

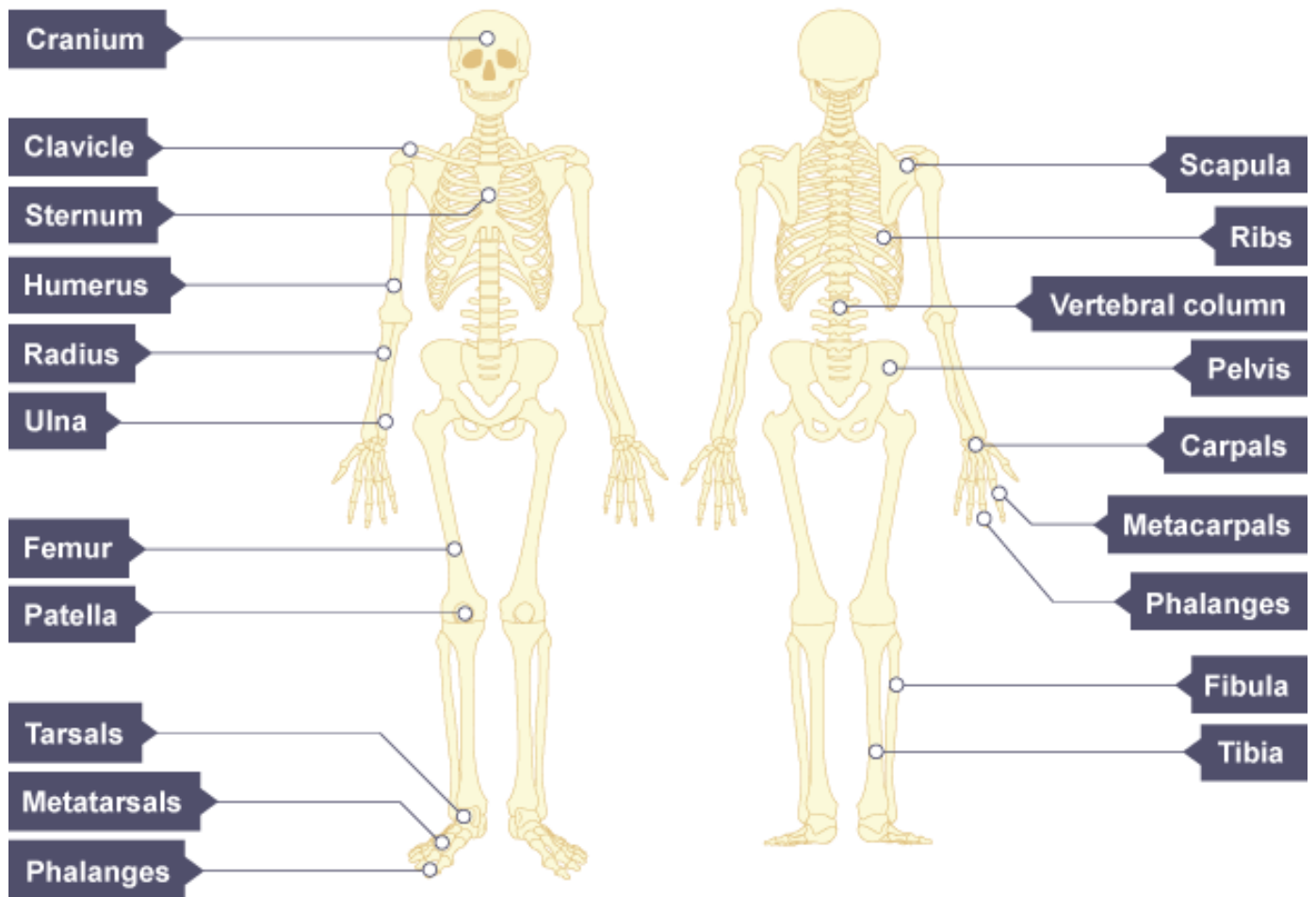
Knowledge Organiser Y7 Movement

The skeleton

Our skeleton is made of more than **200 bones**. Calcium and other minerals make the bone strong but slightly flexible. Bone is a living **tissue** with a blood supply.

Structure of the skeletal system

The main bones of the skeleton and their location are shown here:

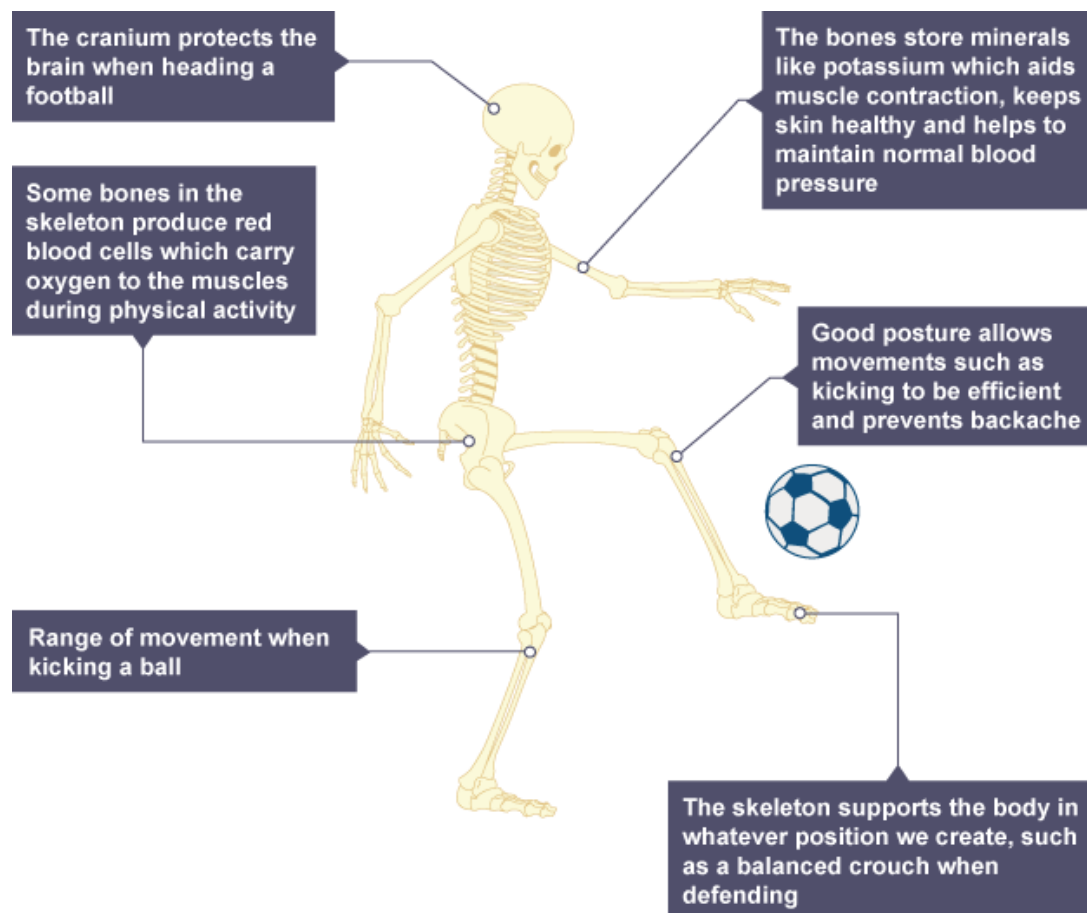


Knowledge Organiser Y7 Movement

Functions of the skeletal system

The skeleton has five main functions:

1. **Movement** – the skeleton allows movement of the body as a whole and its individual parts. The bones act as levers and also form joints that allow muscles to pull on them and produce joint movements.
2. **Support and protection** – the bones of the skeleton provide support for the body and also protect the organs found within it. For example, the cranium protects the brain, the ribs offer protection to the heart and lungs, the vertebrae protect the spinal cord and the pelvis offers protection to the sensitive reproductive organs.
3. **Production of blood cells** – certain bones in the skeleton contain red bone marrow and the bone marrow produces red blood cells, white blood cells and platelets. Examples of bones that contain marrow are the pelvis, sternum, vertebrae and clavicle.
4. **Storage of minerals** – the bones themselves are made of minerals and act as a mineral store for calcium and phosphorous, which can be given up if the body requires the minerals for other functions.
5. **Attachment of muscles** – the bones of the skeleton provide surfaces for the attachment of muscles. This is why bones are often irregular shapes and have bony points and grooves to provide attachment points.



Knowledge Organiser Y7 Movement

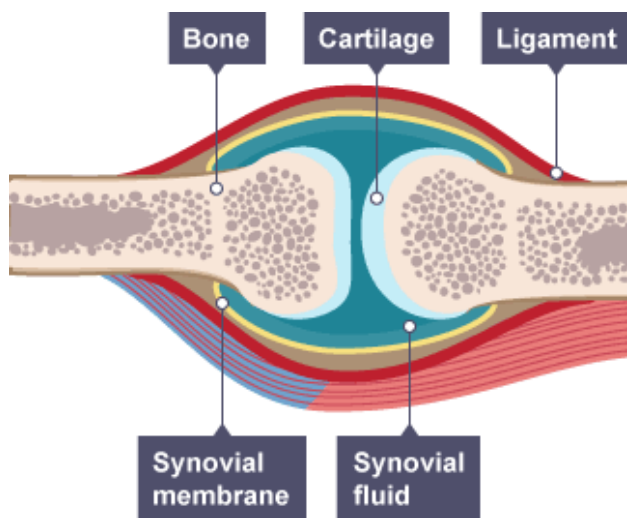
Joints

Bones are linked together by joints. Most joints allow different parts of the skeleton to **move**. The human skeleton has joints called **synovial joints**.

The synovial joint

If two bones just moved against each other, they would eventually wear away. This can happen in people who have a condition called arthritis. To stop this happening, the ends of the bones in a joint are covered with a tough, smooth substance called **cartilage**. This is kept slippery by a liquid called **synovial fluid**.

Tough **ligaments** join the two bones in the joint and stop the joint falling apart.



Movement

Different types of synovial joint allow different types of movement. The table describes two types of joint:

Type of joint	Examples	Movement allowed
Hinge joint	Knee, elbow	The same as opening and closing a door, with no rotation (turning)
Ball and socket	Hip, shoulder	Back and forth in all directions, and rotation

Muscles

Muscles work by getting shorter. We say that they **contract**, and the process is called contraction. Muscles are attached to bones by strong **tendons**. When a muscle contracts, it **pulls on the bone**, and the bone can move if it is part of a joint.

Knowledge Organiser Y7 Movement

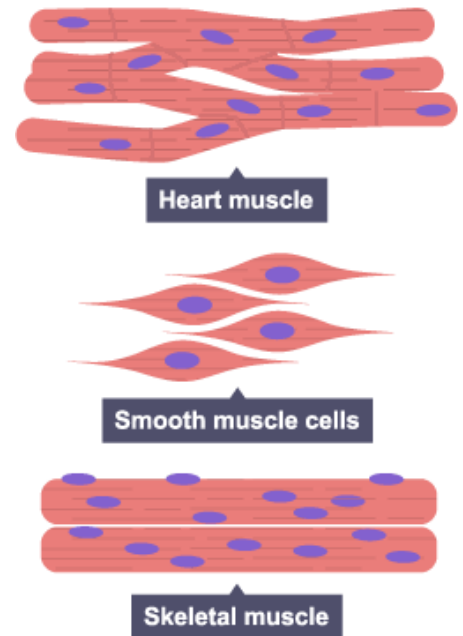
There are three types of muscle in the body:

1. **smooth muscle** – found in the internal organs and blood vessels - this is involuntary
2. **cardiac muscle** – found only in the heart - this is involuntary
3. **skeletal muscle** – attached to the skeleton - this is voluntary

How are muscle cells adapted?

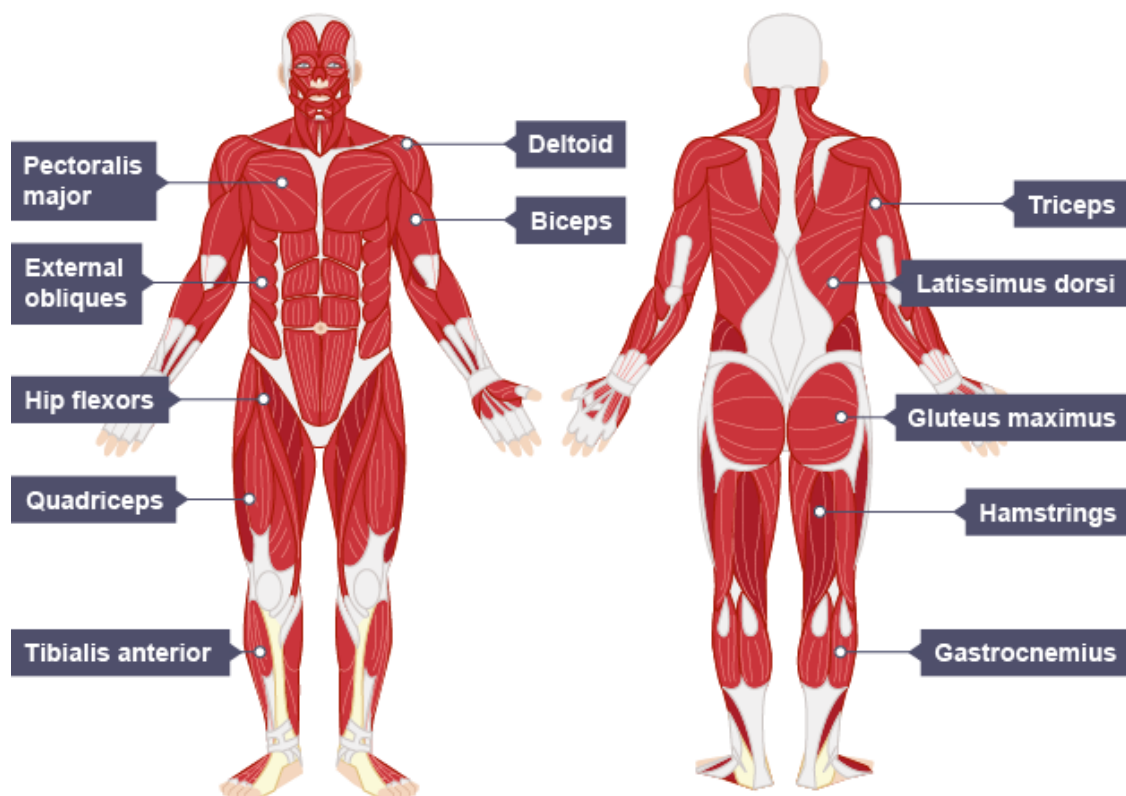
Muscle cells bring parts of the body closer together. They are well suited to this function because:

- Muscle cells are held together in bundles, which pull together to make muscles contract (get shorter and fatter).
- They contain many well-developed mitochondria to provide the energy for muscle contraction.



Involuntary muscles are not under our conscious control which means we can't make them contract when we think about it.

Voluntary muscles are under our conscious control so we can move these muscles when we want to.



Knowledge Organiser Y7 Movement

Antagonistic muscles

Muscles can only pull and cannot push. This would be a problem if a joint were controlled by just one muscle. As soon as the muscle had contracted and pulled on a bone, that would be it, with no way to move the bone back again. This problem is solved by having muscles in pairs, called **antagonistic muscles**.

For example, your elbow joint has **two muscles** that move your forearm up or down. These are the biceps on the front of the upper arm and the triceps on the back of the upper arm:

- to raise the forearm, the biceps contracts and the triceps relaxes
- to lower the forearm again, the triceps contracts and the biceps relaxes

