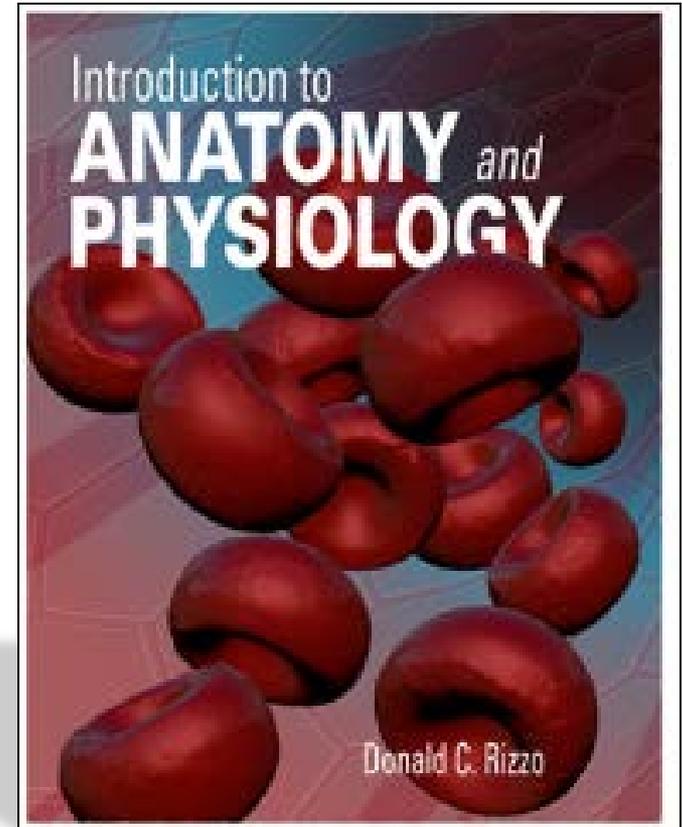
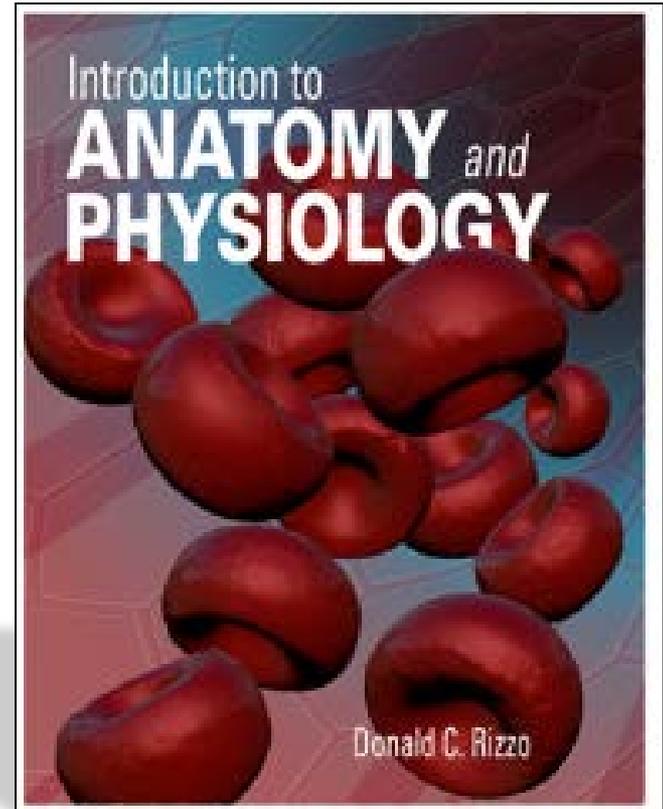


Introduction to Anatomy and Physiology

Author: Donald C. Rizzo
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- ✓ Exposes learners to the fundamentals of the human body and how it functions
- ✓ Requires no prior biology or chemistry knowledge
- ✓ Each body system chapter is self contained and can be studied in any order
- ✓ Meets the needs of a Gen Ed. A&P course
- ✓ Designed for one semester
- ✓ 9th grade reading level



CONTENTS

1. The Human Body.
2. The Chemistry of Life.
3. Cell Structure.
4. Cellular Metabolism and Reproduction: Mitosis and Meiosis.
5. Tissues.
6. The Integumentary System.
7. The Skeletal System.
8. The Articular System.
9. The Muscular System.
10. The Nervous System: Introduction, Spinal Cord and Spinal Nerves.
11. The **Nervous System**: The Brain, Cranial Nerves, Autonomic Nervous System and the Special Senses.
12. The **Endocrine System**.
13. The Blood.
14. The Cardiovascular System.
15. The **Lymphatic System**.
16. Nutrition and the Digestive System
17. The Respiratory System.
18. The **Urinary System**.
19. The Reproductive System.

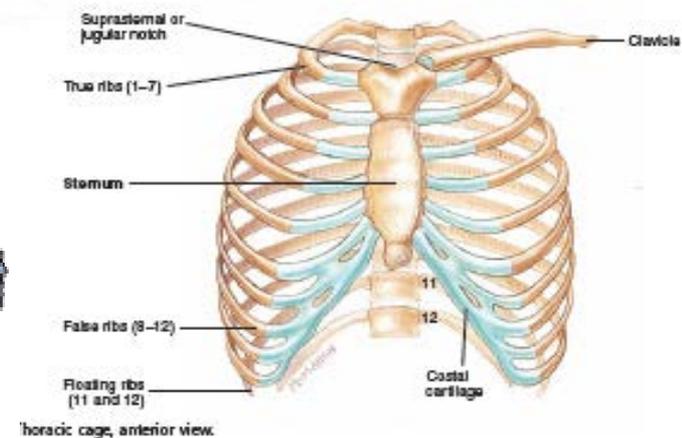
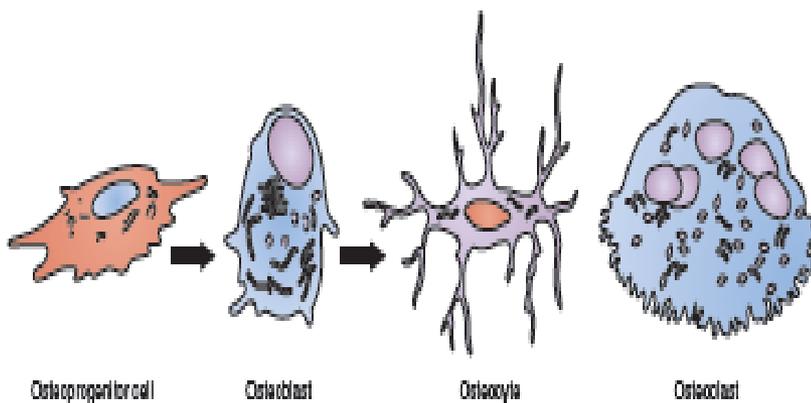
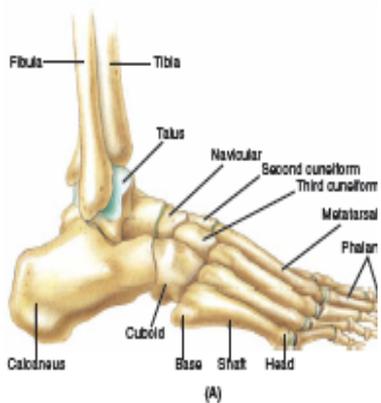
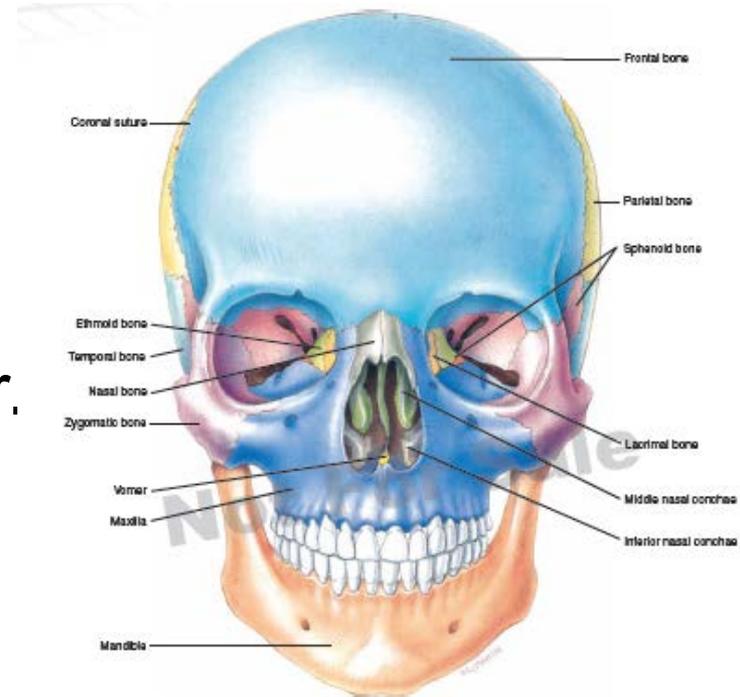


Search and Explore

goes beyond the textbook to expand the learning experience with key word Internet searches, suggested websites with related activities, and brief human interest projects designed to add a personal element to assignments



Full Color Illustrations and Photos... provide visual reinforcement of the major concepts covered in each chapter. Color can help the reader keep a mental picture of the various systems



Special Conditions Boxes...

Provide short descriptions of a significant health alert, common disease, disorder, or condition that can occur in the body throughout the life span.

COMMON DISEASE, DISORDER, OR CONDITION

DISORDERS OF THE SKELETAL SYSTEM

RICKETS

Rickets is a disease caused by deficiencies in the minerals calcium and phosphorus or by deficiencies in vitamin D and sunlight. Vitamin D is necessary for calcium and phosphorus absorption. The condition

(rī-MAH-LAY-she-ah) is often referred to as rickety. Rickets occurs primarily in children who do not get enough of vitamin D (rickets of vitamin D deficiency).

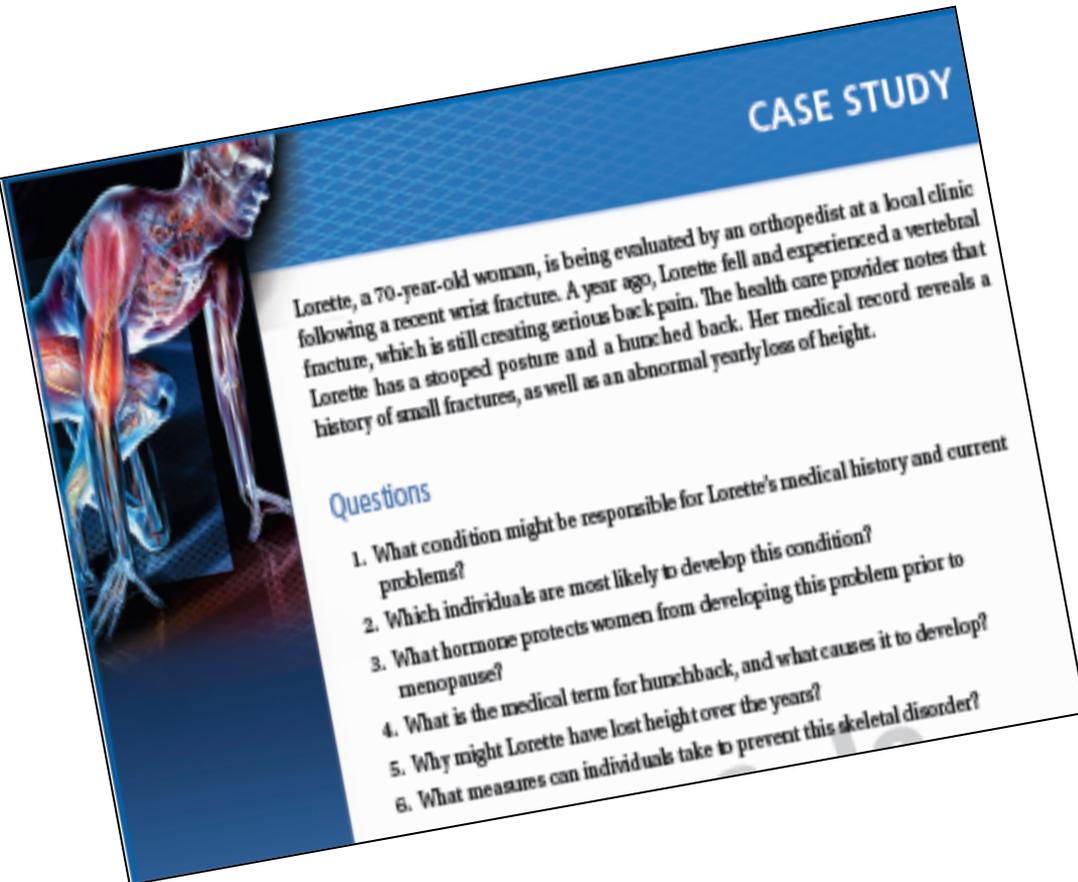
COMMON DISEASE, DISORDER, OR CONDITION

DISORDERS OF THE SPINE

The normal curvatures of the spine can become exaggerated as a result of injury, poor body posture, or disease (Figure 7-15). When the posterior curvature of the spine is accentuated in the upper thoracic region, the condition is called **kyphosis**. This results in the commonly referred to condition called hunchback. It is particularly common in older individuals due to osteoporosis. It can also be caused by tuberculosis of the spine, osteomalacia, or rickets. **Lordosis**, or swayback, is an abnormal accentuated lumbar curvature. It also can result from rickets or spinal tuberculosis. Temporary lordosis is common in men with potbellies and pregnant women who throw back their shoulders to preserve their center of gravity, thus accentuating the lumbar curvature. **Scoliosis** (skoh-lee-OH-sis), meaning twisted condition, is an abnormal lateral curvature of the spine that occurs most often in the thoracic region. It can be common in late childhood for girls, but the most severe conditions result from abnormal vertebral structure, lower limbs of unequal length, or muscle paralysis on one side of the body. Severe cases can be treated with body braces or surgically before bone growth ceases.

Because bone supports the body, bone support tissues like muscle and cartilage also be categorized as connective tissue. A comminuted fracture is one in which the bone is broken into several pieces.





Case Studies are included in each body system chapter to encourage application of concepts learned, promote critical thinking and facilitate discussion.



As the Body Ages.... feature which discusses physiological changes and effects that aging has on each specific body system.



AS THE BODY AGES

As we age, less protein matrix is formed in our bone tissue accompanied by a loss of calcium salts. Bones become more fragile and tend to break more easily in older adults. Older adults also develop stiffness and less flexibility of the skeleton due to a decrease in the protein collagen found in the tendon connective tissue that connects bone to muscle, and in ligaments that connect bone to bone. Hence, as we age we should be more conscious of our diet and include more foods that contain calcium. Regular exercise can also

help maintain healthy bone tissues. Walking is an excellent way to exercise both bones and muscles.

Do we really “shrink” as we grow older? Shrinking is caused by a thinning of the intervertebral disks in the spinal column. Starting at around age 40, individuals can lose about one-half inch in height every 20 years due to the loss of disk protein. ■

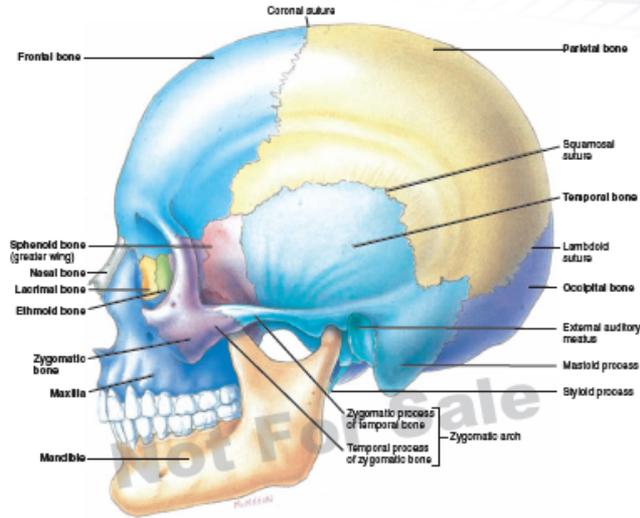


FIGURE 7-9. The cranial bones.

to this mastoid process and assist in moving your head. Finally, the **tympenic plate** forms the floor and anterior wall of the external auditory meatus. A long and slender styloid process can be seen extending from the undersurface of this plate. Ligaments that hold the hyoid bone in place (which supports the tongue) attach to this styloid process of the tympanic plate of the temporal bone.

The single **sphenoid bone** forms the anterior portion of the base of the cranium (Figures 7-9 and 7-10). When viewed from below it looks like a butterfly. It acts as an anchor binding all of the cranial bones together.

The single **ethmoid bone** is the principal supporting structure of the nasal cavities and helps form part of the orbits. It is the lightest of the cranial bones (see Figures 7-9 and 7-10).

The six **auditory ossicles** are the three bones found in each ear (see Figure 7-8B): the **malleus** or hammer, the

stapes (STAY-pees) or stirrup, and the **incus** or anvil. These tiny bones are highly specialized in both structure and function and are involved in exciting the hearing receptors.

The **wormian bones** or **sutural bones** are located within the sutures of the cranial bones. They vary in number, are small and irregular in shape, and are never included in the total number of bones in the body. They form as a result of intramembranous ossification of the cranial bones.

StudyWARE™ Connection

Play an interactive game labeling the cranial bones on your StudyWARE™ CD-ROM.



StudyWARE™ Connection feature adds learning opportunities such as practice quizzes, 3D animations, image labeling and other interactive games included on the accompanying CD-ROM

[Preview Animation](#)



LABORATORY
EXERCISE:

THE SKELETAL SYSTEM

Materials needed: An articulated human skeleton, either real bone, if possible, or a good plastic reproduction; a number of skulls (one skull per 4–5 learners); disarticulated examples of human bones, an articulated foot, and an articulated hand; a microscope slide of compact bone

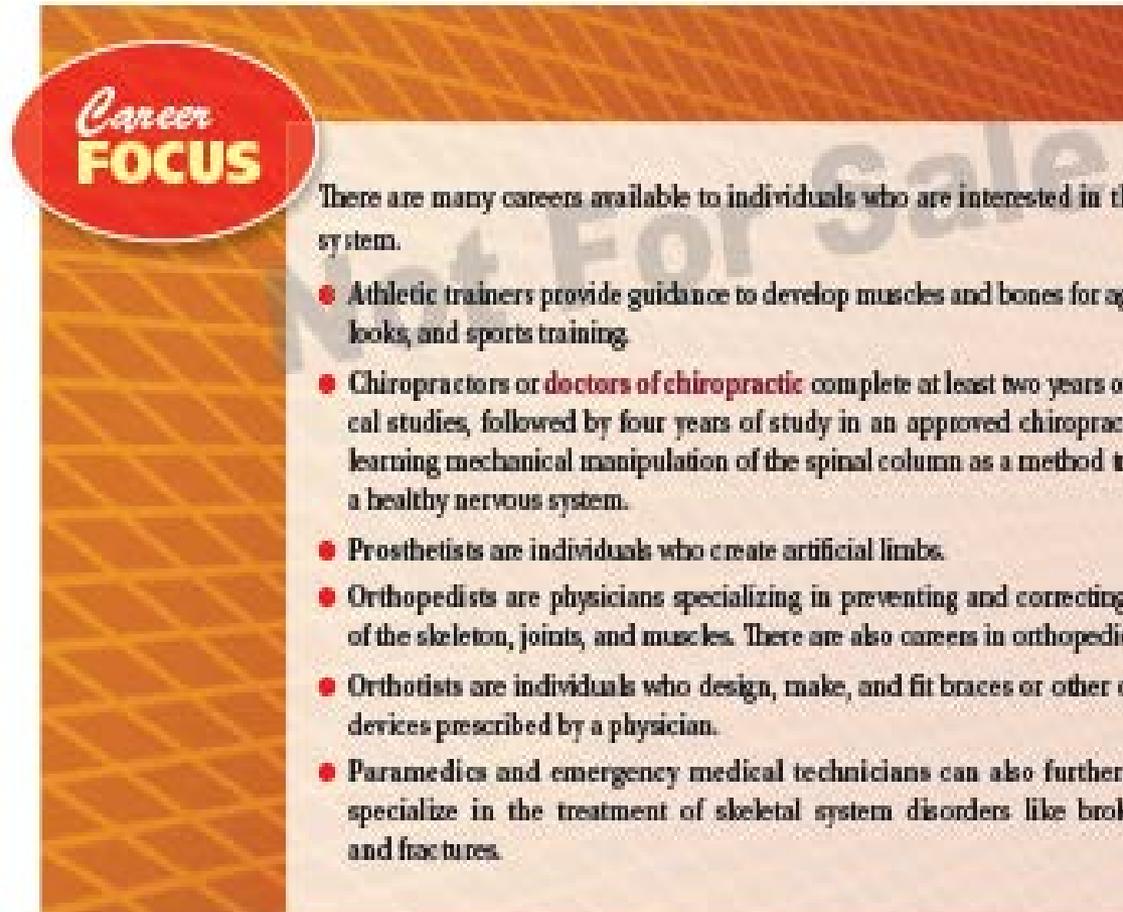
1. Break into groups of 4 to 5 learners. Use the colored plates from your textbook and identify the cranial and facial bones with their major sutures by working with the skulls provided by your instructor.
2. Move to the articulated skeleton and identify the other bones of the body.
3. Look at an articulated hand and a foot and identify the carpal bones of the wrist and the tarsal bones of the foot.
4. Examine a hyoid bone and identify its parts.
5. Try to identify various bone markings mentioned in your text.
6. Examine a long bone that has been split open to view compact and cancellous tissue.
7. Review the histology of compact bone by viewing a microscope slide of compact bone. Identify all the parts of the haversian system or osteon.

- Allows hands-on lab experience
- Observe structures
- Apply knowledge
- No separate lab manual needed



Career Focus sections help learners apply knowledge and consider careers for which an understanding of Anatomy and Physiology is essential:

- Crime scene investigators
- Toxicologists
- Estheticians
- Medical animation specialists
- Food safety specialists
- Health care professionals

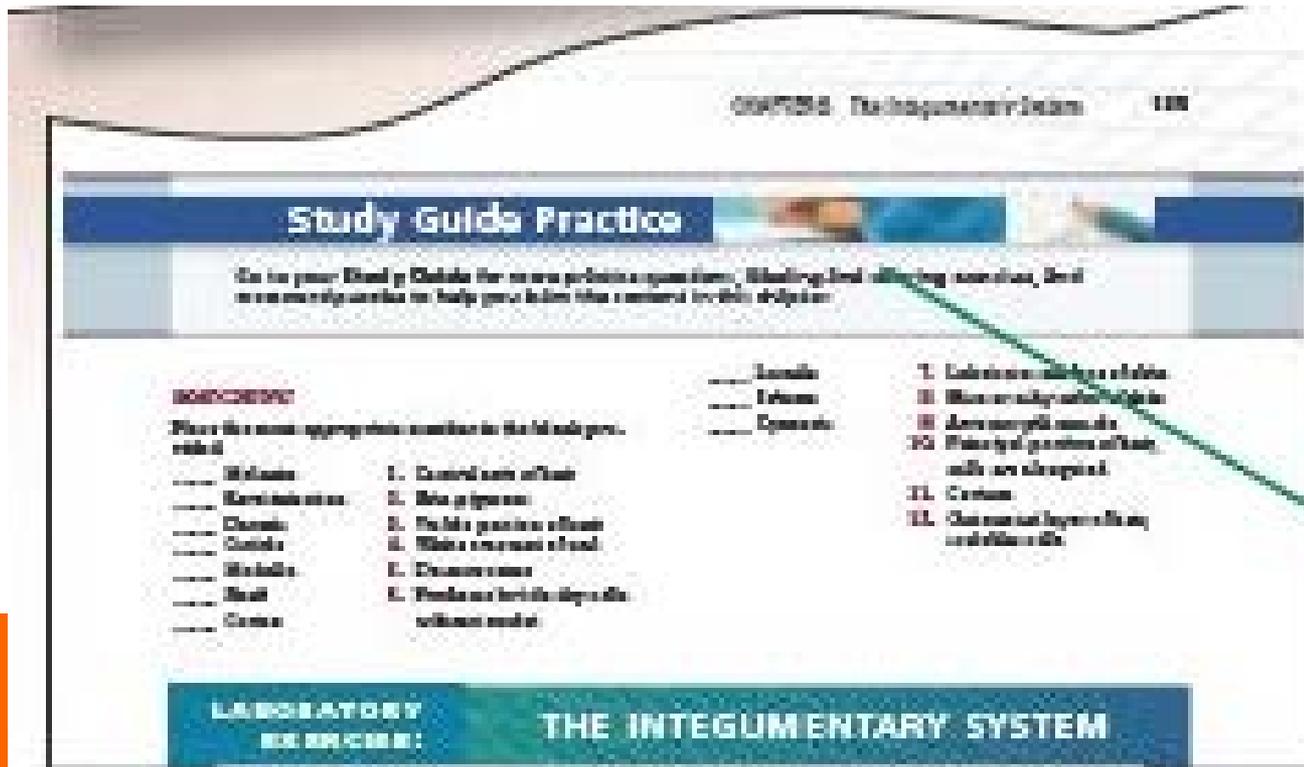


Career FOCUS

There are many careers available to individuals who are interested in the skeletal system.

- Athletic trainers provide guidance to develop muscles and bones for athletes, prevent injuries, and provide sports training.
- Chiropractors or **doctors of chiropractic** complete at least two years of postgraduate studies, followed by four years of study in an approved chiropractic program, learning mechanical manipulation of the spinal column as a method to restore a healthy nervous system.
- Prosthetists are individuals who create artificial limbs.
- Orthopedists are physicians specializing in preventing and correcting disorders of the skeleton, joints, and muscles. There are also careers in orthopedic technology.
- Orthotists are individuals who design, make, and fit braces or other orthotic devices prescribed by a physician.
- Paramedics and emergency medical technicians can also further specialize in the treatment of skeletal system disorders like broken bones and fractures.

Study Guide Practice feature guides readers to even more learning tools including practice questions, labeling and coloring exercises, and crossword puzzles in the Study Guide



CHAPTER 14 The Integumentary System 118

Study Guide Practice

Go to your Study Guide for more practice questions, labeling and coloring exercises, and crossword puzzles to help you learn the content in this chapter.

TERMINOLOGY
Place the correct appropriate number in the blank provided.

_____ Wound	1. Covered area of hair	_____ Scar	7. Collection of pus in a cavity
_____ Carbuncle	2. Skin pigment	_____ Tumor	8. Blister on the skin
_____ Cyst	3. Fluid-filled cavity	_____ Crossword	9. Area of skin that is red, swollen, and itchy
_____ Abscess	4. Skin structure of hair		10. Fluid-filled cavity of hair cells are elongated
_____ Scab	5. Dandruff		11. Cancer
_____ Cancer	6. Pus-filled cavity		12. One of the layers of the epidermis

LABORATORY EXERCISE: THE INTEGUMENTARY SYSTEM



Body Systems... this section at the end of each chapter illustrates how each body system works together to maintain the body's internal environment within certain narrow ranges. Seeing each body system's role in maintaining homeostasis helps you see the integration of separate systems into one body.



Integumentary System

- Vitamin D is produced in the skin by UV light.
- It enhances the absorption of calcium in bones for bone and tooth formation.

Muscular System

- Through their tendons, muscles pull on bones, bringing about movement.
- Calcium from bones is necessary for muscle contraction to occur.

Nervous System

- The cranial bones protect the brain, and the vertebrae and intervertebral disks protect the spinal cord.
- Receptors for pain monitor trauma to bones.
- Calcium from bones is necessary for nerve transmission.

Endocrine System

- The hormone calcitonin causes calcium to be stored in bones.
- The hormone parathormone causes calcium to be released from bones.
- Growth hormone from the anterior pituitary gland affects bone development.

Cardiovascular System

- Blood cells transport oxygen and nutrients to bone cells and take away carbon dioxide and waste products.
- Calcium from bones is necessary for blood clotting and normal heart functions.

Lymphatic System

- Red bone marrow produces lymphocytes, which function in our immune response.

Digestive System

- Calcium, necessary for bone matrix development, is absorbed in the intestine from our daily food intake.
- Excess calcium can be eliminated via the bowels.

Respiratory System

- Oxygen is brought into the body via the respiratory system and transported by the blood to bone cells for biochemical respiration.
- The ribs along with the intercostal muscles and diaphragm bring about breathing.

Urinary System

- The kidneys help regulate blood calcium levels.
- Excess calcium can also be eliminated via the kidneys.

Reproductive System

- Bones are a source of calcium during breastfeeding.
- The pelvis aids in supporting the uterus and developing fetus during pregnancy in the female.

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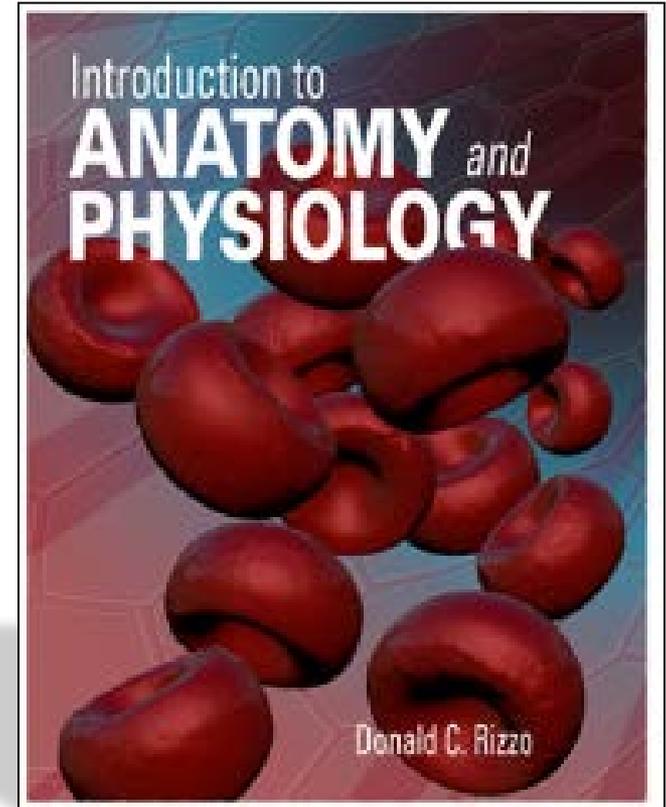
Study Guide

*variety of questions and activities included to reinforce the material presented.
Case studies encourage application of concepts learned and promote critical
thinking and classroom discussion*

eBook available



- ✓ Written specifically for High School
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