

Simple biomechanics



UNTAMED
EDUCATION

1.4 Anatomy and physiology

Dorsi Flexion

Plantar Flexion

Force

Load

Gravity

Simple Biomechanics

Effort

Levers

Acceleration

Air resistance

Fulcrum



Simple Biomechanics

1. Principles of force

- ▶ A force can be a pull or a push
- ▶ Push and pull forces are used when turning the pedals on a bike.
- ▶ An increase or decrease in force can cause acceleration or deceleration.

$$\text{Force} = \text{mass} \times \text{acceleration}$$



Pushing
the pedals

Pulling the pedals



2. Applications of force

1. Sprinter in the blocks



Air resistance

Gravity

Ground reaction
force

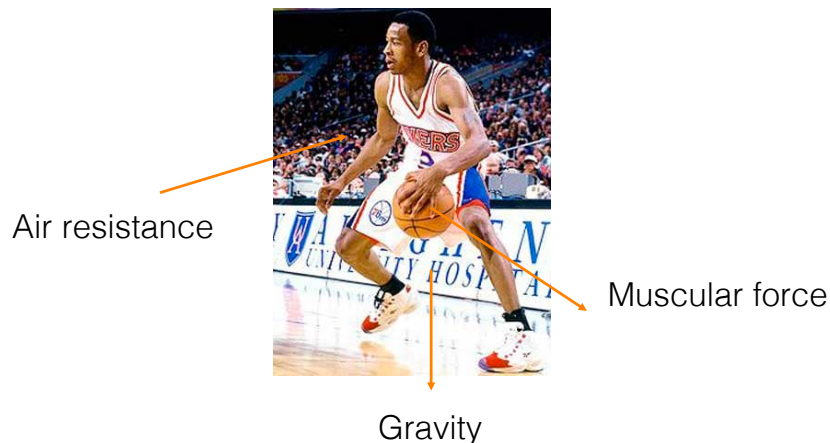


Simple Biomechanics

2. Object in the air



3. Moving performer



3. Levers

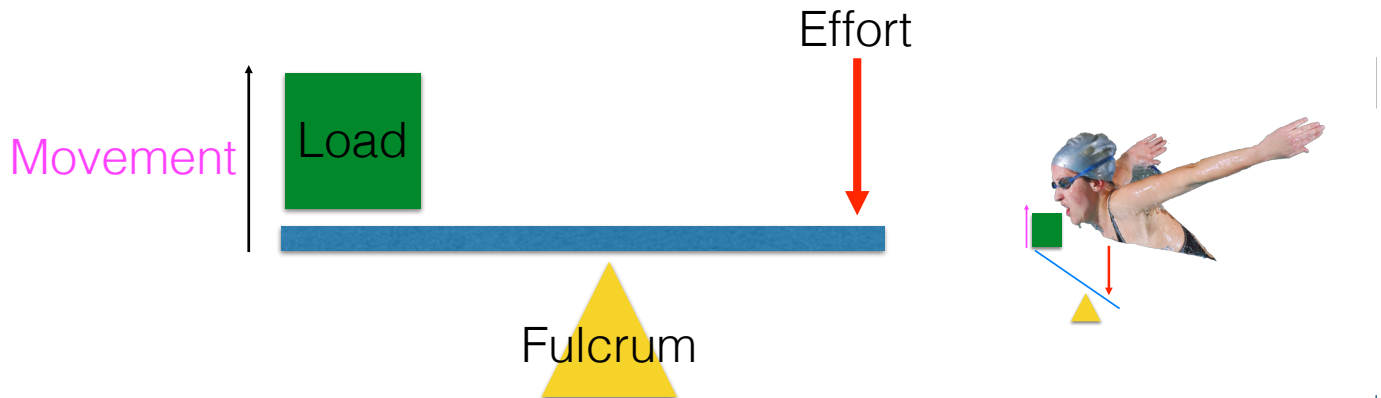
- ▶ Muscles and bones work together as a series of **levers** to create movement.
- ▶ A lever is a **rigid bar** is comprised of three components:
- ▶ **Fulcrum** (the point at which the lever rotates)
- ▶ **Load** (the resistance applied to the lever system)
- ▶ **Effort** (the effort/muscle needed to move the lever system)
- ▶ The **classification of lever** depends on the **order** in which these **three components** are in relation to each other.



Simple Biomechanics

4. First class levers

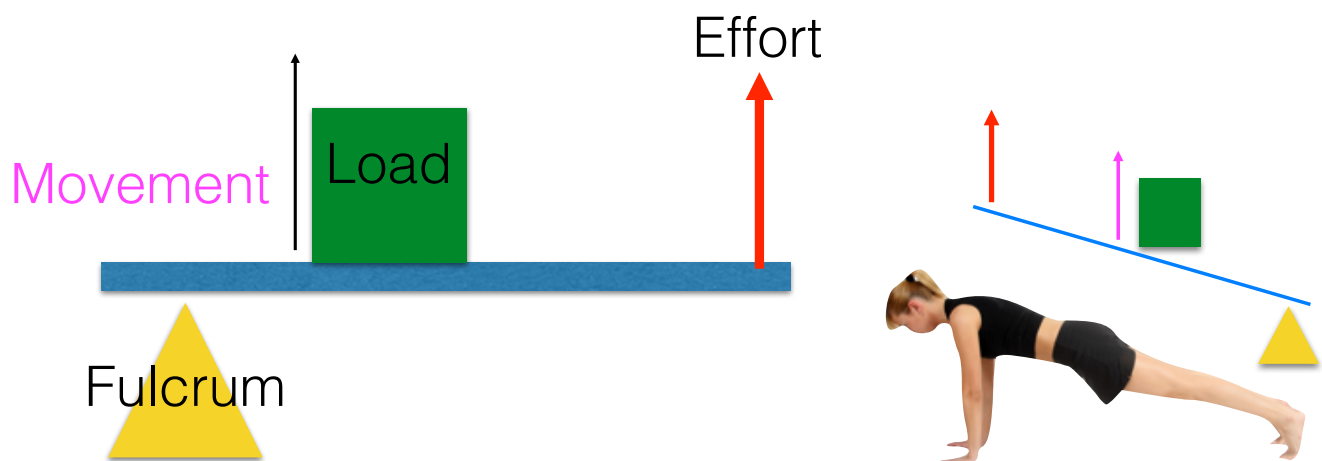
- **First class levers** are organised in a see saw order to move the load.



- Examples of first class levers:
 - **nodding the head** i.e. breathing in Swimming or heading in Football.

5. Second class levers

- **Second class levers** are organised in a wheelbarrow order to move the load.



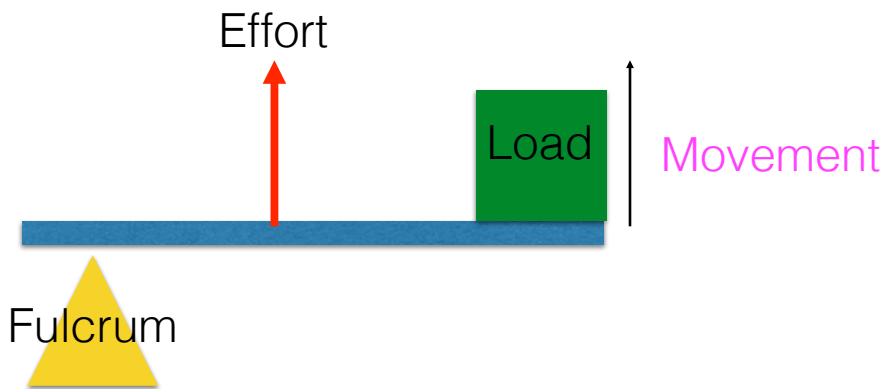
- Examples of second class levers:
 - **press up**



Simple Biomechanics

6. Third class levers

- ▶ **Third class levers** are organised in a fishing rod order to move the load.



- ▶ Examples of third class levers:
 - ▶ **bicep curl** (effort is where the muscle attaches to the lever)