Skin Under the Microscope

Name _____

Date _____

Period _____

mrsajdak.com/skin-layers · Low-write · © 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 Investigating · SEP 5 Math · CCC Scale

Turn the focus until the slide is sharp. Click a spot in 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. One division is worth: at 4× _____ µm, at 10× _____ µm, at 40× _____ µm. (The slide says it, top left.)

Example: 12 divisions at 10× → 12 × 20 µm = 240 µm. 240 µm ÷ 1,000 = 0.24 mm.

3. Put 0 on the top edge of the layer. Count divisions to the bottom edge. Press **Check**.

Slide and layer	Use this objective	Divisions	× µm per division	= µm	= mm
Thin skin (forearm): epidermis	40×		5		
Thin skin (forearm): dermis	4×		50		
Thick skin (palm): epidermis	10×		20		
Thick skin (palm): dermis	4×		50		

4. Try each injury on **both** slides. Tick the deepest layer it reaches. Circle whether it bleeds.

Injury	Thin skin (forearm)			Bleeds?	Thick skin (palm)			Bleeds?
	epidermis	dermis	subcut.		epidermis	dermis	subcut.	
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. At 4×, the thin epidermis covers only about ☐ 1 or 2 divisions ☐ 14 divisions ☐ 50 divisions so 40× is better.

6. The 0.3 mm cut does not bleed on the palm because it stays in the _____, which has no _____.

WORD BANK epidermis · dermis · blood vessels · keratin

Part 2. Body map (Tab 2)

SEP 4 Analyzing Data · CCC Patterns · Structure and Function

7. Click all six sites. Write the numbers. Circle yes if it is thick skin.

Site	Eyelid	Forearm	Upper back	Palm	Fingertip	Sole (heel)
Epidermis (mm)						
Dermis (mm)						
Thick skin?	yes · no	yes · no	yes · no	yes · no	yes · no	yes · no

Example: 0.40 ÷ 0.05 = 8, so the palm epidermis is 8 times thicker than the eyelid's.

8. Sole epidermis _____ ÷ eyelid epidermis _____ = _____ times thicker.

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

9. The thickest epidermis is on the palm, fingertip and sole. All three get
☐ rubbed and pressed ☐ very little use ☐ the most sun

10. The back is pulled and stretched but almost never rubbed. So it needs a thick
☐ dermis (strong fibers) ☐ epidermis (dead cells)

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 Models · CCC Stability and Change

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

11. Write the strata bottom to top. Tick the one in thick skin only. Tick what happens there.

WORD BANK basale · spinosum · granulosum · lucidum · corneum

Order	Stratum	Thick skin only	Cells divide	Cells make keratin	Cells die	Clear band	Dead cells flake off
1 bottom		☐	☐	☐	☐	☐	☐
2		☐	☐	☐	☐	☐	☐
3		☐	☐	☐	☐	☐	☐
4		☐	☐	☐	☐	☐	☐
5 top		☐	☐	☐	☐	☐	☐

12. On **Thin skin**, press Play. The cell enters the spinosum on day _____, the granulosum on day _____, the corneum on day _____, and flakes off on day _____.

28 days is about ☐ 1 week ☐ 4 weeks ☐ 4 months

13. The cell dies in the stratum _____. It is filled with _____.

WORD BANK granulosum · basale · keratin · blood

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

14. By **diffusion**, the epidermis gets food and oxygen from
☐ capillaries in the dermis ☐ its own blood vessels ☐ the air

15. The epidermis stays the same thickness because new cells in the stratum _____ keep replacing the ones that flake off.

Part 4. Inside the dermis (Tab 4)

SEP 3 Investigating · 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 one. Write the force.

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

18. Reticular ÷ papillary: _____ ÷ _____ = _____ times stronger. Switch to **Fingertip surface**. Ridges crossing the 5 mm line: _____. 5 mm ÷ ridges = _____ mm apart.

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

19. The reticular layer is strong in every direction because its fibers run ☐ every direction ☐ all one way

Fingerprints never change because the ridge pattern is set by papillae in the ☐ dermis ☐ stratum corneum

Wrap it up

SEP 7 Argument · CCC Stability and Change

20. Tattoo ink lasts because it is put into the _____. The epidermis would not hold it: its cells _____ every few weeks.

Evidence I used (tick two): ☐ Tab 1 injuries ☐ Tab 3 cell trip ☐ Tab 4 pull test ☐ Tab 4 fingerprints

NYSSLS: building toward HS-LS1-2 (DCI LS1.A). Hole's Essentials 6.2: Layers of the Skin. Day 1: AP.3.6.2. Day 2: AP.3.6.3.