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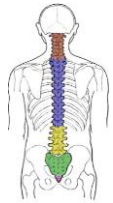
Subject: BTEC Sport | Topic: A - Skeletal System | Side 1 | Year Group: 12/13

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KG 1 A1 – Major bones

	Name	Location
1	Cranium	Head
2	Clavicle	Collar bone
3	Ribs	Ribs
4	Sternum	Breast bone
5	Scapula	Shoulder blade
6	Humerus	Upper arm
7	Radius	Lower arm (Top/Thumb side)
8	Ulna	Lower arm (underneath)
9	Carpals	Wrist
10	Metacarpals	Hand
11	Pelvis	Hips
12	Vertebral Column	Spine
13	Femur	Upper leg
14	Patella	Knee cap
15	Tibia	Shin (Top bone)
16	Fibula	Shin (Small bone)
17	Tarsals	Ankle
18	Metatarsals	Foot
19	Phalanges	Fingers and toes

KG 2 A1 – Areas of skeleton & Postural Deviations

	Area	Name	Function
20		Appendicular Skeleton	Leverage Blood Production Mineral storage Weight bearing Reduce friction
21		Axial Skeleton	Protection Muscle attachment Support
	Vertebral Column		
22		Cervical	Support head
		Thoracic	Supports ribs
		Lumbar	Movement
		Sacrum	Support
		Coccyx	
	Postural Deviations		
		Deviation	Description
23		Scoliosis	Curvature of spine in Thoracic region **S**ide to **S**ide
24		Kyphosis	Curvature of spine in Thoracic region Front to back Hunchback appearance

KG 3 A1 & A2 – Types of Bones and their Functions

	Bone type	Function	Examples
25	Long	Leverage Blood production	Femur Humerus
26	Short	Weight bearing	Carpals Tarsals
27	Flat	Protection Muscle attachment	Scapula Cranium
28	Irregular		Vertebrae
29	Sesamoid	Reduce friction across a joint	Patella

KG 4 A1 – Bone Growth

30	Ossification	Process of bone growth
	Component	Function
31	Epiphyseal plate	Site of growth
32	Osteoclasts	Break down old bone
33	Osteoblasts	Produce new bone
34	Epiphyseal Line	Forms once growth stops

KG 5 A3 – Type of Joints

	Type	Description	Example
35	Fibrous (Fixed)	No movement Joined by fibrous tissue	Cranium
36	Cartilaginous (Slightly Moveable)	Slight movement Cartilage protects bones	Vertebrae
37	Synovial (Freely Moveable)	Large range of movement Contains synovial fluid	Knee Shoulder

KG 6 A3 – Structure of Synovial Joints

	Component	Description
38	Articulating bone	Bones that form the joint
39	Cartilage	Covers end of bone Provides shock absorption
40	Synovial Membrane	Secretes synovial fluid
41	Synovial Fluid	Found between bones Lubricates joint
42	Bursa	Synovial fluid filled sack Lubricates between ligament/bone
43	Joint Capsule	Seals and stabilises joint
44	Ligament	Joins bone to bone

KG 7 A3 – Types of Synovial Joints

	Type	Examples
45	Ball and Socket	Shoulder / hip
46	Condyloid	Wrist
47	Gliding	Between carpals/ tarsals
48	Saddle	Thumb
49	Hinge	Knee / Elbow / Ankle
50	Pivot	Neck Radioulnar joint

KG 8 A3 – Movement Types

	Movement	Definition
51	Flexion	Closing of a joint
52	Horizontal Flexion	Closing of a joint horizontally (elbow)
53	Lateral Flexion	Closing of a joint laterally (sideways)
54	Plantarflexion	Pointing foot down (ankle)
55	Dorsiflexion	Pointing foot up (ankle)
56	Extension	Opening of a joint
57	Horizontal Extension	Opening of a joint horizontally (elbow)
58	Hyper Extension	Opening of a joint past its natural position
59	Adduction	Movement towards centre line
60	Horizontal Adduction	Move towards centre line horizontally (shoulder)
61	Abduction	Movement away from centre line
62	Horizontal Abduction	Move away from centre line horizontally (shoulder)
63	Rotation	Turning of a joint
64	Circumduction	Movement in a circular motion

KG 9 A4 – Responses of the skeletal system

	Response	Type of exercise
65	Increased uptake of minerals	Weight bearing / resistance

A5 – Adaptations of the skeletal system

	Adaptation	Type of exercise
66	Increased bone density	Weight bearing / resistance
67	Increased ligament strength	

KG 10 A6 – Additional Factors

	Skeletal disease	Effects	Prevention
68	Osteoporosis	Reduced density of bones	Weight bearing exercise
69	Arthritis	Swelling of joint Thinning of cartilage Rubbing of bones Pain	

	Age related issue	Effects
70	Weight training in children	Damages epiphyseal plate Stunts Growth

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Subject: BTEC Sport | Topic: B - Muscular System | Side 1 | Year Group: 12/13

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KG 1 – B1 – Types of Muscle

	Type	Characteristics	Function
1	Cardiac	Non-Fatiguing Involuntary	Pumps blood
2	Smooth	Slow contracting Involuntary	Aids digestion
3	Skeletal	Fatiguing Voluntary	Movement

KG 3 – B3 – Roles of Muscle

	Type	Description
24	Agonist	Muscle that produces the most force
25	Antagonist	Muscle that works in opposition to agonist
26	Synergist	Muscle(s) that assists the agonist
27	Fixator	Muscle that stops unwanted movement at joint (stabiliser)

KG 4 – B4 – Type of Contraction

	Type	Description	Example
28	Concentric	Shortens whilst under tension	Bicep in upwards bicep curl
29	Eccentric	Lengthens whilst under tension	Bicep in downwards bicep curl
30	Isometric	Stays the same length whilst under tension	Handstand

KG 2 – B2 – Major Muscles

	Joint	Muscle	Function
4	Shoulder	Deltoids	a. Flexion a. Extension b. Abduction c. Horizontal Abduction
5		Latissimus Dorsi	b. Adduction
6		Pectorals	c. Horizontal Adduction
7	Scapula	Trapezius	Elevation/ depression
8	Elbow	Biceps	Flexion
9		Triceps	Extension
10	Radioulnar	Supinator	Supination
11		Pronator	Pronation
12	Wrist	Wrist Flexor	Flexion
13		Wrist Extensor	Extension
14	Vertebrae	Abdominals	Flexion
15		Erector Spinae	Extension
16	Vertebrae	Obliques	Lateral Flexion
17	Hip	Hip Flexor	Flexion
18		Gluteals	Extension
19	Knee	Hamstrings	Flexion
20		Quadriceps	Extension
21	Ankle	Tibialis Anterior	Dorsiflexion
22		Soleus	Plantarflexion
23		Gastrocnemius	Plantarflexion

KG 5 – B5 – Muscle Fibre Types

	Fibre type	Characteristics	Sporting Examples
31	Type 1 (Slow Twitch)	Aerobic Slow contraction Low Force Slow rate of fatigue Glycogen fuel source	Marathon Tour de France Triathlon Rowing
32	Type 2a (Fast Twitch)	Mainly anaerobic (some aerobic capacity) Fast contraction High force Fast rate of fatigue Glycogen fuel source	400m Sprint 100m swim Basketball turn over
33	Type 2x (Fast Twitch)	Anaerobic Very fast contraction Very high force Very fast rate of fatigue PC fuel source	100m Sprint 50m swim Long Jump

	Nervous control of muscle contraction	
34	Motor Unit	Group of muscle fibres attached to one motor neurone
35	Motor Neurone	Nerve that controls muscle contraction
36	Law	All fibres in motor unit must contract or none at all

KG 6	B6 – Responses of the Muscular System		
	Response	Description	
37	Increased blood supply	Vasodilation	Widening of blood vessels to working muscles
		Vasoconstriction	Narrowing of blood vessels to organs
38	Increased muscle temperature	Heat released as waste product of energy production	
39	Increased pliability	Increased heat increases stretch of muscle Reduced risk of injury	
40	Increased lactate	Lactic acid produced as waste product during high intensity exercise	
41	Microtears	Small tears in muscle fibres during resistance exercise (eccentric) Leads to DOMS (Delayed onset muscular soreness)	

KG 7	B7 – Adaptations of the Muscular System	
	Adaptation	Description
42	Hypertrophy	Microtears repair to become bigger and stronger
43	Increased tendon strength	Tendon joins muscle to bone Resistance training increases strength Increased force of muscle contraction
44	Increase in myoglobin stores	Myoglobin stores and transports O_2 Increased myoglobin increases aerobic capacity
45	Increase in size and number of mitochondria	Mitochondria are the site of aerobic respiration Increased mitochondria increases aerobic capacity
46	Increase in storage of glycogen	Glycogen used as fuel for energy Increased stores delays fatigue
47	Increase in storage of fat	Fat used as fuel for energy Fat more readily broken down for energy
48	Increased tolerance to lactate	Increased blood supply means more O_2 to muscles Delays builds up of lactic acid

KG 8	B8 – Additional Factors	
49	**Age**	
	Sarcopenia	Decrease in muscle mass and function begins in your 30s
	Cause	Lower concentrations of some hormones, including growth hormone Decrease in the ability to turn protein into energy
	Effect	Loss of muscle causes weakness and loss of stamina.
50	**Cramp**	
	Definition	A sudden involuntary contraction of the muscle causing pain
	Cause	Main cause is lack of salt and dehydration
	Effect	Causes lack of function in the muscle and pain
	Treatment	Relieved by stretching

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Subject: BTEC Sport | Topic: C - Respiratory System | Side 1 | Year Group: 12/13

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KG 1 C1 – Structure of the Respiratory System

		Component	Function
1	Pathway of air	Nasal Cavity	Filters and warms the air
2		Pharynx	Warms and moistens the air
3		Epiglottis	Cartilage flap that prevents food entering trachea
4		Larynx	Voice box
5		Trachea	Pipe that carries air to lungs and filters air
6		Bronchi	Carries air into left and right lung
7		Lungs	Organ that draws in air
8		Bronchioles	Narrow airways leading to alveoli
9		Alveoli	Air sac that allows gaseous exchange
10	Respiratory Muscles	External intercostals	Pull rib cage up and out
11		Internal Intercostals	Pull rib cage in and down
12		Diaphragm	Contracts and relaxes to breathe
13		Thoracic Cavity	Space between lungs and ribs

KG 2 C2 – Mechanics of Breathing

14	Law	Gases move from areas of high pressure to areas of low pressure

15 **Inspiration**

	At Rest	During Exercise
Diaphragm	Contracts pulling down and out	Contracts with more force pulling down and out further
Intercostals	External intercostals contract and internal relax, to pull ribs up and out	External intercostals contract with more force, internal relax to pull ribs up and out further
Thoracic Cavity	Increases in size	Increases in size further
Pressure	Reduces	Reduces further
Air	Goes from high pressure to low into lungs	Goes from high pressure to low into lungs quicker

16 **Expiration**

	At Rest	During Exercise
Diaphragm	Relaxes up and in	Relaxes up and in
Intercostals	External relax and Internal contract so ribs drop down and in	Internal contract with more force and pull ribs down and in faster/further
Thoracic Cavity	Decrease in size	Decrease in size further
Pressure	Increases	Increases further
Air	Goes from high pressure to low out of lungs	Goes from high pressure to low out of lungs quicker

KG 3 C2 – Gaseous Exchange

17	Law	Gases move from areas of high pressure to areas of low pressure

18 **Alveoli**

	Rest	Exercise
O_2	Alveoli high pO_2 Capillary low pO_2	Alveoli high pO_2 Capillary even lower pO_2
CO_2	Alveoli low pCO_2 Capillary high pCO_2	Alveoli low pCO_2 Capillary even higher pCO_2
Causing	Diffusion gradient	Steeper diffusion gradient
O_2 Diffusion	Alveoli to capillary	Alveoli to capillary quicker
CO_2 Diffusion	Capillary to alveoli	Capillary to alveoli quicker

19 **Muscle**

	Rest	Exercise
O_2	Capillary high pO_2 Muscle low pO_2	Capillary even higher pO_2 Muscle even lower pO_2
CO_2	Capillary low pCO_2 Muscle high pCO_2	Capillary low pCO_2 Muscle even higher pCO_2
Causing	Diffusion gradient	Steeper diffusion gradient
O_2 Diffusion	Capillary to muscle	Capillary to muscle quicker
CO_2 Diffusion	Muscle to capillary	Muscle to capillary quicker

KG 4 – C3 – Lung Volumes

	Terminology	Abbr.	Definition	Value
20	Breathing Rate	BR	Number of Breaths per minute	12 BPM
21	Tidal Volume	TV	The volume of air breathed in and out in one breath	0.5 L
22	Total Lung volume	TLC	Total capacity after inhaling as deeply as possible	6 L
23	Minute Ventilation	V_E	The volume of air you breathe in and out in one minute.	6 L
24	Residual volume	RV	The volume of air that remains in the lungs after maximal expiration	1.2 L
25	Vital capacity		The volume of air that can be forced out of the lungs after maximal inspiration	4.8 L

KG 5 – C4 – Control of Breathing

26	**Chemical control**	
Chemoreceptors	Found in vessels Detect rise in Lactic Acid /CO_2	
27	**Neural control**	
Medulla Oblongata	Area of brain where RCC is located	
Respiratory Control centre (RCC)	Processes information sent by chemoreceptors	
Motor nerves	Carry information from RCC to respiratory muscles to alter respiratory rate and TV	

KG 6 – C5 – Responses of the Respiratory System

28	Response	Description
	Increased Breathing Rate	Frequency of breathing increases to meet O_2 demand
	Increased Tidal Volume	Depth of breathing increases to meet O_2 demand

C6 – Adaptations of the Respiratory System

29	Adaptation	Description
	Increased strength of the respiratory muscles	Exercise leads to hypertrophy of respiratory muscles Increased strength leads to increase depth of breathing (TV)
	Increase in oxygen and carbon dioxide diffusion rate	Increase in number of alveoli and capillarisation of alveoli enables more gaseous exchange to occur
	Increased vital capacity	Due to increased strength of muscles, there is an increased total lung volume and therefore a greater vital capacity

KG 7 – C7 – Additional factors affecting the Respiratory System

30	**Asthma**	
	Description	Inflammation / narrowing of airways (bronchi/bronchioles)
	Symptoms	Dry cough, wheezing, difficulty breathing
	Effect on performer	Reduced O_2 to muscles increases rate of fatigue
	Long term effects of exercise	Adaptations of exercise increase O_2 uptake and diffusion, delaying rate of fatigue
31	**Altitude**	
	Definition	Altitude is any height above sea level High altitude = 3000m or above
	Effect of altitude	Lower pO_2 in air at altitude → Lower O_2 in alveoli → shallower diffusion gradient → less O_2 to working muscles → hypoxia → increased rate of fatigue Altitude sickness
	Long term adaptations	Increased red blood cells Reduced rate of fatigue seen at sea level

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Subject: BTEC Sport | Topic: D - Cardiovascular System | Side 1 | Year Group: 12/13

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KG 1 D1 – Structure of the CV System

Heart

		Component	Function
1	Pathway of Blood	Pulmonary Vein	Brings oxygenated blood to LA
2		Left Atrium	Pumps blood to ventricle
3		Bicuspid Valve	Prevents back flow of blood
4		Left Ventricle	Pumps blood to body
5		Semi-lunar valve	Prevents back flow of blood
6		Aorta	Carries oxygenated blood to body
7		Vena Cava	Carries deoxygenated blood to heart
8		Right Atrium	Pumps blood to ventricle
9		Tricuspid Valve	Prevents back flow of blood
10		Right Ventricle	Pumps blood to lungs
11		Semi-Lunar Valve	Prevents back flow of blood
12		Pulmonary Artery	Carries blood to lungs
13		Septum	Separates the left and right side of the heart
14		Coronary Arteries	Supplies heart walls (cardiac muscle) with blood

KG 2 D1 – Structure of the CV System

Blood Vessels

	Vessel	Structure	Function
15	Arteries	Thick outer wall Thick muscular wall Narrow lumen	Carry blood away from heart to body and lungs
16	Veins	Thin outer wall Thin muscular wall Large lumen Contains valves	Carry blood back to the heart and lungs
17	Capillaries	Single cell thick wall Very small lumen	Site of gaseous exchange
18	Arterioles	Very small vessel	Connects artery to capillaries
19	Venules	Very small vessel	Connects capillaries to vein

Blood

	Component	Function
20	Red blood cells	Carries O_2 to respiring tissues Carries CO_2 away from tissues
21	White blood cells	Fight infections Surround and engulf harmful microbes Produce antibodies
22	Platelets	Clot blood and wounds by sticking together Produce thrombokinase and release fibrin to form web like structure
23	Plasma	Water based fluid Carries dissolved O_2 and CO_2 Carries waste products

KG 3 D2 – Functions of the CV System

	Function	Description
24	Delivery of O_2 and nutrients	Red blood cells and Plasma
25	Removal of waste products	carbon dioxide and lactate.
26	Thermo-regulation	Cold – vasoconstriction of capillaries at skin to retain heat Hot - vasodilation of capillaries at skin to release heat
27	Fight infection	White blood cells
28	Clot blood	Platelets

KG 4 D3 – Nervous control of cardiac cycle

Conduction system

	Component	Function
29	SA Node	Initiates electrical impulse
30	AV Node	Pauses impulse between Atria and ventricle
31	Bundle of HIS	Carries impulse down septum
32	Purkinje Fibres	Carries impulse around ventricle walls

Nervous systems

33	Sympathetic System	Speeds up HR via Accelerator nerve Releases adrenaline
34	Parasympathetic System	Slows down HR via Vagus nerve

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Subject: BTEC Sport | Topic: D - Cardiovascular System | Side 2 | Year Group: 12/13

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KG 5 D4 – Responses of the CV System to exercise

	Response	Description	
35	Anticipatory Rise	Increased HR before exercise begins Caused by release of adrenaline	
36	Increased HR	HR increases in line with intensity of exercise to meet O_2 demand	
37	Increased Cardiac Output (Q)	Q = Heart rate x Stroke Volume Increase in HR and SV (due to starlings Law) Plateaus of SV during sub maximal exercise	
		Starlings Law	Increased force of contraction due to increased venous return
38	Increased blood pressure	Blood pressure	Force of blood exerted on vessel walls
		Resting BP	120/80 mm/Hg
		Exercising BP	160-200 / 80-90 mm/Hg Due to increase speed of blood leaving heart (Increased Q)
39	Redirection of blood flow	Blood directed to working muscles Vasodilation of arterioles to working muscles Vasoconstriction of arterioles to organs	

KG 6 D5 – Adaptations of the CV System to exercise

	Adaptation	Description
40	Cardiac Hypertrophy	Cardiac muscle (myocardium) in heart wall increases in size and strength
41	Increased resting and exercising SV	SV = Amount of blood ejected from left heart per beat Heart contracts with more force due to cardiac hypertrophy Therefore SV increases
42	Decreased resting HR	Cardiac hypertrophy increases SV Q = HR x SV Resting HR can decrease to maintain Q
43	Decreased HR recovery time	Due to cardiac hypertrophy and capillarisation Oxygen debt repaid quickly
44	Reduction in resting BP	Cardiac hypertrophy allows heart to pump with less effort This decreases the force of blood on vessel walls
45	Increased blood volume	Due to increased capillarisation Increases transport of O_2 and CO_2
46	Increased capillarisation of skeletal muscle and alveoli	Increased number of capillaries around muscles and alveoli Increases capacity for gaseous exchange

KG 7 D6 – Additional Factors

47	**SADS (Sudden Arrhythmic Death Syndrome)**
Description	Sudden death due to cardiac arrest Caused by prolonged QT (quiet time)
Cause	Inherited heart condition
Issues	Unless tested, sufferers wont know they have the condition
SADS and exercise	Exercise increases the risk of cardiac arrest Many clubs now screen for SADS

KG 8 D6 – Additional Factors

48	**Hypothermia**	**Hyperthermia**
Definition	Low body temperature Below 35°	High body temperature Above 39°
Effect on body	Vasoconstriction of vessels to skin Redirection of blood to organs away from muscles Increased HR and BP Severe Hypothermia = cardiac arrest	Blood pooling at skin Redirection of blood away from organ /muscles Decreased SV Sweating decreases blood viscosity Increase HR
Effect on performance	Decrease O_2 to muscles Fatigue	Decrease O_2 to muscles Fatigue

KG 9 D6 – Additional Factors

49	**Hypotension**	**Hypertension**
Definition	Low blood pressure Below 90/60 mmHg	High blood pressure Above 140/90 mmHg
Effect on performer	Slow delivery of O_2 Lack of O_2 for muscles Dizziness, sickness, fainting	Exercise increases blood pressure further Exercise with caution Aerobic preferable
Long term effect of exercise	Improves blood pressure Increases health of artery wall	

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Subject: BTEC Sport | Topic: E - Energy System | Side 1 | Year Group: 12/13

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KG 1 – E1 – Role of ATP in Exercise

1	ATP	Adenosine Triphosphate
2	Breakdown process	ATP → ADP + P + energy
3	Enzyme	ATPase
4	Energy used for	Muscular contractions
5	Resynthesis	ADP + P → ATP
6	Stores duration	3 seconds

KG 2 – E2 – The ATP-PC System

7	Fuel	Phosphocreatine (PC)
8	Process	PC → P + C + energy
9	Enzyme	Creatine Kinase
10	Energy used for	Resynthesis of ATP
11	ATP Yield	1 ATP (1:1)
12	Respiration type	Anaerobic
13	Duration	8-10 seconds
14	Intensity	High intensity contractions
15	Recovery time	50% in 30 seconds 100% in 3 minutes
16	Sporting examples	Power athletes 100m Sprint High Jump Weightlifter
17	Advantages	PC stores readily available No O_2 delay Quick
18	Disadvantages	Low PC stores Low ATP yield

KG 3 – E3 – The Lactate System

19	Fuel	Glycogen
20	Process (Anaerobic Glycolysis)	Glycogen → Glucose 1.→ Pyruvic acid + energy 2.→ Lactic Acid
21	Enzymes	1. PFK 2. LDH
22	Energy used for	Resynthesis of ATP
23	ATP Yield	2 ATP (1:2)
24	Respiration type	Anaerobic
25	Duration	1 – 3 minutes
26	Intensity	High intensity contractions
27	Recovery time	8 – 60 mins
28	Sporting examples	400m runner 100m Swimmer Basketball turnover
29	Advantages	Large glycogen stores No O_2 delay High intensity contractions
30	Disadvantages	Low ATP yield Fatiguing by-products Slow recovery rate

KG 4 – E4 – The Aerobic System

31	Fuel		Glycogen / Fats (Triglycerides)
32	Stage 1 Aerobic Glycolysis	Process	Glycogen → Glucose 1.→ Pyruvic acid + energy
33		Enzymes	1. PFK
34		ATP Yield	2 ATP
35	Stage 2 Krebs Cycle	Process	Pyruvic acid 2.→ Acetyl CoA 3.→ Citric Acid (goes into) → Krebs Cycle ↳ Hydrogen ↳ CO_2 ↳ Energy
36		Enzymes	2. (Combines with) CoA 3. (Combines with) OAA
37		ATP Yield	2 ATP
38	Stage 3 Electron Transport Chain (ETC)	Process	Hydrogen splits into H^+ and E^- H^+ bonds with O_2 to make H_2O E^- carried by NAD and FAD which releases energy
39		ATP Yield	34 ATP
40	Energy used for		Resynthesis of ATP
41	Total ATP Yield		38 ATP (1:38)
42	Respiration type		Aerobic
43	Duration		Long (dependant on intensity)
44	Intensity		Moderate intensity contractions
45	Recovery time		3 minutes to 3 days
46	Sporting examples		Marathon Tour de France Rowing
47	Advantages		Long duration High ATP yield
48	Disadvantages		Low/moderate intensity Requires more O_2 for fat breakdown

KG 5 – E2, 3, 4 – Recovery of Energy Systems

		ATP-PC System	Lactate System	Aerobic System
49				
50	Recovery time	50% in 30s 100% in 3 minutes	8 - 60 minutes	3 Minutes - 3 days
51	How	Resynthesis of PC	Removal of Lactate	Replenishment of myoglobin O_2 stores
52	Requires	Energy from Aerobic System	Oxygen	Oxygen

	EPOC	
53	EPOC	Excess Post-Exercise O_2 Consumption Elevated breathing rate post exercise to repay O_2 deficit
54	Fast Alactacid Component	First 2-3 minutes of recovery Uses aerobic system (1 - 4 litres of O_2) Resynthesis of PC stores Replenishment of blood and muscle (myoglobin) O_2
55	Slow Lactacid Component	Up to 2hrs for full recovery Requires 5 - 8 litres of O_2 for: - Ventilation - Circulation - Body temperature - Removal of lactic acid - Replenishment of glycogen

KG 7 – E5 – Additional Factors

61	Lactate System in Children
Lactate system in children	Lactate system not fully developed until approx. age 20
Reasons	Lack of muscle mass Lower glycogen stores Fewer essential enzymes for energy production
Effects	Quicker build up of lactic acid Difficulty removing lactic acid
Recommendation	Aerobic training recommended for children

KG 6 – E5 – Adaptations to exercise

	System	Adaptation	Benefit
56	ATP-PC	Increased PC stores	Increased duration and intensity of ATP-PC system
57	Lactate System	Increased tolerance to lactate	Increased duration at high intensity before fatigue
58	Aerobic System	Increased glycogen stores	Increased ability to produce energy for higher intensity contractions
59		Increased ability to use fats	Preserves glycogen for higher intensity energy
60		Increased mitochondria number	Increased aerobic energy production

KG 8 – E5 – Additional Factors

62	Diabetes
Definition	The body's inability to regulate the amount of glucose in the blood due to the lack of insulin function
Insulin	Hormone that allows glucose to enter cells to be used for energy
Hypoglycaemia	Very low blood sugar Can be caused by over exercising

63	Type 1 Diabetes
Cause	Body unable to produce enough energy
Effect on performer	Glucose not used effectively for energy Limits use of lactate and aerobic system
Treatment	Blood sugar controlled with insulin

64	Type 2 Diabetes
Cause	Body does not use insulin effectively
Effect on performer	Glucose not used effectively for energy Limits use of lactate and aerobic system
Treatment	Diet and exercise to reduce blood sugar