KNOWLEDGE ORGANISER GUIDANCE

It is advised that you print the relevant subject knowledge organisers and have them available to you when needed at all times.

An alternative recommendation would be to download the knowledge organisers for your subjects onto your electronic devices so you can access them when needed.

With the knowledge organiser you should make revision cards to help revise and build in time during independent study to test yourself weekly on the content.

While you have independent study, you should use your Knowledge Planner to study the relevant subject's Knowledge Organiser and learn the information provided.

Haggerston School

SIXTH FORM KNOWLEDGE ORGANISER

PE

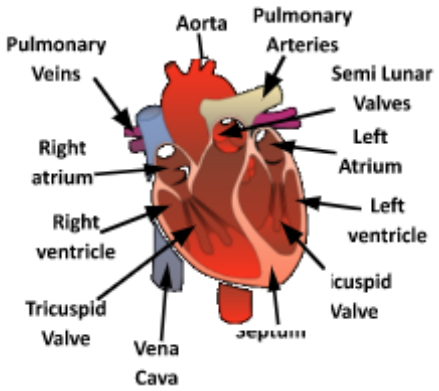
2023/2024

Aspiration Creativity Character

PE

Cardiovascular system System

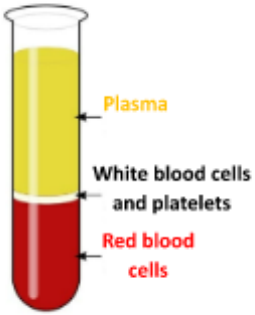
Structure of the Heart



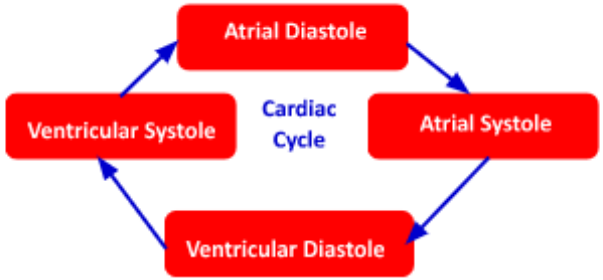
Functions of the System

- Delivering oxygen and nutrients
- Removing waste products
- Thermoregulation
- Fighting infection
- Clot blood

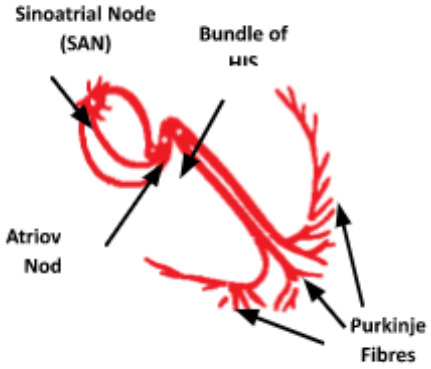
Composition of blood



Cardiac Cycle



Conduction of the Heart



YOU THERE

(YEAH, YOUUUUUU!!!)

THERE'S A DIFFERENCE BETWEEN EXERCISING AND TRAINING. LEARN IT!!!

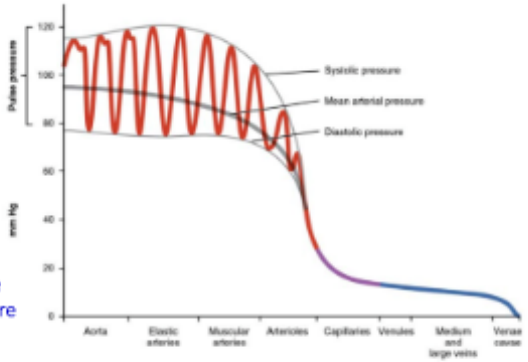
Exercise (Short term)

1) Anticipatory rise
2) Increased heart rate
3) Increased Cardiac output
4) Increased blood pressure
5) redirection of blood

Training (Long Term)

1) Cardiac hypertrophy
2) Decrease in resting heart rate
3) Decrease in resting stroke volume
4) Reduction in resting blood pressure
5) Decreased recovery time
6) Increased blood volume

Blood pressure



Neural control of heart rate

Sympathetic nervous system

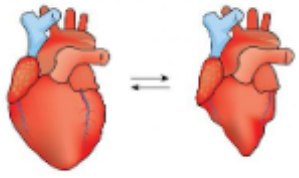
Excites – fight or flight

1) Secretes adrenaline
2) Increases heartrate
3) Increased blood pressure
4) Increases contractibility of the heart
5) Stimulates vasoconstriction/ vasodilation

Parasympathetic nervous system

Calms/relaxes

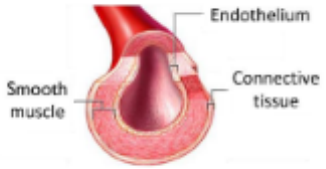
1) Decrease heart rate
2) Decrease blood pressure
3) Decrease cardiac output (Q)



Diastolic Systolic

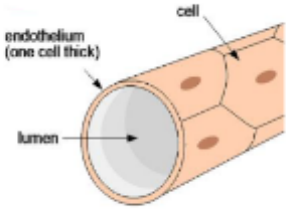
Structure of Blood Vessels

Artery / Arterioles



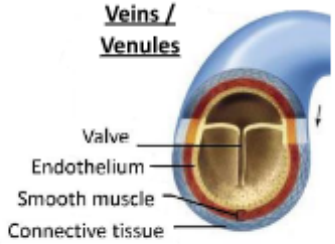
- Takes blood **A**way from the heart (exception the pulmonary artery)
- Oxygenated blood
- Thick elastic walls
- High pressure

Capillary

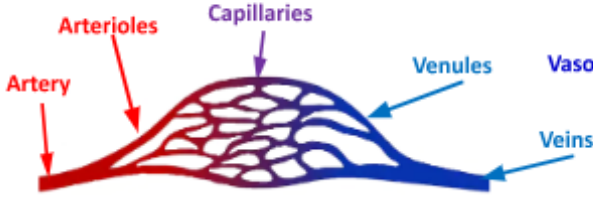


- One cell thick
- Diffusion
- Gaseous exchange (oxygen in CO_2 waste out)

Veins / Venules



- Blood back to the heart
- Deoxygenated blood
- Thin walls
- Large lumen
- Lower pressure
- Valves



Vasodilation

Vasoconstriction

PE

Three types of Muscles

Cardiac, non-fatiguing | Involuntary, slow contraction | Skeletal, fatiguing

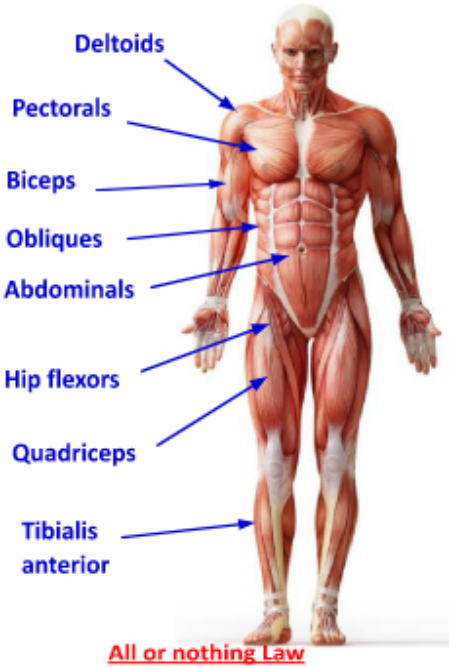
Three types of Muscle Contraction

Isometric – Length of muscle does not change

Concentric – Muscle shortens

Eccentric – Contracts and lengthens

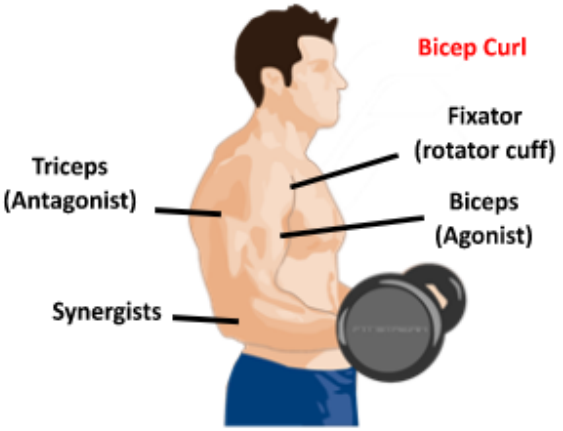
- Slow contraction
- Suited to aerobic activities
- Uses oxygen
- Rich blood supply
- Many mitochondria



All or nothing Law

- Nerve stimulation is needed for contraction
- Motor units used which contain motor neurons.
- When a motor unit is stimulated all the muscles attached will contract

Antagonistic Pairs



Antagonistic pairs = muscles that work together to produce movement (One muscle contracts whilst the other relaxes

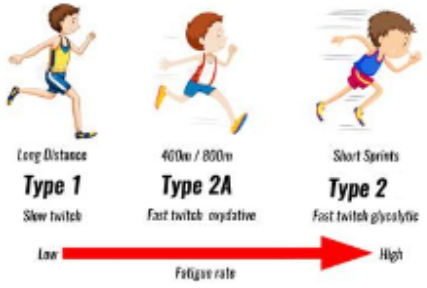
Agonist = muscle shortens to create movement

Antagonist = muscle relaxes during movement

Fixator = stops unwanted movement/stabilises

Synergists = Assists the agonist

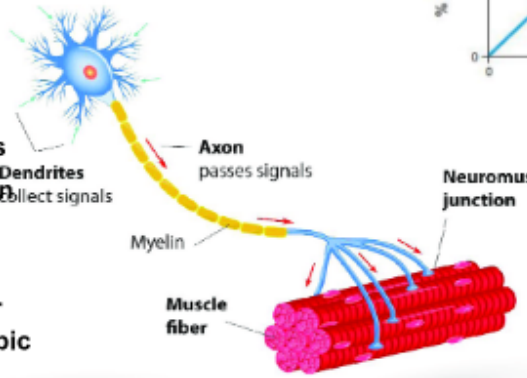
Muscle Fibre Types

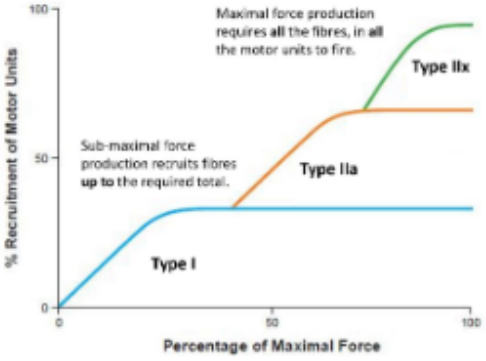


- Fast twitch fibres
- Fast contraction and powerful force
- Resistant to fatigue
- Need less oxygen
- Suited to speed, power activities

- Fast twitch fibres
- Rapid contraction
- Large force produced
- Fatigue so better suited to anaerobic short events

MOTOR NEURON





Additional Factors

- Increased myoglobin stores
- Increased storage of glycogen
- Increased tolerance to lactate

Response to exercise

- Increased blood supply
- Increased temperature
- Increased muscle pliability
- Lactate
- Micro-tears

PE

The development of sport

Popular recreation

Simple/unwritten rules

Violent

Occasional/local

Betting

Natural environment

Little equipment

Popular recreation for the upper classes - real tennis

Took place due to:

Industrialisation – move from rural to urban living – need for disciplined workforce.

Middle/upper classes controlling society, wanting society to be more civilised and less violent. Factory acts – increased free time for the working classes.

Transport and communication developed.

Administration needed as there were more clubs.

Rational recreation

More civilised

Codified/complex/written rules

Boundaries (time and space)

Set numbers/Kit

Tactics and skill

Regular

First half of 19th Century:

Migration of lower classes to urban areas

Lack of leisure time and income

Poor health

Loss of rights

Lack of public provision

Second half of 19th Century:

Health and hygiene improved

Increase in wages and more time

Development of new middle class (self-made men)

Influence of ex-public schoolboys

Cheaper to travel

The role of public school boys and university old boys in the development of sport in Britain and in the British Empire.

As teachers - developed teams and taught traditional sporting values in schools throughout the empire.

As industrialists/factory owners - set up teams and gave workers time off to play nationally and internationally.

As clergy - developed church teams or became missionaries and took sport abroad.

As officers in the British army - used sport with the armed services and spread sport throughout the Empire.

As diplomats - travelled the world and took sport with them.

Formed national governing bodies of sport e.g. RFU - codified sports and established leagues and competitions.

What was life like?

Widespread illiteracy amongst working class

Limited communication, technology and transport

Rural living - limited free time, long hours

Two tier class system - working class/upper class

Harsh living for the working class

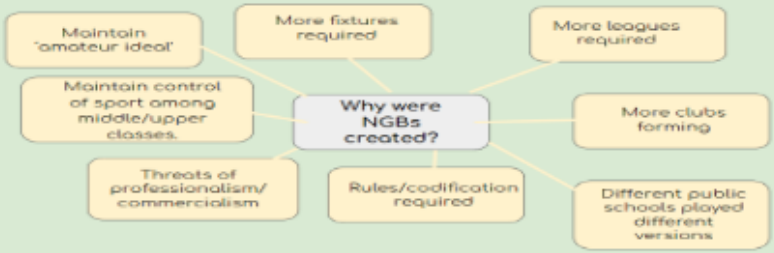
The changing role of women in:
Association football
Lawn tennis
Athletics

Mob football	Real tennis
Working class	Upper class
Simple/unwritten rules	Complex rules
Occasional/local	Regular/non-local
Natural environment	Purpose built facilities
Little equipment	Expensive specialist equipment
Violent	High moral code

Professionals	Amateurs
Working class	Middle/upper class
Poor	Wealthy
Little free time	Lots of free time
Committed to train	No desire to train
Low morality: winning important	High morality: emphasis on taking part
Playing for financial gain	Playing for the love of it

The development of national governing bodies (NGBs)

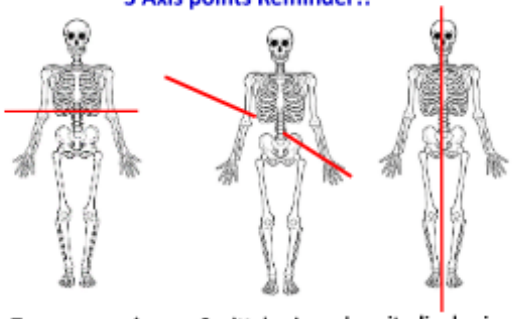
Mid to late 19th century - many NGBs created by ex-public school boys e.g. Football Association in 1863. Because they saw the need for more structure in sport.



PE

Angular Motion – Rotation around a fixed point or axes

3 Axis points Reminder!!



Transverse axis | Sagittal axis | Longitudinal axis

Somersault | Cartwheel | Ice Skating Spin

Angular Motion

Torque = Rotational consequence of a force. A turning force causing rotation

Increasing size of force increases torque. If same force is applied further away from the axes of rotation torque increases

Moment of force/torque (Newton/metres) =

Force x perpendicular distance from fulcrum

Newton's Laws of Angular Motion

Newton's First Law

"A rotating body will continue to turn about its axis of rotation with constant angular momentum unless an external force (torque) acts upon it"

Ice skater will continue to spin until they land. The ground exerts an external force (torque) which changes their state of angular momentum

Newton's Second Law

"The rate of change of angular momentum of a body is proportional to the force causing it and the change that takes place in the direction the force acts"

The greater the torque exerted the faster the rotation will be.

Newton's Third Law

"When a force is applied by one body to another, the second body will exert an equal and opposite force on the body"

Goal keeper tipping a ball over a bar by throwing their arms up (eccentric contraction), which causes the lower part of the body to go back (reaction force)

Moments of Inertia

The resistance to a body to angular motion.

Can be applied at start of rotation a body will resists angular motion but once it starts it will want to continue.

Mass of an object

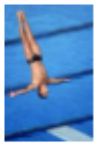
The greater the mass the greater the resistance to change

Bowling ball verses Football

Distribution of mass from axis of rotation

The greater the mass the greater the resistance to change

More difficult to perform



Closer of mass to axis of rotation, easier to turn, Moments of inertia low

Conserving Angular Momentum

Quantity of rotation a body possesses. Stays constant until an external force acts on it (Newton's first law)

Angular momentum = Moments of Inertia x Angular velocity

Ice is friction free

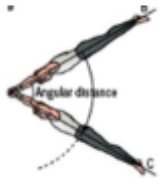
Distance of body parts to point of axis increases, moments of inertia increases, decreasing angular velocity

Distance of body parts to point of axis decreases, moments of inertia decreases, increasing angular velocity

Quantities used in Angular Motion

Angular Displacement

Smallest change in the angle between starting and finishing point. Measured in degrees and radians



Angular velocity

Refers to the rotational speed of an object and the axis about which its turning..

Angular Velocity (rad/s) = Angular displacement (rad) / Time taken (s)

Radians = The displacement for angles

Angular velocity

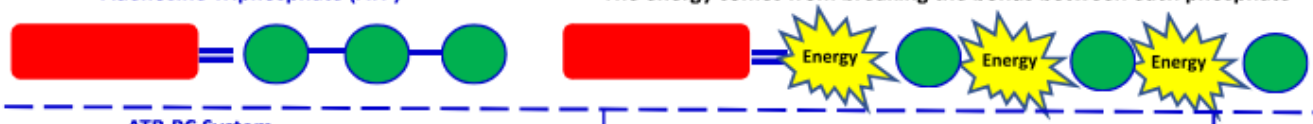
Rate of change of angular velocity

Angular acceleration (rad/s²) = Change in angular velocity (rad) / Time taken (s)

PE

Energy Systems

Adenosine Triphosphate (ATP)

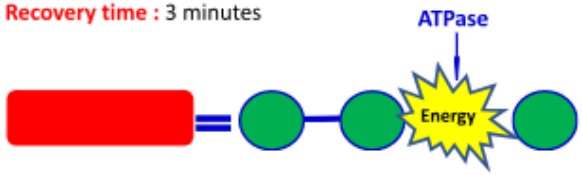


The energy comes from breaking the bonds between each phosphate

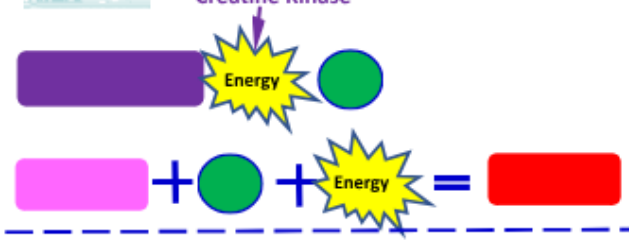
- ATP is the only usable form of energy in the body.
- The body has a store of 3 seconds of ATP.
- Then there are 3 systems that can resynthesise it

ATP-PC System

Type: Anaerobic
Fuel source : Phosphocreatine (PC)
Duration: 8-10 seconds
Used in : short explosive power
Recovery time : 3 minutes

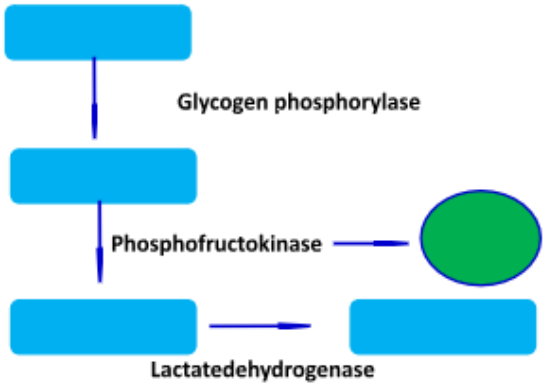


Let's Refuel using Creatine Phosphate



Lactate System

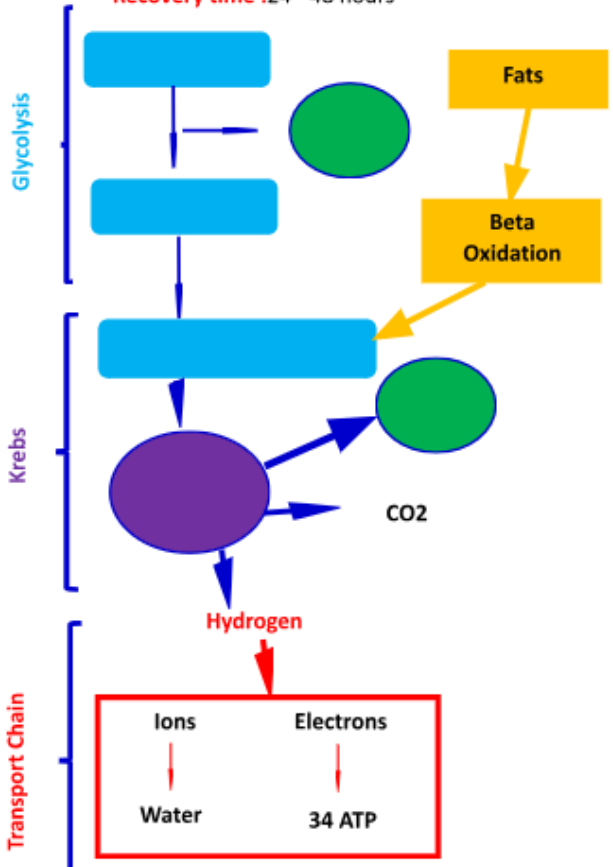
Type: Anaerobic Glycolysis
Fuel source : Glycogen
Duration: 10 secs to 2 mins
Used in : stop start games/ court sports/400m
Recovery time : 1-2 hours



This Process is known as Anaerobic Glycolysis

Aerobic System

Type: Aerobic Glycolysis
Fuel source : Glycogen and fat
Duration: Longer than 2 mins
Used in : Long distance and endurance events
Recovery time :24 - 48 hours



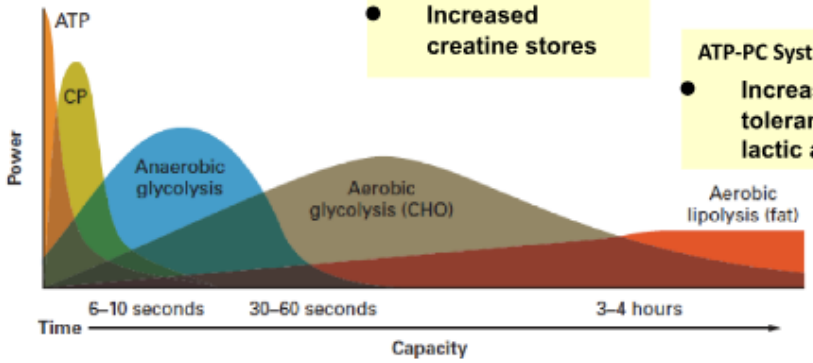
Total Yield: 38 ATP

Adaptations to Systems Long Term

ATP-PC System
- Increased creatine stores

ATP-PC System
- Increased tolerance to lactic acid

Aerobic System
- Increased use of fats
- Increased storage of glycogen



PE

Fluid Mechanics

Fluid Mechanics

Object or body moving through liquid or gas

Swimmer through water

Tennis ball travelling through air

Slowed by friction or drag

Dynamic fluid force

Gases and fluids and forces acting on them

Drag and lift are dynamic fluid forces

Drag effects

Lift effects

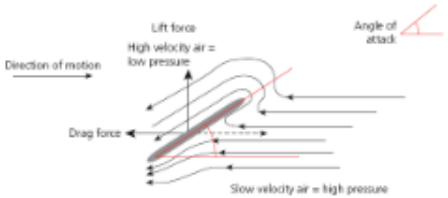
Bernoulli Principle

Air molecules exert less pressure the faster they travel and more pressure the slower they travel

Lift force – upward force that keeps Discus in the air for longer increasing horizontal distance

Discus throw

Angle of attack is vital – it changes in the flow of air. Air underneath has less distance to travel. Upward lift created.



Drag = Slows something down

Types of Drag

Surface Drag

Friction between surface of an object and its fluid environment

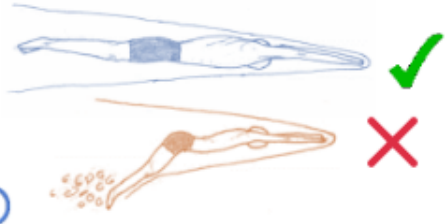
'Skin Drag'

Form Drag

Impact of fluid environment on an object

'Shape Drag'

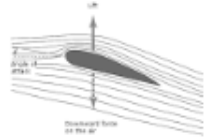
Streamlining



Can also have downward direction (downward lift force)

F1 car – has an angled spoiler so force is directed downward creating friction with the ground to create firm grip on the track.

Air travelling over the car has a shorter distance to go



Streamlined onto the handlebars air has to travel over, having a shorter distance to travel

The velocity of moving objects

Greater the velocity the greater the drag force

Racing car, sprinter or cyclist will experience more air resistance and therefor more drag

To reduce this streamlining is important!

Streamlining – shaping a body so it can move effectively and quickly through a fluid

Factors that Reduce and Increase Drag

Cross-sectional area of a moving body

Can increase or reduce drag.

Large cross-sectional increases drag

For some sports it is essential for success e.g. Tour de France

Crouch down in onto handle bars lowering cross-sectional area

Shape and surface characteristics of a moving body

Gaining marginal gains

Drag resistant clothing

Speed skier – helmet extends to shoulders and specialise clothing and aerodynamic boots

Smooth surface

Swimmers try to create a smooth surface. Clothing and sharing body hair

Shuttlecock

Shape and surface mean a much larger shape and therefore drag from air resistance

PE

Linear Motion Definitions

Scalars and Vectors

Scalar Quantity; Measurements are described in terms of size or magnitude

Mass Speed Distance

Vector Quantity = Measurements described in terms of size and direction

Weight Acceleration Momentum Displacement Velocity

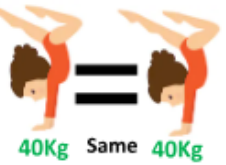
Mass verses Weight

Mass

The quantity of matter the body possesses

Weight

Force on mass due to gravity. Measured in Newtons.



Mass (kg) x Gravity (9.8) = Weight Newtons

Speed

Speed = how fast a body can move

$$\text{Speed} = \frac{\text{Distance covered (m)}}{\text{Time taken (s)}}$$

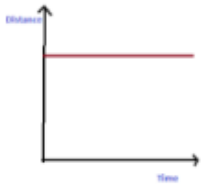
Speed verses Velocity

Velocity = rate of change of displacement. How fast something moves and in what direction

$$\frac{\text{Displacement (m)}}{\text{Time taken (s)}}$$

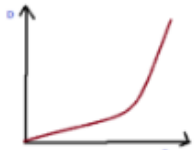
Velocity

Distance – Time Graph

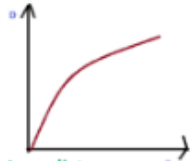


Performer is stationary

Run changing at constant rate at same speed



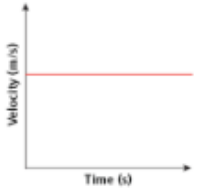
More distance cover, acceleration taking place



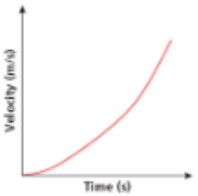
Less distance covered, deceleration occuring

Graphs of motion

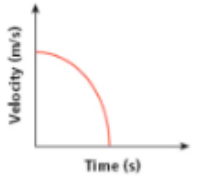
Velocity – time and speed - time Graph



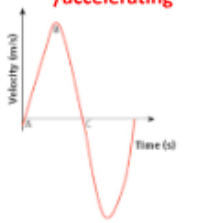
Travelling at a constant speed



Increasing velocity /accelerating



Decreasing velocity/ acceleration



Accelerating and decelerating

Momentum

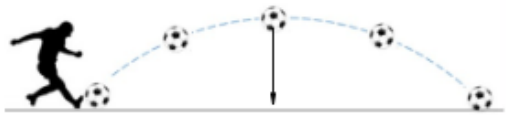
Momentum (kgm/s = Mass (kg) x Velocity (m/s)

Product of mass and velocity of an object

Bigger the mass and high velocity equals greater momentum

Conservation of momentum

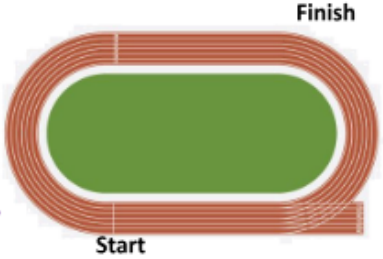
When an object is in flight. Fast arm action releases the ball with a high velocity. Velocity won't change unless and external force acts upon it (gravity)



Distance verses Displacement

Distance

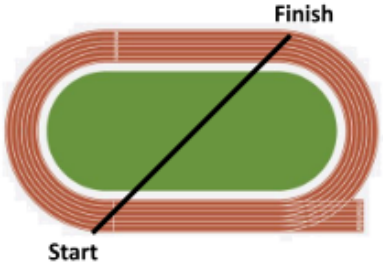
Measured in metres and Tells you how far you have travelled from start to finish.



Distance cover is 200m

Displacement

Length of a straight line from start to finish. Measured in metres.



Acceleration

Rate of change of velocity. If velocity increases so does acceleration.

Acceleration Equation

$$\frac{\text{Change in velocity (m/s)}}{\text{Time (s)}}$$

Change in velocity

$$\frac{\text{Final velocity – initial velocity}}{\text{Time}}$$

PE

Projectile Motion

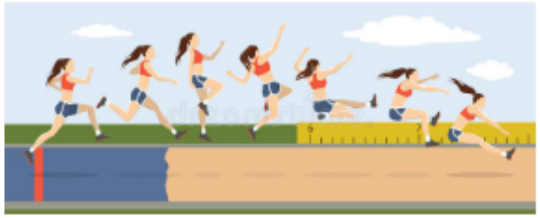
Factors affecting the horizontal displacement of a projectile

Angle of release

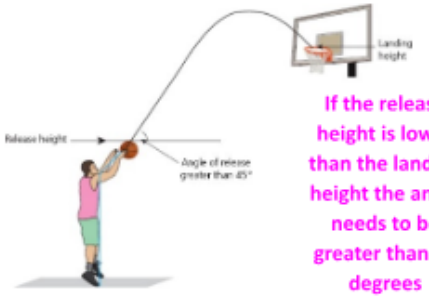
Horizontal displacement
The shortest distance from the starting point to the finishing point in a line parallel to the ground.

Optimum Angle of release
Angle between the horizontal and the direction of a projectile at release.

Optimum angle of release depends on release height and landing height

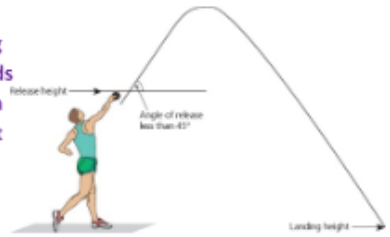


Both release height and landing height are the same a 45 degree angle is needed (long jump).



If the release height is lower than the landing height the angle needs to be greater than 45 degrees

If the release height is higher than the landing height angle needs to be lower than 45 degrees (shot put)



Speed of release

The greater the release of a projectile the greater the horizontal displacement

Rotation across the circle increases maximum velocity

Height of release

The greater release height the greater the horizontal displacement

Gravity is constantly acting on shot put

Factors affecting flight paths of different projectiles

Parabola = A curve matching left and right hand sides

Parabola is a uniform symmetrical curve at its highest point

Parabolic flight path of a shot put

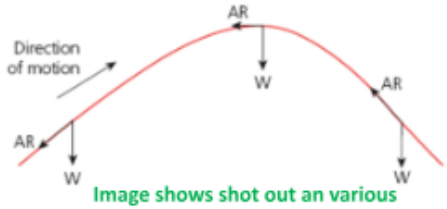
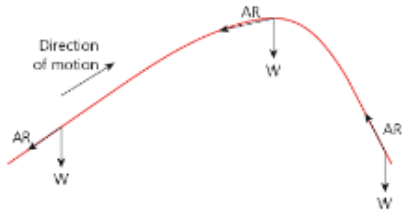


Image shows shot out an various stages of flight. It's a large mass so has a large weight arrow.

Weight and gravity affect projectiles in the air. These determine parabola or distorted parabola



The lighter the mass the more affect air resistance can have on a projectile. E.g. a shuttlecock

Since the shuttlecock has a lighter mass and irregular shape it increases air resistance slowing it down.

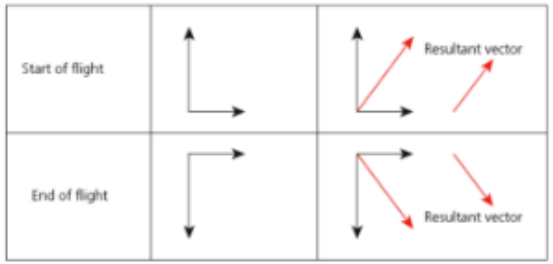
Vector Components of parabolic flight

Horizontal component = horizontal motion of an object

Vertical component = upward motion of an object

Can be affected by vectors. Vector is drawn as an arrow and it has both magnitude and direction.

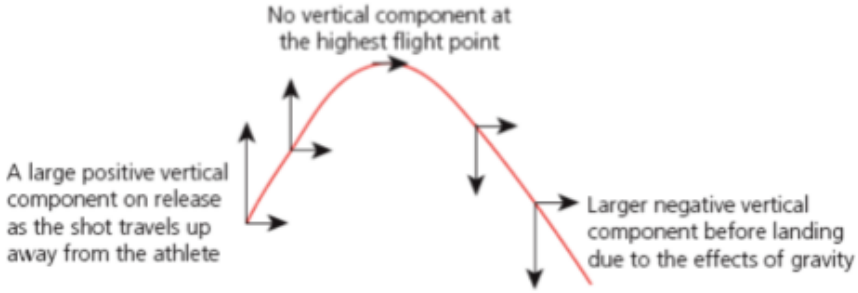
Bigger arrow means more size and smaller arrow means less magnitude



Horizontal and vertical vectors on the flight path as it follow parabolic flight.

Vertical component can only be affected by gravity

Horizontal factors affected by air resistance



Literacy Knowledge Organiser

SPaG

Grammar: Write in Sentences

A sentence is a group of words that make sense. Sentences start with a capital letter and end with a full stop, question mark or exclamation mark. All sentences contain clauses. You should try to use a range of sentences when writing. There are three main types of sentences.

Simple sentence: A sentence containing one main clause with a **subject** and a **verb**.
He reads.
Literacy is important.

Compound sentence: Two simple sentences joined with a conjunction. Both of these simple sentences would make sense on their own. Varying conjunctions makes your writing more interesting.
He read his book because **it was written** by his favourite author.
Literacy is important so **students had** an assembly about reading.

Complex sentence: A longer sentence containing a main clause and one or more subordinate clause(s) used to add more detail. The main clause makes sense on its own. However, a subordinate clause would not make sense on its own, it needs the main clause to make sense. The subordinate clause is separated by a comma (s) and/or conjunction. The clause can go at the beginning, middle or end of the sentence.
He read his book even though it was late.
Even though it was late, he read his book.
He read his book, even though it was late, because it was written by his favourite author.

How can you develop your sentences?
1. Start sentences in different ways. For example, you can start sentences with adjectives, adverbs or verbs.
Adjective: Funny books are my favourite!
Adverb: Regularly reading helps me develop a reading habit.
Verb: Looking at the front cover is a good way to choose a reading book.
2. Use a range of **punctuation**.
3. **Nominalisation**
Nominalisation is the noun form of verbs; verbs become concepts rather than actions. Nominalisation is often used in academic writing. For example:
It is important to read because it helps you in lots of ways.
Becomes: Reading is beneficial in many ways.
Germany invaded Poland in 1939. This was the immediate cause of the Second World War breaking out. Becomes:
Germany's invasion of Poland in 1939 was the immediate cause of the outbreak of the Second World War.

Connectives and Conjunctions	
Cause And Effect	Because So Consequently Therefore Thus
Addition	And Also In addition Further (more)
Comparing	Whereas However Similarly Yet As with/ equally/Likewise
Sequencing	Firstly Initially Then Subsequently Finally After
Emphasis	Importantly Significantly In particular Indeed
Subordinate	Who, despite, until, if, while, as, although, even though, that, which

SPaG: Spelling and Punctuation

Punctuation

Use a range of punctuation accurately when you are writing.

. Full stop Marks the end of a sentence.

, Comma Separates the items on a list or the clauses in a sentence.

' Apostrophe Shows possession (belonging) or omission (letters tak en away).

" " Quotation marks Indicate a quotation or speech.

' ' Inverted commas Indicate a title.

? Question mark Used at the end of a sentence that asks a question.

! Exclamation mark Used at the end of a sentence to show surprise or shock.

: Colon Used to introduce a list or an explanation/ elaboration/ answer to what preceded. A capital letter is only needed after a colon if you are writing a proper noun (name of person or place) or two or more sentences.

; Semi-colon Joins two closely related clauses that could stand alone as sentences. Also used to separate items on a complicated list. A capital letter is not needed after a semi-colon unless you are writing a proper noun (name of person or place).

Brackets Used to add extra information which is not essential in the sentence.

Spelling

Use the following strategies to help you spell tricky words.

1. Break it into sounds (d-i-a-r-y)

2. Break it into syllables (re-mem-ber)

3. Break it into affixes (dis + satisfy)

4. Use a mnemonic (necessary - one collar, two sleeves)

5. Refer to word in the same family (muscle - muscular)

6. Say it as it sounds - spell speak (Wed-nes day)

7. Words within words (Parliament - I AM parliament)

8. Refer to etymology (bi + cycle = two + wheels)

9. Use analogy (bright, light, night, etc)

10. Use a key word to remember a spelling rule (horrible/drinkable for -ible & -able / advice/advise for -ice & -ise)

11. Apply spelling rules (writing, written)

12. Learn by sight (look-cover-say-write check)