Component 1 The Skeletal System

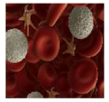
The functions of the skeleton:

1. Protection of vital organs
Cranium protects the brain when heading a ball

2. Muscle attachment
Bones provide anchors for muscles to attach.

3. Joints for movement
Bones act as levers to create movement.

4. Platelets
Platelets clot blood when we are cut to stop the bleeding.



5. Blood cell production
Red blood cells carry oxygen
White blood cells fight infection.

6. Store calcium & phosphorus
Calcium and Phosphorus is stored in the bones to keep them strong.

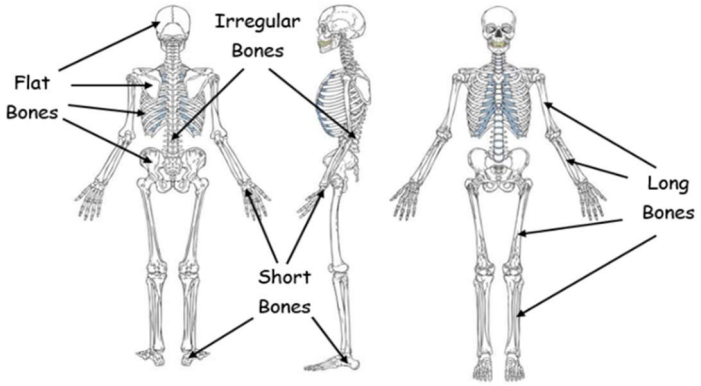
Classification of bones:

Long bones act as levers so we can move. Examples are the humerus, ulna and femur.

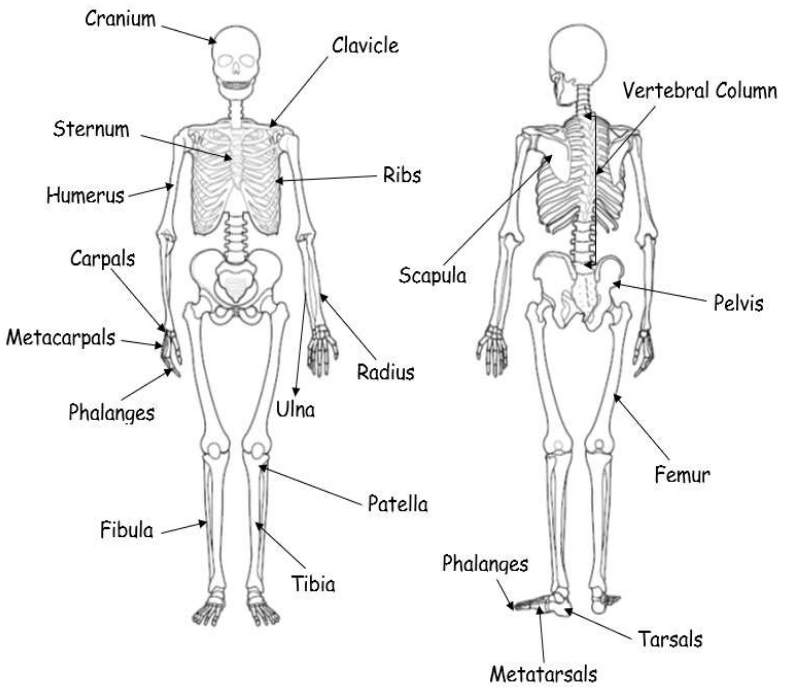
Short bones are important for weight bearing and to absorb shock Examples are the carpals and tarsals.

Flat bones usually protect organs. Examples are the ribs, pelvis and scapula.

Irregular bones have odd shapes and perform a range of functions. Examples are the bones of the vertebrae.

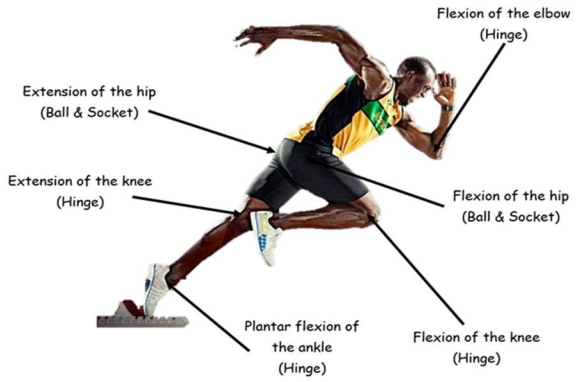


Structure of the skeleton:



Movement possibilities at joints:

Flexion: bending movement (decreases angle)
Extension: Straightening movement (increase angle)
Abduction: Moving away from midline
Adduction: Moving towards the midline
Plantar flexion: Pointing the toes downwards
Dorsi flexion: Pointing the toes upwards
Rotation: Rotation around a joint or axis
Circumduction: flexion/extension Abduction/adduction

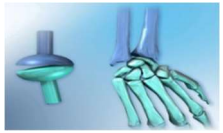


Classification of joints:

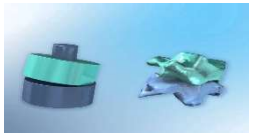
Hinge
E.g. Elbow & Knee

Ball & Socket
E.g. Hip & Shoulder

Condyloid
E.g. Wrist



Pivot
E.g. Neck (axis & Atlas)



The role of ligaments and tendons:

A ligaments main function is to join bone to bone. Ligaments help stabilise joints and prevent dislocation.

Tendons attach muscle to bone. Tendons help provide powerful movements such as kicking, jumping and

Vertebral column:

Component 1 Aerobic & Anaerobic Exercise

Aerobic exercise:

- Uses oxygen for energy production
- Includes activities that are of a long duration
- Includes activities that are of a moderate intensity

Sports and activities:


Long distance cycling


Marathon running


Triathlon


Long distance rowing

Aerobic equation:

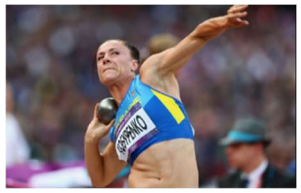
Glucose + O_2 → CO_2 + H_2O + Heat + Energy

Glucose and oxygen are used to release energy aerobically. This process produces carbon dioxide, water and heat (and energy)

Anaerobic exercise:

- Does not use oxygen for energy production
- Include activities that are of a short duration
- Includes activities that are of a high intensity

Sports and activities:


Shot put


Sprinting


Long jump


Weight lifting

Anaerobic equation:

Glucose → lactic Acid + Energy

Lactic acid is produced as a waste product when carbohydrates are broken down without oxygen during anaerobic respiration

Energy Sources

Carbohydrates

- They are an energy source for both aerobic & anaerobic activities
- Doesn't need oxygen to break down into glucose
- Doesn't give as much energy as fats
- Quicker to break down and release more energy than fats

Fats

- They are an energy source for aerobic activities
- They require oxygen to break down the fat into energy (a type of glucose)
- They are slow to break down
- Once broken down they give large quantities of energy

Component 1 Short Term Effects of Exercise

Short term effects of exercise are the ways your body responds as it starts to exercise. These changes happen so that the body can meet the increased demands to the exercise undertaken

Muscular System:

- Muscle fatigue
- Lactate accumulation
- Oxygen deficit

When we start to exercise there is a demand for energy.
When we work anaerobically, we get muscle fatigue and a build-up of lactic acid. This will create an oxygen deficit

Cardiovascular System:

- Increase in heart rate
- Increase stroke volume
- Increase blood pressure
- Increase cardiac output
- Vascular shunting occurs

Respiratory system:

- Increase depth of breathing
- Increase rate of breathing
- Increase gas exchange
- Increase in tidal volume
- Oxygen deficit

The cardiovascular system & respiratory system work together

When we exercise the demand for oxygen and the removal of carbon dioxide increases. This will increase breathing rate and depth and the rate of gas exchange

Because oxygen is needed for the working muscles, vascular shunting occurs

Heart rate is increased as the blood transports the oxygen and carbon dioxide. This increases blood pressure, stroke volume and heart rate

Cardiac output = Stroke Volume x Heart Rate

Stroke volume = Amount of blood pumped from the heart in 1 beat

Heart rate = Amount of time the heart beats per minute

Cardiac output = Amount of blood pumped from the heart in 1 minute