Teach, *continued*

Teaching Key Ideas

Calcium in Bones Bone tissue is a storage site for calcium. Calcium needed elsewhere in the body (such as for nerve or muscle function) may be released from the bones in a process called reabsorption. Parathyroid glands release a hormone in response to low blood calcium levels that stimulates the release of calcium from bone cells into the blood. Conversely, high blood calcium levels trigger the release of calcitonin from the thyroid gland, which stimulates absorption of calcium into bone cells.

Close

Formative Assessment

The effect of regular exercise on the skeletal system is _____.

A. reducing bone mass (Incorrect. Exercise increases bone mass.)

B. promoting osteoporosis (Incorrect. Exercise protects against osteoporosis.)

C. maintaining bone density (Correct! Exercise helps maintain bone density)

D. making bones more porous (Incorrect. Exercise makes bones less porous.)

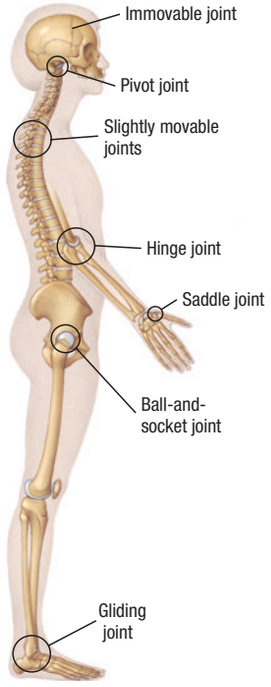


Figure 5 Different types of joints allow varying degrees of motion in the body.

joint a place where two or more bones meet

ligament a type of connective tissue that holds together the bones in a joint

Joints

The skeletal system is linked by many types of joints, as shown in **Figure 5.** A **joint** is a place where two or more bones meet. Joints are grouped by their structure and by the way they move.

Types of Joints Immovable joints, such as those in the skull, do not allow the bones to move. Slightly movable joints, such as the joints of the spine and rib cage, allow only a small amount of movement. Freely movable joints allow the most movement. Most joints of the appendages are freely movable.

Movable joints are made up of bones, cartilage, and ligaments. Pads of cartilage cushion the ends of bones and help movable joints withstand pressure and stress. Movable joints are held together by strong bands of connective tissue called **ligaments.** Ligaments help prevent joints from moving too far in any direction.

Joint Injuries and Disorders Joints are strong and flexible. However, joints are susceptible to certain kinds of injury and disease.

Sprain The most common injury to a joint is a sprain. A sprain occurs when a joint is bent too far or in the wrong direction. This incorrect movement damages the ligaments of the joint. Knees are especially vulnerable to sprains because of the amount of weight that the knees support.

Bursitis *Bursae* are fluid-filled sacs that help cushion and lubricate pressure points around joints. When joints are overused, bursae can become inflamed. *Bursitis* is a common disorder in athletes and musicians in which these sacs become swollen and painful.

Arthritis When the cartilage protecting joints is damaged, a disease called *arthritis* can result. There are two types of arthritis. Osteoarthritis occurs when the cartilage that covers the surfaces of bones wears away. The bones rub together, which causes pain. Rheumatoid arthritis occurs when cells of the immune system attack the tissues around joints. Rheumatoid arthritis is very painful and can result in damaged and deformed joints.

Reading Check ***What is the difference between osteoarthritis and rheumatoid arthritis?***

Section 2 Review

KEY IDEAS

1. **List** the functions of the skeleton.
2. **Describe** the structure of a typical bone.
3. **Identify** the structures that are found in a movable joint.
4. **Describe** six injuries and disorders that affect bones and joints.

CRITICAL THINKING

5. **Relating Concepts** If a person's skeleton were not mostly cartilage at birth, how might the person's growth and development be affected?
6. **Recognizing Relationships** A runner on a track team has a stress fracture. What kinds of activities would you recommend to help the athlete continue to train while letting the fracture heal?

SCIENTIFIC METHODS

7. **Design an Experiment** Calcium can be removed from a chicken bone by soaking the bone in vinegar. Design an experiment to test whether calcium can be reabsorbed by the chicken bone from substances that contain calcium. Sources of calcium may include milk, yogurt, or dissolved antacid.

Answers to Section Review

1. support, protection, movement, mineral storage, and blood cell formation
2. The structure includes the periosteum, compact bone, spongy bone, and bone marrow.
3. bone, cartilage, and ligament
4. Answers may include injuries and disorders discussed in this section.
5. Sample answer: The brain of a young child needs room to grow, which bone would prevent. Babies are learning to walk and cartilage may serve as a cushion when they fall.
6. Students should recommend that the athlete do low impact exercises such as swimming and stationary bicycling.
7. Accept any reasonable experimental design.