

Exploration Summary

Students will match each of the human joint structures to one of the body parts where it is found, watch an animation of how the structure allows the body part to move, and read a description of that movement.

Student Learning Objectives

- Recognize that the bones in your body form your skeletal system.
- Recognize that your skeletal system keeps you upright, anchors your muscles, helps you get around, protects your organs, and even makes new blood cells.
- Recognize that joints are the points where bones meet.
- Identify the joint structures found in the skeletal system.
- Describe the movements allowed by each joint structure.

Student Worksheet

The student worksheet includes questions to check understanding, instructions for how to use the Exploration, and a section for recording Exploration data. Why do the questions come first? In following best practices for teaching science, students are asked to review questions before participating in an activity. When the questions come first, students are more focused on the intended content of the activity. Then they can respond to the questions during the activity or after completion of the activity.

Exploration Procedure

Explain that the purpose of this Exploration is to learn how different joint structures allow bones to move in various parts of the body. Follow the appropriate procedure below.

Student Performs Exploration

1. Tell students how much time they will have to complete the Exploration and the student worksheet.
2. Explain how students should proceed:
 - Read the questions before starting the Exploration.
 - Follow the instructions on the worksheet to perform the Exploration.
 - Take notes or record data as necessary.
 - Respond to the questions in writing.
3. Explain that you will be available to help any students who raise their hands.
4. Tell students to begin the Exploration.
5. When time is up, ask students to share their answers.
6. Talk about the Discussion Question below.



Teacher Performs Exploration

1. Display the questions from the student worksheet and ask students to tell you what they think they will learn from the Exploration based on its questions. Highlight key words.
2. Read the Introduction and click the Continue button.
3. Identify the Exploration components.
4. Roll your mouse over the icon for each type of joint to reveal its name and how it moves.
5. Drag each joint structure to the body part where it is found in the skeleton on the right. (Ask the class which body part is the correct match.) Watch the movement it allows and read and discuss the description of that movement.
6. After matching all the joints to their body parts, click the Next button to watch video footage showing them in action.
7. Pose each of the questions below and ask for answers from the class. Replay parts of the Exploration as necessary to illustrate the answers.
8. Talk about the Discussion Question below.

Optional: Use this Exploration as a small-group activity at a computer station. Assign it to students who need specific reinforcement of the concept.

Questions

1. Which two joints are found in the hand? Where in the hand is each found? **Answer:** saddle (base of thumb) and ellipsoid (base of fingers)
2. Which type of joint is found in the neck, forearms, and elbow? What type of bone movement does it allow? **Answer:** pivot, allows one bone to rotate or twist around another
3. Which joint allows only a swinging, back-and-forth movement? **Answer:** hinge
4. Which joint allows the widest range of movement? **Answer:** ball-and-socket
5. Which joint allows you to bend your neck? Where is it found? **Answer:** gliding, backbone (vertebrae)

Discussion Questions

What factors can interfere with normal joint movement?

Possible answers

- **Injury** to the cartilage within the joint or to the ligaments, muscles, or tendons around the joint
- **Dislocation**—a joint injury that forces the ends of your bones out of their normal positions
- **Fracture**—a gradual loss of bone density over time weakens the bones and makes them more susceptible to fracture (break)
- **Osteoarthritis**—a painful joint disease caused by the wearing away of the cartilage that caps the bones in your joints
- **Rheumatoid arthritis**—a painful joint disease caused by inflammation of the membrane that protects and lubricates joints
- **Gout**—a form of arthritis caused by excessive levels of uric acid in the blood
- **Bursitis**—a painful inflammation of the fluid-filled capsule outside the joint