

Nova's Guide to Skeletons and Muscles

Learning objective: Identify that humans and some other animals have skeletons and muscles for support, protection, and movement.

Read the passage carefully and answer the questions below. Think like a scientist!

Nova the barn owl loves to soar through the night sky, but her flight relies on more than just feathers. Like all vertebrate animals, Nova has an internal skeleton made of strong, lightweight bones. This skeleton provides a sturdy framework, offering support for her body and essential protection for delicate organs, such as her brain, which is shielded by the cranium.

However, bones cannot move on their own. To achieve flight or even a gentle hop, Nova relies on her muscles. Muscles are attached to bones by tough cords called tendons. When a muscle receives a signal to move, it will contract, becoming shorter and tighter, which pulls on the bone to create movement at a joint. Because muscles can only pull and not push, they work in clever pairs. While one muscle contracts to pull a limb, its partner relaxes. This harmonious partnership between the skeletal and muscular systems is what allows animals to hunt, play, and explore their habitats. Without this internal scaffolding and the power of muscular contraction, we would simply be unable to navigate the world around us.

Word bank: skeleton · muscles · support · protection · movement · joints · contract · cranium

1. According to the text, what are the two main purposes of an internal skeleton? (2 marks)

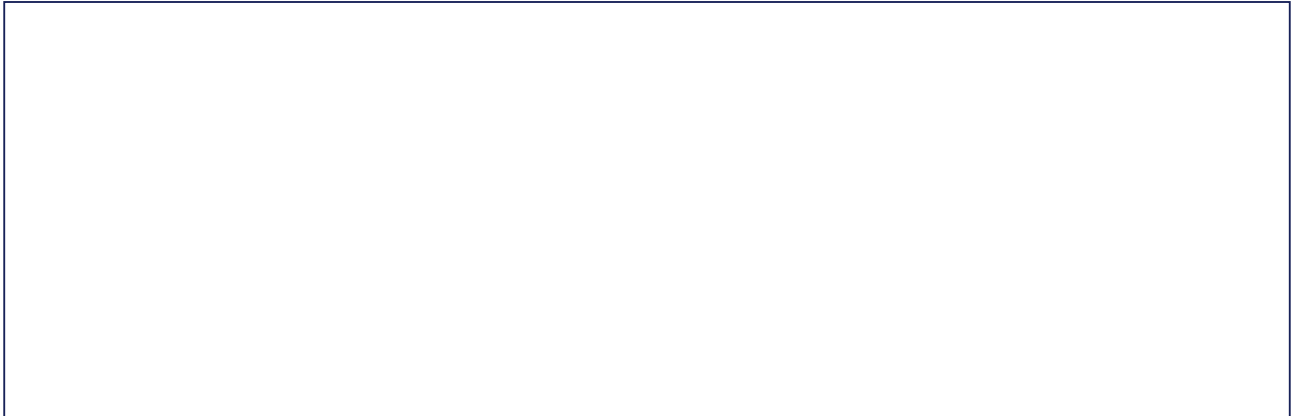
2. How do muscles connect to bones, and what happens to a muscle when it receives a signal to move? (2 marks)

3. Why does the author describe muscles as working in 'pairs'? (2 marks)

4. Based on the passage, why is it important that a bird's cranium is made of hard bone? (2 marks)

5. Justify why having an internal skeleton is more beneficial for a flying animal than having an external shell. Explain your reasoning. (3 marks)

Draw: Draw a diagram of a human arm showing how the biceps muscle contracts to lift a weight. Label the bone, the muscle, and the joint.



Extension challenge: Compare and contrast the human skeleton with an invertebrate, such as a beetle. If you were designing a robot, explain why you would need to include both a rigid frame and a way to create movement. Justify your design choices.