

Nova's Guide to Skeletons and Muscles

Learning objective: To identify and explain the functions of the human skeleton and how muscles work in pairs to enable movement.

Use this scaffold to structure your scientific report. Ensure you use specific biological vocabulary to explain the relationship between the skeletal and muscular systems.

Nova the owl has been observing how humans move, and she has discovered that our bodies rely on a remarkable partnership between bones and muscles.

Word bank: antagonistic pair · contract · relax · structure · protection · support · tendon · bicep · tricep · consequently · furthermore · in contrast · therefore

1. The Purpose of the Skeleton: Describe three primary functions of the human skeleton and explain why these are vital for survival. Start with: 'The human skeleton serves several essential purposes, including...' (3 marks)

2. The Role of Muscles: Explain how muscles are attached to bones and why this connection is necessary for movement. Start with: 'Muscles are connected to bones by strong tissues called tendons, which allow...' (3 marks)

3. Antagonistic Muscle Pairs: Explain the process of movement in the arm using the bicep and tricep. Start with: 'To move the arm, muscles must work in an antagonistic pair because...' (4 marks)

4. Justify your answer: Why would it be impossible for humans to stand upright or perform complex movements if our skeletons were made of soft tissue instead of bone? (3 marks)

5. Compare and Contrast: How does the human skeletal structure compare to the exoskeleton of an insect? What might happen if humans had an external shell instead of an internal skeleton? (4 marks)

6. Creative Extension: Imagine a creature that lives in an environment with no gravity. Explain why its muscles and bones might evolve differently compared to those of a human on Earth. (3 marks)

Extension challenge: Research a specific joint in the human body, such as the ball-and-socket joint in the shoulder. Write a short paragraph explaining how its structure restricts or enables specific ranges of motion.