

Name \_\_\_\_\_ Date \_\_\_\_\_

## Bone Classification Worksheet

1. Your skeleton has over 206 bones. Let's see what a skeleton looks like.
  - a. Open the VIVED Anatomy app (AP31).
  - b. Click on Systems.
  - c. Click on Skeletal.
  - d. Click Next.
  - e. Click on Select All for Regions so the whole body is selected.
  - f. Click Go.
  - g. You should be looking at a skeleton!
  - h. Click Add Slide in the upper- right- hand corner. You will use this slide later.
2. Bones can be grouped into two broad categories. These are appendicular, meaning related to the appendages (arms and legs), and axial, which roughly translates to "line." The axial skeleton consists of the head, ribs, and vertebrae. The appendicular skeleton consists of the arm and leg bones as well as the pectoral and pelvic girdles. The pectoral girdle is made of the shoulder blades (scapulas) and collarbones (clavicles). The pelvic girdle is made of the hip bones (each of which can be broken down into the ilium, pelvic bone, and ischium). Color each of the appendicular bones by clicking on the bone and then a color. Don't forget to rotate the skeleton. When you are done, save your screen.
3. Click on Add Slide.
4. Bones can be placed into several categories based on their shape. These categories are long, short, flat, sesamoid, and irregular. Add labels for each of these bone categories on the screen.
5. Drag three examples of each type of bone under its label. Many of these names may seem pretty self-explanatory. Long bones are longer than they are wide. Short bones are similar in width and length. Flat bones are thin and curved. You may need to zoom in on these to observe their shape; they will not be rounded like long bones. Irregular bones have a complex shape. Sesamoid bones are small, round, and shaped like a sesame seed (note that you will likely find only one of these). They are also embedded in tendons.
6. Click Add Slide.
7. Save your screen.
8. Click on Slide 1, then drag this slide to the bottom of your slide deck.

9. These bones' different shapes lend themselves to different functions. Working on Slide 1, color in the flat bones by clicking on them and then clicking a color. If you are wondering whether a part of the skeleton is a flat bone, you can pull it out and rotate it to better examine its shape.
  
10. Examine the structures that you colored. Are these bones able to move?
  
  
  
  
  
  
  
  
  
  
11. The flat bones have a different internal structure than the long bones. Their internal structure includes spongy bone, which absorbs impact by distributing it across the surface, kind of like styrofoam. This spongy bone is surrounded by a thin, dense layer of compact bone to give it a little structure. Rotate the skeleton around, noting that the structures made by flat bones create cavities. These bone-surrounded cavities protect the organs within them. Which organs are protected by these cavities?
  
  
  
  
  
  
  
  
  
  
12. Flat bones also contain the red bone marrow. What is the function of red bone marrow?
  
  
  
  
  
  
  
  
  
  
13. Similar to flat bones, irregular bones also have a spongy structure and contain red bone marrow. Rotate the skeleton so that you are looking down on the top of the head. Remove the frontal and parietal bones. You should see a hole. If you remove the occipital bone and its associated membranes, you should see that this hole continues through the vertebrae. This creates a cavity. What do you think this cavity protects?

14. Look at the long bones. These are used as levers because of their length. To better understand how length impacts the strength of a lever you can imagine a catapult (or better yet, make one). Which is capable of moving a load farther: a longer or a shorter catapult? What does this tell you about your long bones?
  
15. As these bones are used to make levers, they need to be made of something strong. Remember that spongy bones are kind of like styrofoam, and you cannot make a strong lever out of styrofoam. Instead of spongy bone, your long bones are made mostly out of denser compact bone. However, they do contain spongy bone at the joints. Why would this be the case?
  
16. The dense shafts of long bones have a hollow cavity in the center, which houses bone marrow and blood vessels. One way to view the difference between these kinds of bones is by using the Dicom Viewer in the lower-left side of the menu. The whiter the structure, the more dense it is. Look at cross-sections of long bones and of flat bones. Explain the differences in appearance that you see.
  
17. Now, let's do some dissection. If needed, you can put the model back together by clicking the Restore button.
  
18. Drag the bones of the upper-left limb to the upper-right screen. Drag the bones of the lower-left limb to the lower-right screen.
  
19. Compare your two piles of bones. Which ones are similar?

20. Why do you think this might be the case?

21. Last, we have the short bones. Where are these bones located in your body? You might want to return to Slide 3, where you sorted the bones into categories based on their shape, to refresh your memory.

22. Are these bones creating a protective cavity?

23. Can these bones be used in movement? Use your body as an example.

24. Do these bones move? If so, do they make strong or weak movements? Use your body as an example, and apply what we learned earlier about levers.

25. Let's summarize what you've learned. Looking at Slide 1, how would you describe the axial and appendicular skeleton?

26. On Slide 2, you characterized bones by their category. Name an example bone in the body for each type of bone.

27. Which types of bones are used for movement? How does their structure impact their function?

28. Which types of bones are used to protect internal structures? How are they specialized to do that?