Skin Under the Microscope

Name _____

Date _____

Period _____

mrsajdak.com/skin-layers · © Ryan Sajdak · CC BY-NC-SA 4.0

DAY 1 Skin has two layers: the **epidermis** on top and the **dermis** below. The **subcutaneous layer** is beneath them.

☐ I can identify the epidermis, dermis and subcutaneous layer on a slide and describe the role of each.

☐ I can measure skin layers with a microscope scale and explain why skin is thicker in some places.

Part 1. Virtual microscope (Tab 1)

SEP 3, 4, 5 · CCC Scale, Proportion, and Quantity

Turn the focus until the slide is sharp. Click a spot inside the circle and name the layer. Find all three on both slides.

1. Tick the layer each clue describes.

What you see on the slide	Epidermis	Dermis	Subcutaneous layer
Stacked cells with purple nuclei, no blood vessels	☐	☐	☐
Pink fibers, blood vessels, glands, hair roots	☐	☐	☐
Big round fat cells that look empty	☐	☐	☐

2. The scale has 50 divisions. One division is worth: at 4× _____ µm, at 10× _____ µm, at 40× _____ µm.

3. Measure each layer straight down the scale. Use **Check** to make sure. (1,000 µm = 1 mm)

Slide and layer	Objective you used	Divisions	× µm per division	= µm	= mm
Thin skin (forearm): epidermis					
Thin skin (forearm): dermis					
Thick skin (palm): epidermis					
Thick skin (palm): dermis					

4. Try each injury on **both** slides. Write the deepest layer it reaches and circle whether it bleeds.

Injury	Thin skin (forearm): deepest layer	Bleeds?	Thick skin (palm): deepest layer	Bleeds?
Scrape, 0.05 mm		yes · no		yes · no
Cut, 0.3 mm		yes · no		yes · no
Deep cut, 2.0 mm		yes · no		yes · no

READ FIRST. In the lab, find the **Learn It** box and read it. Then answer 5 and 6.

5. Which objective worked best for the thin epidermis? Use your division counts to explain why not 4×.

6. A 0.3 mm cut bleeds on the forearm, not the palm. Use your Q3 numbers and the words **blood vessels** to explain.

Part 2. Body map (Tab 2)

SEP 4, 5 · CCC Patterns · Structure and Function

7. Click all six sites. Fill in the table.

Site	Eyelid	Forearm	Upper back	Palm	Fingertip	Sole (heel)
Epidermis (mm)						
Dermis (mm)						
Thick or thin skin?						

8. Epidermis: sole _____ ÷ eyelid _____ = _____ times thicker. Does your Q3 forearm number match the chart? _____

READ FIRST. In the lab, find the **Learn It** box and read it. Then answer 9 and 10.

9. Sort by epidermis. What do the three thickest places do all day? Why does that need a thick epidermis?

10. The upper back has the **thickest dermis** but a **thin epidermis**. Use the job of each layer to explain why.

DAY 2 The epidermis is built from **strata**. The dermis has a **papillary** layer on top and a **reticular** layer below.

☐ I can identify the five strata of the epidermis and what happens to a cell in each.

☐ I can tell the papillary from the reticular layer and explain how each one's build fits its job.

Part 3. Inside the epidermis (Tab 3)

SEP 2, 4 · CCC Stability and Change

On **Thick skin**, click each band and name it. Then switch to **Thin skin**.

11. Write the five strata in order, **bottom to top**. Tick the one that is in thick skin only.

Order	Stratum	Thick skin only	What happens to cells here
1 bottom		☐	
2		☐	
3		☐	
4		☐	
5 top		☐	

12. On **Thin skin**, follow one cell. It enters the spinosum on day _____, the granulosum on day _____, the corneum on day _____, and flakes off on day _____. That is about _____ weeks.

13. The cell dies in the stratum _____. By then it is filled with _____.

READ FIRST. In the lab, find the **Learn It** box and read it. Then answer 14 and 15.

14. Use the word **diffusion** to explain how the epidermis is fed. Why is it fine that its top cells are dead?

15. Cells flake off the top every day. Which stratum keeps the epidermis the same thickness, and how?

Part 4. Inside the dermis (Tab 4)

SEP 3, 4 · CCC Structure and Function

16. Find all seven. Then tick where each one is.

Structure	Papillary layer	Reticular layer
Capillary loop	☐	☐
Touch receptor (tactile corpuscle)	☐	☐
Thick collagen bundles running every direction	☐	☐
Coiled sweat gland	☐	☐

17. Pull test: press **Skip to the end** for each row.

Sample and direction	Papillary · along	Reticular · along	Reticular · across	Tendon · along	Tendon · across
Force to tear (N)					

18. Reticular is _____ times stronger than papillary. **Fingertip surface**: _____ ridges on the 5 mm line, so _____ mm apart.

READ FIRST. In the lab, find the **Learn It** box and read it. Then answer 19 and 20.

19. (a) Why is the reticular layer strong both ways, but a tendon only one way? Use how the fibers are arranged.

(b) Your fingerprints are the same all your life, even though the epidermis is replaced every few weeks. Why?

Wrap it up

SEP 6, 7 · CCC Stability and Change

20. Claim: tattoo ink lasts for life only because it is put into the dermis. Give **evidence** from two different tabs and your **reasoning**.

NYSSLS: building toward HS-LS1-2 (DCI LS1.A Structure and Function). Hole's Essentials 6.2: Layers of the Skin. Day 1: Layers of the Skin (AP.3.6.2). Day 2: Layers of the Epidermis and Dermis (AP.3.6.3). SEP = Science and Engineering Practice, CCC = Crosscutting Concept.