

Disciplinary Knowledge

Identifying differences, similarities or changes related to simple scientific ideas and processes.



Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables.



Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.



Using straightforward scientific evidence to answer questions or to support their findings.



Setting up simple practical enquiries, comparative and fair tests.



Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units.



Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.



Substantive Knowledge

All **vertebrates** have internal **skeletons** that protect **vital organs**.

Invertebrates have **exoskeletons** that protect **vital organs**.

Skeletons support the weight of land animals.

Stronger bones can **support** a greater **mass**.

Bones are **connected** (but can move relative to each other) at joints.

Muscles connect to bones and move them when they **contract**.

Stronger bones can **anchor** stronger muscles.

Significant Scientists

Wilhelm Röntgen (1845-1923)



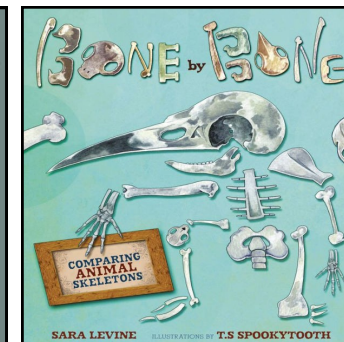
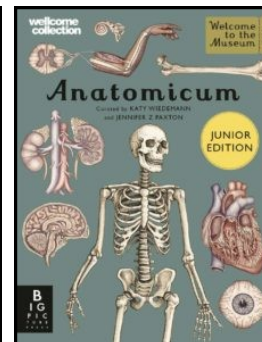
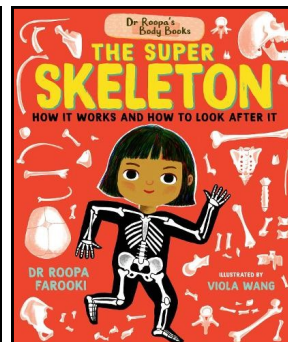
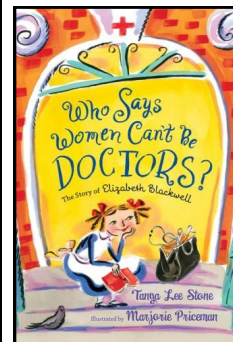
Wilhelm Röntgen was a physicist who received the first Nobel Prize for Physics, in 1901, for his discovery of X-rays. This heralded the age of modern physics and revolutionized diagnostic medicine.

Dr Nicola Phillips (1888-1970)

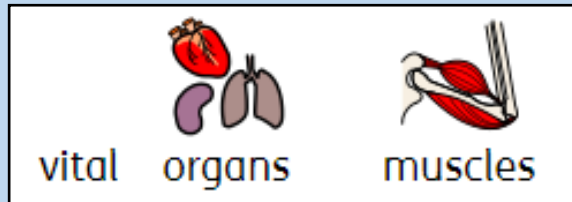
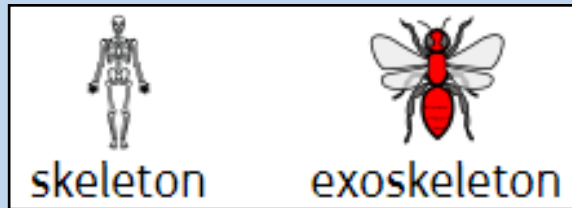
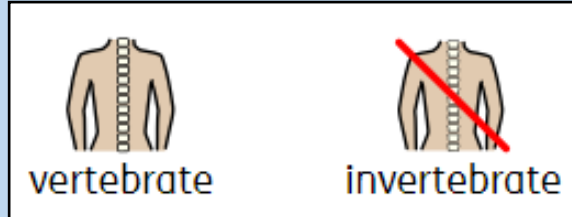


Nicola Phillips is a professor of sport and exercise physiotherapy at Cardiff University. Alongside her academic work, she has also worked in physiotherapy and sport with weightlifting teams, professional rugby union, Olympic and Commonwealth Games.

Interesting Books



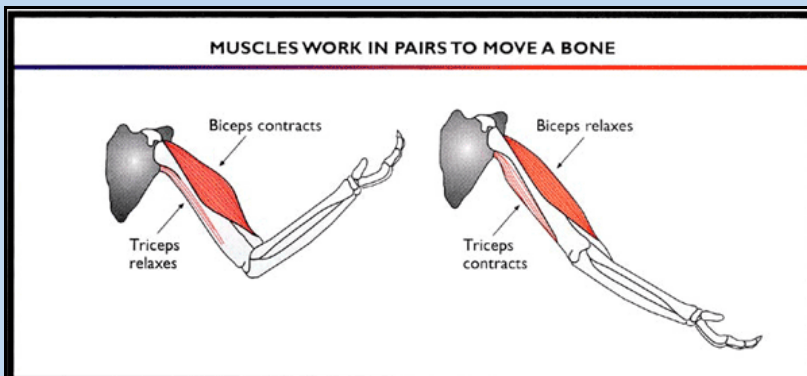
Key concepts



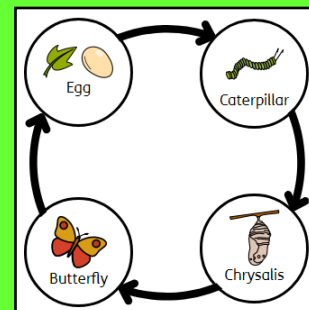
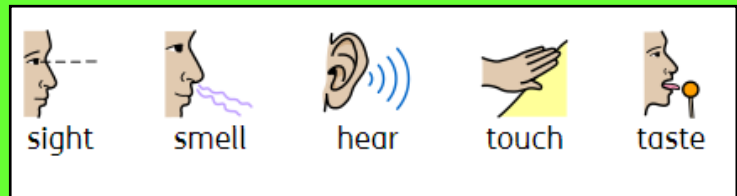
Key Vocabulary

vertebrates	A group of animals that have a backbone, e.g. humans, elephants, dolphins.
invertebrates	A group of animals that do not have a backbone, e.g. Lobsters, woodlice, worms.
skeleton	An internal or external framework of bone supporting/containing the body of an animal.
exoskeleton	A skeleton that is visible on the outside of the body.
vital organs	An organ that is essential for life.
support	To hold up or bear the weight of an organism.
mass	A quantity of matter measured in kg.
muscles	A band/bundle of fibrous tissue that can contract, producing movement.
connect	To bring together or into contact so a link is established.
contract	Become shorter and tighter in order to effect movement of part of the body.

How muscles work



Prior Knowledge



The arrows show the direction the energy is transferred.

