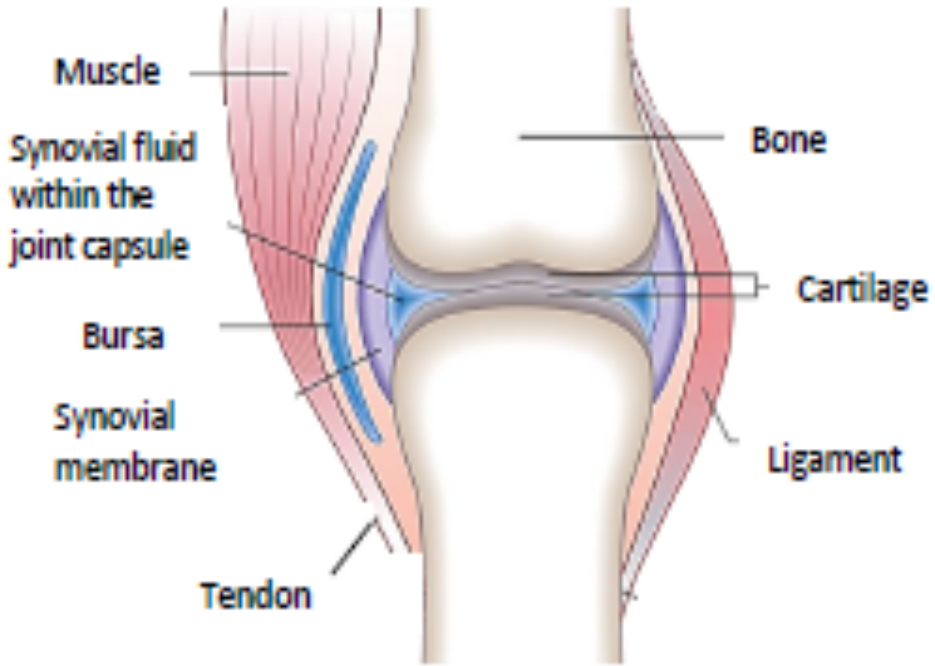
Paper 1: Musculoskeletal system

Joints

Joints are formed where two bones meet. Some joints are fixed and allow no movement, while others are freely moveable, such as a synovial joint.

Structure of a synovial joint



How joint structures help prevent injury

Structure	Prevents injury by...
Synovial membrane	secreting synovial fluid for lubrication
Synovial fluid	lubricating the joint and reducing friction
Joint capsule	sealing joint space to keep in synovial fluid
Bursae	providing a cushion between bones and tendons, and reducing friction
Cartilage	reducing friction and rubbing between two bone ends
Ligament	stabilising the joint and absorbing shock

Synovial joints come in different types: hinge joints (found at the elbow, knee and ankle) and ball-and-socket joints (found at the hip and shoulder). They allow different movements to be performed.

The Role of Muscles at the Joint

- Muscles connect to bones via tendons.
- When muscles contract, tendons pull on the bone and cause it to move at the joint.
- Muscles work together (in pairs) at joints to cause movement. Each pair of muscles is called an antagonistic pair:
  - ★ The agonist (prime mover) contracts, pulling on the bone to cause movement.
  - ★ The antagonist relaxes, so as not to impede the movement.

Muscles contract in two ways:

1. **Isotonic contractions**: when muscles change length as they contract. These can be either:
   - ★ **Concentric** – shorten as they contract

   OR

   - ★ **Eccentric** – lengthen as they contract
2. **Isometric contractions**: when muscles stay the same length as they contract.