Many explorers use maps, figures, and photographs to help orient themselves to the terrain to be explored. The anatomist uses maps, figures, and photos to explore the body and its parts. The use of maps and other aids to find a geographical position is called orienteering and is a useful analogy to human anatomical study. At the beginning of this exercise, you will learn how anatomical "maps" and models are read. Later in this exercise, you will become familiar with the major body systems and some of their organs so that you will be comfortable with the "lay of the land" in the human body.

Before you begin
☐ Read Chapter 1 in your textbook.
☐ Set your learning goals. When you finish this exercise, you should be able to
  ☐ use anatomical terms correctly
  ☐ discuss the nature of an anatomical section
  ☐ describe the basic plan of the human body
  ☐ identify the major body cavities
  ☐ list the major systems of the body, their principal organs, and their primary functions
☐ Prepare your materials:
  ☐ dissectible human torso model (or comparable charts)
  ☐ models or figures showing different anatomical sections
  ☐ computer setup with DISSECTIBLE HUMAN or similar human dissection program (optional)
☐ Read the directions and safety tips for this exercise carefully before starting any procedure.

A. Planes and sections
All terms describing the anatomy of organisms assume that the body is in the classic anatomical position. For the human, that means standing, facing the viewer. The hands are held down along the side of the trunk, with the palms facing forward.

It is often useful to show a figure of a sectioned human body or organ. A section refers to a part cut in a plane. A plane is a geometrical concept referring to an imagined flat surface. The term cross section (c.s.), for example, refers to a part cut crosswise. A longitudinal section (l.s.) is a cut made lengthwise. These terms are useful only in limited circumstances because they do not really identify whether the cuts are made top to bottom, front to back, or side to side. There are three anatomical planes used to describe sections of the body:

1. Sagittal plane—A sagittal plane extends from front to back and top to bottom, dividing the body into left and right portions. A midsagittal plane refers to a sagittal plane that divides the body into exactly equal left and right portions.
2. Frontal plane—The frontal plane, also called a coronal plane, divides the body into front and back portions.
3. Horizontal plane—Also called a transverse plane, the horizontal plane divides the body into top and bottom portions.

Using the models or figures provided, find at least three examples of each of the sections described (Figure 1-1). For each, ask yourself what perspective the section gives that a section cut along a different plane does not give.

B. Anatomical directions
To locate structures within a body, you must use directional terms. Actually, you use these kinds of terms all the time: left, right, up, down, north, south, for example.

1. Review the directional terms given in Table 1-1. Notice that they are grouped in relative pairs. Each member of a pair is the opposite, or complement, of the other member of the pair. For example, right is the opposite direction of left.

To make the reading of anatomical figures a little easier, an anatomical compass is used throughout this lab manual, just as it is in the textbook. On many figures, you will notice a small compass rose similar to those on geographical maps. Rather than being labeled N, S, E, and W, the anatomical rose is labeled with abbreviated anatomical directions.

2. Review this list of directional terms and abbreviations:
   A = Anterior
   I = Inferior
   L (opposite R) = Left
   L (opposite M) = Lateral
   M = Medial
   P = Posterior
   R = Right
   S = Superior

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COLORING EXERCISE
Using colored pens or pencils, shade in the figure and accompanying labels in contrasting colors of your choice as indicated by the red numerals.

Anatomical Planes and Directions

PLANES
SAGITTAL 1
MIDSAGITTAL 2
FRONTAL 3
HORIZONTAL 4

DIRECTIONS
LATERAL 5
MEDIAL 6
ANTERIOR 7
POSTERIOR 8
SUPERIOR 9
INFERIOR 10
PROXIMAL 11
DISTAL 12
C. Body cavities and regions

The inside of the human body contains the viscera, or internal organs. The viscera are found in any of a number of cavities (spaces) within the body (Figure 1-3). The two principal body cavities are the dorsal body cavity and the ventral body cavity. Because these spaces are so large, they are subdivided into smaller units.

1. Using a dissectible torso model, find these divisions of the dorsal body (and organs within):
   - Cranial cavity—Within the skull
     Organ: brain
   - Spinal cavity—Within the vertebral column
     Organ: spinal cord

2. Using the torso model, find these divisions and organs of the ventral body cavity:
   - Thoracic cavity—Within the rib cage
   - Pleural cavities—Left one third and right one third of the thoracic cavity
     Organ: lung
   - Mediastinum—Middle one third of thorax
     Organs: heart, trachea, esophagus
Figure 1-2 Look at the examples of labeling anatomical directions (A and B, F and G), then label the rosettes in C, D and E, H, I and J yourself with the appropriate letters: S, I, A, P, L, and R.
Figure 1-3 Label the names of the body cavities in the lines provided and on the blanks in the Lab Report at the end of this exercise.

- **Abdominopelvic cavity**—From the diaphragm to the bottom of the trunk
- **Abdominal cavity**—From the diaphragm to the rim of the pelvic bones
  Organs: stomach, liver, most of the intestines, pancreas, spleen, kidneys
- **Pelvic cavity**—From the pelvic rim to the floor of the trunk
  Organs: portions of the intestines, ovaries, uterus, urinary bladder

Because the abdominopelvic cavity is so large and contains so many different organs, it is often convenient to subdivide it into nine abdominopelvic regions (Figure 1-4). The regions are bounded by a grid made by imagining two horizontal planes (one just below the ribs, the other just above the hip bones) and two sagittal planes (each just medial to a nipple). This arrangement forms a 3-D, tic-tac-toe grid in the abdominopelvic cavity. Identify the approximate locations of each of the nine regions on a model of the human torso.

- **Right hypochondriac region**—Top right region
  (hypochondriac means “below [rib] cartilage”)
- **Epigastric region**—Top middle region
  (epigastric means “near the stomach”)
- **Left hypochondriac region**—Top left region
- **Right lumbar region**—Middle right region
  (lumbar refers to lumbar vertebrae in lower back)
- **Umbilical region**—Central region
  (umbilical refers to the umbilicus, or navel)
- **Left lumbar region**—Lower right region
  (iliac refers to ilium, the bowl-like part of the hip bone)
- **Right iliac region**—Lower right region
  (iliac refers to ilium, the bowl-like part of the hip bone)
- **Hypogastric region**—Lower middle region
  (hypogastric means “below the stomach”)
- **Left iliac region**—Lower left region

### D. Surface regions

There are hundreds of terms that describe specific locations on the surface of the human body. These names are useful for identifying not only surface features but also underlying muscles, bones, nerves, and blood vessels. In this activity, locate regions named by a few of the more common terms.

- **1** Locate the following surface regions on the anterior aspect of a human model or Figure 1-5:
  - **Abdominal**—Area overlying the abdominal cavity
  - **Antebrachial**—Forearm
Lab Exercise 1 • Organization of the Body

Figure 1-4 Label the nine regions of the abdominopelvic cavity on the blanks in the Lab Report at the end of this exercise.

- Axillary—Armpit
- Brachial—Upper arm
- Buccal—Cheek (side of mouth)
- Carpal—Wrist
- Cervical—Neck
- Coxal—Hip
- Crural—Anterior lower leg (shin)
- Cubital—Anterior of elbow
- Femoral—Upper leg (thigh)
- Mental—Chin
- Orbital—Eye
- Patellar—Anterior knee joint
- Pubic—Lower front of trunk, between legs
- Tarsal—Ankle
- Thoracic—Chest
- Sural—Calf
- Thoracic—Upper back

E. Body systems

As you know, the human organism is composed of organ groups called systems. The organs of a system work together in an organized manner to accomplish the function(s) of the system.

As an introduction to human body systems, study Table 1-2. Each of the systems will be discussed in more detail later in this course.

2 Identify these regions on the posterior aspect of your subject:
- Cervical—Neck
- Gluteal—Buttocks
- Lumbar—Lower back
- Occipital—Posterior of head
- Popliteal—Posterior knee joint
- Scapular—Shoulder blade

Hint

Now would be a good time to familiarize yourself with the DISSECTIBLE HUMAN or similar computerized human dissection program. Explore the human body and try to find some of the structures listed in this activity. Try looking at the body at different angles, or anatomical planes, and see if you can orient yourself regarding anatomical directions such as anterior, posterior, superior, or inferior.
Organization of the Body

Multiple Choice (only one response is correct in each item)

1. An anatomist cuts a cadaver (preserved body) with a large saw in a way that divides the cadaver into equal left and right halves. The cut is along a ? plane.
   a. sagittal
   b. midsagittal
   c. frontal
   d. horizontal
   e. a and b are correct

2. In many study skulls, the top of the skull can be removed so that inner features can be seen. Along which plane should one cut to open the top of a human study skull?
   a. sagittal
   b. coronal
   c. horizontal
   d. frontal
   e. b and d are correct

3. A surgeon makes an incision medially from the left axillary region, turning inferiorly at the midline and proceeding to the pubic region. The path of the cut can be mapped on the patient’s chest as:
   a. _
   b. +
   c. _
   d. _
   e. __
   f. /

4. Which of these regions contains the spleen?
   a. epigastric
   b. hypogastric
   c. left hypochondriac
   d. right hypochondriac
   e. right lumbar

5. Soccer players often wear shin protectors, which shield the ? region of each leg.
   a. femoral
   b. tibial
   c. popliteal
   d. crural
   e. gluteal

6. Control and regulation of other systems are primary functions of the
   a. nervous system
   b. cardiovascular system
   c. endocrine system
   d. urinary system
   e. a and c are correct

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Fill-in (give the correct anatomical term for each item below)

1. The head is ___?___ to the feet.
2. The liver is part of the ___?___ system.
3. A leg amputation is likely to involve a ___?___ cut, or section, through bones.
4. My lower back, or ___?___, is sore.
5. The first finger is ___?___ to the hand, no matter which position it is in.
6. The popliteal vein is found in the ___?___
7. The heart is ___?___ to the right lung.
8. The shoulder is ___?___ to the elbow, no matter how one's arm is held.
9. The skin is ___?___ relative to the skeleton.
10. Adipose tissue is often just ___?___ to the skin.
11. An occipital scar is on the back of the ___?___.
12. The thoracic wall is lined with the ___?___ layer of the double-layered pleural membrane.

Sketch (make a rough sketch of a human figure in the position indicated by the compass rosette and label)
COLORING EXERCISE
Using colored pens or pencils, shade in the figure and accompanying labels in contrasting colors of your choice as indicated by the red numerals.

Anatomical Planes and Directions

Planes
SAGITTAL 1
MIDSAGITTAL 2
FRONTAL 3
HORIZONTAL 4

Directions
LATERAL 5
MEDIAL 6
ANTERIOR 7
POSTERIOR 8
SUPERIOR 9
INFERIOR 10
PROXIMAL 11
DISTAL 12

Figure 1-1
Figure 1-2 Look at the examples of labeling anatomical directions (A and B, F and G), then label the rosettes in C, D, E, H, I and J with the appropriate letters: S, I, A, P, L, and R.
Figure 1-5 Label these figures using the regional terms listed in activity D, pages 5-6, and on the blanks in the Lab Report at the end of this exercise.
Figure 1-3 Label the names of the body cavities in the lines provided and on the blanks in the Lab Report at the end of this exercise.

- **Pleural cavities**—Left one third and right one third of the thoracic cavity

locations of each of the nine regions on a model of the human torso:
- Right bronchovascular region—Top right region