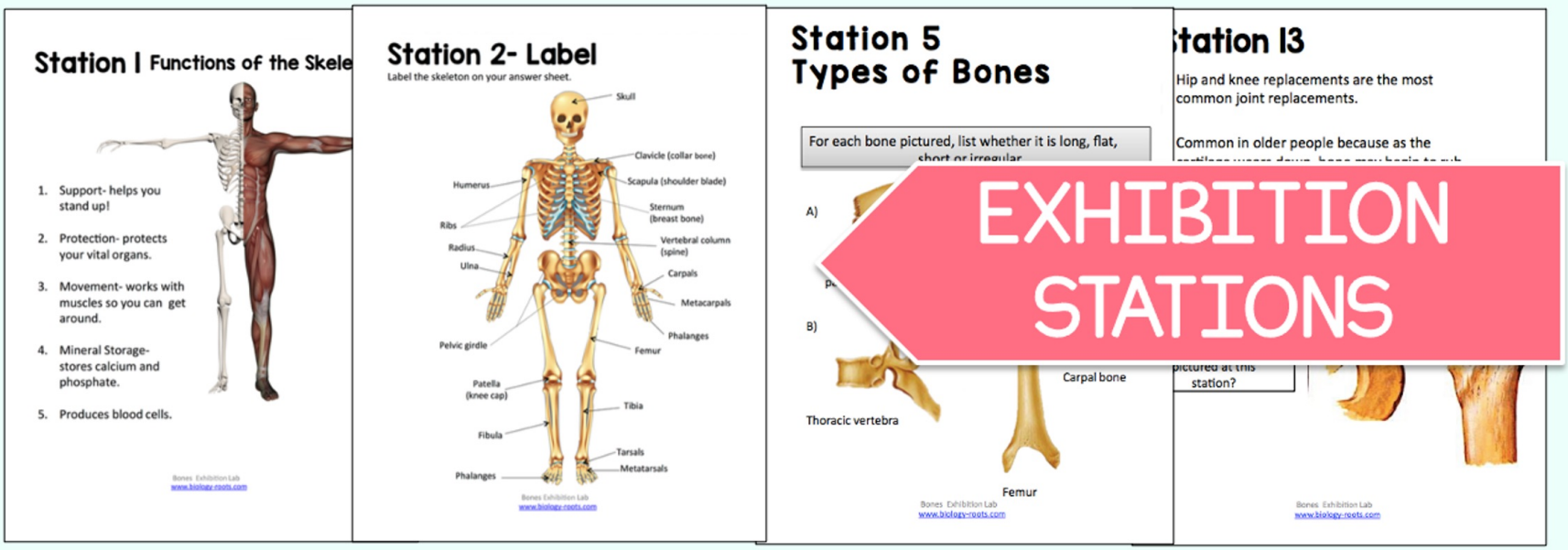
Bisected Bone



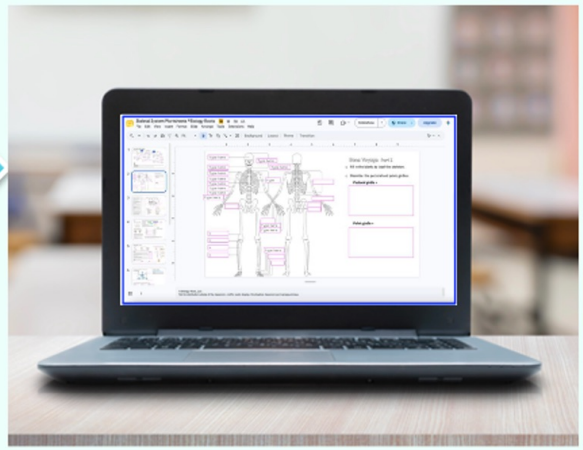
biology roots

Skeletal System





DIGITAL VERSIONS



Hosted on Google Slides

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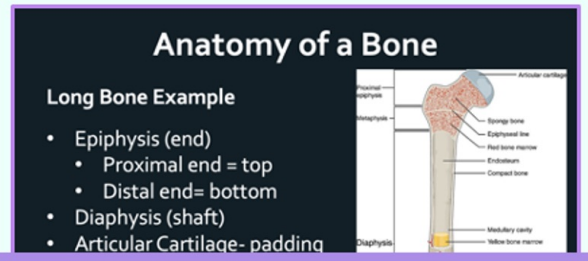
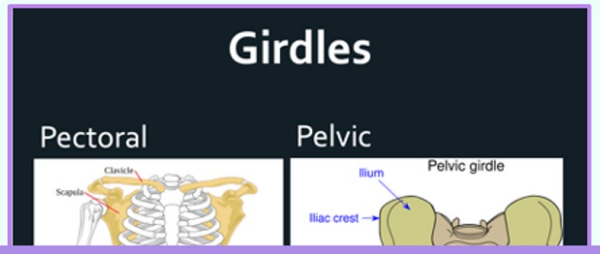
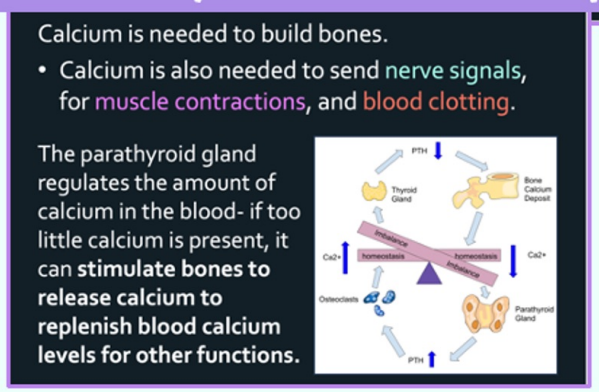
Editable PowerPoint Presentation (+ open note quiz)

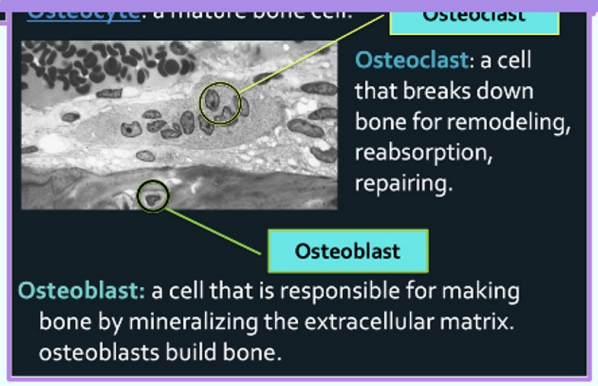


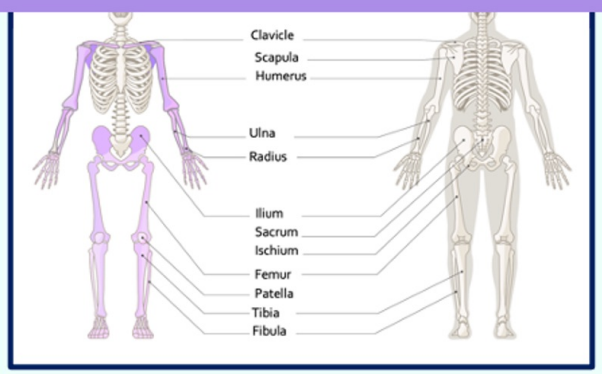




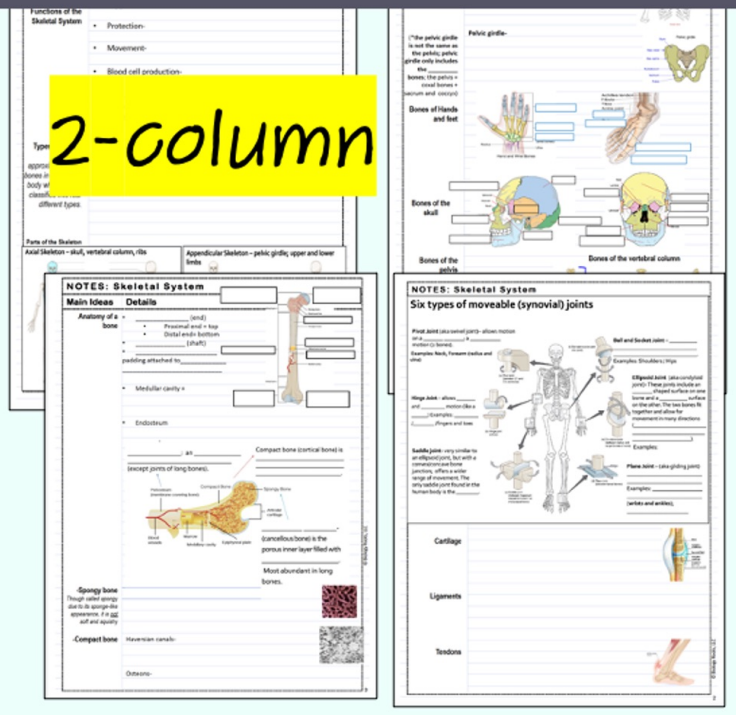
43 slides: covers bone type; parts of the skeleton; bone anatomy; bone cells; plus more

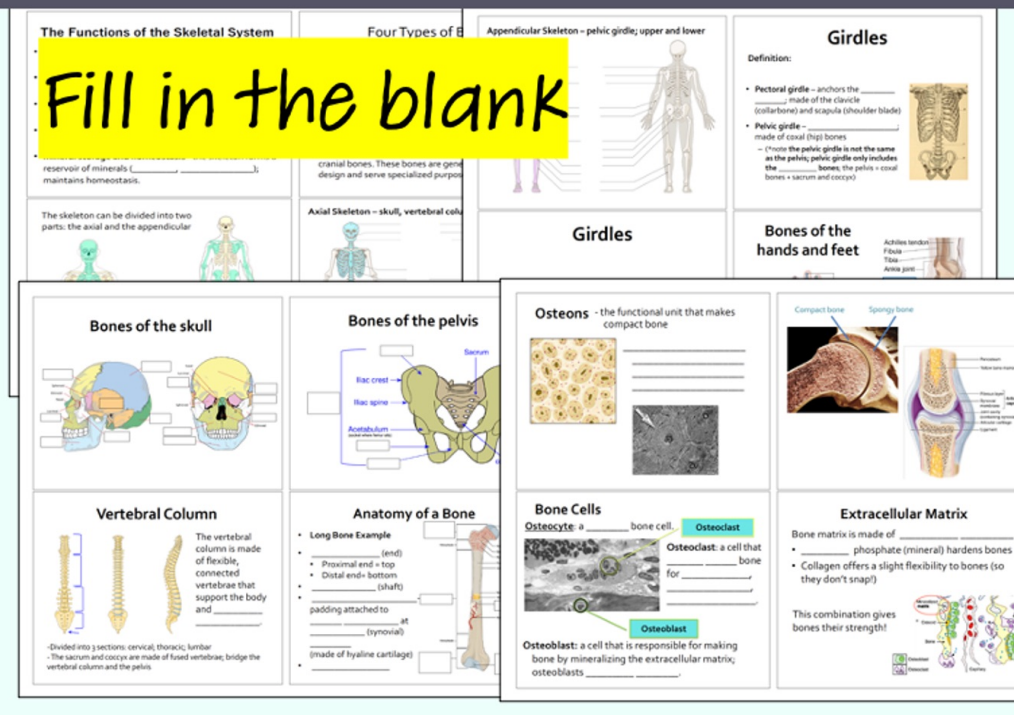






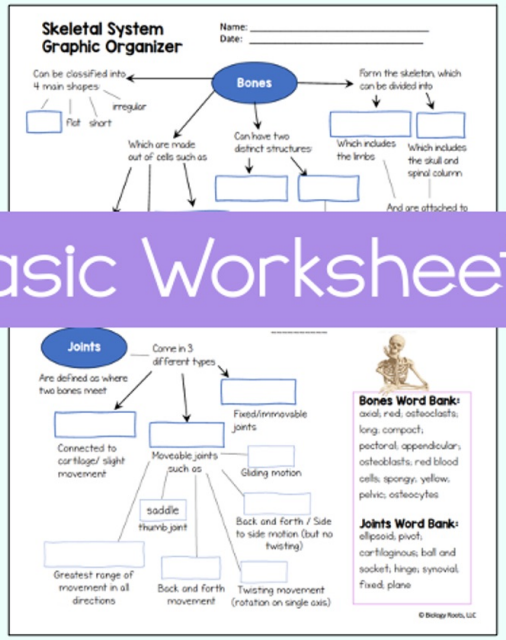
2 types of student notes to choose from
2 column OR fill-in-the-blank

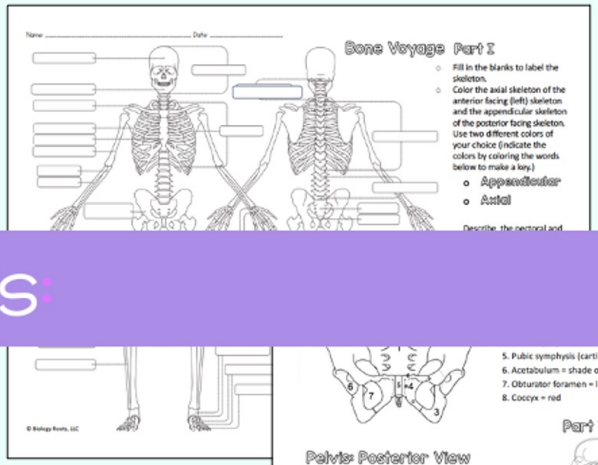


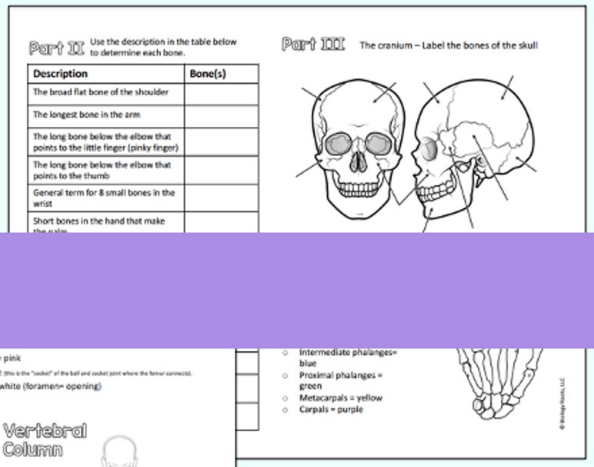


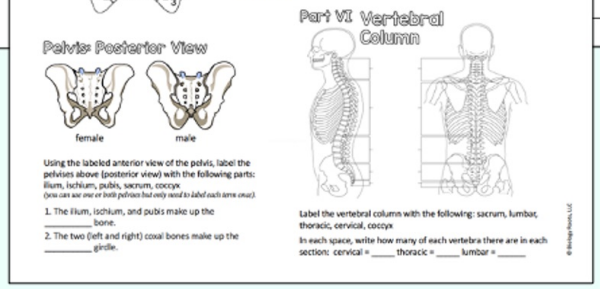
Skeletal System Classwork

Basic Worksheets:

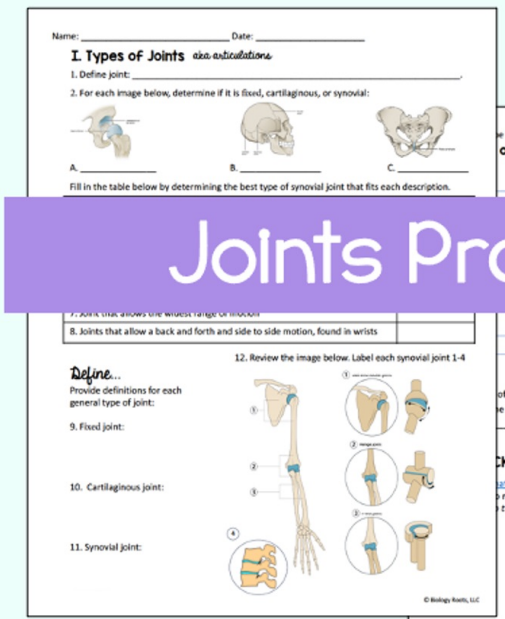


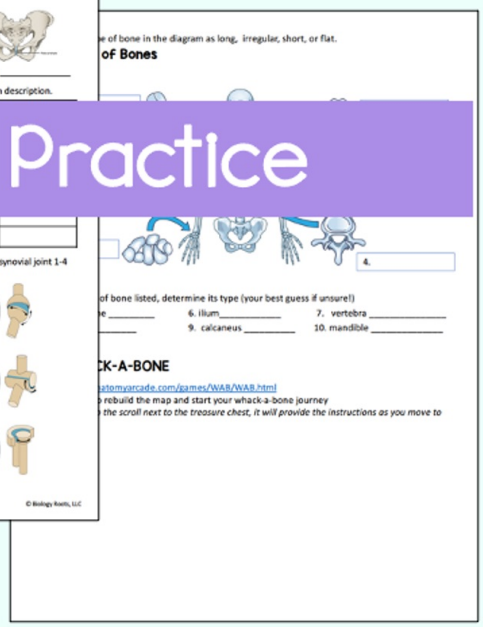




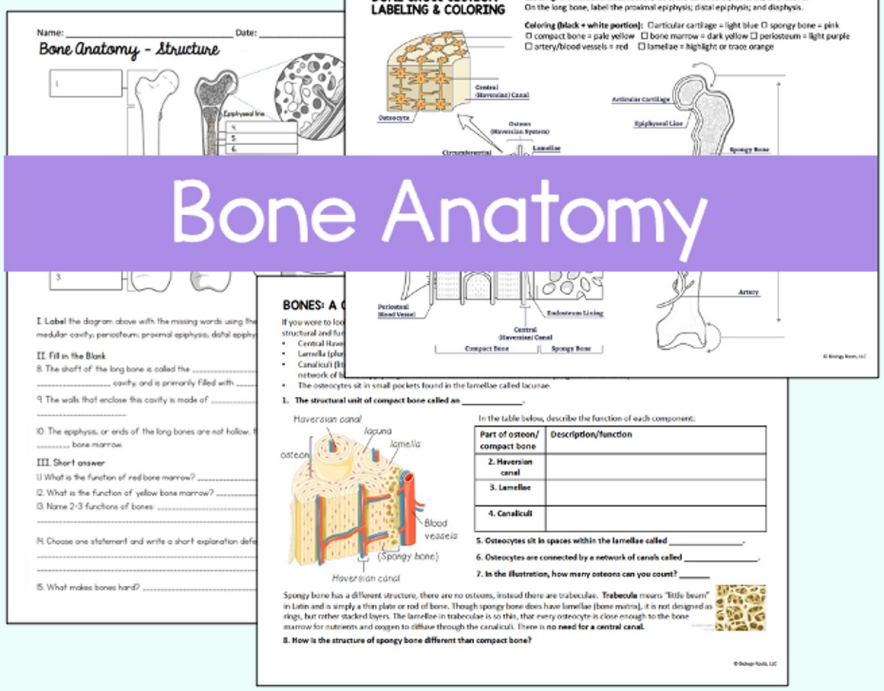


Joints Practice

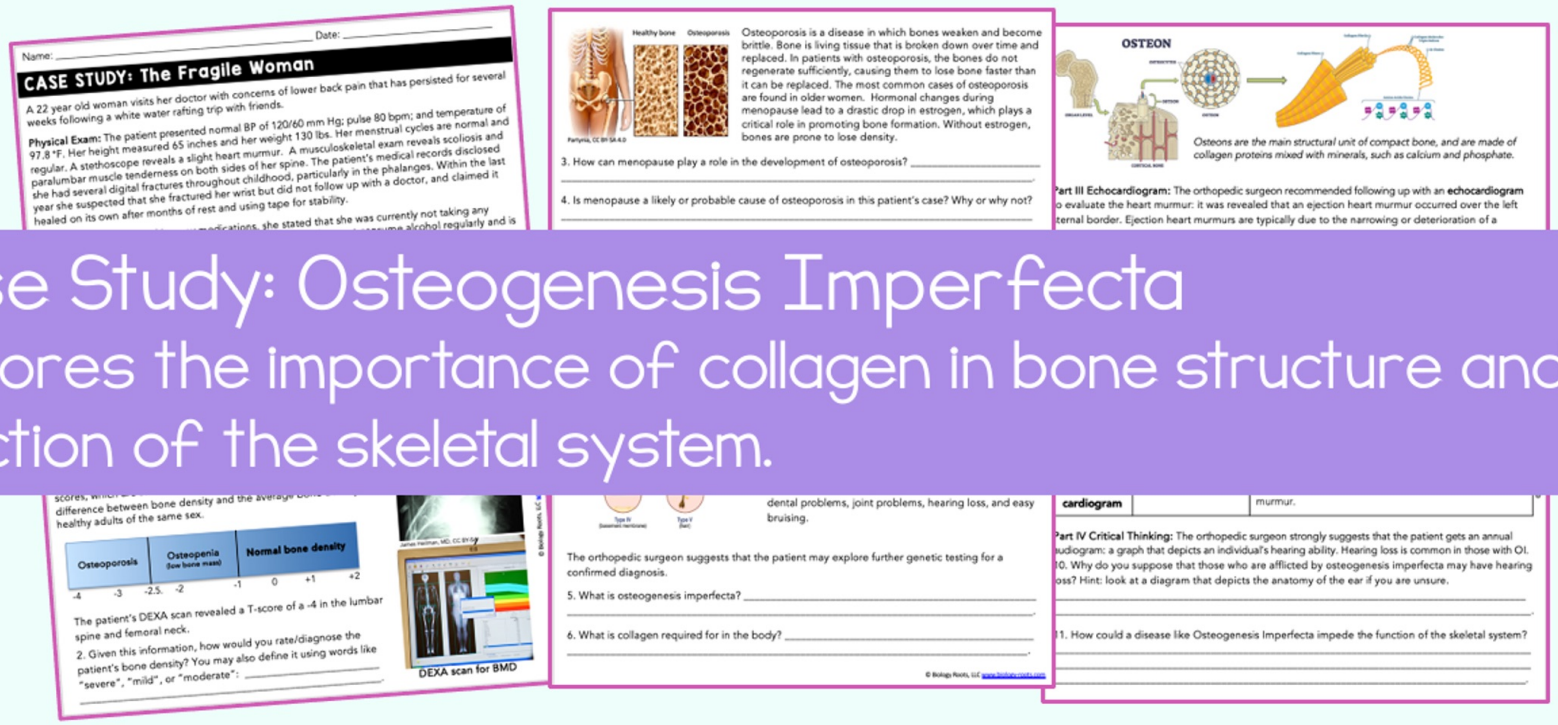




Bone Anatomy

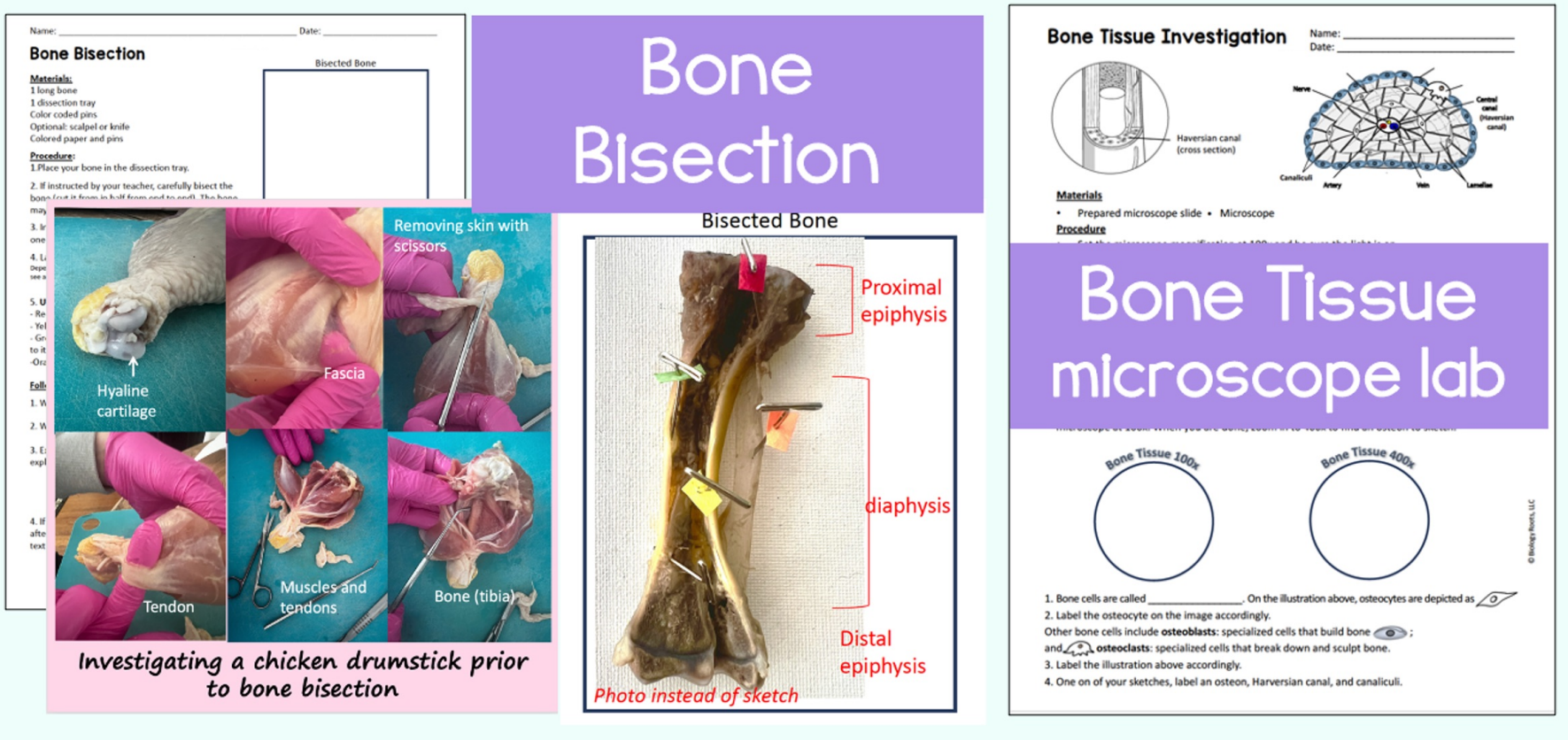


Case Studies and Labs



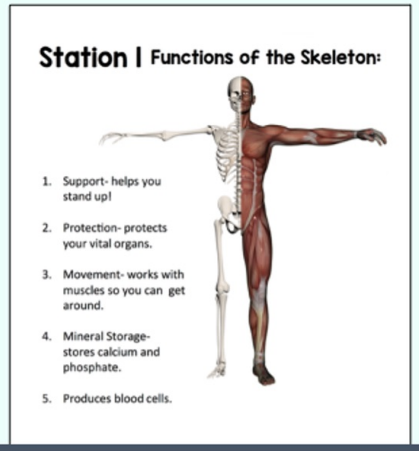
Case Study: Osteogenesis Imperfecta

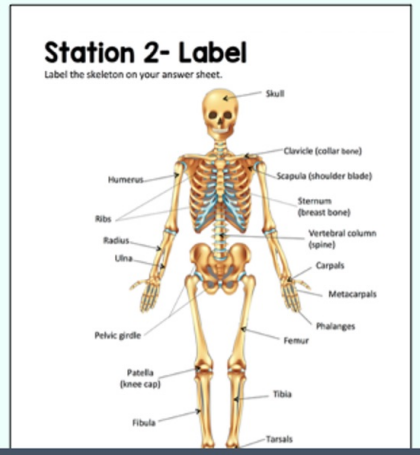
Explores the importance of collagen in bone structure and the function of the skeletal system.

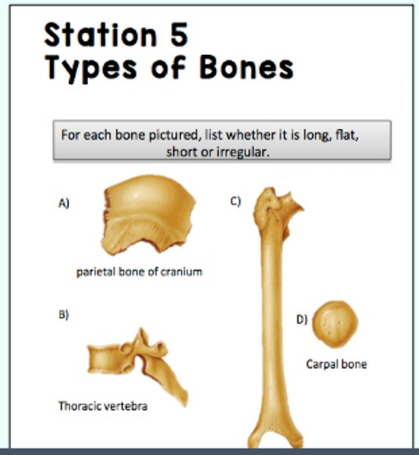


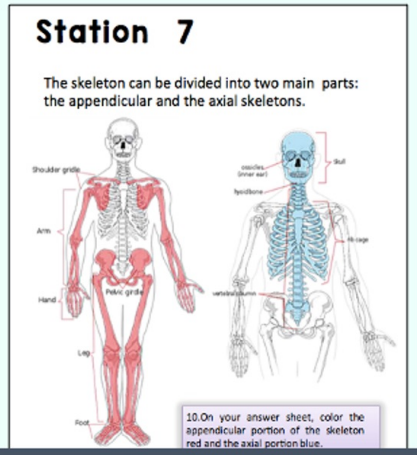
EXHIBITION STATIONS

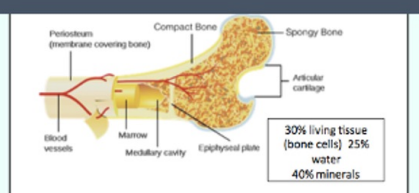
20 stations to further explore the skeletal system











Periosteum- Tough outer membrane- helps protect and insulate bones.

Compact bone- is the hard outer layer made up of bone cells (osteoblasts and osteoclasts).

Spongy bone- hard inner layer of bone with spaces for important materials such as bone marrow.



Cartilage is a flexible connective tissue that can be found between some joints and act as a shock absorber.

Synovial fluid is found between moveable joints to help lubricate them (crrreeeak).

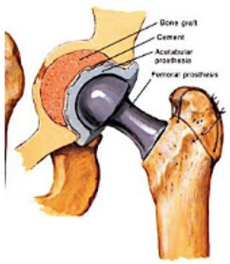
Ligaments attach bones to bones at the joints.

Tendons attach bones to muscle for movement.

- Common in older people because as the cartilage wears down, bone may begin to rub against bone and become painful.

The deteriorated bone is removed (femur head for hip replacement) and a prosthetic is drilled in.

What type of joint is pictured at this station?

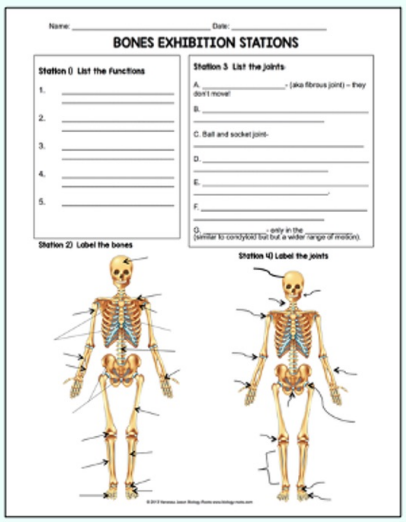


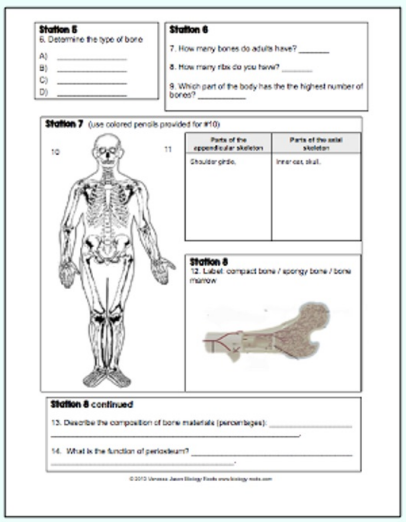
Greenstick	An incomplete fracture where the bone is slightly bent (hence "greenstick" (flexible); occurs most often in children.
Spiral	A fracture that wraps around the bone in a looped or curved fashion.
Comminuted	A fracture in which the break breaks into several fragments.
Transverse	A bone that occurs at a right angle to the bone's axis (or in other words it breaks clean across the bone).
Compound	This is a very serious fracture in which the bone breaks in half and separates. This fracture is most at risk breaking through the skin and leading to infection.

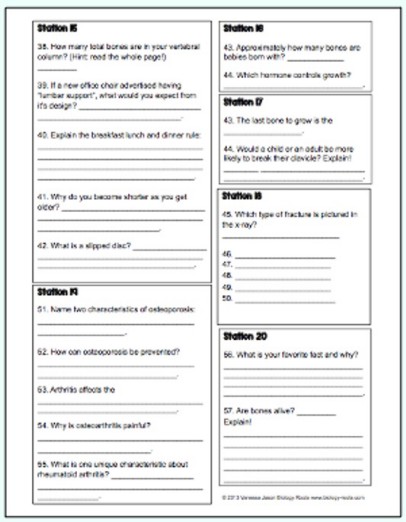


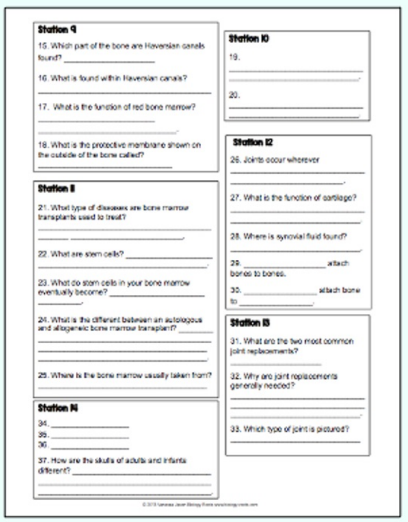
What type of fracture do you see in the x-ray?

Student Recording Sheet for stations









Skeletal System Study Guide

Name: _____ Date: _____

Skeletal System Review

1. List the functions of the skeletal system below

3. Label the parts of the long bone

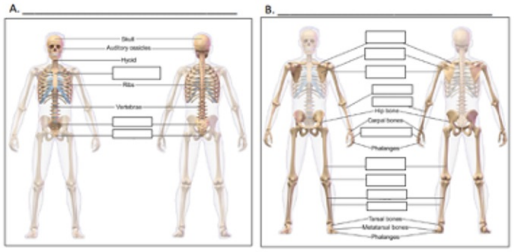
Word bank: articular cartilage; periosteum; compact bone; endosteum; spongy bone; bone marrow; diaphysis; epiphysis

-Is the epiphysis pictured distal or proximal?

Compact bone is thick and needs a system to deliver nutrients to osteocytes embedded in the matrix/lamellae. Spongy bone is thin and has a different design as described:

- Label each diagram (A and B) as either appendicular skeleton or axial skeleton
- Label the bones in the blank boxes.
- Carefully trace over the pectoral girdle and the pelvic girdle, and label each.

A. _____ B. _____



3. Label the sections of the vertebral column



What type of bone are vertebrae?

What type of joint is found between the vertebrae?

marrow	
Periosteum	
Articular cartilage	



- What is the medullar cavity? _____

- What is the endosteum? _____

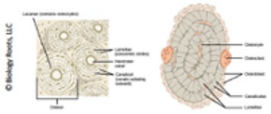
- Compare and contrast compact bone and spongy bone: _____

_____

_____

5. Bone Cells

Cell or Structure	Definition / Function
Osteon	
Haversian canal	
Osteocyte	
Osteoblast	
Osteoclast	



Describe bone tissue's extracellular matrix. How does its structure give bones their strength?

For each description in the table below, determine which type of synovial joint it best describes, as well as examples:

Definition	Type of synovial joint	Examples
Joint that offers the widest range of motion (back/ forth; up/down; circular, etc.)		
An oval shaped bone paired with a concave bone to create a joint that offers movement in many directions		
A joint that offers back and forth movement		
A joint that behaves like a swivel allowing a rotation on a single axis		
Allows a gliding motion between bones		
A convex shaped bone paired with a concave bone allowing for greater/smoother motion		thumb

7. Identifying bones

You are responsible for studying the skeleton and names of the bones for identification purposes. A general list of bones to know is available below:

Parietal	Frontal	Pubis	Metacarpals	Metatarsals
Occipital	Mandible	Humerus	Femur	Sternum
Temporal	Maxilla	Radius	Tibia	Phalanges
Zygomatic	Ilium	Ulna	Fibula	Clavicle
Sphenoid	Ischium	Carpals	Tarsals/calcaneus	Scapula

**Be sure to know the difference between short, flat, long, and irregular bones!*

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Editable Lab Practical

18 stations / 55 parts

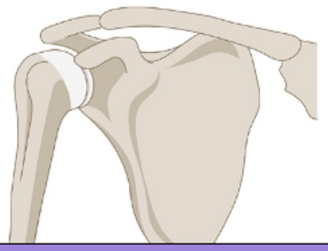
Includes student answer sheet

Lab Practical Station #4



4a. Identify the bone

Lab Practical Station #5

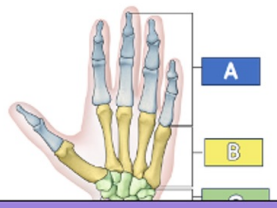


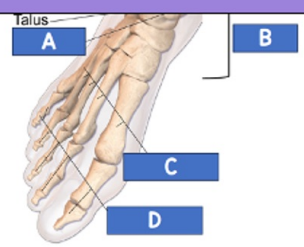
Lab Practical Station #6

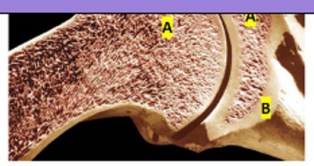


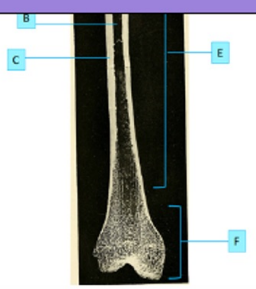
Lab Practical Station #7

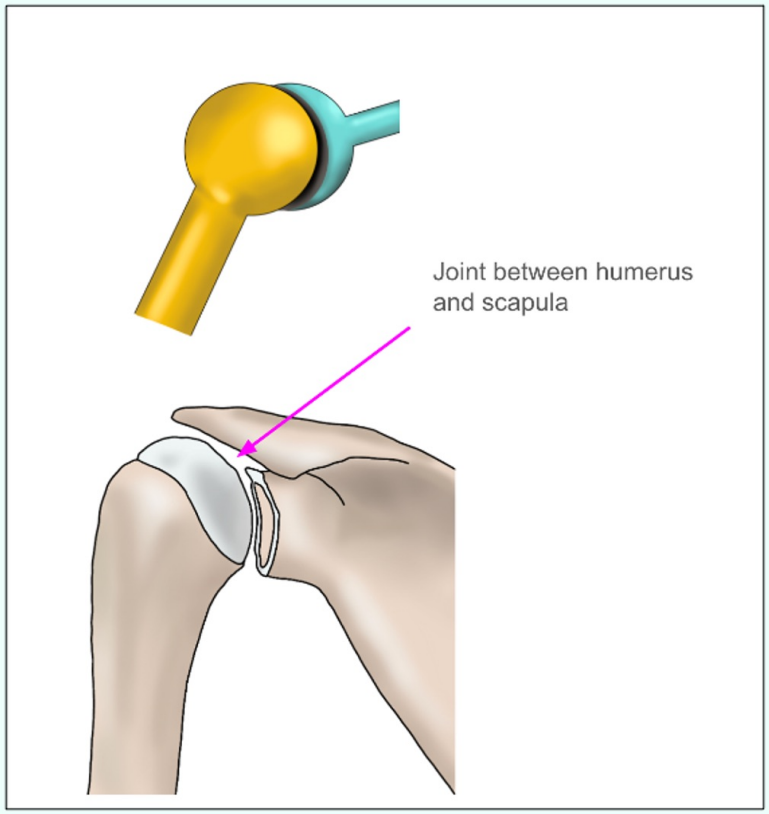
Label the bone of the hand

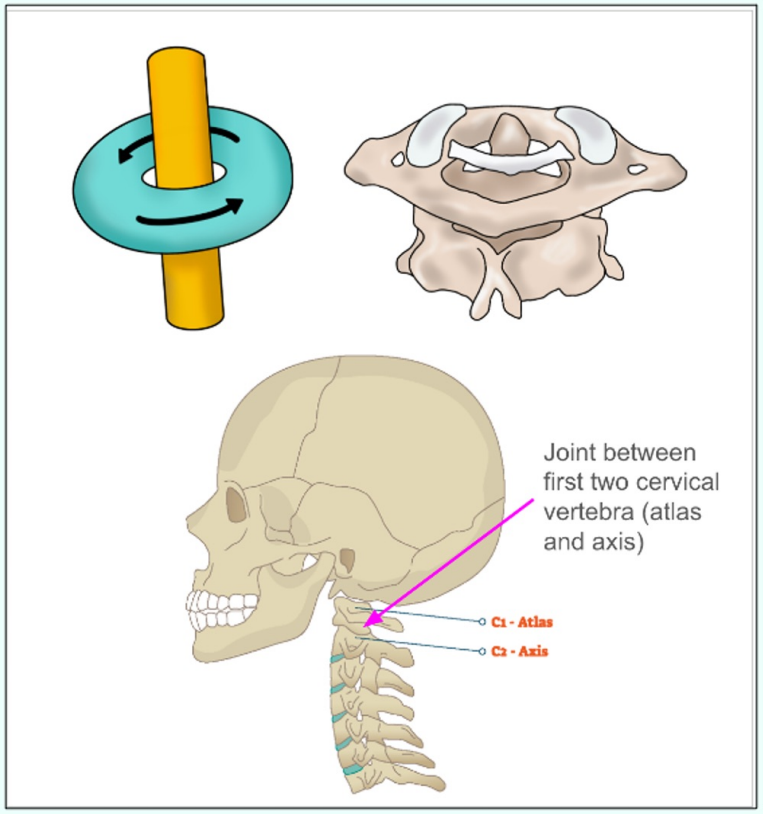




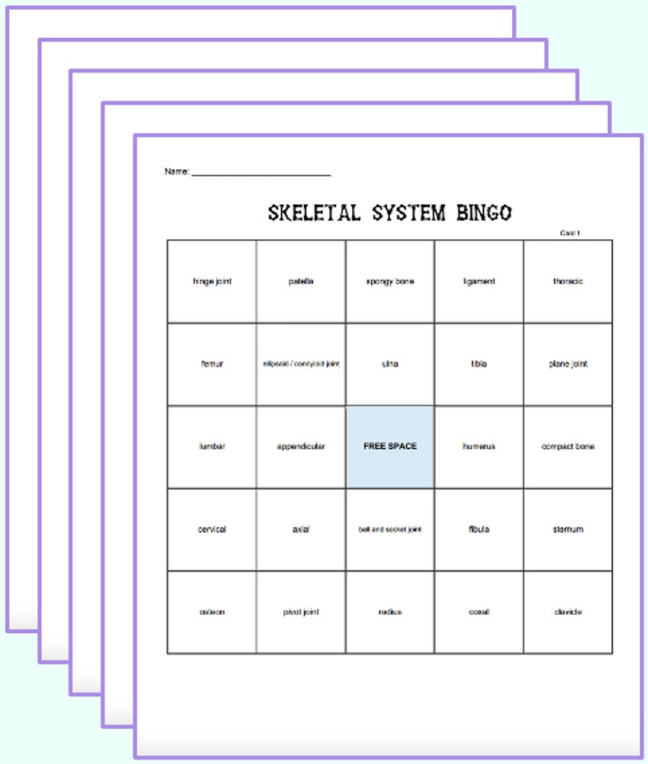




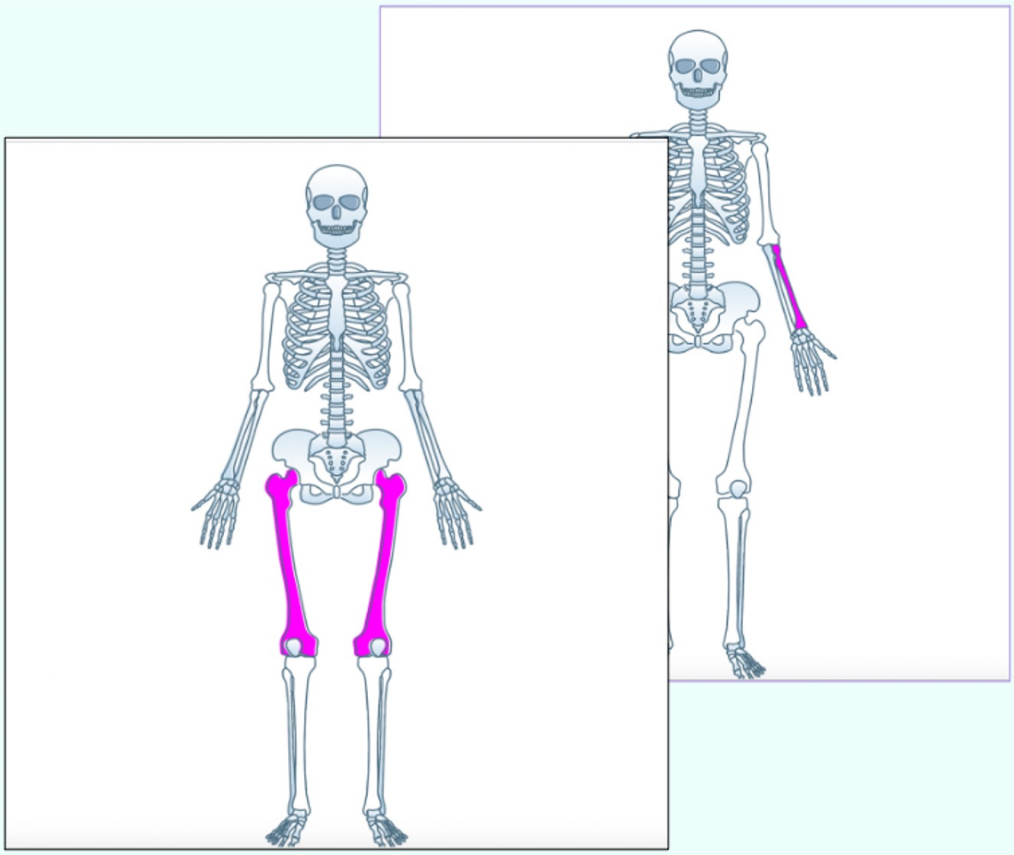




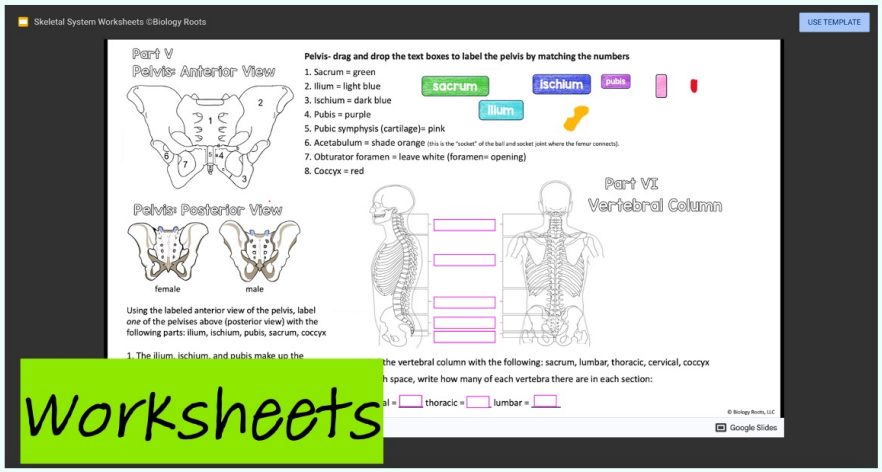
Skeletal System Bingo



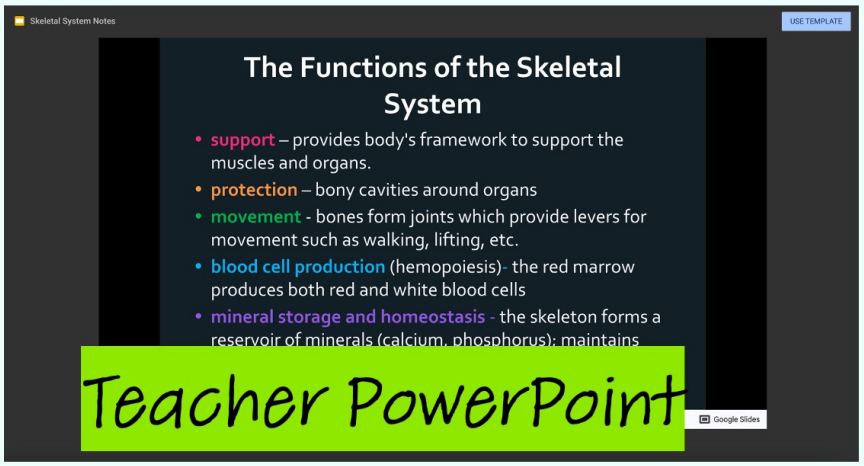
Includes 20 different cards



Digital options available

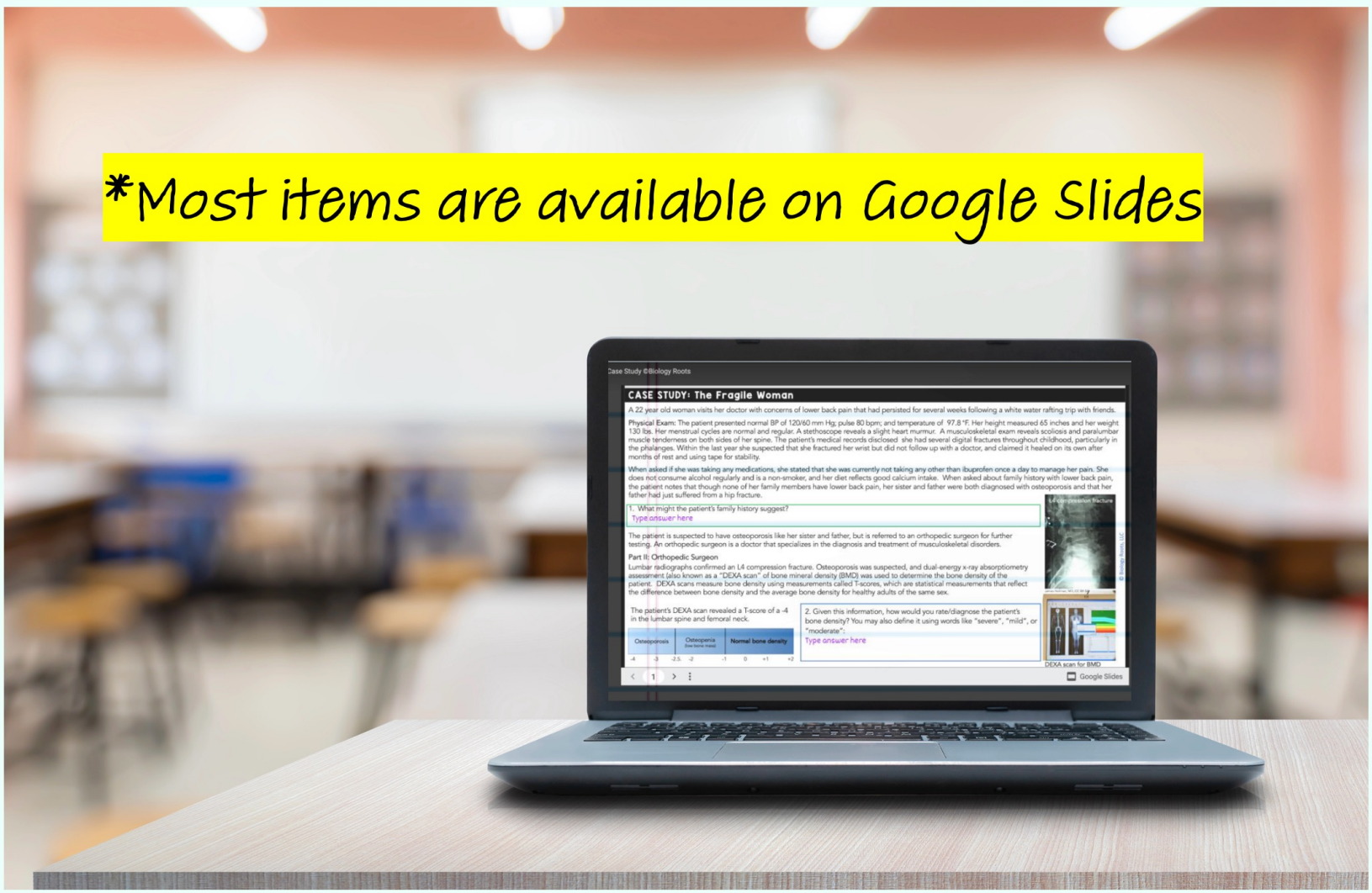


Worksheets



Teacher PowerPoint

*Most items are available on Google Slides



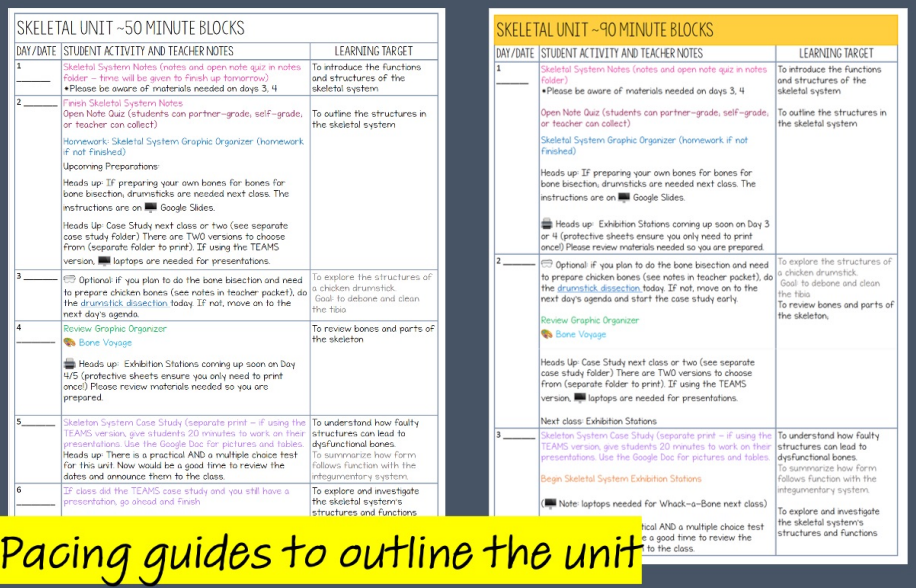
Features in a Nutshell:

Answer keys included.

Editable items offered

Differentiated Tests

Pacing Guides
(50 and 90 minute)



SKELETAL UNIT ~50 MINUTE BLOCKS

DAY/DATE	STUDENT ACTIVITY AND TEACHER NOTES	LEARNING TARGET
1 _____	Skeletal System Notes (notes and open note quiz in notes folder – time will be given to finish up tomorrow) •Please be aware of materials needed on days 3, 4	To introduce the functions and structures of the skeletal system.
2 _____	Finish Skeletal System Notes Open Note Quiz (students can partner-grade, self-grade, or teacher can collect) Homework: Skeletal System Graphic Organizer (homework if not finished) Upcoming Preparations: Heads up: IF preparing your own bones for bones for bone bisection, drumsticks are needed next class. The instructions are on Google Slides. Heads Up: Case Study next class or two (see separate case study Folder) There are TWO versions to choose from (separate folder to print). IF using the TEAMS version, laptops are needed for presentations.	To outline the structures in the skeletal system
3 _____	Optional: if you plan to do the bone bisection and need to prepare chicken bones (see notes in teacher packet), do the drumstick dissection today. IF not, move on to the next day's agenda.	To explore the structures of a chicken drumstick. Goal: to debone and clean the tibia
4 _____	Review Graphic Organizer Bone Voyage Heads up: Exhibition Stations coming up soon on Day 4/5 (protective sheets ensure you only need to print once) Please review materials needed so you are prepared.	To review bones and parts of the skeleton
5 _____	Skeleton System Case Study (separate print – if using the TEAMS version, give students 20 minutes to work on their presentations. Use the Google Doc for pictures and tables. Heads up: There is a practical AND a multiple choice test for this unit. Now would be a good time to review the dates and announce them to the class.	To understand how faulty structures can lead to dysfunctional bones. To summarize how form follows function with the integumentary system.
6 _____	IF class did the TEAMS case study and you still have a presentation, go ahead and finish	To explore and investigate the skeletal system's structures and functions

SKELETAL UNIT ~90 MINUTE BLOCKS

DAY/DATE	STUDENT ACTIVITY AND TEACHER NOTES	LEARNING TARGET
1 _____	Skeletal System Notes (notes and open note quiz in notes folder) •Please be aware of materials needed on days 3, 4 Open Note Quiz (students can partner-grade, self-grade, or teacher can collect) Skeletal System Graphic Organizer (homework if not finished) Heads up: IF preparing your own bones for bones for bone bisection, drumsticks are needed next class. The instructions are on Google Slides. Heads up: Exhibition Stations coming up soon on Day 3 or 4 (protective sheets ensure you only need to print once) Please review materials needed so you are prepared.	To introduce the functions and structures of the skeletal system To outline the structures in the skeletal system
2 _____	Optional: if you plan to do the bone bisection and need to prepare chicken bones (see notes in teacher packet), do the drumstick dissection today. IF not, move on to the next day's agenda and start the case study early. Review Graphic Organizer Bone Voyage Heads Up: Case Study next class or two (see separate case study Folder) There are TWO versions to choose from (separate folder to print). IF using the TEAMS version, laptops are needed for presentations. Next class: Exhibition Stations	To explore the structures of a chicken drumstick. Goal: to debone and clean the tibia. To review bones and parts of the skeleton.
3 _____	Skeleton System Case Study (separate print – if using the TEAMS version, give students 20 minutes to work on their presentations. Use the Google Doc for pictures and tables. Begin Skeletal System Exhibition Stations (Note: laptops needed for Whack-a-Bone next class)	To understand how faulty structures can lead to dysfunctional bones. To summarize how form follows function with the integumentary system. To explore and investigate the skeletal system's structures and functions

Pacing guides to outline the unit

Still not sure if you need this resource?

This unit is for any teacher who is looking for a fully prepared anatomy unit from start to finish, with fun, fresh activities to keep your students engaged! The skeletal unit is COMPLETE and can be used as is –or if you already have an existing unit, this can absolutely be used to supplement, support, or freshen up. Every piece has been thoughtfully curated and mapped out for your anatomy classroom to give you the most successful (and fun) year of anatomy yet!

Questions? Reach out to me at vanessa@biology-roots.com

-Vanessa