

# SI A&P - Full Discipline Demo - Digital

## The Integumentary System - No Materials

### Final Report - Answer Guide

|                    |                                         |
|--------------------|-----------------------------------------|
| <b>Institution</b> | Science Interactive University          |
| <b>Session</b>     | SI A&P - Full Discipline Demo - Digital |
| <b>Course</b>      | SI A&P - Full Discipline Demo - Digital |
| <b>Instructor</b>  | Sales SI Demo                           |

### Test Your Knowledge

**Match the illustration of the fingerprint minutiae with the correct term.**

Arrector pili

Dermis

Epidermis

Stratum corneum

Sudoriferous gland

Outer layer of skin composed of stratified epithelial cells

Thickest layer of skin composed of connective tissue

Tubular structure in skin that secretes sweat

Dead skin cells connected by keratin

Muscle connected to hair follicles

1

2

3

4

5

Correct answers:

- 1 Epidermis    2 Dermis    3 Sudoriferous gland    4 Stratum corneum
- 5 Arrector pili

### Exploration

**The integumentary system is composed of the \_\_\_\_.**

- ☐ skin
- ☐ hair
- ☐ nails
- ☒ All of the above

✓

**Melanocytes and Merkel cells are present in the \_\_\_\_ .**

- ☒ stratum basale
- ☐ stratum corneum
- ☐ stratum lucidum
- ☐ stratum granulosum

✓

**The \_\_\_\_ form ridges on the palms of the hands and the soles of the feet.**

- ☐ melanocytes
- ☒ dermal papillae
- ☐ arrector pili
- ☐ hair follicles

✓

## Exercise 1

**What are the functions of each epidermis labeled in Photo 2 of this exercise?**

The stratum corneum prevents dehydration and provides resilience of the skin.

The stratum lucidum functions to reduce friction between the stratum corneum and stratum granulosum.

The stratum granulosum functions to prevent fluid loss from the body.

The stratum spinosum functions to remove damaged cells and foreign particles from the skin and to produce keratin and glycolipids that migrate into the stratum granulosum.

The stratum basale contains melanocytes which produce the pigment melanin, and Merkel cells which facilitate the sense of touch.

**What are some of the features of the dermal papillae that you observed on this slide, and how do those features affect the surface of the skin?**

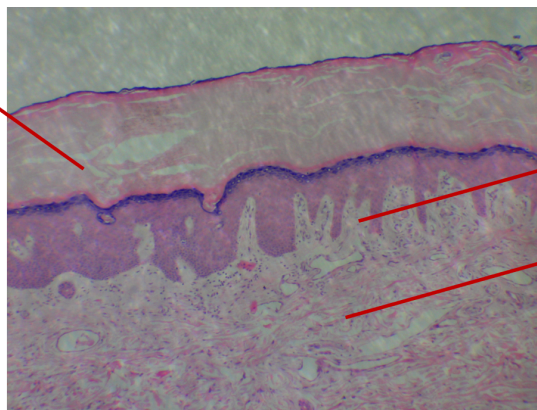
The dermal papillae are protrusions of the upper dermal layer that extend up towards the epidermis. These protrusions form ridges on the palms of the hands and soles of the feet, creating the patterns that give each individual their unique fingerprints.

**What are three key features (glands and follicles) of the dermis that were not labeled in Photo 1 and what are their functions?**

Three key unlabeled structures that reside within the dermis are sudoriferous glands, sebaceous glands, and hair follicles. Sudoriferous glands secrete sweat to cool the body. Sebaceous glands secrete sebum (oil) into hair follicles to lubricate and soften hair and skin, prevent water loss, and kill bacteria. Hair follicles are tubular structures surrounding hair roots and strands that function to grow and maintain hair.

**Photo 1: Skin Layers**  
(SAMPLE ANSWER BELOW)

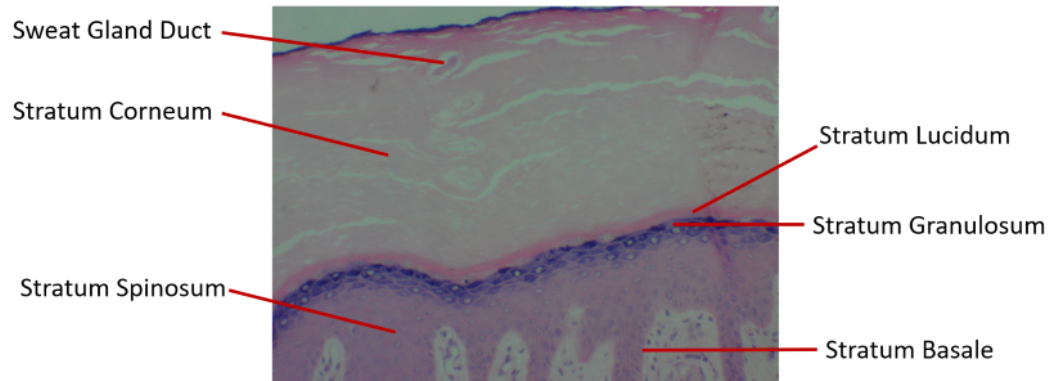
Epidermal Layer



Dermal Papillae

Dermal Layer

Photo 2: Epidermis Layers  
(SAMPLE ANSWER BELOW)



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## Competency Review

**Skin is composed primarily of connective and epithelial tissues.**

- ☐ True
- ☐ False



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**The epidermis is composed of five layers of \_\_\_\_ cells.**

- ☐ adipose
- ☐ secretory
- ☐ cuboidal epithelial
- ☐ stratified epithelial



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**The stratum basale is the deepest layer of the dermis.**

- ☐ True
- ☐ False



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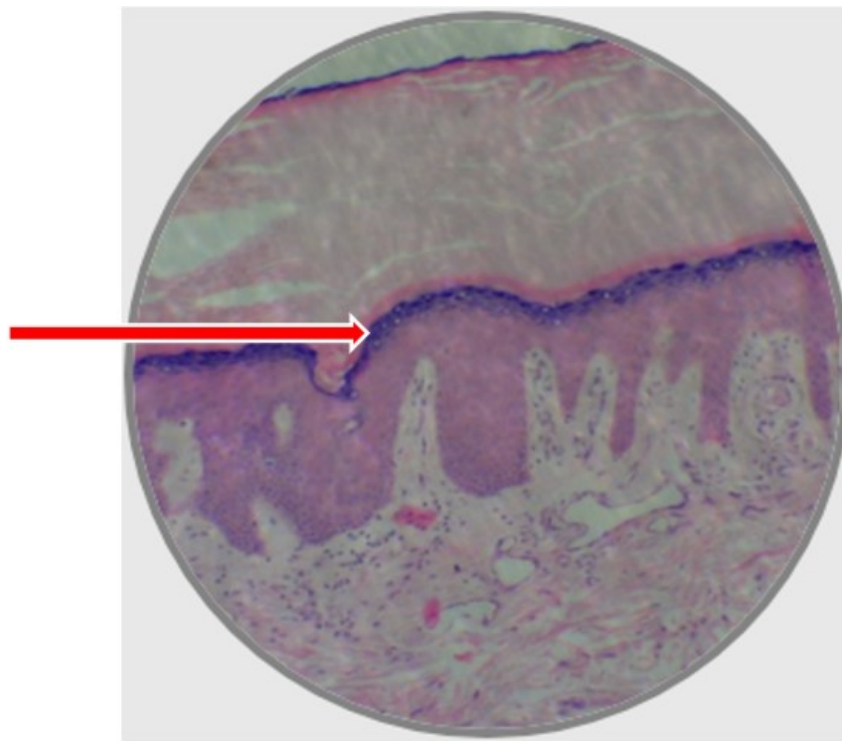
The dermis contains \_\_\_\_.

- ☐ sudoriferous glands
- ☐ sebaceous glands
- ☐ hair follicles
- ☒ All of the above

✓

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The \_\_\_\_ is indicated by the red arrow in the human skin micrograph below.



- ☐ dermal papillae
- ☐ subcutaneous layer
- ☐ arrector pili
- ☒ stratum granulosum

✓

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## Extension Questions

**Criminals have attempted to remove or alter their fingerprints by filing or cutting away the surface layer of skin. Apply your knowledge the integumentary system to explain why**

**fingerprint mutilation is not typically successful.** (SAMPLE ANSWER BELOW)

The dermal papillae that produce the ridges that form the fingerprints are in the dermis, six tissue layers below the surface of the skin. Removal of superficial skin layers by filing or cutting would likely not remove the dermal papillae and the fingerprint would persist.