

AQA GCSE PE 9-1: Levers

Specification

3.1.2.1 Lever systems, examples of their use in activity and the mechanical advantage they provide in movement

Content	Additional information
First, second and third class lever systems within sporting examples	<p>Identification of first, second and third class lever systems.</p> <p>Basic drawings of the three classes of lever to illustrate the positioning of:</p> <ul style="list-style-type: none"> • fulcrum • load (resistance) • effort. <p>Draw linear versions of a lever, showing the positioning of the fulcrum, load/resistance and effort.</p> <p>Students do not need to be taught to draw anatomical body parts but must be able to link the correct lever to a sporting movement or action.</p> <p>Interpretation of sporting movements or actions which involve flexion or extension of the elbow and/or knee, and plantar or dorsi-flexion at the ankle.</p>

16 Visit for the most up-to-date specification, resources, support and administration

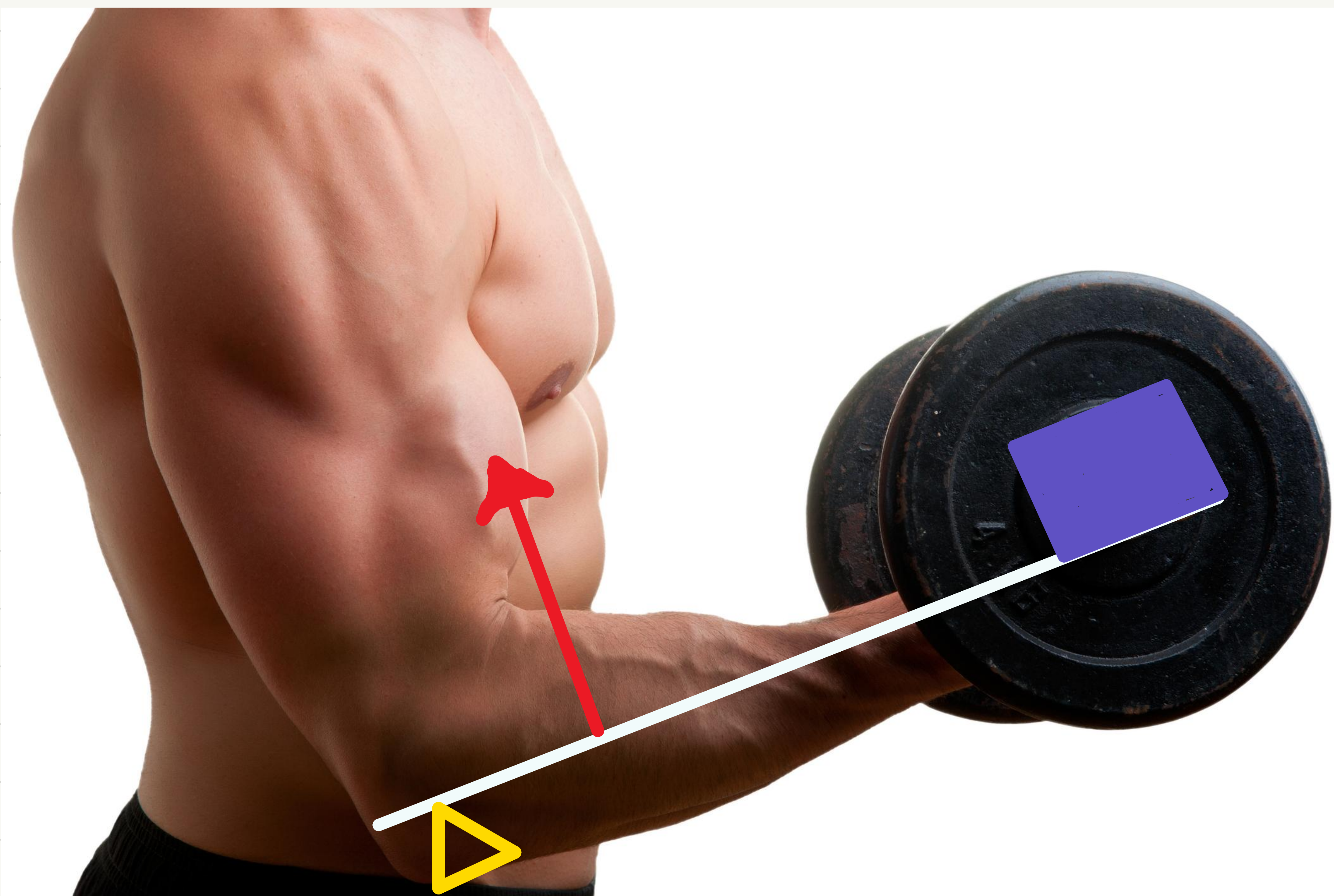
AQA GCSE Physical Education 8582. GCSE exams June 2018 onwards. Version 1.5 14 June 2021

Content	Additional information
Mechanical advantage – an understanding of mechanical advantage in relation to the three lever systems	<p>Label the effort arm and load/resistance arm on the three classes of lever.</p> <p>Mechanical advantage = effort arm ÷ weight (resistance) arm.</p> <p>Labelling of the effort arm and resistance arm on lever drawings, and interpretation of the mechanical advantage of that lever.</p>

Analysis of spec incorporating exam keywords

Levers	Identification of first	Elbow extension
		Neck extension
	Identification of second	Ankle during plantar flexion
	Identification of third	Elbow flexion
		Knee flexion
		Knee extension
	Basic drawings of the systems showing the three components	Fulcrum
		Load (resistance)
		Effort
Mechanical advantage	Definition	Mechanical advantage = effort arm/load arm
	Label the effort arm on all three lever systems	
	Understanding of mechanical advantage	Overcome large loads
		Relatively little effort
		Short RoM
Limited speed of movement		

Canvras



Lever's have
four
components:

Lever arm
fulcrum
Effort
Load

How to identify levers

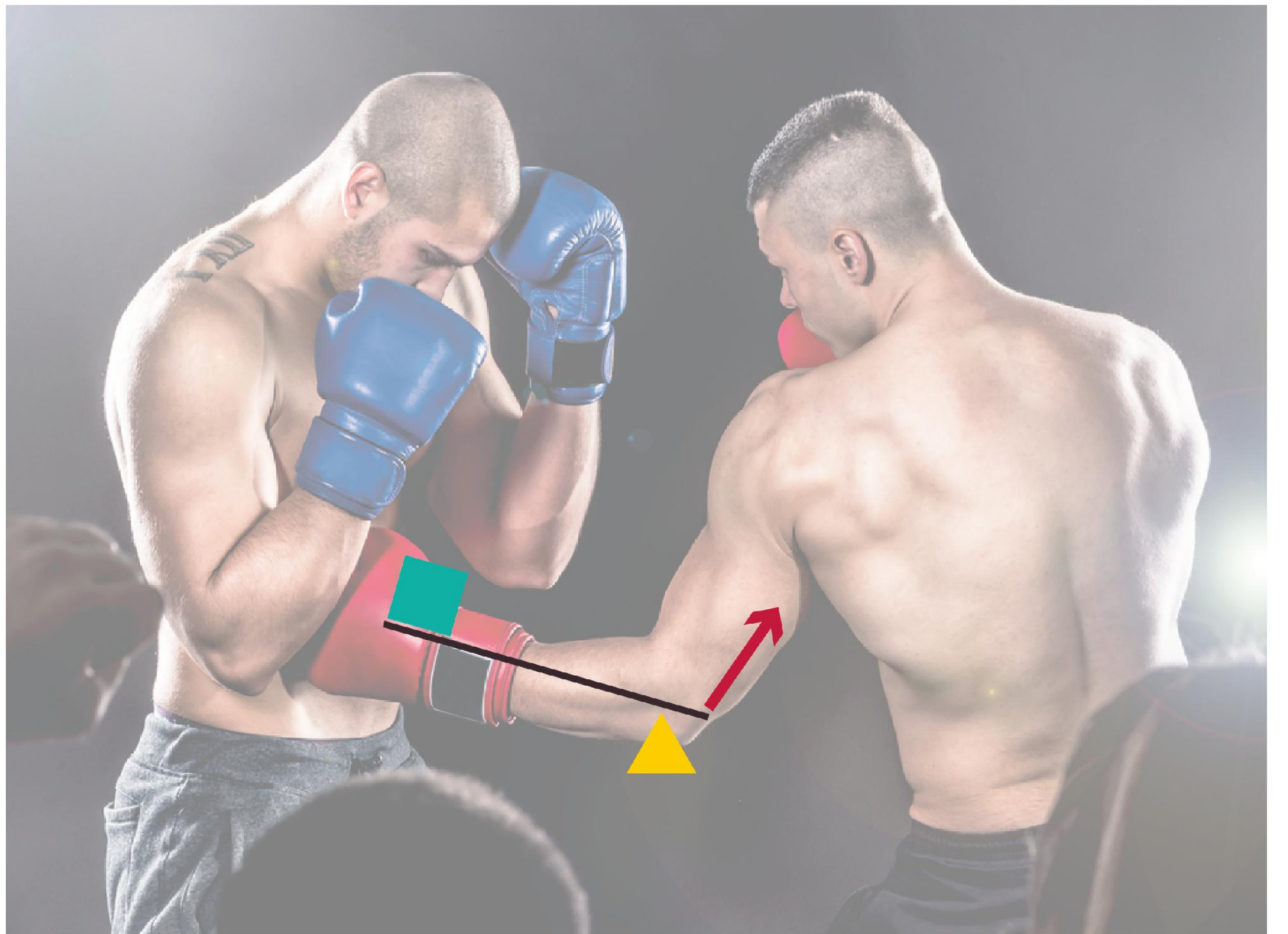
for 1, 2, 3

Think F, L, E

Class 1 levers

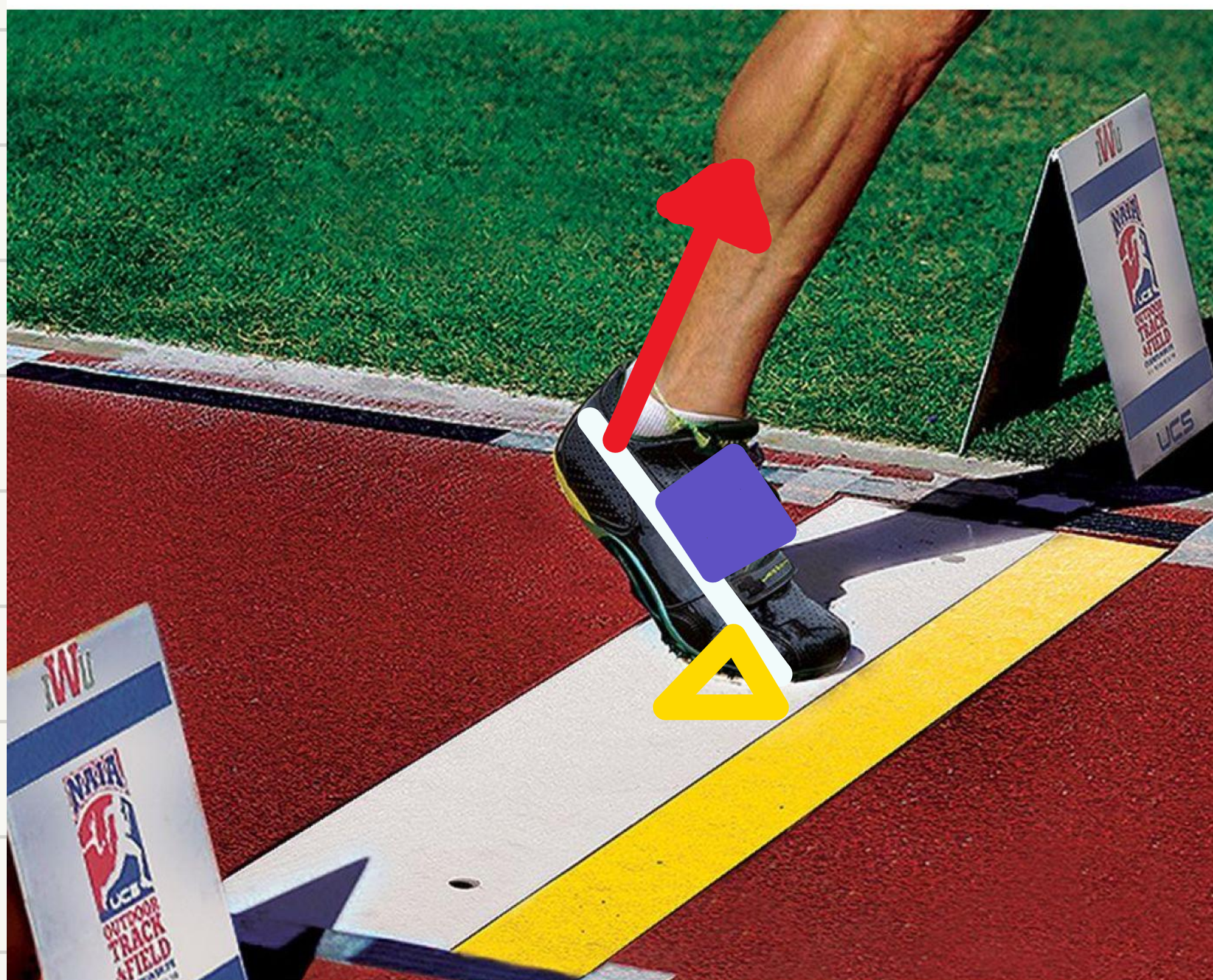


Neck extension
fulcrum: Atlas + axis
Effort: sternocleidomastoid
Load: weight of the head (COM)



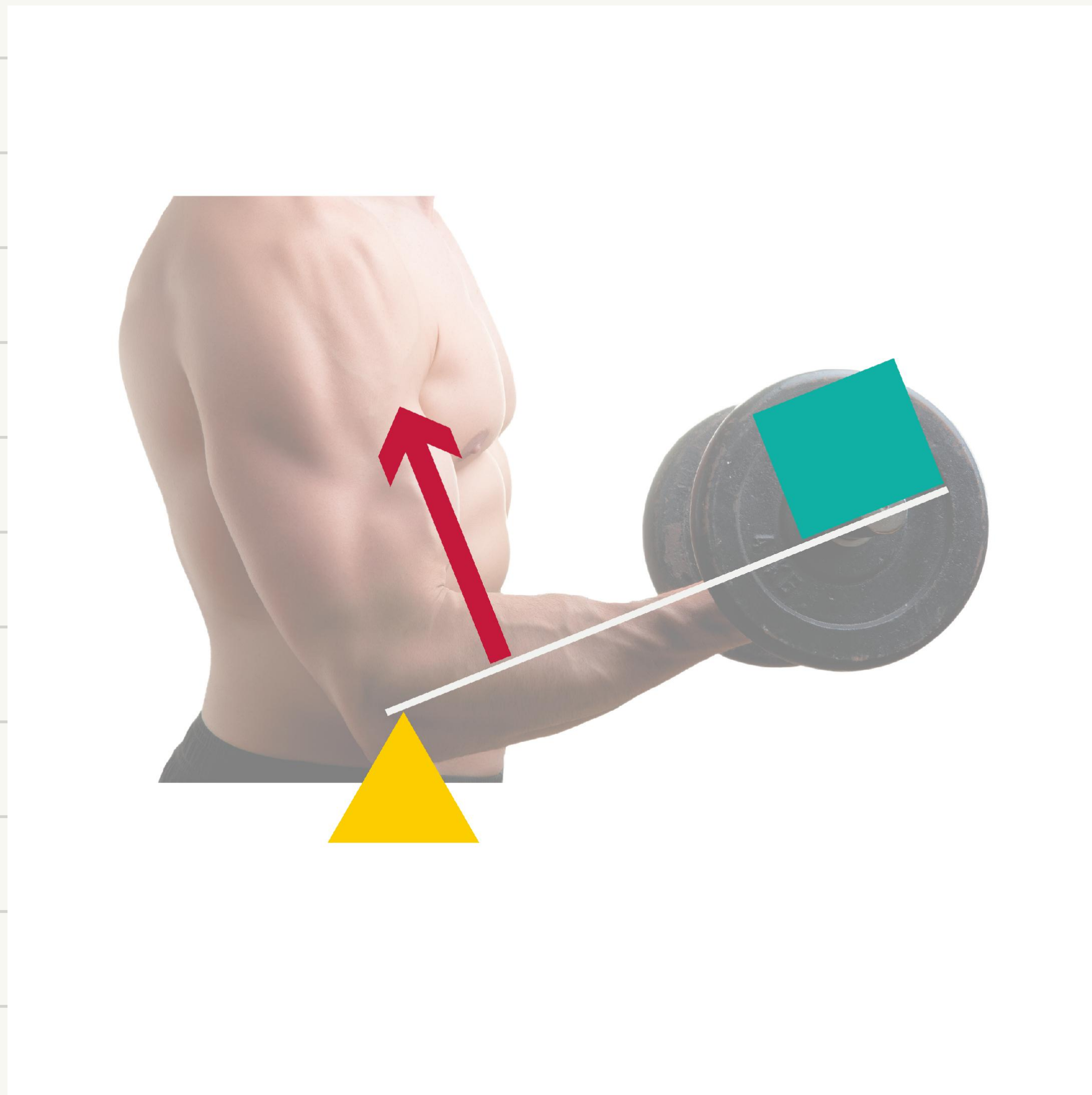
Elbow extension
Fulcrum: elbow joint
Effort: Insertion of triceps onto the ulna
Load: Weight of forearm

Class 2 levers



plantar flexion
Fulcrum: ball of the foot
Effort: Gastrocnemius
Load: Body weight

Class 3 levers



Elbow Flexion

Fulcrum: elbow

Effort: biceps insertion onto the radius

Load: dumbbell

Mechanical Advantage

$$MA = \frac{\text{Effort arm}}{\text{Load arm}}$$

If the effort arm is long in relation to the load arm, MA is present.

Short ROM/
little flexibility

Limited speed
of movement

MA

Overcome
large loads

Relatively
little effort