ANSWER KEY

Integumentary System Worksheet

Rewrite

1. What is a body membrane? What are the 2 types and what are included within these subtypes?

sheetlike structure that covers & protects the body
① epithelial ② Connective tissue

2. List the Epithelial membranes (3) and give a brief description of each:

cutaneous = primary organ
Serous = surface in enclosed cavities
Mucous = line body surfaces open to env.

3. What structures are included in the integumentary system?

receptors, hair, sebaceous glands, sweat glands, nails

4. Skin may be one of the most underestimated organs in the body. List ~~six~~ 5 functions your skin performs while it is "just lying there".

1. protection
2. regulate body temp
3. synthesize chemicals
4. sense organs
5. excretion
6. ~~6.~~

5. The outer layer of skin is the epidermis layer. The inner layer is the dermis layer. Which layer is the thickest? ~~dermis~~ dermis What is the subcutaneous layer?

hypodermis
fat & connective tissue

6. Epidermis contains a few distinct cell ~~types~~ layers. Fill in the name of the cell type that fits each description:

a. Most numerous cell type, this cell produces keratin which helps to waterproof skin:

S. corneum

b. This type of cell produces the pigments which give skin its color: S. basale.

7. The epidermis is _____; that is it has no blood supply of its own, similar to epithelial tissue.

8. The dermis is composed of (connective / epithelial) tissue. Describe the dermis and the 2 major regions that the dermis consists of.

mechanical strength

① Reticular ② Papillary

9. Answer these question about glands.

a. Where in the body would you most likely find sebaceous glands? ~~all over~~ skin & hair

b. What are the functions of these glands?

produce oil

10. Do the following descriptions refer to sebaceous, sudoriferous, or Apocrine glands:

a. Sweat glands: Sudoriferous
b. If this gland's duct becomes blocked by sebum, it can lead to acne: ~~apocrine~~ sebaceous
c. Present in the axillary and genital areas of body and function during puberty: apocrine

11. Match the following Disease or Disorder with the description that best describes the condition:

A. AcneB. Athletes Foot C. Burns

D. Cancer E. Boils & Carbuncles

D Uncontrolled cell growth

B A fungus infection that invades and lives off of the dead outer layers of the skin.

E A sometimes hereditary, chronic condition characterized by reddened epidermal lesions covered with dry, silvery scales.

A An inflammatory condition of infected sebaceous glands

C Tissue injury caused by thermal, electrical, chemical or radioactive sources.

12. Which is not a function of the skin?
a. Protection against mechanical injury
b. Protection against foreign invaders
c. Regulation of body heat
d. All of the above are functions

13. The layer of skin that lacks blood vessels is:
a. Subcutaneous.
b. Dermis.
c. Integument.
d. Epidermis.

14. The dermis does not contain:
a. Sebaceous glands.
b. Hair follicles.
c. Mucous glands.
d. Nerves.

15. The color of human skin depends upon:
a. Whether the blood within the skin is well oxygenated.
b. The number of underlying blood vessels.
c. The kind and amount of pigment.
d. All of the above.

16. Which layer of epidermis would be gradually shed through bathing?

a. Stratum granulosum
b. Stratum corneum
c. Stratum basale
d. Stratum lucidum

17. The dermis is primarily composed of which tissue type?

a. Nervous
b. Muscle
c. Connective
d. Epithelial

. The amount of melanin produced in the skin is determined by the:
a. Number of melanocytes.
b. Activity of melanocytes.
c. Diet.
d. Proximity of blood vessels to the skin.

19. Which epidermal layer is closest to a blood supply?
a. Stratum basale
b. Stratum spinosum
c. Stratum granulosum
d. Stratum corneum

20. Distinguish between serous and mucous membranes:
Serous = cover enclosed cavities
Mucous = line body surfaces open to env.

21. Distinguish between the epidermis and the dermis.

Epidermis	Dermis
- thin - ~~no nutrients~~ no blood supply - 5 layers - keratin	- thick connective tissue - blood supply - 2 layers - receptors - ~~no~~ hair

22. Explain what happens to epidermal cells as they undergo keratinization.
cytoplasm ~~fills~~ is replaced by keratin

23. Describe the function of melanocytes.
produce melanin

24. Distinguish between a hair and a hair follicle
hair = dead
hair follicle = protects root of hair

25. Distinguish between eccrine and apocrine sweat glands.
eccrine = widespread, clear secretion
apocrine = armpits & genitals, milky secretions

26. Explain how sweat glands help regulate body temperature.
evaporative cooling

27. Explain importance of Vasodialation and Vasoconstriction.
↓ blood flow
↑ blood flow

INTEGUMENTARY SYSTEM (SKIN)

Basic Structure and Function

3. Figure 4–2 depicts a longitudinal section of the skin. Label the skin structures and areas indicated by leader lines and brackets on the figure. Select different colors for the structures below and color the coding circles and the corresponding structures on the figure.

- ○ Arrector pili muscle
- ○ Adipose tissue
- ○ Hair follicle
- ○ Nerve fibers
- ○ Sweat (sudoriferous) gland
- ○ Sebaceous gland

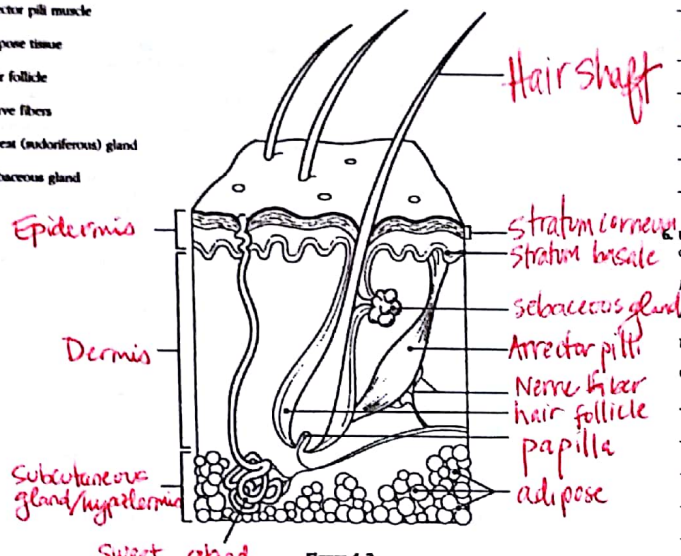


Figure 4–2

4. The more superficial cells of the epidermis become less viable and ultimately die. What two factors account for this natural demise of the epidermal cells?

1. As basal cells continue to divide superficial cells pushed farther from nutrient supply diffusing from dermis
2. H_2O-proofing substances (keratin, etc) made by the keratinocytes effectively limit nutrient entry into the cells

5. Complete the following statements in the blanks provided.

1. Heat — Radiation from the skin surface and evaporation of sweat are two ways in which the skin helps to get rid of body (1).
2. Subcutaneous — Fat in the (2) tissue layer beneath the dermis helps to insulate the body.
3. Keratin — The waterproofing protein found in the epidermal cells is called (3).
4. Vitamin D — A vitamin that is manufactured in the skin is (4).
5. freckle — A localized concentration of melanin is (5).
6. elasticity — Wrinkling of the skin is due to loss of the (6) of the skin.
7. O_2 (blood flow) — A decubitus ulcer results when skin cells are deprived of (7).
8. cyanosis — (8) is a bluish cast of the skin resulting from inadequate oxygenation of the blood.

6. Using key choices, choose all responses that apply to the following descriptions. Enter the appropriate letter(s) or term(s) in the answer blanks.

Key Choices

A. Stratum corneum
B. Stratum basale
C. Stratum granulosum
D. Stratum lucidum
E. Papillary layer
F. Reticular layer
G. Epidermis as a whole
H. Dermis as a whole

1. A, D — Translucent cells, containing keratin
2. A, D — Dead cells
3. E — Dermis layer responsible for fingerprints
4. H — Vascular region
5. B — Epidermal region involved in rapid cell division; most inferior epidermal layer
6. A — Scalelike cells full of keratin that constantly flake off
7. F — Site of elastic and collagen fibers
8. B — Site of melanin formation
9. G — Major skin area from which the derivatives (hair, nails) arise

Skin = dermis + epidermis
↓ ↳ 5 layers: S. corneum, S. lucidum, S. granulosum, S. spinosum, S. basale
2 layers
① Papillary layer - dermal papillae
② Reticular layer - elastic, stretch marks are when this layer is stretched beyond rebound "Striae"
↳ wrinkles when we lose elasticity

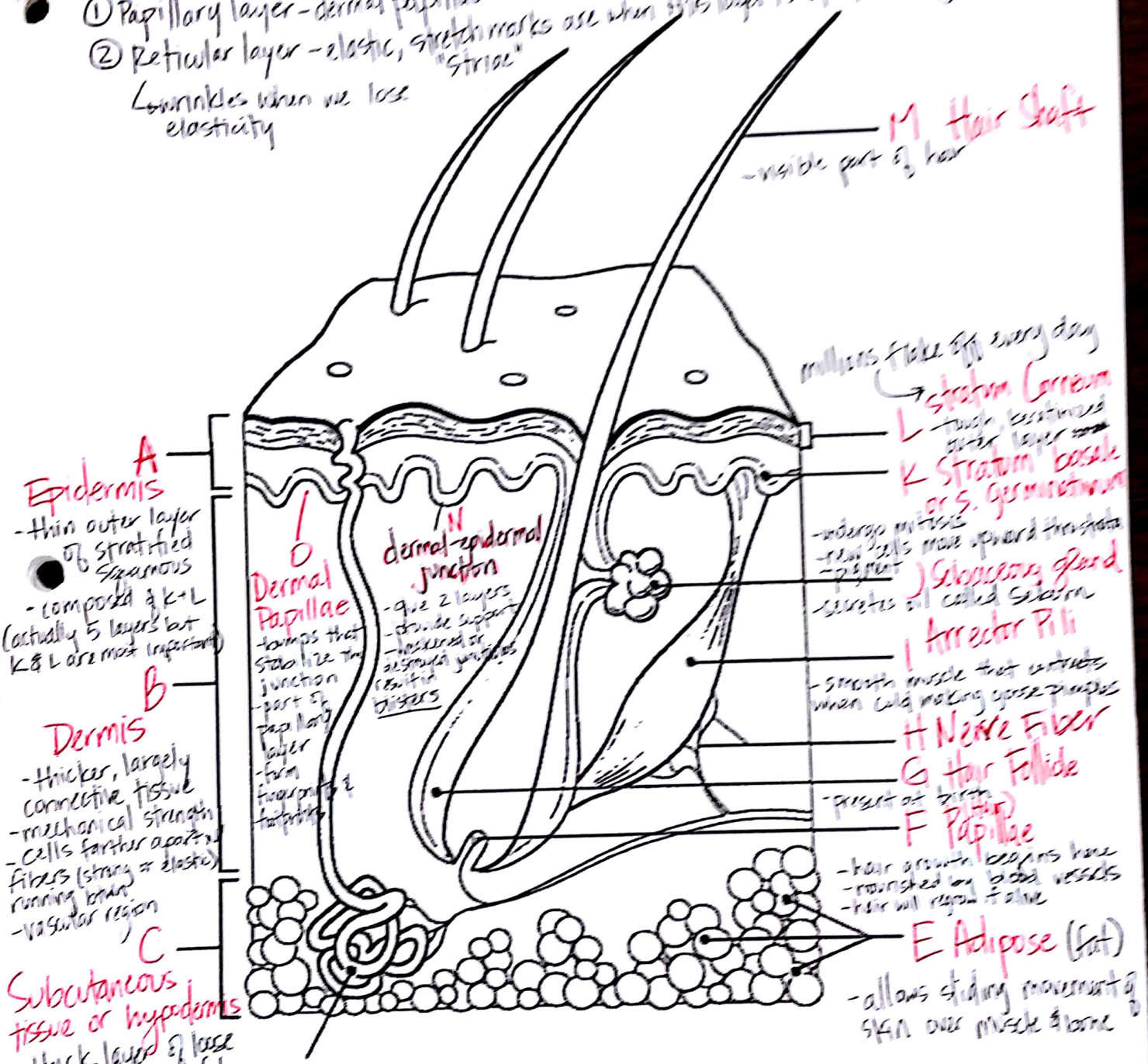


Figure 4–2

D Sweat gland
- two types: eccrine, apocrine

Appendages

7. For each true statement, write *T*. For each false statement, correct the underlined word(s) and insert your correction in the answer blank.

melanin 1. Greater amounts of the pigment carotene are produced when the skin is exposed to the sun.

keratin 2. The most abundant protein in dead epidermal structures such as hair and nails is melanin.

T 3. Sebum is an oily mixture of lipids, cholesterol, and cell fragments.

stratum corneum 4. The oldest epidermal cells in the epidermis are found in the stratum basale.

shaft 5. The externally observable part of a hair is called the root.

Dermis 6. The epidermis provides mechanical strength to the skin.

8. Figure 4–3 is a diagram of a cross-sectional view of a hair in its follicle. Complete this figure by following the directions in steps 1–3.

1. Identify the two portions of the follicle wall by placing the correct name of the sheath at the end of the appropriate leader line.
2. Use different colors to color these regions.
3. Label, color code, and color the three following regions of the hair.

○ Cortex ○ Cuticle ○ Medulla

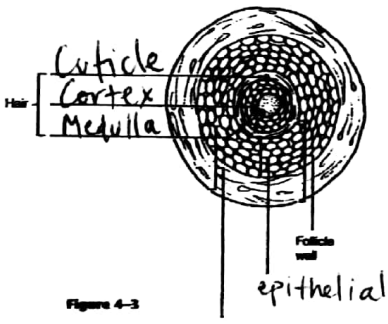


Figure 4–3

9. Using key choices, complete the following statements. Insert the appropriate letter(s) or term(s) in the answer blanks.

Key Choices

A. Arrector pili C. Hair E. Sebaceous glands G. Sweat gland (eccrine)
B. Cutaneous receptors D. Hair follicle(s) F. Sweat gland (apocrine)

E 1. A blackhead is an accumulation of oily material produced by (1).

A 2. Tiny muscles attached to hair follicles that pull the hair upright during fright or cold are called (2).

G 3. The most numerous variety of perspiration gland is the (3).

D 4. A sheath formed of both epithelial and connective tissues is the (4).

F 5. A less numerous variety of perspiration gland is the (5). Its secretion (often milky in appearance) contains proteins and other substances that favor bacterial growth.

C 6. (6) is found everywhere on the body except the palms of the hands, soles of the feet, and lips, and primarily consists of dead keratinized cells.

B 7. (7) are specialized nerve endings that respond to temperature and touch, for example.

E, F 8. (8) become more active at puberty.

G, F 9. Part of the heat-liberating apparatus of the body is the (9).

10. Circle the term that does not belong in each of the following groupings.

1. Sebaceous gland — Hair — Arrector pili — Epidermis
2. Radiation — Absorption — Conduction — Evaporation
3. Stratum corneum — Nails — Hair — Stratum basale
4. Freckles — Blackheads — Moles — Melanin
5. Scent glands — Eccrine glands — Apocrine glands — Axilla
6. Cyanosis — Erythema — Wrinkles — Pallor
7. Keratin — Carotene — Melanin — Hemoglobin

Homeostatic Imbalances of the Skin

11. Overwhelming infection is one of the most important causes of death in burn patients. What is the other major problem they face, and what are its possible consequences?

water, protein, electrolyte loss
circulatory collapse, renal shutdown

12. This section reviews the severity of burns. Using the key choices, select the correct burn type for each of the following descriptions. Enter the correct answers in the answer blanks.

Key Choices

A. First-degree burn B. Second-degree burn C. Third-degree burn

C 1. Full-thickness burn; epidermal and dermal layers destroyed; skin is blanched

B 2. Blisters form

A 3. Epidermal damage, redness, and some pain (usually brief)

B 4. Epidermal and some dermal damage; pain; regeneration is possible

C 5. Regeneration impossible; requires grafting

C 6. Pain is absent because nerve endings in the area are destroyed

13. What is the importance of the "rule of nines" in treatment of burn patients?

it allows estimation of the extent of burns so that fluids volume replacement can be correctly calculated

14. Fill in the type of skin cancer which matches each of the following descriptions:

Squamous cell carcinoma 1. Epithelial cells, not in contact with the basement membrane, develop lesions; metastasizes.

Basal cell carcinoma 2. Cells of the lowest level of the epidermis invade the dermis and hypodermis; exposed areas develop ulcer; slow to metastasize.

malignant melanoma 3. Rare but often deadly cancer of pigment-producing cells.

15. What does ABCD mean in reference to examination of pigmented areas?

pigmented areas that are assymetric, have irregular borders, exhibit several colors and have a diameter greater than 6mm are likely to be cancerous

AT THE CLINIC

See attached answers.

18. Mrs. Ibañez volunteered to help at a hospital for children with cancer. When she first entered the cancer ward, she was upset by the fact that most of the children had no hair. What is the explanation for their baldness?

19. A new mother brings her infant to the clinic, worried about a yellowish, scummy deposit that has built up on the baby's scalp. What is this condition called, and is it serious?

20. Patients in hospital beds are rotated every 2 hours to prevent bedsores. Exactly why is this effective?

21. Count Dracula, the most famous vampire of legends, was based on a real person who lived in eastern Europe about 600 years ago. He killed at least 200,000 people in the region he ruled. He was indeed a "monster," even though he was not a real vampire. Let your fingers do the walking through a medical dictionary and determine which of the following conditions the historical Count Dracula may have suffered from: (a) porphyria, (b) EB, (c) halitosis, (d) dermatitis.

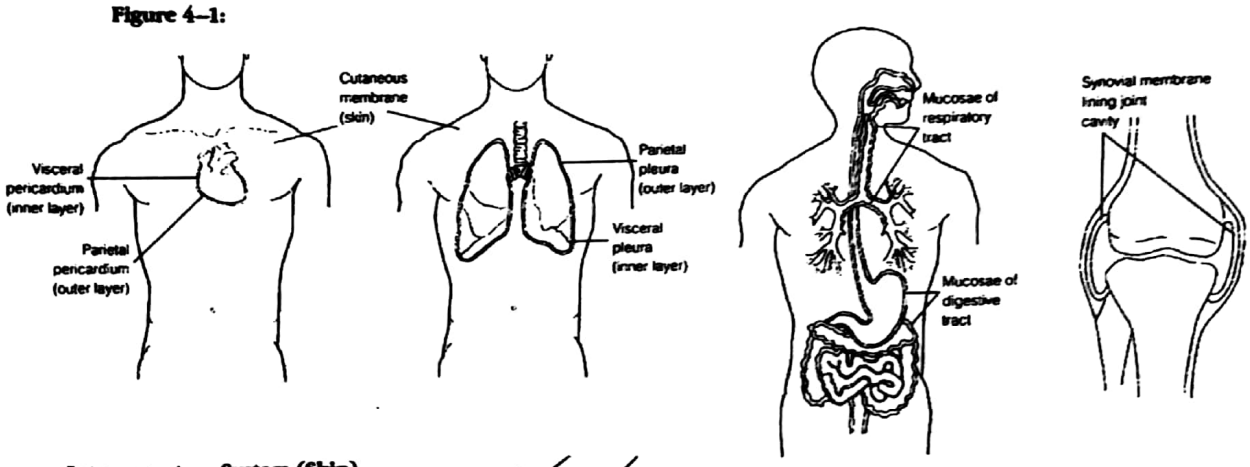
Chapter 4 Skin and Body Membranes

Classification of Body Membranes

1. The mucous, serous, and cutaneous membranes are all composite membranes composed of an epithelial layer underlaid by a connective tissue layer. A mucous membrane is an epithelial sheet underlaid by a connective tissue layer called the lamina propria. Mucosae line the respiratory, digestive, urinary, and reproductive tracts; functions include protection, lubrication, secretion, and absorption. Serous membranes consist of a layer of simple squamous epithelium resting on a scant layer of fine connective tissue. Serosae line internal ventral body cavities and cover their organs; their function is to produce a lubricating fluid that reduces friction. The cutaneous membrane, or skin, is composed of the epithelial epidermis and the connective tissue dermis. It covers the body exterior and protects deeper body tissues from external insults. The synovial membranes, which line joint cavities of synovial joints, are composed entirely of connective tissue. They function to produce lubrication to decrease friction within the joint cavity.

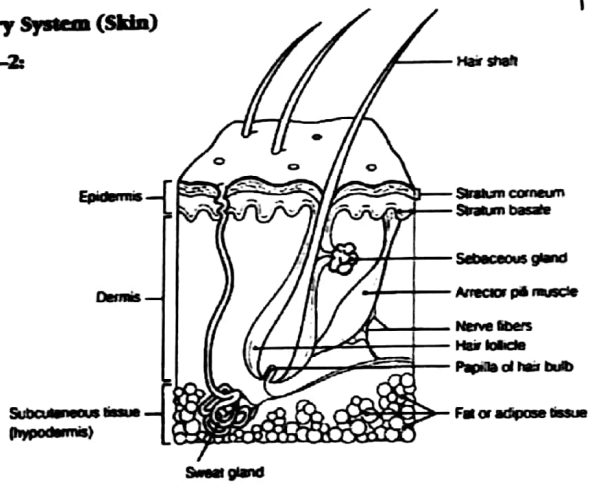
2. In each case, the visceral layer of the serosa covers the external surface of the organ, and the parietal layer lines the body cavity walls.

Figure 4–1:



Integumentary System (Skin)

3. **Figure 4–2:**



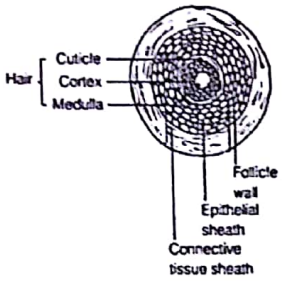
4. 1. As the basal cells continue to divide, the more superficial cells are pushed farther and farther from the nutrient supply diffusing from the dermis. 2. Water-proofing substances (keratin and others) made by the keratinocytes effectively limit nutrient entry into the cells.

5. 1. Heat. 2. Subcutaneous. 3. Keratin. 4. Vitamin D. 5. A freckle. 6. Elasticity. 7. Oxygen (blood flow). 8. Cyanosis.

6. 1. A or stratum corneum, D or stratum lucidum. 2. A or stratum corneum, D or stratum lucidum. 3. E or papillary layer. 4. H or dermis as a whole. 5. B or stratum basale. 6. A or stratum corneum. 7. H or dermis as a whole. 8. B or stratum basale. 9. G or epidermis as a whole.

7. 1. Melanin. 2. Keratin. 3. *T.* 4. Stratum corneum. 5. Shaft. 6. Dermis.

8. **Figure 4–3:**



9. 1. E or sebaceous glands. 2. A or arrector pili. 3. G or eccrine sweat glands. 4. D or hair follicle. 5. F or apocrine sweat gland. 6. C or hair. 7. B or cutaneous receptors. 8. E or sebaceous glands, and F or apocrine sweat glands. 9. G or eccrine sweat glands.

10. 1. Arrector pili. 2. Absorption. 3. Stratum basale. 4. Blackheads. 5. Eccrine glands. 6. Wrinkles. 7. Keratin.

11. Water/protein/electrolyte loss; circulatory collapse, renal shutdown.

12. 1. C or third-degree burn. 2. B or second-degree burn. 3. A or first-degree burn. 4. B or second-degree burn. 5. C or third-degree burn. 6. C or third-degree burn.

13. It allows estimation of the extent of burns so that fluid volume replacement can be correctly calculated.

14. 1. Squamous cell carcinoma. 2. Basal cell carcinoma. 3. Malignant melanoma.

15. Pigmented areas that are Assymetric, have irregular Borders, exhibit several Colors, and have a Diameter greater than 6 mm are likely to be cancerous.

Developmental Aspects of the Skin and Body Membranes

16. 1. C or dermatitis. 2. D or delayed-action gene. 3. F or milia. 4. B or cold intolerance. 5. A or acne. 6. G or vernix caseosa. 7. E or lanugo.

The Incredible Journey

17. 1. Collagen. 2. Elastin (or elastic). 3. Dermis. 4. Phagocyte (macrophage). 5. Hair follicle connective tissue. 6. Epidermis. 7. Stratum basale. 8. Melanin. 9. Keratin. 10. Squamous (stratum corneum) cells.

At the Clinic

18. Chemotherapy drugs used to treat cancer kill the most rapidly dividing cells in the body, including many matrix cells in the hair follicles; thus, the hair falls out.

19. The baby has seborrhea, or cradle cap, a condition of overactive sebaceous glands. It is not serious; the oily deposit is easily removed with attentive washing, and soon stops forming.

20. Bedridden patients are turned at regular intervals so that no region of their body is pressed against the bed long enough to deprive the blood supply to that skin; thus, bedsores are avoided.

21. Porphyria (a) may have been Count Dracula's disease.

22. Besides storing fat as a source of nutrition, the hypodermis anchors the skin to underlying structures (such as muscles) and acts as an insulator against heat loss.

23. The body of a nail is its visible, attached part (not its white free edge). The root is the proximal part that is embedded in skin. The bed is the part of the epidermis upon which the nail lies. The matrix is the proximal part of the nail bed and it is responsible for nail growth. The cuticle is the skin fold around the perimeter of the nail body. Since the matrix is gone, the nail will not grow back.

24. The peritoneum will be inflamed and infected. Since the peritoneum encloses so many richly vascularized organs, a spreading peritoneal infection can be life threatening.

25. He probably told her that regeneration would occur and grafts would not be needed if infection was avoided.

Name ___Teacher Version/Evidence
Period _____

Teacher _____
School _____

Reading for Evidence

Directions: Below are the 10 statements about cancer followed by the words "Support" or "Reject" and a short reading passage about each statement. Each reading passage contains information about the cancer topics in each statement. For each statement:

- Underline or highlight the part of the passage that you believe provides evidence to support or reject that the statement as a cancer truth.
- Then circle the word "Support" or "Reject" to indicate what you concluded based on the evidence you found.

NOTE TO TEACHERS: Red or bold type areas below represent a sample of evidence for the Truth decision.

A. If your parents had cancer, so will you.

~~**Support**~~ Reject

While having a family history of certain cancers may increase your risk, **it does not automatically mean that you will develop cancer**. Some types of cancer such as breast cancer, ovarian cancer, and colorectal cancer are hereditary. If a parent has these cancers, the cancer gene may be passed on the to an offspring. If a child inherits the gene, it does not mean that the child will develop cancer. The gene only increases the likelihood that the child will develop cancer. **Whether the child develops cancer or not depends on many other factors such as the environment, a person's lifestyle, and other genes in the cells.**

B. If you find an abnormal lump on your body, it must be cancer.

~~**Support**~~ Reject

Many lumps turn out to be benign tumors or cysts, rather than malignant tumors. For example, 90% of breast lumps are totally harmless. If you detect an abnormality such as a lump, you should see your doctor. Your doctor may suggest a procedure known as a biopsy or other tests to determine if the cells in the lump are cancerous.

C. It is possible to have cancer without exhibiting any symptoms or warning signs.

Support ~~**Reject**~~

Cancer is a complicated disease and there is no sure way to always detect it. Cancer cells can grow anywhere in a person's body, sometimes on the skin, or often deep within internal organs. **Until the cancer growth reaches a certain size, symptoms or warning signals may not reveal the presence of cancerous tumors.** Many cancers can exist in the body for some time with no apparent symptoms. By the time you experience symptoms or feel a lump, the cancer may have been there for many years. Scientists have developed cancer screen tests that can detect some types of cancer in early stages. They are looking for additional screening tests that can detect other types of cancer before symptoms appear.

D. Young peoples' lifestyles affect their chances of getting cancer later in life.

Support ~~Reject~~

Most cases of cancer are the result of many years of exposure to several risk factors. What you eat as a young person, or whether you are physically active, get sunburned regularly, and especially whether you smoke can have substantial influence on whether you develop cancer later in life. More than two-thirds of all fatal cancer cases could be prevented with simple life style changes: eating fruits, vegetables and whole grains; exercising regularly; maintaining a healthy body weight; using protection against the sun; and especially, not smoking.

E. Cancer that has metastasized (spread throughout the body) is fatal.

~~Support~~ Reject

Yes, cancer can cause death, and if metastasis has occurred, the risk of dying is significantly increased. New breakthroughs in early detection of cancer and chemotherapy drugs or other treatments have made it possible for an estimated 40% of cancer patients to reach or exceed the five-year survival mark.

F. Everyone with same stage (or the same kind) of cancer gets the same kind of treatment.

~~Support~~ Reject

Doctors tailor cancer treatments to the patient. What treatment the patient receives depends on where the cancer is located, whether or how much it has metastasized, and how it is affecting body functions and general health. In addition, cells from the same type of cancer many have different features in different people. These differences can affect how the cells respond to treatment, which in turn may influence the doctor's recommendations.

G. The only treatments for curing cancer are surgery, radiation, and chemotherapy.

~~Support~~ Reject

Surgery, radiation, and chemotherapy are the most common types of cancer treatments. However, there are other cancer procedures used by doctors that are also proving effective in the treating cancers. Angiogenesis inhibitors (drugs that reduce the blood supply to tumors), bone marrow transplants, gene therapy, vaccines, hyperthermia, and phototherapy are just a few of the alternatives being used to target cancer cells more effectively with fewer side effects.

H. If you are infected with a cancer-causing virus, you will develop cancer.

~~Support~~ ~~Reject~~

There are two known contagious viruses, HPV and Hepatitis C, that may increase people's risk of developing cancer. HPV is a known risk factor for cervical cancer and Hepatitis C is a risk factor for liver cancer. Both viruses can be transmitted through unprotected sexual intercourse. Hepatitis C is more often transmitted through blood-to-blood contact such as sharing needles and transfusions. However, many people who have the HPV or Hepatitis C virus may never develop cancer.

I. Cancer patients involved in clinical trials receive the best possible treatment for their cancer.

~~**Support or**~~ **Reject**

Clinical trials are research studies designed to determine whether promising approaches to cancer prevention, diagnosis, and treatment are safe and effective for use in humans. In Phase I trials, a small number of patients evaluate how a new drug should be given, how often, and what dose is safe. Phase II trials continue to test the safety of the drug, and begin to evaluate how well the new drug works on a particular type of cancer. Phase III trials involve large numbers of patients in testing a new drug, a new combination of drugs, or a new surgical procedure in comparison to the current standard. A participant will usually be randomly assigned to a group that receives the new treatment **or to a control group that is given the current standard treatment.** Potential benefits of cancer trials include:

- Health care provided by leading physicians in the field of cancer research
- Access to new drugs and interventions before they are widely available
- Close monitoring of your health care and any side effects

The potential risks include:

- **New drugs and procedures may have side effects or risks unknown to the doctors**
- **New drugs and procedures may be ineffective, or less effective, than current approaches**
- Even if a new approach has benefits, it may not work for each patient.

J. Cancer is caused by changes in genetic material.

Support ~~**or Reject**~~

Cancer begins with damage (mutations) in a cell's DNA. DNA contains a set of chemical instructions for cells, telling them how to grow and divide. Normal cells often develop mutations in their DNA, but most cells have the ability to repair most of these mutations. If cells can't make the repairs, the cells often die. However, certain mutations aren't repaired, causing the cells to grow and become cancerous. Mutations also cause cancer cells to live beyond a normal cell life span and to spread throughout the body. This causes the cancerous cells to form tumors and to metastasize. The initial genetic mutation may be present at birth, or occur later in life, but the mutation is just the beginning of the process by which cancer develops. Scientists believe that a need a number of mutations within cells have to accumulate in order for cancer to develop. A person's genetic makeup, lifestyle choices, and environment may increase the risk for developing these. For instance, if you inherited a genetic mutation that predisposes you to get cancer, you may be more likely than other people to develop that cancer when you are exposed to certain cancer-causing substances. The genetic mutation and its inheritance began the cancer process, and then the cancer-causing substance could play a role in the further development of that cancer.