Skin Lab: The Organ You Wear

Name _____
Date _____
Period _____

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The **integumentary system** is the skin plus the hair, nails, glands and sensory receptors that grow in it. Take it apart, test it, and match its five jobs to real life.

☐ I can name the parts of the integumentary system and match the skin's five jobs to their parts.

☐ I can plan and run a fair test of how well two areas of skin sense touch.

Part 1. Inside the skin (Tab 1)

SEP 2 Models · CCC Systems

Click every part of the slice. The box on the right says what it is and where it belongs.

1. Tick one box in each row.

Part	A layer of the skin	Beneath the skin	Accessory structure
Epidermis	☐	☐	☐
Dermis	☐	☐	☐
Subcutaneous layer	☐	☐	☐
Hair and follicle	☐	☐	☐
Sebaceous (oil) gland	☐	☐	☐
Sweat gland	☐	☐	☐
Sensory receptors	☐	☐	☐
Nail	☐	☐	☐

Example: 16% of 100 lb is 100 × 0.16 = 16 lb.

2. Set 150 lb and 5 ft 6 in. Skin weighs _____ lb. That is _____ times a 3 lb brain. The skin covers _____ ft².

Now change the weight to 300 lb. Skin weight: _____ lb. Skin area: _____ ft².

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

3. Did the area double? ☐ yes ☐ no The area grew about ☐ 1.4 times ☐ 2 times ☐ 4 times

A bigger body has ☐ more ☐ less skin for each pound, because the ☐ inside ☐ outside grows faster.

Part 2. Touch map (Tab 2)

SEP 3 Investigating · CCC Structure and Function

Keep **Show the receptor patches** OFF until question 6. Start with a wide gap and work down.

4. Set the person to **Just says "two"** . Touch with **one point** . They say: ☐ one ☐ two

5. Set **Answers honestly** . Find the smallest gap that still feels like two points.

Site	Fingertip	Lip	Palm	Forearm	Back	Calf
Smallest gap (mm)						

6. Forearm _____ ÷ fingertip _____ = _____ times wider.

Turn ON the patches. Set 20 mm. Squares the two points press on: forearm _____ fingertip _____

READ FIRST. In the lab, find the **Learn It** box and read it. Then answer 7.

7. (a) One-point touches are a **control** . They:

☐ catch a person who is guessing ☐ make the test go faster ☐ make the touches hurt less

(b) At 20 mm on the forearm, both points press on _____ receptor patch. On the fingertip they press on _____ patches. **WORD BANK** the same · two different · no · a bigger

(c) Braille dots are 2.5 mm apart. Which site could read Braille? ☐ fingertip ☐ lip ☐ palm ☐ forearm

Because its smallest gap, _____ mm, is less than 2.5 mm.

Part 3. Sweat test (Tab 3)

SEP 4 Analyzing Data · CCC Stability and Change

Set each row, then press **Skip to the end**. **Your runs** keeps the numbers. The air is 27 °C (81 °F) every time.

8. Write the numbers. "Off" means sweat that dripped or was wiped away.

Settings	Core °C at 30 min	Sweat made (mL)	Evaporated (mL)	Off (mL)
Dry · still air				
Humid · still air				
Humid · a breeze				
Dry · still · sweat glands OFF				
Dry · still · towel ON				

9. Run dry, still air with **Run 30 minutes** . Sweat rate at minute 0: _____ mL per minute. At minute 30: _____ mL per minute.

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

10. In humid air, the sweat that evaporated was ☐ more ☐ less than in dry air.

Sweat only cools you when it _____. **WORD BANK** evaporates · drips · is cold · is salty

11. (a) The glands turned up because the core temperature went _____. The sweat pushes the temperature back toward 37 °C. This is _____ feedback. **WORD BANK** up · down · negative · positive

(b) A friend says, "Sweat cools you because it is cold." Tick the **two** facts that prove them wrong.

- ☐ Sweat comes out at 34 °C. That is warmer than the 27 °C air.
- ☐ Wiping the sweat off made the runner hotter.
- ☐ Sweat is ice cold when it comes out.
- ☐ Humid air made the runner cooler.

Part 4. Five jobs (Tab 4)

SEP 6 · CCC Structure and Function

12. Write the part. Tick the job.

WORD BANK epidermis · sweat gland · sensory receptor · hair · sebaceous gland · subcutaneous layer · nail

Moment	Part	Protect	Temp.	Sense	Vit. D	Excrete
1. Paper cut, no blood		☐	☐	☐	☐	☐
2. Feel a mosquito land		☐	☐	☐	☐	☐
3. Forehead sweat dries in gym		☐	☐	☐	☐	☐
4. Salty lip after a run		☐	☐	☐	☐	☐
5. Swim an hour, no water soaks in		☐	☐	☐	☐	☐
6. July sun, calcium for bones		☐	☐	☐	☐	☐
7. Goosebumps on a cold morning		☐	☐	☐	☐	☐
8. Hair and skin stay soft		☐	☐	☐	☐	☐
9. Body heat kept in on a cold day		☐	☐	☐	☐	☐

13. The paper cut did not bleed because:

☐ the epidermis has no blood vessels ☐ the epidermis is very thick ☐ the cut hit fat

Wrap it up

SEP 7 Argument from Evidence · CCC Structure and Function

14. Claim: The skin is built for its jobs.

Evidence 1: The fingertip felt two points only _____ mm apart, because its receptors are packed _____.

Evidence 2: Sweat glands put water on the skin. When it _____, it carries heat away.

Reasoning: The way each part is _____ lets it do its job.

WORD BANK built · colored · evaporates · tightly · loosely

NYSSLS: building toward HS-LS1-2 and HS-LS1-3 (DCI LS1.A). Anatomy & Physiology, Hole's Essentials 6.1 to 6.4: Parts and Functions of the Integumentary System. SEP = Science and Engineering Practice, CCC = Crosscutting Concept.