
BIOMECHANICS

What is Biomechanics?

- The study of how living organisms move and the forces that act on them.
- Helps us understand sports performance, injury prevention, and everyday movements.

Basic Biomechanical Concepts

- Muscles: Tissues that contract to produce movement.
- Bones: Provide structure and support for the body.
- Joints: Connect bones and allow movement.
- Forces: Push or pull that causes an object to move or change direction.
- Motion: Changing position or location.

Types of Joints

- Hinge Joints (e.g., knees, elbows): Allow movement in one direction (like a door hinge).
- Ball-and-Socket Joints (e.g., shoulders, hips): Allow movement in multiple directions (like a ball in a socket).

How Muscles Work

- Muscle contraction: Muscles shorten and pull on bones to create movement.
- Types of muscle contractions: Concentric (shortening), eccentric (lengthening), isometric (no change in length).

Biomechanics in Sports and everyday life

- Example: Running biomechanics - Discuss stride length, foot strike, and arm swing.
- Importance of biomechanics in sports performance and injury prevention.
- Examples: Walking, sitting, lifting objects.
- How biomechanics principles apply to activities we do daily.

Forces in Biomechanics

- Types of forces: Gravity, friction, applied force.
- Examples: Gravity pulls us down, friction helps us grip surfaces, applied force when pushing or pulling objects.
- Newton’s three laws of motion.

Biomechanics of Usain Bolt