LEARNING OUTCOMES:

- To identify the layers of the epidermis, the dermis, the hypodermis, and accessory structures on prepared microscope slides of both thick and thin skin.
- Relate skin structures observed under the microscope with those depicted in anatomical models.
- Make microscopic comparisons of thick and thin skin.
- Follow the steps of the scientific method to determine relative sweat gland activities.
- Present and make valid conclusions from your data.

ACTIVITY 1: Plotting the Distribution of Sweat Glands in Thick vs. Thin Skin

In this experiment, you will test two parts of your body (your forearm and your palm) for sweat gland activity. To do this, you will paint a small amount of iodine in both locations. Once dry, you will tape a small paper square on your skin. As you sweat, the iodine will be transferred from your skin to the paper, turning the starch in the paper blue-black. The amount of blue-black on the two papers will be used to conclude the relative numbers of active sweat glands in the two areas.

In Lab:

1. Before beginning the experiment, get together with your lab group and formulate a hypothesis based on your previous experience with sweating by your forearm and your palm. Write this hypothesis on the top of the lab review sheet.

2. Once you have formed your hypothesis, show it to the instructor. Once it has been determined to be valid, you will be provided with the following supplies:
   - dropper bottle of iodine;
   - small squares of white paper;
   - roll of tape; and
   - cotton swabs

3. Using a cotton swab, each member of the lab group should paint a small amount of iodine on both the palm and on the forearm (see * on photo). I recommend that you use your non-writing arm for this so you can do other parts of the lab while waiting for the experiment to finish.

4. Once the iodine is dry, use the tape to secure a small piece of paper over each dried iodine spot. Tape the paper directly to your skin.

5. Leave the paper in contact with your skin for 20 min. During this time, you can do other parts of the lab.

6. When the 20 min has elapsed, peel the paper off your skin and determine whether or not a significant portion of the paper has turned blue-black or has remained white. Blue-black color is positive for sweating; white is negative for sweating.

7. Record your group’s data on the board. You will analyze the data from the whole class on the lab review sheet.
ACTIVITY 2: Thick Skin

In this activity, you will observe a prepared microscope slide of thick skin and relate its structure to an anatomical model of skin.

In Lab:

1. Obtain a slide of thick skin. This slide comes from the palm or sole. The tissue on this slide most likely comes from the inside of the mouth or esophagus.

2. On the thick skin slide, you need to:
   - find the following layers of the epidermis: stratum corneum, stratum lucidum (if visible on your slide), stratum granulosum, stratum spinosum, and stratum basale;
   - note the prominent thickness of the stratum corneum;
   - find the dermal papillae (papillary layer of dermis); and
   - find and identify the predominant tissue type that comprises the reticular layer of the dermis;
   - find examples of eccrine sweat glands; and
   - find and identify the predominant tissue type that comprises the hypodermis.

3. Obtain the skin model and find the structures listed above on the model. (Note: the third “segment” of the model shows thick skin.)
ACTIVITY 3: Thin Skin

In this activity, you will observe a prepared microscope slide of thin skin and relate its structure to an anatomical model of skin.

In Lab:

1. Obtain a slide of thin skin with hair. These slides generally come from either the scalp or axillary (armpit) area.

2. On the thin skin slide, you need to:
   - find the following layers of the epidermis: stratum corneum, stratum granulosum, stratum spinosum, and stratum basale;
   - relate the thickness of the stratum corneum in thin skin to what you observed in thick skin;
   - find the dermal papillae (papillary layer of dermis);
   - find and identify the predominant tissue type that comprises the reticular layer of the dermis;
   - find examples of hairs and hair follicles;
   - find examples of sebaceous glands; and
   - find and identify the predominant tissue type that comprises the hypodermis.

3. Obtain the skin model and find the structures listed above on the model. (Note: the first two “segments” of the model show thin skin.)