The Structure and Functions of the Musculo-skeletal System

You must be able to:

- Explain the structure and functions of the musculo-skeletal system
- Apply the functions of the skeleton to physical activity and sport.

The Functions of the Skeleton

Protecting Vital Organs

- **Bones** are extremely strong.
- One of their main functions is to protect the organs, e.g. the skull protects the brain, and the ribs protect the heart and lungs.

Muscle Attachment

- **Muscles** are attached to bones at each end by a thick tendon.
- When the muscles contract, they exert a force on the bones.

Joints for Movement

There are three different types of joint which enable the body to move.

- Fixed **joints** have no space between the bones, therefore no movement is possible, e.g. the skull.
- Slightly moveable joints are separated by cartilage and allow small amounts of movement, e.g. the vertebral column.
- Freely moveable joints contain a membrane that surrounds the joint; this membrane contains **synovial fluid**. An example would be the knee.

Platelets

- The bones produce **platelets** which help blood to clot when the skin is damaged.
- Platelets are tiny cells with no nucleus.

Red and White Blood Cell Production

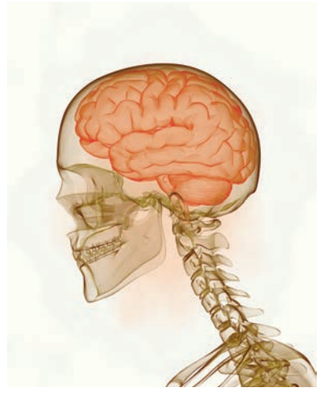
- Bones are responsible for red and white blood cell production.
- **Red and white blood cells** destroy viruses and bacteria, and are produced in the bone marrow of major bones.
- **Red blood cells** carry oxygen all over the body in red haemoglobin to where it is needed.
- Red blood cells only have space for haemoglobin and do not have a nucleus.
- **White blood cells** are vital for protecting against disease and infection. White blood cells have a nucleus.

Storing Calcium and Phosphorus

- Bones store vital minerals such as **calcium** and phosphorous. These minerals are responsible for making bones and teeth strong.

Key Point

A joint is where two or more bones meet.



The Classification of Bones

Long Bones:

- are longer than they are wide
- have a soft centre surrounded by a hard outer casing
- are used as levers to enable the body to move
- examples include the fibula and tibia, the long leg bones used in cycling, running and swimming.

Short Bones:

- are approximately as long as they are wide
- are weight bearing and often shock absorbing
- have large quantities of bone marrow to make blood vessels
- examples include the carpals and tarsals in the wrists and foot.

Flat Bones:

- are flat and particularly strong
- have muscles attached that provide protection
- examples include the scapula (shoulder) and the cranium (skull).

Irregular Bones:

- all remaining bones are classed as irregular bones
- are often unusual in appearance
- are used for both protection and muscle attachment
- examples include the bones that make up vertebral column (spine) and mandible (jaw).

Quick Test

1. Name the functions of the skeleton.
2. Name the three different types of joint.
3. Name the four classifications of bones.

Revise

Key Point

Bones are the white hard tissue which make up the skeletal system.

Key Point

It is important to remember that the body is made up of different classifications of bones, all of which have specific functions.

Key Words

Bones
Muscles
Joints
Synovial fluid
Platelets
Red blood cells
White blood cells
Calcium