

Lesson Plan

Organization of the Human Body

Goals of the Lesson

Cognitive: The student will understand the terms and concepts related to healthy human anatomy and physiology, including the body systems and what is necessary for the body to achieve and maintain a healthy state. In addition, the student will be able to list and define terms used to describe position within the body.

Psychomotor: N/A

Affective: N/A

Learning Objectives (LO)

LO-1 Define the terms anatomy, physiology, and pathology.

LO -2 Describe the organization of the body from chemicals to the whole organism.

LO -3 List 11 body systems, and give the general function of each.

LO- 4 Define and give examples of homeostasis.

LO -5 Using examples, discuss the components of a negative feedback loop.

LO -6 Explain the importance of barriers in the body, and give several examples of barriers.

LO -7 Define a gradient, and explain the effect of resistance on flow down a gradient.

LO -8 List and define the main directional terms for the body.

LO -9 List and define the three planes of division of the body.

LO-10 Name the subdivisions of the dorsal and ventral cavities.

LO-11 Name and locate the subdivisions of the abdomen.

LO-12 Cite some anterior and posterior body regions along with their common names.

Assessments

Module Quiz

Section 1 Exam

Final Exam

Estimated Time on Task

Learning Content	Pre-Test	Practice Activities	Quiz	TOTAL
89 min	10 min	30 min	10 min	2.3 hr

Learning Objective 1

Define the terms anatomy, physiology, and pathology.

Outline	Instructor's Notes
<ul style="list-style-type: none">• Anatomy<ul style="list-style-type: none">• Study of body structure• Physiology<ul style="list-style-type: none">• Study of how the body functions• Pathology<ul style="list-style-type: none">• Disease; anything that upsets normal structure or function of the body	For the activity: Consider, for instance, the eye: the study of the structure of the lens would be its anatomy, how the lens changes shape to permit near and far vision is physiology, and presbyopia (farsightedness, due to an inflexible lens) is an example of pathology.

Resources and Activities

Resources

PPT Slide(s), Pre-Test, Practice Activities, Module Quiz, Section 1 Exam, Final Exam

Activities

Ask students to brainstorm about the relation between these three aspects of human biology in respect to different body parts.

Web Resources

[Introduction to Anatomy & Physiology: Crash Course](#)

Learning Objective 2

Describe the organization of the body from chemicals to the whole organism.

Outline	Instructor's Notes
<ul style="list-style-type: none">• Organization of the body from simple to complex<ul style="list-style-type: none">• Chemicals• Cells• Tissues• Organs• Body systems• Whole organism	Change at the chemical level of organization affects the cell's structure and function. Changes in the cell's structure and function affect the tissue and organ levels of organization. Any change in one tissue or organ of the body has effects on the functions of others.
Resources and Activities	
<p data-bbox="159 678 295 709">Resources</p> <p data-bbox="151 716 894 779">PPT Slide(s), Pre-Test, Practice Activities, Module Quiz, Section 1 Exam, Final Exam</p> <p data-bbox="159 814 285 846">Activities</p> <p data-bbox="151 852 992 1031">The human body is organized from very simple levels to more complex levels. With this in mind, divide the class into small groups and have them describe why a disease at the chemical level can have an effect on organ system function. Have them give an example of a disease that progresses from cell to whole organism.</p> <p data-bbox="159 1066 358 1098">Web Resources</p> <p data-bbox="151 1104 792 1136">Introduction to Anatomy & Physiology: Crash Course</p>	

Learning Objective 3

List 11 body systems, and give the general function of each.

Outline

- Body systems can be grouped according to general functions
- Protection, support, and movement
 - Integumentary system
 - Skeletal system
 - Muscular system
- Coordination and control
 - Nervous system
 - Endocrine system
- Circulation and immunity
 - Cardiovascular system
 - Lymphatic system
- Energy supply and fluid balance
 - Respiratory system
 - Digestive system
 - Urinary system
- Production of offspring
 - Reproductive system

Instructor's Notes

Resources and Activities

Resources

PPT Slide(s), Pre-Test, Practice Activities, Module Quiz, Section 1 Exam, Final Exam

Activities

Ask the students to brainstorm about the various body systems and their functions before covering this topic. Students may wish to begin by making a list of all the functions the body must accomplish and subsequently matching organs and systems to the different functions.

Web Resources

[11 Human Body Systems](#)

Learning Objective 4

Define and give examples of homeostasis.

Outline

- Homeostasis steady state within an organism, internal balance
- Regulated variables: any condition in the body that is subject to change
 - Body temperature
 - Volume and composition of body fluids
 - Blood gas concentrations
 - Blood pressure

Instructor's Notes

Resources and Activities

Resources

PPT Slide(s), Pre-Test, Practice Activities, Module Quiz, Section 1 Exam, Final Exam

Activities

Ask students to list body parameters that are regulated yet can vary to a large degree over the course of the day without causing disease. Some important body functions, such as heart rate and breathing rate, can vary significantly without compromising homeostasis. For instance, a stressful thought can cause heart rate to increase significantly, or you can voluntarily increase your breathing rate. Either of these parameters can double. These changes only disrupt homeostasis if they alter a regulated variable outside of the normal range: blood pressure or blood gas concentrations, respectively

Web Resources

[Homeostasis – What is homeostasis?](#)

[Homeostasis and Negative/Positive Feedback](#)

Learning Objective 5

Using examples, discuss the components of a negative feedback loop.

Outline	Instructor's Notes
<ul style="list-style-type: none"> • Negative feedback loop <ul style="list-style-type: none"> • Reverses any upward or downward shift in body conditions to return to normal range • Example: glucose/pancreas/insulin production • A negative feedback loop must contain three components <ul style="list-style-type: none"> • Sensor • Control center • Effector 	<p>Cruise control scenario - In a car operating under cruise control, the speed it is set to maintain is the set point. The speedometer is the sensor, and the effector is the mechanism that accelerates or decelerates the car. If the setting is changed to a new speed, the set point is altered.</p> <p>Fever scenario - The set point rises above body temperature when an individual has a fever. The brain induces involuntary muscle contractions (shivering) to raise body temperature until the new set point is achieved (say, 39°C) and then shivering ceases. Until the fever breaks, negative feedback will keep body temperature at this new, elevated level.</p>

Resources and Activities

Resources

PPT Slide(s), Pre-Test, Practice Activities, Module Quiz, Section 1 Exam, Final Exam

Activities

Give the students a practice scenario to help them identify the components of a feedback loop.

Use a car operating under cruise control as an example of a negative feedback loop. Have students identify the set point and the components of the system (sensor, effector).

Another scenario to explore is the negative feedback loop when you have a fever.

Web Resources

[Physiological concept of positive and negative feedback](#)
[Homeostasis and Negative/Positive Feedback](#)

Learning Objective 6

Explain the importance of barriers in the body, and give several examples of barriers.

Outline	Instructor's Notes
<ul style="list-style-type: none"> • Body's ability to maintain homeostasis relies on barriers • Barriers separate constant internal environment from dynamic outside environment <ul style="list-style-type: none"> • Skin • Mucous membranes • At microscopic level, plasma membrane separates internal and external cell environments <ul style="list-style-type: none"> • Intracellular fluid – fluid contained within the cells • Extracellular fluid – all body fluids outside of cells: lymph, blood plasma • Volume and composition of fluids must remain in narrow limits to maintain homeostasis 	<p>The marble stays within the digestive tract, which is considered “outside” the body. A marble cannot be broken down in the digestive system. Anything too large to pass through the membranous barriers between the digestive and circulatory systems cannot be absorbed into body cells. Consequently, the marble will be eliminated from the body without affecting body cells.</p>

Resources and Activities

Resources

PPT Slide(s), Pre-Test, Practice Activities, Module Quiz, Section 1 Exam, Final Exam

Activities

Facilitate a class discussion around the following question: If a child swallows a marble, does the marble actually get inside his body? Explain.

Further discuss the concept of “outside” versus “inside” the body.

Web Resources

[Body membranes – Types of membranes in the body](#)

Learning Objective 7

Define a gradient, and explain the effect of resistance on flow down a gradient.

Outline

- Flow
 - The movement of a substance from one area to another
 - Blood flow
 - Diffusion
 - Air flow
- Gradient: difference in specific physical or chemical values between two areas
 - Water from snow melting down a steep roof
- Resistance
 - All factors that inhibit flow down a gradient
 - Friction
 - Barriers

Instructor's Notes

Resources and Activities

Resources

PPT Slide(s), Pre-Test, Practice Activities, Module Quiz, Section 1 Exam, Final Exam

Activities

Using an example from the module case study, divide the class into small groups to discuss the following questions.

In Mike's case, blood is flowing out of the blood vessels in his abdomen into his abdominal cavity.

1. What sort of gradient is driving the flow?
2. What do you think changed in Mike's case that enabled this flow to occur: the gradient or the resistance?

Web Resources

[Concentration gradients](#)

1. Blood pressure is driving Mike's blood out of the blood vessels and into his abdominal cavity.

2. Damage to Mike's blood vessels enabled blood flow to occur. Thus, the factor involved was resistance, which was lowered because of damage to the blood vessel walls.

Learning Objective 8

List and define the main directional terms for the body.

Outline

- Main directional terms for the body
 - Superior – above, in a higher position
 - Inferior – lower, below
 - Anterior (ventral) – located toward the belly surface
 - Posterior (dorsal) – located toward the back surface
 - Medial – nearer an imaginary plane through vertical midline of the body
 - Lateral – toward a side, away from midline
 - Proximal – nearer the origin of a structure
 - Distal – farther from origin of a structure

Instructor's Notes

Resources and Activities

Resources

PPT Slide(s), Pre-Test, Practice Activities, Module Quiz, Section 1 Exam, Final Exam

Activities

Ask for a student volunteer. Point out any two parts of the student's body (in the anatomical position) and ask the class to describe the anatomical relationships.

Divide the class into two groups. Distribute cards with parts of the body written on them (knee, ankle, elbow). One student from each group reads their card. Ask the class to describe the anatomical relationship both ways. For example – if the two cards are knee and hip, the hip is superior to the knee, the knee is inferior to the hip.

Materials

Cards labeled with various parts of the body

Web Resources

[The Easiest Way to Learn Directional Terms](#)

Learning Objective 9

List and define the three planes of division of the body.

Outline

- Planes of division
 - Frontal (or coronal) plane
 - Sagittal plane
 - Transverse (or horizontal) plane
- Tissue sections
 - Cross section
 - Longitudinal section
 - Oblique section

Instructor's Notes

Resources and Activities

Resources

PPT Slide(s), Pre-Test, Practice Activities, Module Quiz, Section 1 Exam, Final Exam

Activities

Review the web resources and discuss the different scenarios that would be best suited for referencing the various planes of division and tissue sections.

Web Resources

[The Easiest Way to Learn Directional Terms](#)

[Body Planes and Sections: Frontal, Sagittal, Oblique, Transverse](#)

Learning Objective 10

Name the subdivisions of the dorsal and ventral cavities.

Outline

- Dorsal cavity – two subdivisions
 - Cranial cavity
 - Spinal cavity
- Ventral cavity – two subdivisions separated by diaphragm
 - Thoracic cavity
 - Pericardial cavity
 - Pleural cavity
 - Mediastinum: space between the lungs
 - Abdominopelvic cavity
 - Abdominal cavity
 - Pelvic cavity

Instructor's Notes

Resources and Activities

Resources

PPT Slide(s), Pre-Test, Practice Activities, Module Quiz, Section 1 Exam, Final Exam

Activities

Use an anatomical model to show the location of the different cavities and organs within each cavity. Divide the class into three small groups. Create flash cards with major organs of the body written on them. Distribute the cards to the three groups. Each group will take a turn naming the cavity of the body where the organ on the card can be found.

Materials

Introductory male/female torso model

Flash cards with major organs of the body written on them

Web Resources

[Body Cavities – Drawn and Defined](#)

Learning Objective 11

Name and locate the subdivisions of the abdomen.

Outline

- Nine regions of the abdomen
- Three central regions
 - Epigastric
 - Umbilical
 - Hypogastric
- Three regions on the right and left (total of six)
 - Hypochondriac
 - Lumbar
 - Iliac (or inguinal)
- Divisions into four quadrants – simpler but less precise
 - Right upper quadrant
 - Left upper quadrant
 - Right lower quadrant
 - Left lower quadrant

Instructor's Notes

Resources and Activities

Resources

PPT Slide(s), Pre-Test, Practice Activities, Module Quiz, Section 1 Exam, Final Exam

Activities

Use an anatomical model to show the locations of the different abdominal regions on the skin. Ask students to state which organs exist in the different regions.

Materials

Introductory male/female torso model

Web Resources

[Abdominopelvic Quadrants and Regions – Abdominal Quadrants](#)

Learning Objective 12

Cite some anterior and posterior body regions along with their common names.

Outline

- Some terms describing the anterior head and neck
 - Cephalic
 - Cranial
- Some terms describing the anterior upper extremities
 - Brachial
 - Thoracic
- Some terms describing the anterior lower extremities
 - Femoral
 - Crural
- Some terms describing the posterior head and neck
 - Parietal
 - Cervical
- Some terms describing the posterior upper extremities
 - Acromial
 - Scapular
- Some terms describing the posterior lower extremities
 - Popliteal
 - Sural

Instructor's Notes

Resources and Activities

Resources

PPT Slide(s), Pre-Test, Practice Activities, Module Quiz, Section 1 Exam, Final Exam

Activities

Organize the students into groups of four. Divide the list of terms from the anterior and posterior body regions between the group members and ask each student to write a term on a separate sticky note. Have students identify terms and stick on the model in the appropriate body location.

Materials

Introductory male/female torso model
Sticky notes

Web Resources

[The Easiest Way to Learn Anatomical Regions](#)
