

The Human Skeleton: NYSSLS Alignment

Teacher guide for the student worksheet at mrsajdak.com/skeleton (two pages, 14 questions; a low-write version has the same numbers). Anatomy & Physiology, Hole's Essentials Chapter 7: The Skeletal System. The answer key is kept off the website.

The model

All 206 bones of one adult man, each a real surface built from scans: Z-Anatomy (CC BY-SA 4.0), built on BodyParts3D from the Database Center for Life Science. Students can turn it, zoom to any bone, color it four ways, take it apart, and quiz themselves. Each bone's card gives its name, axial or appendicular, its shape, its region and one plain-language fact. It runs in any current browser. It's about a 2.5 MB download, so load it once before class on a slow connection.

Things students may ask: the pelvis is male (a female pelvis is wider with a rounder inlet). The sternum is three clickable pieces but one bone. Teeth, costal cartilage and the two sesamoids under each big toe are shown but are not in the 206. This adult has 28 teeth (no wisdom teeth).

Performance expectation: building toward

HS-LS1-2 Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

Worksheet link: students use the 3D model to sort the skeleton into its two divisions and nine regions (Q1, Q2, Q8). They take the hand and foot apart into their parts (Q12) and tie bone shape to function (Q5 to Q7, Q14). This is one step toward the PE, not a full assessment of it.

DCI LS1.A: Multicellular organisms have a hierarchical structural organization, in which any one system is made up of numerous parts and is itself a component of the next level.

Part by part

Part	SEP	CCC	What students do
1. Two skeletons Q1 to 3	SEP 2 Developing and using models	Systems and System Models	Color the model axial vs. appendicular, count 80 + 126, and sort eight bones. The trap: the clavicle, scapula and hip bone sit in the trunk but belong to the girdles.
2. Sort by shape Q4 to 7	SEP 4 Analyzing and interpreting data	Structure and Function	Read the five shape counts (90 / 30 / 33 / 51 / 2) and classify nine bones. The trap: a fingertip bone is a long bone, because shape is not size. Then tie flat bones to protection.
3. Count them Q8 to 10	SEP 5 Using mathematics	Scale, Proportion, and Quantity	Read region counts and find that 106 of 206 bones (51%) are in the hands and feet, then explain why with joints and movement.
4. Find the bone Q11	SEP 8 Obtaining and evaluating information	Structure and Function	Use search and the bone cards to match eight clues. "See it alone" shows the stapes and sphenoid, which hide inside the skull.
5. Take a hand and a foot apart Q12	SEP 2 Developing and using models	Systems and System Models	Pull the model apart and count 27 bones in a hand and 26 in a foot. Shape coloring separates the short carpals and tarsals from the long bones. Then check against Part 3.
6. Find the bone Q13	(retrieval practice)	Structure and Function	Two 10-question rounds. Only first clicks score; three misses show the answer.
Wrap it up Q14	SEP 6 Constructing explanations SEP 7 Engaging in	Structure and Function	Claim, evidence and reasoning that a bone's shape fits its job, using evidence from two parts.

	argument from evidence		
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Running it

One device per student or pair, about 35 to 45 minutes. Parts 1 to 3 build on each other. Part 4 can be a starter or a homework task. Part 6 makes a good closing competition on the board. Students are likely to get stuck on Q2 (the girdles) and Q6 (long bones are about shape, not size). Both are worth a whole-class discussion.

Shape sorting follows the usual five-way textbook split. The page tells students that books disagree on a few bones. Here the frontal, parietal, temporal and occipital bones are flat. The sphenoid, ethmoid and hip bone are irregular, and the pisiform is short. The sheet only asks about bones every textbook sorts the same way (the parietal bone in Q5 is flat in all of them), so a different textbook will not change the answers.