# 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 how it feels touch, find out how sweat cools you, 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, 5 · CCC Systems and System Models**

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** | ☐ | ☐ | ☐ |

**2.** Use **Weigh it, spread it out** . Set 150 lb and 5 ft 6 in. Skin and the fat layer under it weigh _____ lb. That is _____ times the weight of a 3 lb brain. The skin covers _____ ft². Now keep the height and 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.** The weight doubled. New area ÷ old area = _____. Did the area double too? Use the ideas of **inside** and **outside** to explain. Does a bigger body have more or less skin for each pound?

## Part 2. Touch map (Tab 2)

**SEP 3, 4 · 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** . What do they say? _____

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

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

**6.** Forearm gap _____ ÷ fingertip gap _____ = _____ times wider. Now turn ON the receptor patches and set 20 mm. How many squares do 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) Use the word **control** . Why do scientists mix in one-point touches? Use your answer to Q4.

(b) Use the word **receptor** and your Q6 squares. Why does 20 mm feel like one point on the forearm but two on the fingertip?

(c) Braille dots are 2.5 mm apart. Which site could read Braille? _____ Proof from Q5: _____ mm

## Part 3. Sweat test (Tab 3)

SEP 3, 4 · 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.** Fill in the table. “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** . Watch the sweat rate in the corner box. Minute 0: _____ 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 runner made **more** sweat than in dry air, but got **hotter** . Use the word **evaporate** and both evaporated numbers to explain.

**11.** (a) Use your Q9 numbers. What made the sweat glands turn up? Use **negative feedback** to explain how that keeps the core steady.

(b) A friend says, “Sweat cools you because it is cold.” Use **two** facts from this tab to show them they are wrong.

## Part 4. Five jobs (Tab 4)

SEP 6 · CCC Structure and Function

**12.** For each moment, write the part that does it. Tick the job.

| 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.** Moment 1: why did the paper cut not bleed? What does that tell you about how the epidermis is built?

## Wrap it up

SEP 6, 7 · CCC Structure and Function

**14. Claim:** The skin is built for its jobs. Give **evidence** from two different tabs. Then give your **reasoning** : how does the way each part is built let it do its job?

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