Paper 1

Movement Analysis

Lever Fulcrum Load Effort First Class Lever Second Class Lever Third Class Lever Mechanical Advantage Load Arm Effort Arm
Flexion Extension Abduction Adduction Dorsiflexion Plantar Flexion Rotation Circumduction Plane Axis Frontal Plane
Transverse Plane Sagittal Plane Sagittal Axis Longitudinal Axis Transverse Axis

Lever: a rigid bar that turns about an axis to create movement
Fulcrum: The fixed point at which a lever turns or is supported. (It can also be referred to as the axis)
Load: The weight or 'resistance' that the lever must move
Effort: The force required to move the load.

Types of Levers

First Class Lever

EFL

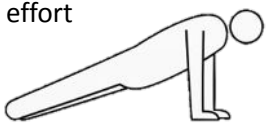
Fulcrum is midway between the effort and the load. Also, the fulcrum is quite close to both the effort and the load

E.g. A line-out in rugby

Second Class Lever

ELF

The load is between the fulcrum and the effort. This means that a large load can be moved with relatively low effort



E.g. A press up

Third Class Lever

FEL

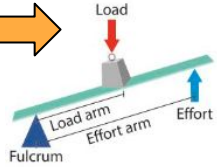
The effort placed between the fulcrum and the load. They can produce a larger range of movement with relatively low effort

E.g. A bicep curl

Mechanical Advantage

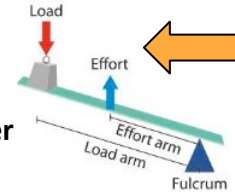
The distance from the load to the fulcrum is known as the **LOAD ARM**
The distance from the effort to the fulcrum is known as the **EFFORT ARM**

A lever's effort arm is longer than its load arm = high mechanical advantage. High mechanical advantage can move large loads with relatively low effort



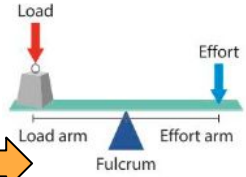
2nd class lever

A lever's load arm is longer than its effort arm = low mechanical advantage. Cannot lift heavy loads due to the position of the fulcrum in relation to the effort and load



3rd class lever

First class levers can have high (fulcrum is close to load) or low mechanical advantage (fulcrum is close to effort)



1st class lever

Paper 1

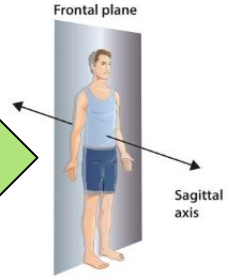
Movement Analysis

Basic Movements

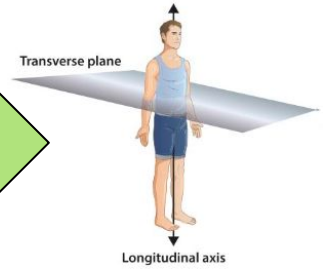
Shoulder, Elbow, Hip, Knee	Shoulder & Hip	Ankle	Shoulder & Hip
Preparation to kick a ball (bend at the knee)	Outward movement in a star jump	Downward phase of a squat, at the ankle	Topspin forehand shot in tennis, at the shoulder
Decrease in angle	Away from midline	Ankle: point toes	Around an axis
Flexion 	**Abduction** 	**Plantar flexion** 	**Rotation**
Increase in angle	Towards midline	Ankle: Flexes foot	Creates a cone
Extension 	**Adduction** 	**Dorsi Flexion** 	**Circumduction**
Shoulder, Elbow, Hip, Knee	Shoulder & Hip	Ankle	Shoulder & Hip
Making contact with the ball (straight at knee)	Inward movement in a star jump	Basketballer jumps into the air, at the ankle	Overarm tennis serve, at the shoulder

Planes of Movement & Axes of Rotation

Movement occurs in the frontal plane about the sagittal axis. **CARTWHEEL**



Movement occurs in the transverse plane about the longitudinal axis. **FULL TWIST JUMP**



Movement occurs in the sagittal plane about the transverse axis. **FRONT SOMERSAULT**