**Functions of the Skin and Its Role in Homeostasis Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Ø Learning Target: Explain how the anatomy and physiology of the skin works to maintain homeostasis.

**Activity 1: Distribution of Sweat Glands**Only one partner needs to complete this activity.

1. Obtain 2 squares of paper (1 in. x 1 in.), tape, ½ cotton ball and Lugol’s Iodine.
2. Using the iodine, paint an area of the medial aspect of your left palm (avoid the crease lines) and also paint an area on your left forearm. Painted area should be larger than paper square.
3. Allow iodine to dry. Have your partner tape the paper over the iodine and leave in place for 15 minutes.
4. While waiting for time to pass move on to the following activities.
5. After 15 minutes, remove the paper squares and compare the number of blue-black dots on each. (Iodine in the pore dissolves in the sweat and reacts with starch in the paper to produce the blue-black color – thus you have created a “sweat-map.”)
6. Draw your sweat-maps below:

Forearm

Palm

Ø Connection to Learning Target  
What did you learn about the anatomy and physiology? How can you relate this to homeostasis?

**Activity 2: External Structure of Nails**

This procedure is to be performed individually by each student.

1. Examine your fingernails. Identify as many of the structures listed below as possible. Place a check mark next to each structure you can see. (You may need to consult your textbook)
2. Draw the structure of your fingernail shown as a superficial view. Label the parts you have checked off.

\_\_\_\_ a. free edge

\_\_\_\_ b. nail body

\_\_\_\_ c. nail root

\_\_\_\_ d. lunula

\_\_\_\_ g. nail fold

Nail Drawing

\_\_\_\_ i. nail bed

\_\_\_\_ j. nail matrix

3. What is the function of the nail root?

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**Activity 3: Microscopic Examination of the Hair**   
This procedure is to be performed individually by each student. (You may need to consult your textbook)  
  
1. Remove a hair from your scalp and one from your partner’s scalp. Prepare a wet mount.  
2. Examine the hair preparations under both low power and high power.  
3. Sketch the appearance of both hairs in the space provided.

your hair: your partner’s hair:

Low power or High power Low power or High power   
(Circle one.) (Circle one.)

4. Look for any unusual surface features, such as scales and patterns. You can do this more easily by using the diaphragm to adjust the amount of light.  
5. Answer the following questions.  
a. Describe any unusual surface features. If there are none, please state that.

b. For your hair, is the medulla visible or not visible ? (circle one)

c. For your partner’s hair, is the medulla visible or not visible ? (Circle your answer.)

d. The protein which makes up your hair is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

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**Activity 4: Changes in Skin Color due to Pressure Changes**

1. Obtain a small glass plate. Press the heel of your hand firmly against the plate for 4 seconds and then observe and record the color of your skin by looking through the glass.
   1. Observation:
2. What is the reason for this color change?
3. What would happen if the pressure was continuously applied for an extended period of time in the same area?

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**Activity 5: Determining Two-Point Threshold**  
Only one partner needs to complete this activity.

The density of touch receptors varies significantly in different areas of the body. In general, the more touch receptors yields more sensitivity which enables more fine motor control.

1. Using two toothpicks and a ruler you are going to test the two-point threshold.
2. Beginning with the face, start with the toothpick ends together and gently press. Remove the toothpicks and partially separate and press again. Continue moving the toothpicks further apart until your partner can feel both toothpick ends pushing down.
3. Measure the distance between the toothpicks when your partner can feel two separate toothpick ends and fill in the data table below:

|  |  |
| --- | --- |
| **Two-Point Threshold** | |
| **Body Area Tested:** | **Two-Point Threshold Distance (mm)** |
| Face |  |
| Back of Hand |  |
| Palm of Hand |  |
| Fingertips |  |
| Lips |  |
| Back of Neck |  |
| Ventral Forearm |  |

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**Activity 6: Testing Tactile Localization**  
Only one partner needs to complete this activity.

Tactile localization is the ability to determine which portion of the skin has been touched. Some areas of the body are better represented with a “touch” field than others.

1. Subject should close their eyes and experiment will use a black felt-tipped marker to touch the palm of the subject’s hand.
2. Subject should then try to touch the exact point with his own marker. Measure the distance between the two marks in millimeters and record below.
3. Repeat the test in the same spot twice more, recording the distance for each test and then average the results.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Testing Tactile Location** | | | | |
| Body Area Tested | Distance (mm) for each trial | | | Average Distance (mm) |
| Palm of Hand |  |  |  |  |
| Fingertip |  |  |  |  |
| Ventral Forearm |  |  |  |  |
| Back of Hand |  |  |  |  |
| Back of Neck |  |  |  |  |

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**Activity 7: Adaptation of Touch Receptors**  
Only one partner needs to complete this activity.

In many cases, when a stimulus is applied for a prolonged period of time the rate of receptor response slows and conscious awareness of the stimulus declines or is lost. This phenomenon is referred to as adaptation. The touch receptors adapt particularly rapidly, which is highly desirable.

1. Subject’s eyes should be closed. Place one coin on the anterior surface of the subject’s forearm. Start a timer and the subject should determine how long it takes before the sensation of the weight of the coin goes away.

Duration of sensation: \_\_\_\_\_\_\_\_\_ sec

1. Repeat the test, placing the coin at a different location of the forearm.

Duration of sensation: \_\_\_\_\_\_\_\_\_ sec

1. After awareness of the sensation has been lost at the second site, add three more coins atop the first one without removing it.
   1. Does the pressure sensation return?
   2. If so, why?

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