

WEST AFRICAN SENIOR SCHOOL CERTIFICATE EXAMINATION
HEALTH SCIENCE

(For Candidates in The Gambia, Nigeria and Sierra Leone)

PREAMBLE

The content of this syllabus incorporates courses in scientific concepts and principles to meet the demands of an applied science as well as the development of the right attitudes and values for healthy living in a rapidly changing society.

Evidence of involvement in practical work will be determined through a paper on test of practical work. It is therefore essential that this examination syllabus be used in conjunction with the teaching curriculum.

OBJECTIVES OF THE SYLLABUS

The objectives of the syllabus are to:

- (a) enable candidates acquire basic knowledge of the organs of the body and the necessary skills for maintenance of health.
- (b) encourage the candidates to acquire and practise positive health habits in the community.
- (c) enable candidates appreciate the ecological relationship between man and his environment as a basis of preventing diseases.
- (d) make observations and draw inferences from practical experiences that may have implications for health.
- (e) prepare candidates for professional training in Health related careers.

EXAMINATION SCHEME

There will be two written papers both of which must be taken. The total score for the two papers will be 200 marks.

PAPER 1: This will be a 1¾ hour paper consisting of two sections; A and B.

SECTION A: This will consist of questions on test of practical work lasting one hour and will carry 40 marks.

SECTION B: This will consist of structured short answer questions lasting 45 minutes and will carry 40 marks.

Candidates are expected to answer all the questions in Paper 1. Total score for Paper 1 will be 80 marks.

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PAPER 2: This will be a 2¼ hour paper consisting of two sections; A and B.

SECTION A: This will consist of sixty (60) multiple-choice objective questions lasting for one hour and will carry 60 marks. Candidates are expected to answer all the questions in this section.

SECTION B: This will consist of five (5) essay type questions out of which candidates will be required to answer any three (3). This section will last for 1¼ hours and will carry 60 marks. Total marks for Paper 2 will be 120 marks.

DETAILED SYLLABUS

CONTENTS	NOTES
A. <u>GROWTH AND DEVELOPMENT</u>	
<p>1. Definition of growth and development.</p>	Factors that affect growth and development should be discussed.
<p>2. (a) Types of cell</p> <p style="padding-left: 40px;">(i) Somatic cells</p> <p style="padding-left: 40px;">(ii) Sex cells</p>	Structure of a typical animal cell and functions of its parts should be discussed.
<p>(b) Cell division</p> <p style="padding-left: 40px;">(i) mitosis</p> <p style="padding-left: 40px;">(ii) meiosis</p>	Differences between mitosis and meiosis should be emphasized.
<p>(c) Cell differentiation</p> <p style="padding-left: 40px;">Formation of tissues, organs and systems.</p>	Mention should be made of epithelial, connective and muscular tissues. Relationship between a tissue, an organ and a system should be explained.
<p>3. Reproduction</p> <p>(a) Structure and functions of male and female reproductive organs.</p>	Secondary sexual characteristics in boys and girls should be discussed. Candidates should observe the parts of the reproductive system in a mammal.

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<p>(b) Conception, pregnancy, foetal development and child birth.</p> <p>(c) Disorders of the reproductive system.</p> <p>4. Nutrition</p> <p>(a) Classes, sources and functions of food nutrients.</p> <p>(b) Calorific value of food nutrients.</p> <p>(c) Balanced diet.</p> <p>(d) Water.</p> <p>(e) Organs of the digestive system and their functions.</p> <p>(f) Type, structure and functions of the teeth.</p> <p>(g) Process of digestion.</p> <p>(h) Absorption, assimilation and metabolism</p>	<p>Menstrual cycle, sex determination, ante-natal and post-natal care should be discussed.</p> <p>Causes of infertility should be discussed. Artificial insemination and test tube babies should be mentioned.</p> <p>Tests for starch, simple and complex sugars, proteins and fats should be carried out. Local examples of sources of food nutrients should be mentioned.</p> <p>Calorific needs in relation to age, occupation and health conditions should be discussed.</p> <p>Factors affecting unbalanced diet should be discussed under causes, prevention and control.</p> <p>The role of water in relation to nutrition should be stressed.</p> <p>Candidates should examine the alimentary canal of a dissected mammal. The location and functions of accessory organs of digestion should be emphasized.</p> <p>Digestive enzymes should be discussed in relation to substrates and end-products.</p> <p>Mention should be made of tissue respiration in relation to metabolism. Osmosis and diffusion should be demonstrated and their importance in absorption should be explained.</p>

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<p>(i) Disorders of the digestive system and their prevention.</p> <p>5. Respiration</p> <p>(a) Structure and functions of the respiratory system.</p> <p>(b) Process of respiration:</p> <p style="padding-left: 20px;">(i) Mechanism of breathing</p> <p style="padding-left: 20px;">(ii) Gaseous exchange</p> <p style="padding-left: 20px;">(iii) Tissue/Cellular respiration</p> <p>(c) Disorders of the respiratory system and their control.</p> <p>6. Circulation</p> <p>(a) Structure and functions of the circulatory system.</p> <p style="padding-left: 20px;">(i) Heart</p> <p style="padding-left: 20px;">(ii) Blood and lymph vessels</p> <p>(b) Composition of blood and lymph</p> <p>(c) (i) Blood and lymph circulation</p> <p style="padding-left: 20px;">(ii) Process of blood clotting</p>	<p>Importance of proper eating habits and the effects of over-eating and under-eating should be discussed.</p> <p>Candidates should examine the respiratory organs of a dissected mammal.</p> <p>Experiment to demonstrate the inhalation and exhalation of air should be performed.</p> <p>Tidal, complemental and residual air should be explained. Experiment to show that expired air contains more carbon dioxide and water vapour should be performed.</p> <p>Candidates should examine the heart of a dissected mammal.</p> <p>Pulse rate should be counted. The web of a toad/frog should be examined with a hand lens to observe the capillaries. The importance of lymph nodes should be mentioned.</p> <p>Prepared slides of blood should be observed under a microscope.</p> <p>Pulmonary and systemic circulation should be explained.</p>

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<p>(d) Blood groups, rhesus factor, haemoglobin genotype.</p> <p>(e) Disorders of the circulatory system and their causes: sickle cell anaemia, leukaemia, haemophilia arteriosclerosis, hypertension, coronary-thrombosis and stroke.</p> <p>7. Excretion</p> <p>(a) Structure and functions of the kidney and skin.</p> <p>(b) Process of urine formation.</p> <p>8. Skeletal system and muscles</p> <p>(a) The general plan of the axial and appendicular skeleton.</p> <p>(b) Functions of the skeletal system.</p> <p>(c) Joints: Structure and types.</p> <p>(d) Principle of levers.</p> <p>(e) Structure and types of muscle tissues.</p> <p>(f) Movement</p>	<p>The relevance of these factors in relation to blood transfusion should be mentioned.</p> <p>Heredity aspects of sickle cell and haemophilia should be stressed. Prevention of anaemia and arteriosclerosis should be discussed.</p> <p>Candidates should examine the parts of the urinary system of a dissected mammal. Candidates should examine prepared slides of the skin under the microscope.</p> <p>Reference should be made to the excretory functions of the lungs. The use of dialysis machine for kidney failure should be mentioned.</p> <p>A chart/model of a human skeleton should be examined.</p> <p>Types of bones that make up the mammalian skeleton should be identified.</p> <p>Emphasis should be on synovial joint. Location of the different types of joint should be identified.</p> <p>Specific examples should be used to illustrate the three classes.</p> <p>The three different types of muscle should be discussed in relation to their functions.</p> <p>Reference should be made to origin and insertion of muscles in relation to movement.</p>

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<p>9. Posture and postural defects</p> <p>(a) Characteristics of correct posture</p> <p>(b) Determinants of correct postures</p> <p>(c) Types of postural defects: flat foot, scoliosis, kyphosis and lordosis.</p> <p>(d) Effects of incorrect posture on physical appearance, position and functioning of body organs.</p> <p>10. Nervous System</p> <p>(a) Structure and functions of the components of the nervous system.</p> <p>(b) Voluntary and involuntary actions.</p> <p>(c) Disorders of the nervous system.</p> <p>11. Sense Organs</p> <p>(a) Structure and functions of the following sense organs:</p> <p>(i) eye</p> <p>(ii) tongue</p> <p>(iii) ear</p> <p>(iv) nose</p> <p>(v) skin</p>	<p>Posture should be related to the following: sitting, standing, walking and lifting.</p> <p>The role of nutrition and exercise as determinants of correct posture should be discussed.</p> <p>The causes of postural defects e.g. habits, accidents, heredity and diseases should be discussed. The role of orthopaedic hospital and physiotherapy units in the correction of postural defects should be mentioned.</p> <p>The brain, spinal cord and nerves should be discussed.</p> <p>The reflex arc should be studied.</p> <p>Accommodation should be discussed.</p> <p>Process of hearing and balancing should be discussed.</p>

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<p>(b) Eye defects and their corrections:</p> <p style="padding-left: 40px;">myopia hypermetropia astigmatism presbyopia squint (Cross-eye)</p> <p>(c) Auditory defects</p> <p style="padding-left: 40px;">(i) Conductive impairment</p> <p style="padding-left: 40px;">(ii) Neurosensory impairment</p> <p>(d) Disorders of the skin</p> <p>(e) Care of the eye, ear and skin</p> <p>12. Endocrine system</p> <p style="padding-left: 40px;">Location of the different endocrine glands, the hormones produced and their functions.</p> <p>B. BEVERAGES AND FOOD PRESERVATION</p> <p>1. Beverages</p> <p style="padding-left: 40px;">Types and effects of alcoholic and non-alcoholic beverages.</p> <p>2. Food Preparation</p> <p style="padding-left: 40px;">(a) Principles of food hygiene.</p>	<p>The use of snellen chart for vision screening should be mentioned. The role of eye specialist in the correction of the defects should be discussed.</p> <p>The use of tuning fork, audiometer, guitar strings and wrist watch in auditory screening should be mentioned. Mention should also be made of the sign language.</p> <p>Characteristics of endocrine glands should be mentioned.</p> <p>Charts/models should be used to study the location of the glands. The effects of over – and under – secretion of hormones should be emphasized.</p> <p>Negative and positive effects should be stressed.</p> <p>Food handling, cleanliness of cooking utensils and surroundings should be discussed. Effects of poor food hygiene should be stressed.</p>

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(b) Effects of methods of food preparation on their nutrients	Effects of washing, boiling, frying, baking and roasting should be discussed.
3. Food Preservation	
Methods of food preservation.	
Smoking/drying/dehydration.	
Freezing/refrigeration, addition of chemicals/sugar/salt, bottling/pickling/canning.	The processes, advantages and disadvantages of each method should be discussed.
C. PHYSICAL HEALTH	
1. Body forms	
Ectomorph, mesomorph, endomorph.	The features of the three body forms and their implications to health should be discussed.
2. (a) Maintenance of health	The factors for the maintenance of health should be discussed.
(b) Personal hygiene	Care of body parts including the teeth, hair and nail should be discussed.
3. Homeostasis	
Physiological factors affecting homeostasis.	Body temperature, blood sugar level, water balance, electrolyte balance, pH and blood pressure should be highlighted.
	Candidates should test urine for pH with litmus paper and also count pulse rate.
	Mention should be made of the positive and negative feed back control system.

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<p>D. FIRST AID AND SAFETY EDUCATION</p> <p>1. First Aid</p> <p>(a) Aims and principles of first aid</p> <p>(b) First Aid kit</p> <p>(c) Specific emergency conditions:</p> <p style="padding-left: 40px;">Cuts/wounds, bleeding, dislocation, fractures, burns, scalds, shocks, asphyxia/suffocation, poisoning.</p> <p>2. Accident</p> <p>(a) Types and causes of accident.</p> <p>(b) Safety Education.</p> <p>(c) Disaster Relief</p>	<p>Qualities of a First Aider should be stressed.</p> <p>Both standard and improvised kits should be discussed in relation to their uses.</p> <p>The causes and characteristics of each condition should be discussed and their respective care where applicable should be demonstrated.</p> <p>Agencies involved with first aid should be mentioned.</p> <p>Mention should be made of Red Cross Society, Blue Crescent Society, Girls Guide, Boys scout and Sheriff Guards.</p> <p>Types of accidents in relation to location e.g. Home, Road, Schools, Industries, etc. Factors causing accidents e.g. fire should be discussed.</p> <p>Safety principles and measures of various types of accidents should be discussed.</p> <p>Types of disaster and the relief measures should be discussed.</p>

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<p>E. PREVENTION AND CONTROL OF COMMUNICABLE AND NON-COMMUNICABLE DISEASES</p> <p>1. (a) Communicable diseases</p> <p style="padding-left: 40px;">(b) Factors necessary for communicable diseases to occur.</p> <p style="padding-left: 80px;">(i) causative agent</p> <p style="padding-left: 80px;">(ii) susceptible host</p> <p style="padding-left: 80px;">(iii) transmission route</p> <p>2. Principles of prevention and control of diseases.</p> <p>3. Classification of communicable diseases.</p> <p style="padding-left: 40px;">(a) Air-borne diseases: Common cold, measles, whooping cough, poliomyelitis, tuberculosis and cerebro-spinal meningitis.</p> <p style="padding-left: 40px;">(b) Water/Food borne diseases: Dysentery, cholera, typhoid fever and schistosomiasis.</p> <p style="padding-left: 40px;">(c) Insect-borne diseases: Malaria, yellow fever, trypanosomiasis and filariasis.</p>	<p>The meaning of the terms: endemic, epidemic and pandemic in relation to communicable diseases should be explained.</p> <p>Bacteria, fungi, viruses, protozoa, rickettsia and worms should be mentioned as causative agents.</p> <p>Reference should be made to immunization, sterilization and isolation.</p> <p>Each disease should be discussed under the following headings:</p> <p style="padding-left: 40px;">(i) causative agent;</p> <p style="padding-left: 40px;">(ii) mode of transmission;</p> <p style="padding-left: 40px;">(iii) signs and symptoms;</p> <p style="padding-left: 40px;">(iv) prevention and control.</p> <p>The life cycle of the parasite of each disease should be discussed with charts.</p>

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<p>(d) Worm infestation:</p> <p style="padding-left: 40px;">(i) <i>Ascaris lumbricoides</i> (Round worm)</p> <p style="padding-left: 40px;">(ii) <i>Taenia solium</i> (Tape worm)</p> <p style="padding-left: 40px;">(iii) <i>Ancylostoma duodenale</i> (Hook worm)</p> <p style="padding-left: 40px;">(iv) <i>Dracunculus medinensis</i> (Guinea worm)</p> <p>(e) Animal-borne disease:</p> <p style="padding-left: 40px;">Rabies</p> <p>(f) Contact diseases:</p> <p style="padding-left: 40px;">Gonorrhoea, syphilis, <u>Tinea pedis</u> (athlete's foot) <u>Tinea capitis</u> (Ringworm), leprosy, scabies and Acquired Immune Deficiency Syndrome (AIDS).</p> <p>4. Non-Communicable diseases:</p> <p>Types of non-communicable diseases:</p> <p style="padding-left: 40px;">Tetanus, diabetes mellitus and sickle cell anaemia.</p> <p>5. Pioneers in Health Science</p> <p>(a) African pioneers: Lambo, Omololu Ogunlesi, Oluwole Odeku, Nichol, Konotey-Ahulu, Adeniyi-Jones.</p>	<p>The life cycle of each worm should be discussed with the aid of a chart.</p> <p>Each disease should be discussed under the following headings:</p> <p>Causes, symptoms and prevention/control where applicable.</p> <p>Specific contributions of the pioneers should be discussed.</p>

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<p>(b) Non-African pioneers:</p> <p style="padding-left: 40px;">Leeuwenhoek, Pasteur, Jenner, Lister, Koch, Hopkins, Fleming, Harvey, Ross and Manson.</p> <p>F. COMMUNITY AND ENVIRONMENTAL HEALTH</p> <p>1. Community Health</p> <p>(a) Family health programme</p> <p>(b) School health services</p> <p>2. Environmental Health</p> <p>(a) Water supply</p> <p>(b) Disposal of waste</p> <p style="padding-left: 40px;">(i) Refuse disposal</p> <p style="padding-left: 40px;">(ii) Sewage disposal</p> <p>(c) Housing:</p> <p style="padding-left: 40px;">Criteria for good housing</p> <p>3. Problems of Environmental Health</p> <p>(a) Pollution</p>	<p>The role of orthodox and traditional health services should be discussed.</p> <p>Maternal health and child health programmes should be discussed.</p> <p>The different health services to be provided by the school should be stressed.</p> <p>Sources and methods of purification of water should be discussed.</p> <p>Different methods of disposal of wastes, advantages and disadvantages of each method should be discussed.</p> <p>Effects of substandard housing on health should be discussed.</p> <p>Causes and prevention of the different types of pollution should be discussed. Their effects on health should be emphasized.</p>

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(b) Poor sanitation	Effects of poor sanitation and pest infestation in homes should be discussed.
4. Public Health Agencies	
(a) National health agencies	The role of different Health Agencies in providing health services should be discussed.
(b) International health agencies	The role and functions of World Health Organisation, International Red Cross and UNICEF should be discussed.
5. (a) Industrial Health Services	The need for health care and rehabilitation should be discussed.
(b) Occupational hazards	The need for health insurance scheme should be stressed.
6. Vital Statistics	
(a) Birth rate	The importance and use of health records should be stressed.
(b) Mortality rate	
(c) Morbidity statistics	
G. FAMILY LIFE AND SEX EDUCATION	
1. Sex Education	Importance of sex education should be discussed.
2. (a) The Family	Characteristics of a happy family and the role of each member should be discussed. Factors influencing family life should be stressed.
(b) Family types	Reference should be made to monogamous, polygamous, single parent, nuclear and extended family.

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<p>(c) Family problems</p> <p>3. (a) Family Planning</p> <p>(b) Contraceptive techniques</p> <p>H. EMOTIONAL AND MENTAL HEALTH</p> <p>1. Attributes of emotional health.</p> <p>2. Personality defence mechanisms.</p> <p>3. Mental illness</p> <p>I. CHEMICAL SUBSTANCES THAT ALTER BEHAVIOUR</p> <p>1. Tobacco</p> <p>(a) Components</p> <p>(b) Effects of smoking on health</p>	<p>Social and emotional causes should be discussed.</p> <p>Meaning and need for family planning should be discussed.</p> <p>Sources of family planning services should be mentioned.</p> <p>The relative reliability, advantages and disadvantages of each technique should be discussed.</p> <p>Effects of emotional and mental health on stability, personality and social health development should be discussed.</p> <p>Various defence mechanisms should be discussed.</p> <p>Causes, prevention and management of mental illness should be discussed. Mention should be made of neurosis and psychosis as examples of mental illness.</p> <p>Reasons for smoking and the methods of controlling smoking should be discussed.</p>

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<p>2. Drugs</p> <p>(a) Types of drugs.</p> <p>(b) Drug abuse.</p> <p>3. Alcohol</p> <p>Effects of alcohol on health.</p> <p>J. CONSUMER HEALTH</p> <p>1. Consumer health products and services.</p> <p>2. Factors influencing choice of consumer products.</p>	<p>Effects of drug abuse Consequences of self diagnosis and self medication should be stressed. Prevention of drug abuse should be highlighted.</p> <p>Reasons for drinking alcohol and methods of controlling drinking should be discussed.</p> <p>The importance of checking label and expiry dates on products before purchase should be stressed. The dangers of quacks and quackery should be highlighted.</p> <p>The role of diagnostic and dispensing services should be stressed.</p>