**Exercise 1: Introduction to the Human Body**

A painting of a group of people around a body during an autopsy in 1914.


Figure **1**.1 This painting, entitled "The Master" by Carlos Bonvalot (1914) depicts Professor Henrique de Vilhena conducting an anatomy lesson for his pupils at the University of Lisbon.

Exercise 1 Learning Goals

After completing this lab, you should be able to:

* Define the terms anatomy and physiology
* Describe anatomical position and use directional terminology relative to other body parts or structures
* Identify and explain the planes of the body and the importance of planes in the study of cross-sectional anatomy
* Describe and identify the compartments/cavities of the body
* Describe and identify the serous membranes for the ventral body cavities
* Describe and identify the 9 regions and 4 quadrants of the abdomen

**Pre-Lab for Exercise 1**

Instructions: Using your textbook, complete the following pre-lab activities.

|  |
| --- |
| Define **Anatomy**: |
| Define **Physiology**: |
| Briefly list 3 things you already know about Anatomy and Physiology: |

**Exercise 1: Introduction to the Human Body**

Activity 1.1: Introduction to anatomical position and directional terms.

A diagram of a woman's body shown in proper anatomical position. First view shows the woman's right side while standing in anatomical position. The second view shows the woman's frontal view in standard anatomical position.

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When a person is in an anatomical position lying on their back, this is called supine.

The prone position occurs when a person is lying face down in an anatomical position.

Note: All directional terms are used in reference to the body as it is in an anatomical position.

**Figure 1.**2 Directional Terms are labeled on this body, which is standing in anatomical position.

Go through the pairs of directional terms and use your own body to place them into the correct context. Remember that directional terms are used to describe locations relative to another structure or body part. For example, you would use these terms to describe where the heart is relative to the midline of the body, or where the heart is relative to other organs or regions.

***Anterior/Ventral:*** towards the front

***Posterior/Dorsal:*** towards the back

**A. Note which side of your body is anterior and which side is posterior.**

***Inferior:*** towards the bottom, near the feet

***Superior:*** towards the top, near the head

**B. On your body, note which direction is inferior and which is superior relative to another body part.**

***Medial:*** towards the midline

***Lateral:*** towards the periphery, or away from the midline

**C. Note which direction is medial and which is lateral.**

*Proximal:* nearer to the origin of a structure or an attachment to the trunk (arm/ leg)

*Distal:* farther from the origin of a structure or an attachment to the trunk (arm/leg)

**D. On your arm, note which direction is proximal and which is distal.**

***Superficial:*** on the surface of the body, the skin, or an organ

***Deep:*** within the body, the skin, or an organ

**E. Note which structures of your body are superficial and which structures are deep.**

**F**. **With a partner, use the labels and an anatomical model of the body or a skeleton to identify each of the directional terms defined above.**

**Activity 1.2: Fill in the blank with the appropriate directional term:**

When standing in an anatomical position?

1. Your hand (**manus**) is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ relative to your elbow (**cubital**).
2. Your head (**cranium**) is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ relative to your feet.
3. Your shoulder blade (**scapula**) is \_\_\_\_\_\_\_\_\_\_\_\_\_\_ relative to your backbone (**vertebral column**).
4. Your breastbone (**sternum**) is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_relative to your heart.

**Activity 1.3: Answer the following questions**

On a skeleton or body model locate and assess the following structures:

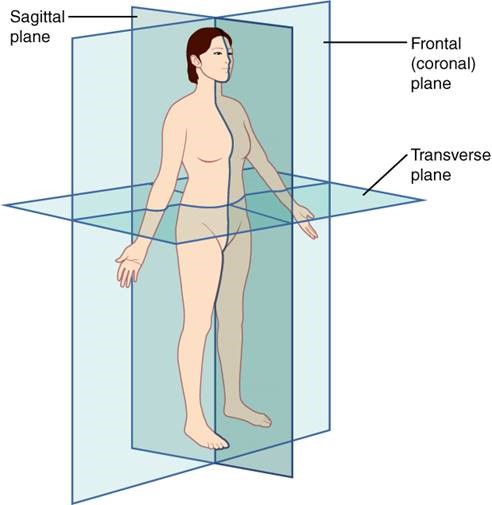
1. Locate the **heart**. Which organs or structures are lateral to the heart?
2. Locate the **ribs**. Which organs or structures are medial to the ribs?
3. Locate the **liver**. Which organs or structures are inferior to the liver? Which structures are superior to the liver?
4. Locate the **wrist**. Which structures are distal to the wrist? Which structures are proximal?

**Activity 1.4: Critical Thinking**

1. Why is it important that health professionals have a shared knowledge of anatomical position?
2. Think of an example in which it could be detrimental to the patient’s health if the practitioner involved does not understand anatomical position and directional terms?

**Activity 1.5: Anatomical Planes**

While standing in an anatomical position, consider how the anatomical planes (shown in the image below) would bisect (cut) the body. For each description provided, give the corresponding anatomical plane.



**Figure 1.3** Anatomical planes exhibited in standard anatomical position.

**Fill in the Blank**:

1) The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plane divides the body into left and right halves.

2) The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plane divides the body into anterior and posterior sections.

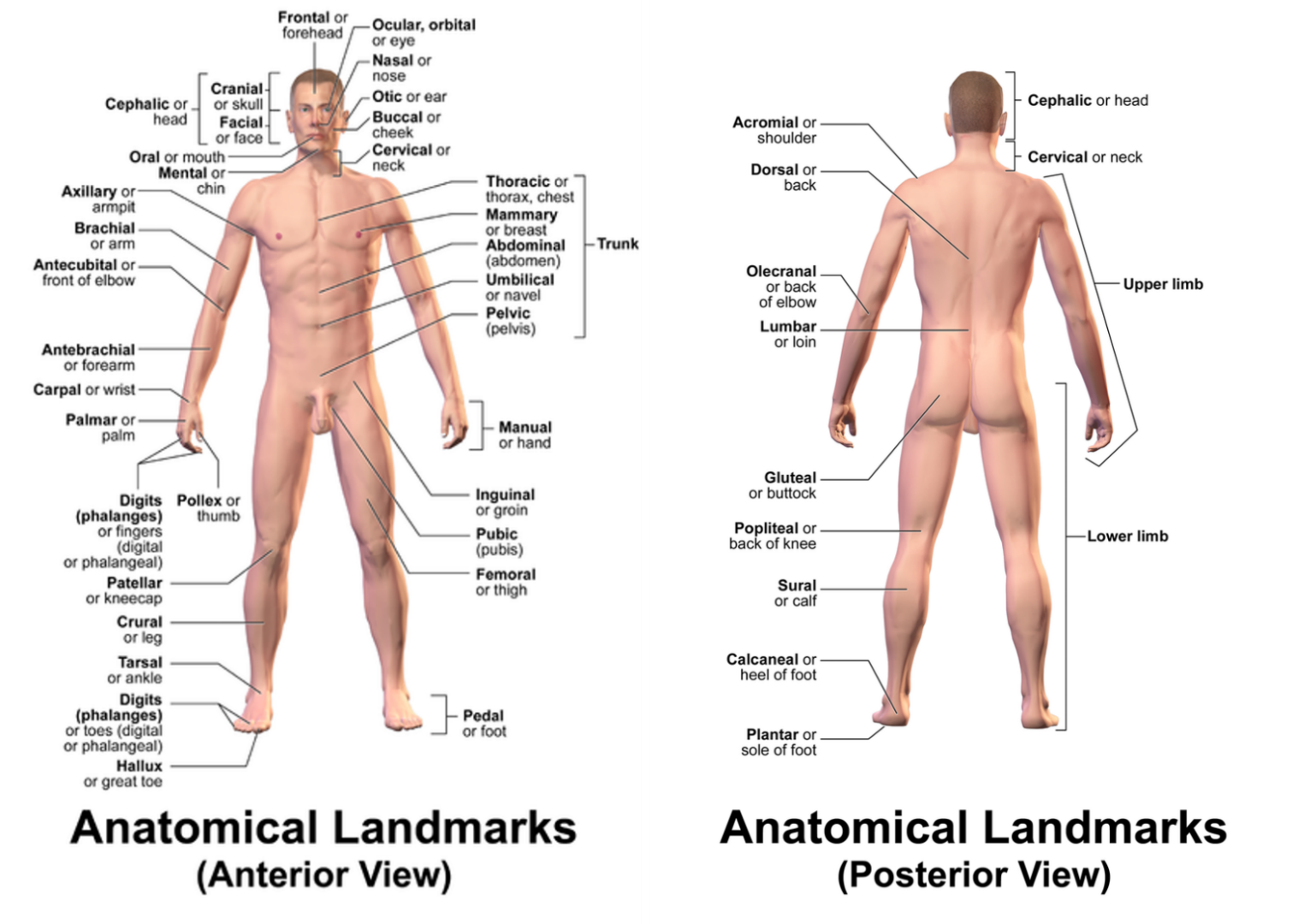
3) The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ plane divides the body into **inferior** and **superior** sections.

**Activity 1.6: Surface Anatomy and** Regional Terms

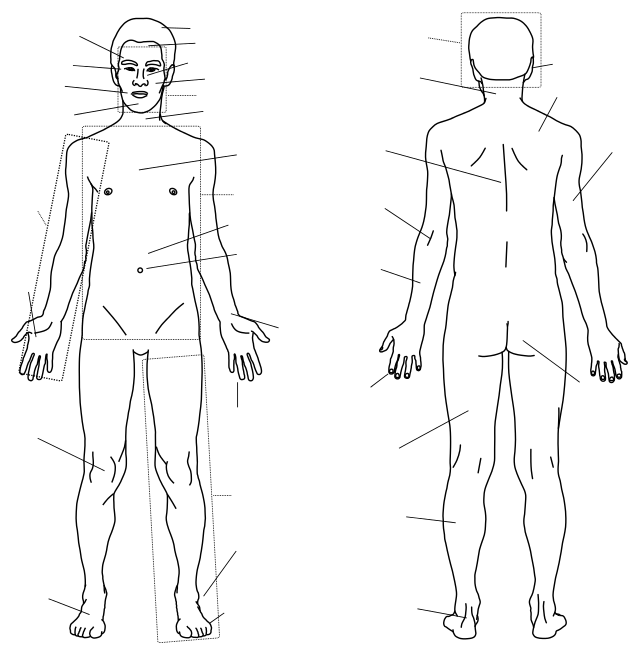
The human body is divided into regions: head, neck, trunk, upper limb, and lower limb. The trunk is further broken into the thorax, the back, the abdomen, and the pelvis.

|  |
| --- |
|  |

1. To familiarize yourself with these regions before moving on, draw/label a simple human body (anteriorly facing) and divide into the major regions: head, neck, trunk, right upper limb, left upper limb, right lower limb, and left lower limb.
2. Next, shade in the thorax, abdomen, and pelvis of the trunk using three different colored pens.

**Label the Skeleton/Model with the Correct Anatomical Landmark**

**Figure 1.4** Anterior and posterior views of the body in anatomical position.

**Figure 1.5** Additional practice image has been provided with unlabeled anatomical regions for the body's anterior and posterior view.

On your model or skeleton, examine region by region to identify the terminology related to each anatomical feature. Using the materials provided, label the skeleton or model that the anatomical term denotes. For example, label the knee with the term “patellar.”

**Terms to label and know for exams:**

*Head and Neck:*

* Facial: face
* Frontal: forehead
* Cranial: skull
* Auris/Otic: ear
* Nasal: nose
* Oral: mouth
* Orbital: eye
* Buccal: cheek
* Oris/Oral: mouth
* Mental: chin
* Cervical: neck
* Cephalic: head
* Occipital: base of the skull

*Trunk:*

* Sternal: breastbone
* Costal: rib
* Clavicular: clavicle
* Mammary: breast
* Dorsum/Dorsal: back
* Sacral: tailbone/between hips
* Lumbar: lower back or loin
* Umbilical: naval or belly button
* Inguinal: groin
* Pubic: pubic region
* Coxal: hip
* Pelvic: pelvis

*Upper Limb:*

* Antebrachial: forearm
* Antecubital: front of elbow
* Axillary: armpit
* Brachial: arm
* Carpal: wrist
* Manual: Hand
* Pollex: thumb
* Digital/Phalangeal: fingers

*Lower Limb:*

* Crural: shin (anterior)
* Gluteus: buttocks
* Femoral: femur/upper leg or thigh
* Popliteal: back of knee
* Sural: calf (posterior)
* Pedal: foot
* Calcaneal: heel
* Tarsal: ankle
* Hallux: great toe
* Digital/Phalangeal: toes

**Activity 1.7: Organ Systems**

Complete the table using your textbook, or lab resources provided to investigate the organ systems of the body. Which organs are included? What are their primary functions? **Locate the various organs of each system on a model.**

Table 1.1: Organ systems of the human body.

|  |  |  |
| --- | --- | --- |
| Organ System | Organs | Primary Function(s) |
| Integumentary |  |  |
| Skeletal |  |  |
| Muscular |  |  |
| Nervous |  |  |
| Endocrine |  |  |
| Cardiovascular |  |  |
| Lymphatic |  |  |
| Respiratory |  |  |
| Digestive |  |  |
| Urinary |  |  |
| Reproductive |  |  |

**Activity 1.8: Body Cavities and Abdominopelvic Regions**

**A. Body Cavities** are regions contained within the body, which can be separated by bone connective tissue or muscle. Identify the regions and where they are located relative to one another. Cavities contain organs, fluid filled spaces, membranes, and other structures, such as arteries and nerves.

A diagram of the human body with the major body cavities viewed in a right lateral side view and anterior frontal view.

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**Figure 1.6** Major body cavities.

**Answer the following questions below**:

1. Which **muscular structure** serves as a boundary between the thoracic and abdominopelvic cavities?

1. Which **bones** serve as the lateral boundary for the thoracic cavity?

1. Which **bones** serve as the superior boundary for the cranial cavity?

1. Which **bones** serve as all boundaries for the vertebral cavity?

1. Which structures are the **anterior boundary** of the abdominal cavity?

**Matching**

Match the listed structures with the cavities they are found in. The correct answer will be the most descriptive, or the smallest region that the structure is contained within. The regions may be used once, more than once, or not at all.

1. The Heart and lungs \_\_\_\_\_
2. Brain \_\_\_\_\_\_
3. Spinal cord \_\_\_\_\_\_
4. Bladder \_\_\_
5. Cranial meninges \_\_\_\_\_\_
6. Spinal meninges \_\_\_\_\_\_
7. Pituitary gland \_\_\_\_\_\_
8. Lungs \_\_\_\_\_\_
9. Liver \_\_\_\_\_\_
10. Stomach \_\_\_\_\_
11. Heart \_\_\_\_\_\_
12. Kidneys \_\_\_\_\_\_
13. Esophagus \_\_\_\_\_\_
14. Trachea \_\_\_
15. Brain and spinal cord \_\_\_\_
16. Entire colon \_\_\_\_\_
17. Transverse colon \_\_\_\_\_
18. Rectum \_\_\_
19. Spleen \_\_\_
20. Small intestine \_\_\_\_

1. **Thoracic**
2. **Cranial**
3. **Vertebral**
4. **Dorsal**
5. **Pleural**
6. **Mediastinum**
7. **Pericardial**
8. **Abdominal**
9. **Pelvic**
10. **Ventral**

**B. Quadrants** are divisions made by imaginary lines drawn through the abdominopelvic region. There are two systems: a system that divides the abdominopelvic region into 4 **quadrants** and a system that divides the abdominopelvic cavity into 9 **regions**. Physicians often use the quadrants, while anatomists prefer the regions because they are more descriptive. These divisional systems can be helpful when describing the location of structures in the abdominopelvic regions because it is a large region that contains many irregularly shaped structures, such as the colon, or large intestine. In the figure below label the two horizontal (subcostal/ transtubercular) and two vertical (midclavicular) lines for the nine abdominopelvic regions or the median line and transumbilical lines that form the four quadrants.

A diagram of the internal organs of the abdomen. The nine abdominopelvic regions are labeled on the left image, and the 4 abdominopelvic quadrants are labeled on the right image.

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**Figure 1.7** Regions and quadrants of the abdominopelvic cavity.

**Engage**

With masking tape, recreate the lines above on an image or body model. Discuss with a lab partner how the lines bisect various organs and which organs fall within each quadrant/ region.

|  |  |
| --- | --- |
| Quadrant | Organs |
| Right Upper Quadrant (RUQ) |  |
| Left Upper Quadrant (LUQ) |  |
| Right Lower Quadrant |  |
| Left Lower Quadrant |  |

**Activity 1.9: Serous Membranes**

Within the pleural, mediastinal, and abdominopelvic cavities are a series of double layered membranes, which protect, lubricate, and reduce the friction created by the movement of organs within the body. These double-layered membranes are called **serous membranes**. The serous membrane that covers the lungs is called the **pleura**, or plural membrane. The serous membrane that protects the heart is called the **pericardium** or pericardial membrane. The serous membrane that lines the abdomen and many of the organs within the abdomen is called the **peritoneum**.

A diagram of the human heart with the serous membrane depicted first in the proper anatomical location superficial to the heart. A second image on the right illustrates the serous membrane being analogous to a water balloon surrounding the superficial aspect of a person's fist.

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**Figure 1.8** Serous membranes: pericardium

While the two layers of the membrane are continuous with one another, each layer has a name. One layer adheres (sticks) to the surface of the organ called the **visceral layer**. This layer gives the organ a shiny look on its surface and must be pulled off to be removed. The other layer will line the wall of the body, along with any organs that are attached to the body wall (like the kidneys). This layer is called the **parietal** layer. The parietal layer adheres to the wall and can be pulled off as well.

Please note that not all organs of the abdominopelvic cavity are completely covered by the peritoneum, organs in the abdomen, which fall outside of the serous membrane, or behind the parietal layer, such as the kidneys, are described as **retroperitoneal (retro: behind)**. Organs like the small intestine, the transverse colon, and the stomach, which are covered by visceral membrane are called **intraperitoneal (intra: within)**.

**Complete the table below.**

For each organ or structure, describe the associated **visceral** or **parietal** membrane, and if in the abdomen, state whether the organ is **retroperitoneal** or **intraperitoneal**.

|  |  |  |
| --- | --- | --- |
| Organ | Serous membrane | Retro/Intra? |
| Heart | Visceral pericardium |  |
| Left lung |  |  |
| Right lung |  |  |
| Stomach |  | Intraperitoneal |
| Kidneys |  |  |
| Thoracic wall | Parietal pleura |  |
| Abdominal wall |  |  |

**Post-Lab Exercise 1: Review Questions**

The following is a list of structures that you may not have heard of before. However, with your new terminology, the name of each structure should tell you the region with which it is associated. For each structure, provide the associated landmark in plain language (example: if “patellar,” describe it as the “knee”):

1. The **mentalis** muscle: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. The **gluteus** minimus muscle: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. The **brachial** artery: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. The **axillary** nerve: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. The **tibialis** anterior: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. The **inguinal** canal: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. The **orbicularis** oculi muscle: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. The **frontalis** muscle: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
9. The **cervical** vertebrae: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
10. The **femoral** artery: \_\_\_­­­­­\_\_\_\_\_\_\_\_\_\_\_\_

**On the image below, label the directional terms located at each arrow.**

Two drawings of a person in standard anatomical position from the right lateral side view and from the frontal anterior side view. Arrows indicate the areas of the body needing to be labeled.

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* Use the image above with the **anterior view** to circle and label the epigastric region.
* Use the image above with the **lateral view** to circle and label the cranial cavity.

**Use the correct directional term to complete the sentences below.**

1. The **radius** is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the **ulna**.
2. The **carpal region** is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the **phalanges**.
3. The **axillary region** is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the **mammary region**.
4. The **abdominopelvic cavity** is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the **thoracic cavity**.
5. The **vertebral** cavity is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the **cranial cavity**.