

Nova's Science Quest: Skeletons and Muscles

Learning objective: To identify and describe the functions of the human skeleton and the role of muscles in movement, designed for Year 5 pupils working at Greater Depth.

Study these flashcards to master the mechanics of the human body. Think carefully about how our skeletal and muscular systems work in harmony to allow us to move and survive.

What is the primary function of the human skeleton beyond providing a framework for the body?

Protection. The skeleton encases vital organs, such as the cranium protecting the brain and the ribcage protecting the heart and lungs.

Define an 'antagonistic muscle pair' and provide an example.

Antagonistic muscle pairs are muscles that work in opposition; when one contracts, the other relaxes. Example: The biceps and triceps in the upper arm.

Explain the difference between a ligament and a tendon.

A ligament connects bone to bone at a joint, while a tendon attaches a muscle to a bone, allowing the muscle to pull the bone and create movement.

What is the role of a joint in the human body?

A joint is the point where two or more bones meet, allowing for movement, such as the hinge joint in the knee or the ball-and-socket joint in the shoulder.

Nova asks: Why is the femur considered a critical bone for movement?

The femur is the longest and strongest bone in the body, providing essential support for the weight of the upper body and acting as a lever for the leg muscles to facilitate walking and running.

Justify why a human would struggle to move without a skeleton.

Without a skeleton, the body would lack the rigid structure required for muscles to anchor onto. Muscles need a solid 'lever' to pull against to create motion; without bones, the body would be unable to stand or propel itself.

Compare and contrast the function of the cranium and the vertebrae.

The cranium provides a rigid, protective shell for the brain, whereas the vertebrae (the spine) provide both protection for the spinal cord and the flexibility required for the body to bend and twist.

What might happen if a person's tendons were significantly weakened?

If tendons were weakened, the muscles would lose their ability to transmit force to the bones, resulting in an inability to move the limbs effectively, even if the muscles themselves were functional.

Explain why the skeleton is described as an 'endoskeleton'.

It is called an endoskeleton because it is located inside the body, covered by muscles, skin, and other soft tissues, which is a characteristic of vertebrates.

How do muscles change physically when they contract?

When a muscle contracts, it becomes shorter and thicker, pulling on the tendon to move the attached bone.