Skin at Work

Trace how skin structures and membranes protect the body.

HAP.3.1 "Identify structures and explain the functions of the integumentary system, including layers of skin, accessory structures, and types of membranes."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the named skin layers and the layer beneath them, circle accessory structures, and number each type of membrane where it first appears. Use your marks to connect each structure with its function.

A Hike Through Heat and Dust

1. During a long hike, skin faces sunlight, gritty rock, and dry air. Its outer epidermis forms a barrier that limits water loss and blocks many microbes. The epidermis has no blood vessels; new cells form in its deepest region and move toward the surface. Below it, the dermis contains blood vessels, sensory receptors, hair follicles, and sweat glands. Its collagen-rich connective tissue helps skin resist tearing. Under the dermis lies the hypodermis, a layer of fatty and loose connective tissue that cushions the body, stores energy, and helps insulate it. The hypodermis supports skin but is not part of skin proper.

2. As the trail grows steep, sweat glands release sweat onto the skin. When that sweat evaporates, it removes heat. Blood vessels in the dermis widen to release more heat at the surface. Hair follicles in the dermis produce hairs that help shield the scalp from sunlight, while oil glands release sebum that softens skin and hair. Nails, made of hard keratin, protect the tips of fingers and toes and help fingers grasp small objects. These accessory structures grow from or connect with the skin, but each has a different job. A shallow scrape that stays above the dermis may not bleed.

3. Skin is also called the cutaneous membrane, but it is not the body's only membrane. In the nose, a mucous membrane lines a passage open to the outside; its mucus helps trap dust and microbes. A serous membrane lines a closed body cavity and covers the organs inside it. Around the lungs, its thin fluid reduces friction as the lungs move. A synovial membrane lines the inner surface of a movable joint capsule and produces fluid that lubricates the joint. Unlike cutaneous, mucous, and serous membranes, synovial membranes are made mainly of connective tissue rather than an epithelial layer.

2 ANSWER WITH EVIDENCE

Use the passage

1. How do the epidermis and dermis help a hiker in different ways? Give one function of each.

2. Which layer beneath the dermis helps cushion a fall? Explain one other function of that layer.

3. During a steep climb, how do sweat glands and blood vessels in the dermis help release heat in different ways?

4. Compare the serous membrane around the lungs with the synovial membrane in a movable joint. What does the fluid associated with each do?

3 YOUR TURN

Your own words

A student walks through a cold, dusty workshop and picks up a tiny screw. In three sentences, explain how one skin layer, one accessory structure, and one noncutaneous membrane each help the student in this situation. Name each structure and describe its function.

ANSWER KEY

Skin at Work

HIGH SCHOOL · HAP.3.1

PART 1 · READ AND MARK

Underline the named skin layers and the layer beneath them, circle accessory structures, and number each type of membrane where it first appears. Use your marks to connect each structure with its function. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How do the epidermis and dermis help a hiker in different ways? Give one function of each.	**The epidermis limits water loss and blocks many microbes. The dermis helps resist tearing or contains blood vessels that help release heat.**
2	Which layer beneath the dermis helps cushion a fall? Explain one other function of that layer.	**The hypodermis cushions the body. It also stores energy or helps insulate the body.**
3	During a steep climb, how do sweat glands and blood vessels in the dermis help release heat in different ways?	**Sweat glands release sweat that removes heat as it evaporates. Dermal blood vessels widen to release more heat at the skin's surface.**
4	Compare the serous membrane around the lungs with the synovial membrane in a movable joint. What does the fluid associated with each do?	**Fluid associated with the serous membrane reduces friction as the lungs move. Fluid produced by the synovial membrane lubricates the joint.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

Sensory receptors in the dermis help the student feel the tiny screw. Fingernails help the student grasp it. The mucous membrane in the nose traps some of the workshop dust in mucus.

Accept any three accurate, situation-specific connections that name a skin layer, an accessory structure, and a noncutaneous membrane. The hypodermis may be used for insulation, but it is beneath the skin rather than part of skin proper.