Two Ways to Build a Bone Lab

Name _____

Date _____

Period _____

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Do Now A newborn's skull has a soft spot on top with no bone in it. 2 minutes, before you open the lab
A 12-year-old's X-ray shows dark gaps near the ends of the bones. Neither gap is a break.

A. What do you think fills each gap?

B. Did these two gaps come from the same way of building bone?

☐ Same way ☐ Two different ways ☐ Not sure yet

☐ I can compare how intramembranous and endochondral bones form.

☐ I can use evidence to explain how a long bone gets longer.

☐ I can read a growth plate on an X-ray and say what it means.

Part 1. Watch two bones form (Tab 1)

SEP 2 Developing and Using Models · CCC Stability and Change

Click every stage of both bones. Watch what is there first, and where hard bone starts.

1. What is there first, at Stage 1? Tick one in each row.

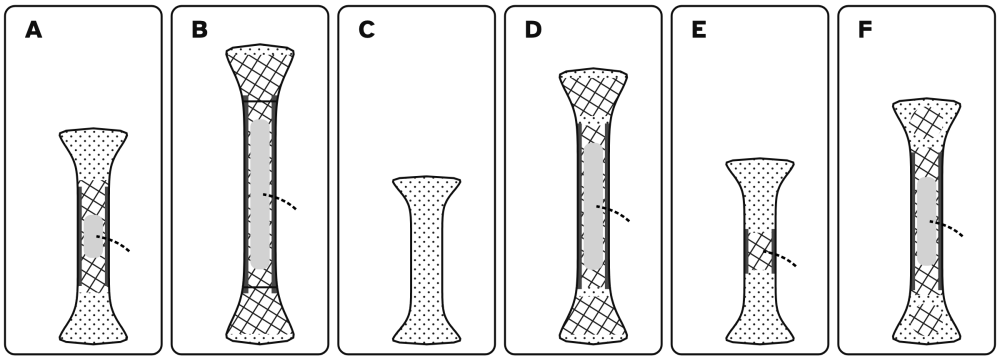
Skull bone	☐ a soft sheet ☐ a cartilage model ☐ hard bone
Leg bone	☐ a soft sheet ☐ a cartilage model ☐ hard bone

2. Where does hard bone first form in the leg bone? ☐ in each end ☐ in the middle of the shaft ☐ all at once

3. At Stage 5, what is still left between the end and the shaft?

READ FIRST. In the lab, find the green Learn It box and read it. Then answer 4 to 6.

4. Put the leg bone cards in order in the lab. Write the letters, youngest first.



5. How was each bone built? Tick one in each row.

Vertebra	☐ Intramembranous ☐ Endochondral
Nasal bone	☐ Intramembranous ☐ Endochondral
Rib	☐ Intramembranous ☐ Endochondral
Frontal bone	☐ Intramembranous ☐ Endochondral
Parietal bone	☐ Intramembranous ☐ Endochondral
Humerus	☐ Intramembranous ☐ Endochondral

6. Compare the two ways.

	Intramembranous	**Endochondral**
Starts from		
Bone forms first		
Growth plate?		

Part 2. How does it get longer? (Tab 2)

SEP 4 Analyzing and Interpreting Data · CCC Scale, Proportion, and Quantity

Pick an idea. Slide to week 8. Press Record. Do this for all three ideas.

7. Predict. Which idea is right? ☐ A Stretch ☐ B Add in the middle ☐ C Add near the ends

8. Copy your records at week 8.

Idea	Whole bone (mm)	Gap between marks (mm)
A: Stretch		
B: Add in the middle		
C: Add near the ends		

9. Read the 1727 box in the lab. Which idea fits Hales's data? Use his numbers.

READ FIRST. In the lab, find the green Learn It box and read it. Then answer 10 to 11.

10. Number these steps at the plate, from the end of the bone toward the shaft (1 to 4).

Calcium hardens the matrix	Cartilage cells divide	Osteoclasts clear, osteoblasts build	The cells grow bigger

11. Model check (SEP 2). Tab 2 is a model. Name one thing it leaves out.

Part 3. Read the plate (Tab 3)

SEP 6 Constructing Explanations · CCC Stability and Change

Pick each X-ray. Look where the end of a bone meets its shaft. Press Dark gap or Solid bone.

12. Where the end meets the shaft, what did you see? Tick one in each row.

X-ray A	☐ Dark gap ☐ Solid bone
X-ray B	☐ Dark gap ☐ Solid bone
X-ray C	☐ Dark gap ☐ Solid bone
X-ray D	☐ Dark gap ☐ Solid bone

13. Which X-rays do you think show a person who is still growing? _____

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

14. Use the growth rule in the lab. Plates add 16 mm a year (SEP 5).

Bone age now	Plates close at	Growth left (mm)
12	14	
13	16	
15	16	

15. A femur has only a thin line where the plate was. Tick one. ☐ Still growing ☐ Done growing

16. Explain it (SEP 6). A newborn's soft spot and a teen's dark gap are both unfinished bone. How are they different?

What I saw	
The science idea	
How it explains it	