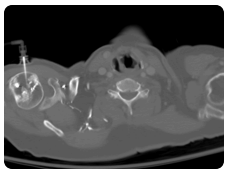
Inside a Long Bone Lab

Name _____

Date _____

Period _____

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Do Now A paramedic cannot find a vein. She drills a thin needle into a bone and pushes medicine in. This CT scan shows a needle in the top of a person's upper arm bone. 2 minutes, before you open the lab

A. How could medicine get from inside a bone into the blood?

B. What do you think fills the inside of a living bone?

☐ Nothing, it is hollow ☐ Soft living tissue ☐ Solid hard bone

☐ I can label the parts of a long bone.

☐ I can describe the function of each part.

☐ I can trace a needle from the skin to the marrow and explain why it reaches the blood.

Part 1. Find the parts (Tab 1)

SEP 2 Developing and Using Models · CCC Structure and Function

Pick a letter, or click a yellow spot. Look at it in the zoomed box. Visit all seven spots.

1. Spots A to C are on the real, cleaned bone. What do you see? Tick one in each row.

Spot C	☐ solid and pale	☐ net of thin plates	☐ dark empty space
Spot A	☐ solid and pale	☐ net of thin plates	☐ dark empty space
Spot B	☐ solid and pale	☐ net of thin plates	☐ dark empty space

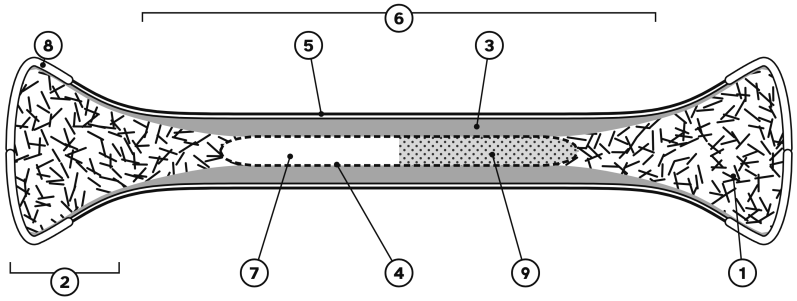
2. Spots D to G are on the drawing of a living bone. What does each one do? Tick one in each row.

Spot F	☐ covers the end	☐ wraps the outside	☐ lines the channel	☐ fills the channel
Spot G	☐ covers the end	☐ wraps the outside	☐ lines the channel	☐ fills the channel
Spot D	☐ covers the end	☐ wraps the outside	☐ lines the channel	☐ fills the channel
Spot E	☐ covers the end	☐ wraps the outside	☐ lines the channel	☐ fills the channel

READ FIRST. In the lab, find the green **Learn It** box and read it. Then answer 3 to 4.

3. Label the bone in the lab. Then write each part beside its number.

WORD BANK. articular cartilage · compact bone · diaphysis · endosteum · epiphysis · marrow · medullary cavity · periosteum · spongy bone



1		**4**		**7**	
2		**5**		**8**	
3		**6**		**9**	

4. Model check. Tick the parts a real, cleaned bone has lost.

☐ periosteum ☐ compact bone ☐ marrow ☐ spongy bone

The drawing does not show well: ☐ the real size of the bone ☐ that a bone has two ends

Part 2. Test the shaft (Tab 2)

SEP 5 Using Mathematics · CCC Structure and Function

Measure lines **O** and **C**. Then set the slider to each cavity width in the table and press **Record this tube**.

5. The lab's numbers: outer width _____ mm. Cavity width _____ mm.

6. Wall = (outer – cavity) ÷ 2. Example, not yours: (20 – 8) ÷ 2 = 6. Your wall = _____ mm.

7. Copy from **Your records** . The amount of bone is the same in every row.

Cavity width (mm)	Outer width (mm)	Wall (mm)	Strength (times a solid rod)
0			
11			
20			
30			

8. As the cavity gets wider, the strength ☐ goes up ☐ goes down and the wall gets ☐ thinner ☐ thicker

READ FIRST. In the lab, find the green **Learn It** box and read it. Then answer 9 to 11.

9. Tick one job for each part.

Medullary cavity	☐ saves weight, holds marrow ☐ makes blood cells
Periosteum	☐ tendons blend into it, repairs bone ☐ keeps the joint slippery
Articular cartilage	☐ lets the joint move smoothly ☐ stores fat
Red marrow	☐ resists bending ☐ makes blood cells

10. Do the four cases in the lab. Tick the part that failed.

1. The knee bones grind	☐ articular cartilage ☐ endosteum ☐ marrow ☐ periosteum
2. New bone from the outer sleeve	☐ articular cartilage ☐ endosteum ☐ marrow ☐ periosteum
3. Too few blood cells	☐ articular cartilage ☐ endosteum ☐ marrow ☐ periosteum
4. Lining of the channel damaged	☐ articular cartilage ☐ endosteum ☐ marrow ☐ periosteum

11. Model check. A very thin wall might ☐ dent or crumple ☐ turn into marrow

Part 3. Trace the needle (Tab 3)

SEP 4 Analyzing and Interpreting Data · CCC Systems and System Models

Pick **Near the end**. Move the slider slowly to 25 mm. Do the same for **Middle of the shaft**.

12. Copy from **Your results** . Layer 3 thickness = drop depth – jump depth. Example, not yours: 15 – 10 = 5 mm.

Site	Push jumps to 9 at (mm)	Push drops at (mm)	Layer 3 is (mm thick)
Near the end			
Middle of the shaft			

13. Which site has the thinner hard layer? ☐ near the end ☐ middle of the shaft

READ FIRST. In the lab, find the green **Learn It** box and read it. Then answer 14 to 16.

WORD BANK. compact bone · marrow · periosteum · cartilage · endosteum

14. From the outside in: skin and fat → _____ → _____ → spongy bone and _____

15. The first try worked 91% of the time in the tibia and 43% in an arm vein. 91 ÷ 43 = _____, so about _____ times as often.

Explain it

SEP 6 Constructing Explanations · CCC Systems and System Models

16. Why does a needle in a bone get medicine to the heart?

I saw the push drop when the tip reached the _____. Marrow is full of _____. So the medicine goes into the _____ and on to the heart.

Word bank for 16: blood vessels · marrow · veins · plates

NYSSLS HS-LS1-2, touching HS-LS1-1. Hole's Essentials, Section 7.2, Bone Structure. Data: Reades and others (2011). Tab 3 depths are a model.