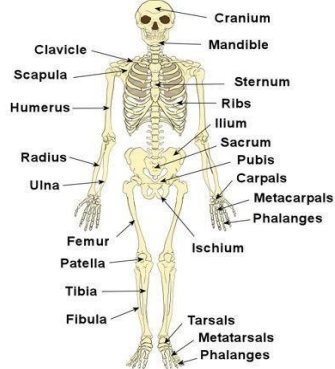


BTEC Sport Year 12-Unit 1 Learning aim A-The effects of exercise on the skeletal system

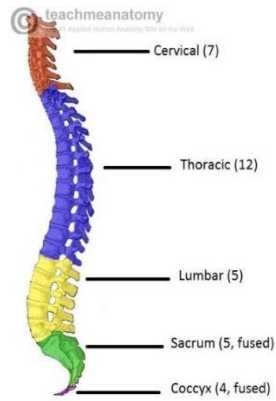
A1 and A2 Structure and function

What is the structure of the skeletal system?



Axial skeleton- 80 bones- The skull, thoracic cage, vertebral column
Appendicular skeleton- 126 bones- Upper limbs, lower limbs, shoulder girdle, pelvic girdle

What is the structure of the vertebral column?



What are the functions of the skeleton?

Support-shape
Protection-vital organs. Skull-brain. Thorax-heart and lungs. Vertebral column-spinal cord. Pelvis-abdominal and reproductive organs
Attachment for muscle
Source of blood cell production
Store of mineral-calcium and phosphorus for bone growth and health
Leverage
Weight bearing
Reducing friction across joints-synovial fluid

What are the different types of bone and their function?

Type	Description	Example and function
Long	Shaft known as the diaphysis and two expanded ends known as epiphysis	Femur, Leverage and blood cell production
Short	Small, light, strong and cube shaped. Consist of cancellous bone surrounded by a thin layer of compact bone.	Carpals, tarsals Weight bearing
Flat	Thin, flattened and slightly curved. Large surface area	Sternum, cranium, Protection
Irregular	Complex in shape	Spinal column
Sesamoid	Specialist functions and found within a tendon.	Patella, Reduce friction

How do bones grow?

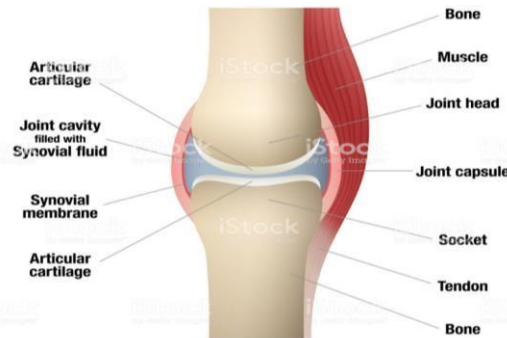
Bones are continually reshaped through modelling.
Ossification is the process through which bones are formed. Calcium is removed from cells while new layers of bone tissue are created.
Osteoblasts are cells which bring calcium to your bones. Osteoblast activity increases with exercise so your bones become stronger.
 Exercise reduces the risk of osteoporosis.
 The ends of each long bone contain **plates** which allow the bone to grow. These are called epiphyseal plates.

A3 Joints

What are the different types of joint?

Fixed -Also known as fibrous or immovable -Do not move -Formed when bones overlap during early childhood -Held together by bands of tough, fibrous tissue -Example is the cranium	Slightly moveable - Also known as cartilaginous - Ends of the bone are covered in hyaline cartilage which reduces friction - The bones are separated by pads of white fibrocartilage which absorbs shock	Synovial -Vital to all sporting movements -Consist of 2 or more bones -Covered in articular cartilage
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What is a synovial joint?



Joint/fibrous capsule-holds bone in place and protects the joint
Bursa-fluid filled sac which provides a cushion between the tendons and the bones, preventing friction.
Articular cartilage-on the ends of bones to stop them rubbing together
Synovial membrane-capsule lining that releases synovial fluid
Synovial fluid-thick liquid that lubricates the joint and reduces the friction
Ligaments-holds bone together

What are the different types of synovial joints?

Type	Where in the body?	Sporting example
Hinge	Knee and elbow joints	Running, bicep curls
Ball and socket	Hip and shoulder.	Running and javelin
Condyloid	Wrist	Dribbling in basketball
Gliding	Wrists and ankles	Netball jump with foot pointing down
pivot	Neck	Turn head from side to side
Saddle	Base of thumb	Tennis to grip racket

What movements happen at synovial joints?

Flexion-bending a joint eg preparing to strike a ball in football
Extension-straightening a joint
Dorsiflexion-an upward movement eg pulling toes up when walking
Plantar flexion-pointing toes down eg when jumping in netball
Lateral flexion-bending sideways. Eg from the waist
Hyper extension-movement beyond the norm. eg a cricketer arching their back when approaching the crease to bowl
Abduction-movement away from the body-eg a side step
Adduction-movement towards the body eg pulling the oars when rowing
Circumduction
Rotation-circular movement. Eg cricket bowl.

A4-6 responses and adaptations to exercise

How does the skeletal system respond to a single exercise session?

Short term/Acute

1. Produces more synovial fluid to protect bones
2. Synovial fluid becomes thinner (less viscous)
3. Increased range of movement
4. Increased uptake of minerals to increase bone density

What are the long - effects of exercise on the skeletal system?

Chronic

1. Increased bone density
2. Increased strength of ligaments
3. Increased flexibility

How does exercise affect the skeletal system?

Arthritis- Inflammation in a synovial joint causing pain and stiffness
 -Main type is osteoarthritis caused by general wear and tear.
 -This reduces the amount of cartilage tissue and means bones can rub.
 -Regular exercise can prevent arthritis by producing more synovial fluid and minerals for the bones to get stronger.
Osteoporosis- Weakening of bones caused by loss in calcium or lack of vitamin D.
 -Resistance training is a good way of preventing osteoporosis as overloading the skeleton will increase bone density.
Age- Weight training can be harmful to children as their bones are still growing. Putting too much weight on them can damage the epiphyseal plates found at the ends of bones