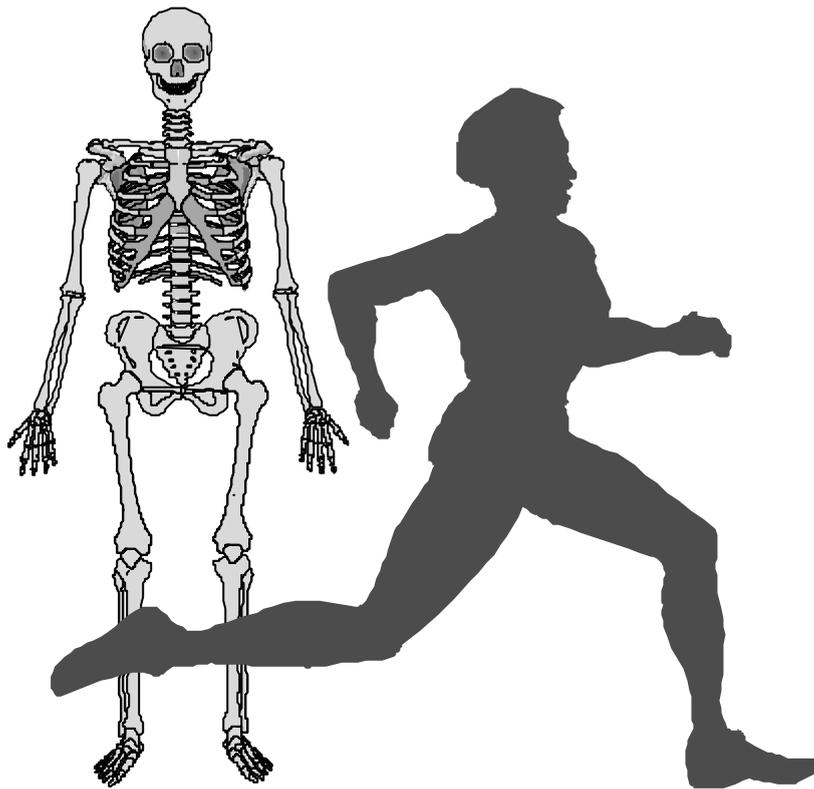


Mathematics Science Strand

Health and Physical
Education

Unit
HPE

Lecturers' Guide



Lecturer Support Material

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PASTEP

Primary and Secondary Teacher Education Project

Australian Agency for International Development (AusAID)

GRM International

Papua New Guinea-Australia Development Cooperation Program

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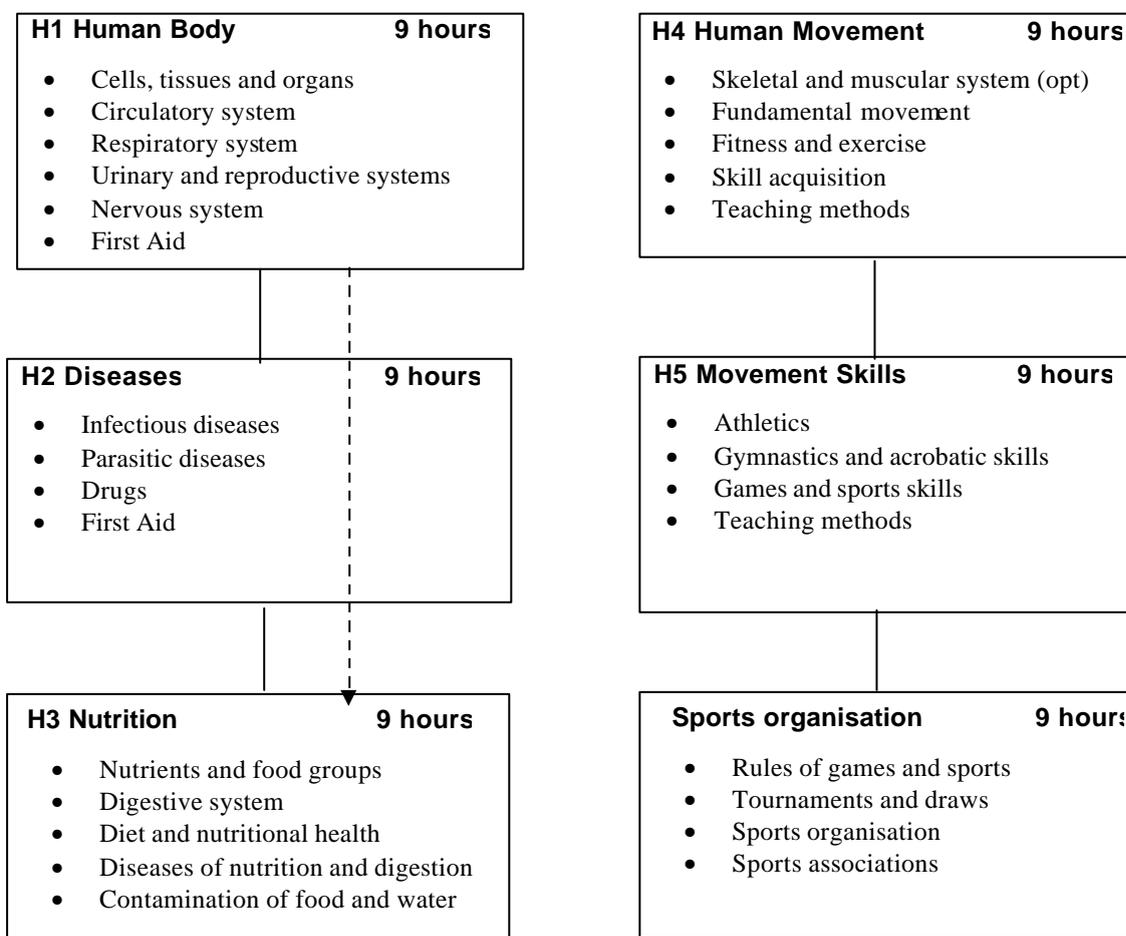
Unit overview

In light of recent changes to the Lower and Upper Primary Syllabuses the content and emphases of some modules have been changed from that originally proposed in Program 2000. In particular, topics on sexually transmitted diseases have been included in two modules, Human Body and Diseases due to the importance of understanding the problems in PNG. This will enable colleges to ensure that adequate teacher training is provided for the topics in human reproduction and diseases associated with sexual practices in PNG. First Aid is treated contextually and has been integrated throughout all modules where appropriate. The modules contain topics to provide coverage of the topics in Program 2000 as well as the draft Syllabuses.

Sequencing

You may choose to mix and match the modules to suit local conditions and needs. Arrows indicate a recommended sequence in the teaching and learning of the modules. In some colleges two units may be allocated for the teaching of HPE. This provides a better opportunity and reflects the new syllabuses for the teaching of a very important part of the primary program in schools.

It is also recommended that the teaching program for HPE should integrate appropriate skills and strategies for teaching these topics, that is, the method. A contextual approach would be more beneficial than separating the method into a separate subject.



Links to Primary Syllabuses

It is essential that lecturers keep abreast of the changes in the Primary Syllabuses and modify the Unit content, emphases and teaching programs to reflect these changes.

It is only through a proactive approach to curriculum development and teaching that Primary teachers will be adequately prepared to teach the new Syllabuses.

This table summarises the relationship between the current Program 2000 modules and the draft Primary Syllabuses.

Code	Module/topic	Lower Primary			Upper Primary		
		Yr3	Yr4	Yr5	Yr6	Yr7	Yr8
H1	Human Body						
	• Cells, tissues and organs		H	H	Sc/PD	Sc/PD	PD
	• Circulatory and respiratory systems			H		PD	PD
	• Reproductive and urinary systems			H	PD	PD	Sc/PD
	• Nervous system		H	H	Sc/PD	Sc/PD	PD
	• First aid and	H	H	H	PD	PD	PD
H2	Diseases						
	• Health and diseases – STDs, AIDS	H	H	H	PD	PD*	PD
	• Sexually transmitted diseases			H	PD	PD	PD
	• Parasitic diseases, e.g. malaria	H	H	H	Sc/PD	PD*	PD
	• Drugs		H	H	PD	PD	PD
	• First aid and	H	H	H	PD	PD	PD
H3	Nutrition						
	• Nutrients and food groups	H	H	H	PD	Sc/PD*	PD
	• Digestive system			H	PD	Sc	PD
	• Diet and nutritional health	H	H	H	PD	Sc/PD*	PD
	• Diseases of nutrition and digestion	H	H	H	PD	PD	PD
	▪ Contamination of food and water	H	H	H	PD	PD	PD
H4	Human Movement						
	• Skeletal/muscular system					Sc	
	• Fundamental movement	H/PE	H/PE	H/PE	PD	Sc/PD	PD
	• Fitness and exercise/ skills	H/PE	H/PE	H/PE	PD	PD	PD
	• Injuries	H	H	H	PD	PD	PD
H5	Movement Skills						
	• Sports organisation (athletics)			H	PD	PD	PD
	• Gymnastic and acrobatic skills	H/PE	H/PE	H/PE	PD	PD	PD
	• Games and sports skills	H/PE	H/PE	H/PE	PD	PD	PD
	• Injuries	H	H	H	PD	PD	PD

H Topics covered in Health Syllabus (Grades 3 – 5)

PE Topics covered in Physical Education Syllabus (Grades 3 – 5)

PD Personal Development Syllabus (Grades 6 – 8)

Sc Science Syllabus (Grades 6 – 8)

General Objectives

At the end of this unit students should be able to:

- (a) Describe, illustrate and identify particular functions of a number of human body systems;
- (b) Relate knowledge of the human reproductive system, pregnancy, contraception and the use of condoms to sexual health, family planning and safe sexual practices;
- (c) Describe the major diseases, including parasitic infections, affecting people in PNG, identify causes and methods of prevention;
- (d) Identify and compare the effects of useful drugs and the abuse of drugs such as alcohol on societies in PNG;
- (e) Describe the process of digestion with reference to the functions of various organs of the digestive system;
- (f) Survey types of foods and diets in PNG and relate these to possible causes of malnutrition and digestive diseases;
- (g) Outline safe practices for obtaining and maintaining clean drinking water and good standards of hygiene, and the possible consequences of bad practices;
- (h) Describe and plan fitness regimes and programs to maintain a healthy body;
- (i) Plan and implement games, sports and athletic programs in community schools;
- (j) Describe and participate in a range of suitable gymnastic and acrobatic activities suitable for Primary children;
- (k) Confidently and competently organise, conduct and referee a number of common sports played in PNG primary schools;

Approaches to teaching and learning

It is very important that the teaching of Health and Physical Education (HPE) is approached from the personal experience of students. These experiences will provide a real life connection to the important HPE issues facing the citizens of PNG. Therefore students' prior knowledge and misconceptions about important issues must be established before planning the teaching program.

Student interaction and participation is essential to build on the fundamental understandings of HPE knowledge. Practical experiences should be incorporated in the student learning experiences wherever possible. Activities, which encourage group debate, should form an integral part of the teaching strategies.

Local resources should also be utilised for student learning experiences. These resources include health clinics, hospitals, health workers, volunteers, church groups and sporting identities.

It also important to ascertain “tambus” in relation to different cultural origins and beliefs before the discussing sensitive issues. Alternative teaching and learning strategies may need to be provided to avoid potential conflict.

Assessment strategies

In keeping with a student-centred approach to teaching and learning it is important that assessment strategies provide opportunity for students to prepare for their professional roles as teachers. Therefore a range of assessment items should be utilised to reflect the teaching approaches and student application to their profession. A list of suggested items has been included but is not exhaustive by any means. Some assessment items may include a number of strategies as a “package”. For example, a student may conduct a survey, research his/her findings and assemble a teaching package tailored to local needs.

Some of the ranges of strategies are:

- Pen and paper examination e.g. multiple choice, short answer and extended answers;
- Portfolio e.g., Health diary or fitness records;
- Practical e.g., Preparation of traditional medicines, fitness circuits, minor games;
- Wall charts and posters for teaching HPE topics
- Models e.g., working of skeleton and muscles (levers);
- Essay e.g., impact of HIV/AIDS on the population of PNG;
- Diary e.g., own personal health and fitness records;
- Personal research e.g., Health and physical fitness in own Tok Ples;
- Library and media research e.g., Selected and directed HPE topics from newspapers; CD –ROMS, library references;
- Teaching resource e.g., prepare resource for teaching a Health and/or PE topic;
- Survey, e.g., Health of inhabitants of local/regional areas; malaria occurrence;
- Interview e.g., survey local conceptions about health issues;
- Case studies e.g., collect and collate latest information on a disease and eradication measures;
- Comparative studies e.g., Health in Western Societies compared to Third World countries; comparing the rules for sports;
- Stories about health and traditional medicines
- Seminar e.g., Human body systems presentation including posters; exercise
- Group projects e.g., HPE issues (obesity, heart conditions, HIV/AIDS, malaria)
- Marking of fields for athletics and games.
- Organising sports competitions (draws, etc)
- Refereeing games; skill assessment
- Participation in sports – contributions to teams

Resources

This list provides colleges with recommended resources for the teaching of this unit. College lecturers should continue to keep abreast of changes and the publication of new books and new editions through the relevant booksellers.

The following titles are essential and it is highly recommended that colleges add multiple copies of these to their libraries:

Deutrom, B. (1998). Science for the Pacific: A – Z of Essential Terms. Oxford: PNG. (ISBN: 0-19-554162-6. Price approx AUD13.00 available from the Co-operative Bookshop).

Cross, R. (1996). Teaching Primary Science: Empowering children for their world. Addison Wesley Longman: Melbourne. (ISBN: 0-582-80364-0. Price approx. AUD30.00).

The following CD ROM set is also very useful for both students and lecturers:

Oxford University Press. (2001). Encyclopaedia Britannica 2001 Deluxe Edn. (CD ROM). Oxford University Press: London. (CDDLX01/01: Cost approx. AUD99.00. Available from any good computer software store such as Harvey Norman or Office Works (Price: Approx. AUD90.00).

Government Departments: It is worth contacting the relevant Government Departments who look after Health and Sport for more resources.

Health

The current copies of Health Manuals used for Health Workers in PNG would be of benefit. See the local Health Department, Clinics and/or hospitals.

Davis, Damien (1996). Foundation of Health & Physical Education Handbook

Goode, K. The Human Body: The Ears. Macmillan. ISBN: 73295262X; Approx. AUD22.00

Goode, K. The Human Body: The Eyes. Macmillan 732952611; Approx. AUD22.00

Goode, K. The Human Body: The Mouth. Macmillan. ISBN: 732952638; Approx. AUD22.00

Goode, K. The Human Body: The Nose. Macmillan. ISBN: 32952646; Approx. AUD22.00

Goode, K. The Human Body: The Skeleton and Muscles. Macmillan. ISBN 732952662; Approx. AUD22.00

Goode, K. The Human Body: The Skin and Hair. Macmillan. ISBN: 732952654; Approx. AUD22.00

Shaw, Dr. J. (Ed.) (1990). *The Australian Medical Association: Guide to Medicine & Drugs*. Reader's Digest: Sydney. (A later edition should be available).

Malaria site – up to date information from Royal Perth Hospital, Australia.
Includes treatment regimens for all malaria drugs, including artemether.
<http://www.rph.wa.gov.au/labs/haem/malaria/index.html>

CD ROMS

(Available from Office Works (Myers) or Harvey Norman, Australia.)

Oxford University Press. (2001). *Encyclopaedia Britannica 2001* Deluxe Edn. (CD ROM). (Price: Approx. AUD90.00).

The Learning Company. (1997). *Home medical Advisor: The diagnostic guide to symptoms, diseases and medications*. (Cost: Approx. AUD65.00).
Web Site: <http://www.learningco.com>

The Learning Company. (1997). *Mosby's Medical Encyclopaedia*. (Source: As for Home medical Adviser; Price: Approx. AUD 65.00).
Web Site: <http://www.learningco.com>

Physical Education

Sports Associations: Most Sports Associations are more than willing to provide information about games and rules. For example the following may be obtained from these organisations:

- Field measurements and plans
- Sports Organisation – NSI – RULES
- Draws and ladders, New Zealand Sports Commission, Wellington, NZ
- Soccer Handbook Grades 4-6, 7 – 10.- Dept. of Education, PNG.
- Net ball Handbook - Dept. of Education, PNG
- Net ball Handbook - NSI, Goroka
- Basketball Handbook- NSI, Goroka
- Softball Handbook- NSI, Goroka
- Rugby Touch Handbook- NSI, Goroka
- Rugby League Handbook- NSI, Goroka
- Assume Rules Handbook- NSI, Goroka
- Physical Education for Community School Teachers Book 3

References for HPE

- Australian Track and Field Coaches' Association. (1976). *Track and Field Athletics Coaching Manual*. Rothmans National Sports Foundation. Australia.
- Blackall, B. & Davis, D. (1992) *Australian Physical Education*. Book 2, Second Edition, Macmillan education Australia Pty Ltd.
- Blackall, B. (1992). *Australian Physical Education*. Book 1. Second Edition. Macmillan: Melbourne.
- Brandt, T. (1983). *Physical Education for Community School Teachers*. National Sports Institute, Goroka. PNG.
- Brandt, T. (1984). *Athletics Organisation Manual*. National Sports Institute, Goroka. PNG.
- Brandt, T. (1984). *Physical Education for Primary School Teachers: Book 3*. NSI
- Davis, D, Kimmet, T. & Auty, M. (1986) *Physical Education: Theory and Practice*. Macmillan Company of Australia.
- Davis, D., Kimmet, T. & Auty, M. (1991) *VCE Physical Education*, Book 2. Macmillan Education Australia Pty Ltd.
- O'Brian, C. (1991) *Understanding Children Series: Movement and Young Children*. Queensland Early Childhood Curriculum Project, Department of Education. Queensland.
- Watt, Nemece & Dawe. (1998). *Jump Into PDHPE: Teacher Resource Book*. Macmillan. ISBN: 732956781; Approx. AUD77.00

Equipment for HPE

The equipment needs for individual colleges will vary depending on the program and sports being played. This list is very general.

- Sphygmomanometer, Digital (Approx. AUD90.00)
- Needle, Pump Attachment, For Inflatable Balls
- Stopwatch, Electronic, Large LCD Display, Water Resistant, 1/100th Split, Alarm/Chrono, 12 Month Warranty 'Spalding'
- Ball, Soccer, Synthetic Leather, 32 Panel, Stitched, Black & White, No 5
- Net, Sports Carry Bag, Toggle Tie, 700mm x 1.1M
- Ball, Cricket, Plastic, 156gm, Red With White Seam

- Ball, Football, Touch
- Ball, Soccer, Nylon, No 4
- Ball, Softball, Rubber
- Megaphone, Hand Held, With Siren, 15W Output, 10hrs Talk, 20min Siren, 6 x C Batteries (9V DC) Not Included (ER1015S)
- Ball, Tennis, Practice Quality
- Playground Marker, Hemisphere Dome, 200mm Dia, 90mm High, Assorted Colours, Rigid Plastic Construction
- Rope, Skipping, Plastic, 2.5M
- Hoop, Polypropylene, Assorted Colours, 750mm Dia.
- Whistle, Metal
- Tape measures

First Aid – An integrated topic

It is essential that first aid practices be integrated throughout the teaching of Health and Physical Education modules. For this reason, first aid should not be treated separately but as the need arises in each module.

Sports injuries should be dealt with while teaching Modules H4 and H5, while conditions such as drowning, bleeding, cardiac arrest and poisoning should be integrated with the relevant modules in Health.

Main ideas developed

Teachers have a duty to develop competency in first aid so that they can provide proper care for the children for whom they are responsible.

Correct procedures in the application of first aid must be practiced continuously.

First aid procedures are continuously changing with new methods and research being applied. Therefore it is important to stress that teachers must upgrade their first aid qualifications at regular intervals. Booklets explaining first aid procedures are readily obtained from the health department.

Suggested student activities

1. Research traditional methods of applying first aid in an emergency. List some common injuries and the ways each would have been treated.
2. Make a list of the common injuries that would exist in a village situation. For each injury identify the likely cause and describe the treatment that is most appropriate to that injury.
3. Research the different types of bandages. Obtain samples of each bandage and demonstrate how each one is applied. Draw a poster showing how to apply each type of bandage.
4. Make a list of the materials that a first-aid-er would need to carry out their duties efficiently. Check the first aid box or materials to see whether each of the materials on your list is present.
5. Find out what the symbols “EAR” and “CPR” stand for and how they should be applied. Demonstrate to your group the correct application of each procedure.
6. Describe what you would do if you found a person floating face down in the sea near the shore. Research what you should do in such a situation and compare that with your first description.
7. Role play a number of emergency situations and use the proper equipment to apply the appropriate first aid procedures.
8. Collect details, including diagrams, of accurate first aid procedures and compile them into a booklet that you can keep for future reference.

Module H1

Human Body

9hrs

Rationale

The study of the different body systems and their interdependence for proper functioning is important to understand the way cells, tissues and organs work. It is important for the trainee teachers to have a good understanding of these systems to be good healthy teachers in the primary school.

It is also essential that students have a clear idea about how cells work as the units of life or building blocks within the human body. Children are naturally curious about their own body and this curiosity is nurtured through teaching the different body systems. The respiratory, cardiovascular, circulatory and nervous systems are the main foci of this module.

The reproductive system is studied in this module to provide an understanding and bases for the development of healthy attitudes towards sexual practices, childbirth and diseases related to sexual practice.

Objectives

At the end of this module students should be able to:

- Identify and explain the parts and functions of different human tissues and organs;
- Explain the processes of mitosis and meiosis;
- Explain the relationship between chromosomes and genes;
- Describe how linkage between cells, tissues and organs leads to different body systems;
- Research and present information about human systems;
- Illustrate and explain the function of the circulatory and respiratory systems;
- Describe the major components and functions of the human nervous system;
- Describe some common nervous disorders and treatment;
- Describe the functions of the human urinary and reproductive systems;
- List common problems and diseases associated with the circulatory, respiratory, nervous, urinary and reproductive systems;
- Describe how a knowledge of the different body systems leads to better care of one's body;
- Conduct library research and share information to enhance self-learning;
- Prepare teaching resources on this module for a Primary school class.

Main ideas developed

Body systems

The human body can be studied as a number of discrete systems for the purpose of identifying particular functions but it should be remembered that the systems are interdependent.

Reproductive health

Sexual reproduction allows for variation in offspring, which is an advantage in the evolution of species.

Knowledge about contraception is important for spacing children in families and allowing personal choice in family size.

Good knowledge of the human reproductive system is necessary for promoting sexual health.

Urgent action is needed to promote healthy pregnancy and prevent maternal mortality and child malnutrition. (Also see module H3, *Nutrition*).

Knowledge about AIDS and STDs is important for its prevention and treatment. (Also see module H2, *Diseases*).

Content and sequencing

1 Cells, tissues and organs Organs

- **Cell** – structure, functions, multiplication, chromosomes.
- **Tissues (types, structure, functions)** Epithelial tissue; Connective tissue; Muscles tissue; Nervous tissue

2 Circulatory system

- **Blood** - Blood and its constituents
- **Heart** - Position of organ; the heart structure and function;
- **Blood Vessels** - Arteries, veins, capillaries (structure and function)
- **Circulation** of blood through the heart; Types of circulation in the human body; Pulmonary circulation; General circulation
- **Lymphatic system**
Structure and function of lymphatic organs; lymph channels, vessels, capillaries and glands
- Diseases of the heart, blood and lymph

3 Respiratory system

- Upper and lower respiratory tract - Parts, position and structure of the organs of the system.
- Respiration: External; Cycle of Respiration; Ventilation of the lungs; Control of respiration
- Exchange of gases; Cell respiration (covered in science)
- Diseases: Pneumonia; Tuberculosis; Asthma

3. Urinary and reproductive systems

- Reproductive system
- Urinary system
- Sexually transmitted diseases
- Fertilisation, pregnancy and birth control

4. Nervous system

- Human brain and spinal cord
- Nerves: types, functions; Nerve impulse transmission
- Nervous systems: Central; Peripheral; Autonomic
- Disorders of the nervous system: brain tumour/damage; meningitis; cerebral malaria; epilepsy; leprosy; paralysis

Note: Other body systems are covered in other modules and some may be covered as student projects (library research) depending on the specific needs of each college.

Suggested teaching strategies

The three modules on health should be treated together rather than separate entities. First Aid issues and treatments should be discussed in a contextual setting, i.e., talk about the first aid for a heart attack while students are studying the topic on the circulatory system. In this way the modules will be more integrated. Continuous reference should also be made to the links to everyday health and general well being.

- Charts and models are essential aids for the teaching of this module. These should be ordered for the college. (See procurement order suggestions).
- The lecturer should also draw on students' personal experiences with health matters. There are always plenty of stories in this area.
- Dissections of systems (rat, cow, and fish) will also be useful to show the parts of a real system, e.g., heart, lungs, kidneys, etc.
- Slides (35mm) or prepared sections are also useful when teaching about concepts that are not easily seen, i.e., microscopic.
- Visits to clinics and hospitals may be useful to study some topics.
- Guest speakers (experts) would also be beneficial to gain greater student interest and awareness in the health topics.

It is also essential that the lecturer keeps up to date with health issues and treatments in PNG through reading and correspondence with health organisations.

There are also many good WEB sites that contain information on a range of health topics and issues worldwide.

In this section suggested are given to introduce some topics and to provide the lecturer with more information. Sample answers are given for some of the activities and exercises so that the lecturer may guide students in the right direction. You should also refer to the list of specific strategies at the front of this guide.

Cells, tissues and organs



Research. What does a human cell look like?

The lecturer should try to obtain some prepared slides of tissue samples. You might be assisted by the local hospital. Prepared slides are also available from scientific suppliers. Make sure you include some on your resource order for the college.

A number of stations could be set up around the room for students to view, sketch and describe the sample slides. The groups could then report back to the class.



Activity 1. Cells under the microscope

In this research activity, a sample of cheek cells could be obtained for students to look at. These are easily obtained by scraping the inside of the cheek with a toothpick and smearing a slide. Some staining with dilute red ink might improve the view. The cells from the cheek are **squamous epithelial tissues**. The nucleus is easily visible.



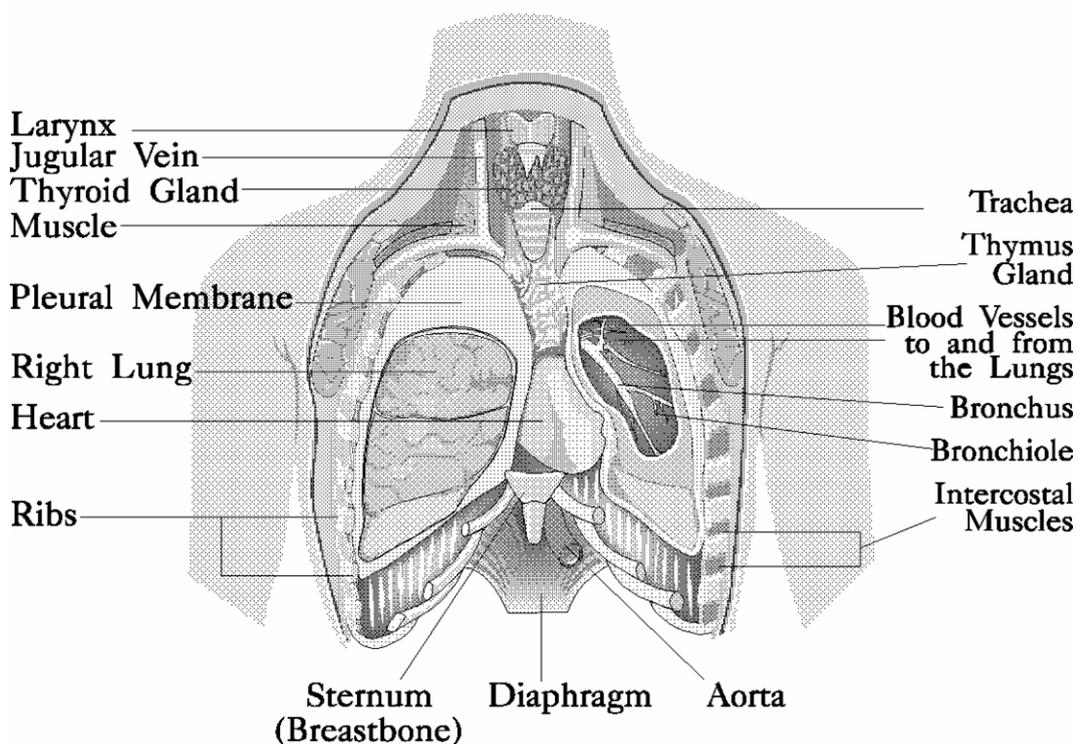
Activity 2. What type of tissue?

Some suggested answers are given but these could be discussed with reference to later sections in the module/s.

Tissue	Classification	Function
Skin	Epithelial	Protection
Blood	Connective	Circulation of gases, food and wastes
Cartilage	Connective	Connect bones together
Muscle	Muscular	Provide movement to the skeleton
Fat	Connective	Store food and provide protection
Brain	Nervous	Central nervous system – all functions

Activity 3 **Body cavities**

The diagram below will assist the lecturer to guide students with answers to this activity.



Cavity	Organs contained
Spinal	<i>spinal cord</i>
Orbital	<i>eyes</i>
Nasal	<i>passages (nostrils) inside the nose; sinuses</i>
Oral	<i>tongue and teeth; palate</i>
Thoracic	<i>heart and lungs</i>
Abdominal	<i>stomach, intestines, liver, gall bladder, spleen, pancreas, and kidneys</i>
Pelvic	<i>urinary bladder, ureters and urethra; Reproductive organs (male or female)</i>

Additional lecturers' notes

Blood Pressure

This can be demonstrated with two syringes that are the same size. Use different forces to push out a coloured liquid, which can be “blood”. Students will notice that more force will squirt the “blood” further. Secondly different size needles may be placed on the syringes to show the effects of different size blood vessels on blood pressure. Thirdly different amounts of fluid in the syringes may be used to illustrate what happens with loss of blood (smaller volume of blood).

Lymphatic system

The lymphatic system is made up of lymph vessels, lymph nodes (glands) and lymph. Fluid passes from the capillaries to the tissues, some of this is collected back into the capillaries, but some is collected into the lymph vessels and then emptied back into the blood stream. The fluid in the tissues is similar to plasma; as it is collected into the lymph vessels it is called lymph. All lymph vessels pass through some lymph nodes.

Lymph nodes

There are groups of lymph nodes in several parts of the body. The ones that it is important for the health worker to know are in the neck, maxilla and groin.

Functions of the Lymph Nodes

- To collect or filter the bacteria and cancer cells from the lymph.
- To produce one type of white blood cell.
- To make antibodies to fight infection.

Lymph vessels

Lymph vessels carry lymph from the tissues to the lymph nodes and then from the lymph nodes back to the blood stream. Lymph moves along because of contraction of muscle around the vessels, e.g. leg muscles. The vessels have valves to prevent the lymph flowing backward.

Respiration is to provide the cells of the body with oxygen and to excrete from the body the waste gas, carbon dioxide.

Respiration

We breathe in through our nose (or mouth) air with oxygen. The air passes through the naso-pharynx, the pharynx, larynx, trachea, bronchi and bronchioles to the alveoli. From the alveoli the oxygen passes through the alveoli cell wall to the blood in the capillaries. The body uses oxygen to convert food to energy and the waste product carbon dioxide is produced. It is absorbed through the capillary wall into the blood. This carbon dioxide from the blood in the capillaries passes into the alveoli and is breathed out. This exchange of gases is necessary for the body to have enough oxygen and to get rid of its carbon dioxide.

When we breathe in the muscles between the ribs tighten and pull the ribs up and out, and the diaphragm goes down. This makes the lung space bigger and air rushes in.

When we breathe out the muscles relax and the ribs go down and in and the diaphragm goes up so the space is smaller and air is pushed out.

The rate of respiration is controlled by the 'respiratory centre' in the brain. When there is too much carbon dioxide at the respiratory centre, it sends a message to the lungs to breath faster to get more oxygen. When the level of carbon dioxide is normal again then breathing settles back to normal.

Our body cells can only live for a few minutes without oxygen so it is very important that the airway is kept clear at all times. The tongue may fall back and block the airway or the person may inhale a foreign body and it get caught at the larynx and block the airway; disease may cause a swelling of the vocal cords at the larynx and block the airway, or disease may cause a blockage of the bronchioles, or a filling of the alveoli with fluid, and again there is a blockage of the airway. It is one of the First Aid person's important duties to make sure the patient's airway is clear, so that he can get enough oxygen to the cells of his body. An unconscious person is put in a coma position to prevent the tongue falling back.

Treating respiratory system problems

Symptoms of breathing difficulties often include a cough and tightness in the chest. Difficulty in breathing may be due to:

- narrowing of the air passages, from spasm (as in asthma and bronchitis) or from swelling of the linings of the air passages (as in bronchiolitis and bronchitis).
- an infection of the lung tissue (as in pneumonia and bronchitis)
- damage to the small air sacs (alveoli) from emphysema or inhaled dusts or moulds (as in pneumoconiosis and farmer's lung).
- congestion of the lungs from heart disease
- an inhaled object such as a peanut
- infection or inflammation of the throat.

Drugs with a variety of actions are used to clear the air passages, soothe inflammation, and reduce the production of mucus.

Decongestants reduce the swelling inside the nose making it possible to breathe more freely. antihistamine is often recommended to relieve symptoms or to prevent attacks if the cause of congestion is an allergic response, an antibiotics are given for infections of the respiratory tract, such as bronchitis or pneumonia.

Drugs that widen the bronchi are known as bronchodilators. They are used to relieve or prevent asthma attacks. Bronchodilators include drugs that relax the muscles surrounding he airways. These may also be of limited benefit in chronic respiratory problems such as chronic bronchitis.

A variety of drugs may be used to relieve coughs. Some of them make it easier to eliminate phlegm while others suppress the cough by inhibiting the cough reflex itself.

Phases of the menstrual cycle

The normal human menstrual **cycle** is 28 days, but no woman is always precisely regular, and cycles as short as 21 days or as long as 35 days are not abnormal. It is customary to call the first day of the menstrual period the first day of the **cycle**, although menstruation is the end rather than the beginning of a process. On this basis the **cycle** is described as starting with about five days of menstruation, followed by a proliferative phase that lasts to about the 14th day, and then a secretory phase that lasts until the next menstruation. The external manifestation of menstruation depends upon cyclical change in the lining of the body of the uterus. The lining, called endometrium, consists of tubular glands that open into the uterine cavity. The glands lie in a vascular framework, or stroma, and are separated by it.

At the end of menstruation, just at the beginning of the proliferative phase, the endometrium is thin, with short, straight glands, and the ovary is quiescent. Under the influence of the gonadotropic hormones from the pituitary gland an ovarian follicle (occasionally more than one) ripens in one of the ovaries. This ovarian follicle contains the ovum, which is a cell about 0.14 millimetre (0.006 inch), in diameter, surrounded by a group of smaller cells, called granulosa cells. The granulosa cells multiply, with the ovum situated in the wall of the rounded structure that they form, and secrete an estrogenic hormone, estradiol (a hormone). This hormone causes proliferative changes in the endometrium, so that the glands become taller and the whole endometrium becomes thicker and more vascular.

At about mid-**cycle** ovulation occurs: The ovum is discharged out of the follicle and from the surface of the ovary, to be received into the fallopian tube, down which it is carried to the uterus. After ovulation the granulosa cells lining the follicle from which the ovum has been extruded accumulate yellow lipid and are therefore called lutein cells, from the Latin word *luteus*, "saffron-yellow." The altered follicle is called corpus luteum. The corpus luteum continues to secrete estrogens but now also secretes progesterone. This additional hormone induces the secretory phase in the endometrium. The endometrial glands are distended with secretion and become very tortuous, while the stromal cells are swollen. The appearance of the endometrium at the end of the menstrual **cycle** is indistinguishable from that of early pregnancy and this endometrial change is a preparation for the reception of the ovum. If it is fertilized, the ovum liberated at mid-**cycle** reaches the uterine cavity at a time when the endometrium is in the secretory phase, and the ovum embeds itself in the endometrium and starts its growth.

If the ovum is not fertilized the endometrium breaks down and menstruation occurs. Menstruation has therefore been described as the outward evidence of the abortive close of one **cycle** and the hopeful commencement of the next.

When the ovum dies, the corpus luteum degenerates and ceases to produce hormones. On the withdrawal of estrogens and progesterone there is sudden spasm of the endometrial blood vessels, and all but the basal layer of the endometrium dies.

The disintegrating endometrium is shed, together with some blood. The endometrium contains plasmin, an enzyme that dissolves blood clots, so that the menstrual discharge is normally fluid. The total blood loss does not ordinarily exceed 50 millilitres. After menstruation the endometrium regenerates from the residual basal layer during the proliferative phase of the next **cycle**.

Suggested student activities

The following suggestions provide further ideas for demonstration, discussion, and research in-class and extension activities for students during study of this module.

Body systems

- 1 Research the topic of blood. Construct a chart giving the (i) name (ii) description (iii) structure (diagram) and (iv) function of each of the four main components of blood.
- 2 Use plasticine (or some other material) to make scale models of red cells, white cells and platelets.
- 3 Research the circulatory system. Copy a chart of this system, cut it up into parts and labels then try to reassemble the chart. (See student activities in module).
- 4 Research the lungs.
 - (a) Construct a chart of the main parts of the respiratory system giving (i) name (ii) description (iii) structure (diagram) and (iv) function of each of these parts.
 - (b) Demonstrate and explain where each of the parts occurs in the body.
- 5 Work with a partner.
 - (a) Lie on the floor and have your partner trace around your body with a piece of chalk.
 - (b) On the body outline draw to scale the positions of the parts of the digestive system.
 - (c) Explain to a larger group the functions of each of the parts.
- 6 Cut the toe off an old sock and, with a tennis ball or ball of paper, demonstrate how peristalsis pushes a bolus of food down the gullet. Explain how hiccups and vomiting occur.
- 7 Organise to test all of the class members for reflexes by sitting them down and tapping them on the kneecap. Account for any variations amongst the reactions.
- 8 Measure and record the reaction time of all the class members by dropping a ruler between thumb and forefinger and measuring the distance the ruler falls before they can react and stop the ruler. Graph the results and make some conclusions.

Reproductive health

1. Research and explain the differences between sexual and asexual reproduction and give some examples.
2. Research and write definitions in your own words for the terms gametes, sperm, eggs, and X and Y-chromosomes. Explain why children are not identical to either their mother or father and why this factor is important in evolution.
3. Work with a partner.
 - (a) Lie on the floor and have your partner trace around your body with a piece of chalk.
 - (b) On the body outline draw to scale the positions of the parts of the female reproductive system.
 - (c) Swap tasks and make a second tracing and on it draw the male reproductive system.
 - (d) Explain to a larger group the functions of each of the parts.
4. Research, write and act out a role-play of:
 - (a) the action of sperm in moving up the uterus to fertilise an egg,
 - (b) the formation of identical and non-identical twins.
5. Research and report to your group how artificial insemination works.
6. Draw a chart of the female reproductive cycle in humans and explain to your group what is happening in each part of the cycle.
7. Research one of the following birth control devices or methods: contraceptive pill, condom, intrauterine device (IUD), and rhythm method. Draw a diagram of the device or method and use it to explain clearly how it acts to prevent conception.
8. Set up a "Question Box"⁷ in your classroom into which your colleagues can put questions about sexual health and reproduction without embarrassment. Members of the class (or the lecturer) can take turns to read out the questions for a class discussion.
9. Research maternal mortality rates. "One out of every twenty two rural mothers in PNG will most likely die from pregnancy or childbirth" (UNICEF). Explain to your group the likely causes of this unacceptable figure. Discuss possible actions to lower this figure.

Module H2 Diseases

9 hrs

Rationale

The topic “diseases” is covered in both the lower and primary school syllabus therefore it must form an essential part of the curriculum. Student teachers need to identify common PNG diseases, signs, symptoms and treatment through discussions, lectures, hospital visit and so on. Emphasis should then be placed on both personal and environmental hygiene.

Objectives

At the end of this module students should be able to

- Identify and classify common PNG diseases and the kind of treatment used.
- State the importance of why prevention of diseases is better than cure.
- Discuss the significance of personal hygiene, environmental health.
- Openly discuss traditional and modern views as the causes of types of disease.
- State types of drugs used by people and the impact on people’s health if over used.
- Discuss other PNG diseases such as STD and how to prevent them.
- Demonstrate knowledge about the moral value of studying Sexually Transmitted Diseases in detail.
- Differentiate between health and diseases and how and why they should be studied interdependently.

Main ideas developed

Occurrence of diseases and spread of diseases can be prevented by good sanitation.

Malaria is prevalent in most regions of PNG and other tropical countries. It is spread by mosquitoes and is a major problem disease in PNG.

Knowledge about the causes and prevention of malaria is necessary for reducing its incidence.

Drugs are chemicals that affect the human body. Some drugs are useful (medicinal) if taken in moderate quantities.

Any drug can be harmful if taken in large quantities. Some powerful drugs can be harmful even if taken in very small quantities.

Alcohol is a drug that is not thought harmful if taken in moderation. Excessive alcohol consumption is harmful to the individual and to the people around the individual.

Knowledge about Aids and sexually transmitted diseases is important for its prevention and treatment.

Content and sequencing

Infectious diseases

- Agents of infection
- Routes of infection
- How infections occur
- The body's defenses
- Immunisation
- Sexually transmitted diseases, HIV/AIDS
- Dengue fever

Parasitic infections

- Malaria
- Worms
- Fungal infections
- Lice and scabies

Drugs

- Medicine and prescription drugs
- Drug abuse – Alcohol, tobacco, marijuana, opium and heroin
- Betel nut

Suggested teaching Strategies

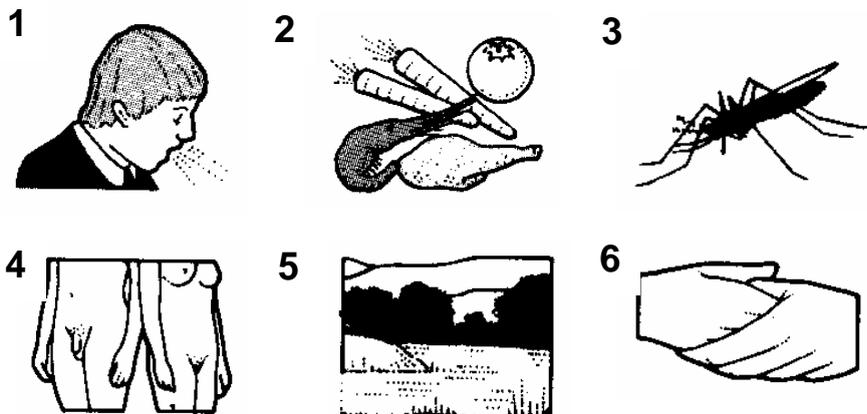
The three modules on health should be treated together rather than separate entities. First Aid issues and treatments should be discussed in a contextual setting, i.e., talk about the first aid for a heart attack while students are studying the topic on the circulatory system. In this way the modules will be more integrated. Continuous reference should also be made to the links to everyday health and general well being.

- Charts and models are essential aids for the teaching of this module. These should be ordered for the college. (See procurement order suggestions).
- The lecturer should also draw on students' personal experiences with health matters. There are always plenty of stories in this area.
- Dissections of systems (rat, cow, and fish) will also be useful to show the parts of a real system, e.g., heart, lungs, kidneys, etc.
- Slides (35mm) or prepared sections are also useful when teaching about concepts that are not easily seen, i.e., microscopic.
- Identify a disorder or disease and use a case study to introduce aspects of the disease module.

 **Activity 1. Spreading infections**

Work in groups and use each of the illustrations given below to create an educational poster that shows how infections may be spread.

1. For each diagram, list the way infection occurs and PNG examples of infections spread in each way.
2. List examples of the types of infections spread by each method of transmission.
3. Research the best prevention method for each example you have named.



Suggested answers

- 1 **Sneezing and coughing** causes **water droplets** to carry the bacteria or virus through the air to others. Influenza. Cover your cough.
- 2 **Handling food** with dirty hands will pass on harmful bacteria such as E. coli (a fecal bacterium). Wash hands with soap before handling food.
- 3 **Bites** of insects pass on a number of diseases including malaria (mosquito). Use insect repellent and protection (net) while sleeping.
- 4 **Sexual intercourse.** Contract STDs (including HIV) through contact of body fluids (increased with open sores). Use a condom or abstain.
- 5 **Contaminated water.** (Giardia, E. coli, etc). Boil all suspect water for 20 minutes.
- 6 **Contact.** Some bacteria are passed on by contact with clothing or skin. Avoid contact with highly contagious people (e.g., mumps, chicken pox)

 **Activity 2. Immunization**

Lecturer should obtain latest statistics from Health Department.

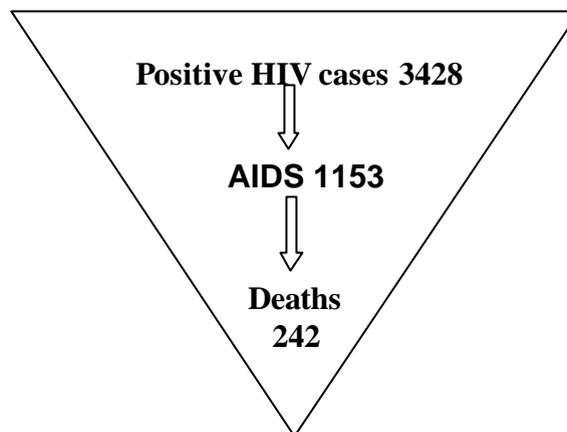
Activity 3 Reporting statistics about HIV

1 What is misleading about this diagram used to report the state of HIV, AIDS and deaths from AIDS in PNG during 2000?

2 How would you better present these statistics?

3 Discuss in groups the following extract from the **PNG National HIV/AIDS Medium Term Plan 1998 – 2002**:

“There is no means to effectively measure the true extent of HIV infection in the population. It has been estimated, however, that for every known case of HIV there could be up to 100 unreported cases.”



4 Given the statement above what might be the estimate of HIV cases for PNG?

5 Comment on your answer given that **WHO** estimates the PNG HIV cases to be as low as 11 000 and as high as 27 000.

Suggested answers

1 The diagram seems to suggest that only 242 of the 3428 that are HIV positive will die from AIDS. This is quite erroneous! Why?

2 Do not present data from **different populations** in the one diagram. Show actual deaths from those who were HIV positive at the same time! The result will be closer to ALL DIED!

3 This discussion might need to be led by the lecturer providing more recent information.

4 There could be over 300 000 cases of HIV undetected.

5 The 100 unreported case for every one might be “sensationalism”! The figure of 27 000 indicates that there could be **about 8 unreported or unconfirmed cases for every one confirmed**



Activity 4. HIV cases in PNG

- 1 Use the data given in the table to **calculate** the cumulative totals for HIV cases in PNG?
- 2 Discuss these statistics in groups. What do the figures mean?
- 3 Use the data to draw bar graphs to show the changes from 1987 to 2000 in:
 - (a) the number of reported HIV cases each year.
 - (b) The cumulative total of HIV cases since 1987.
- 4 If the PNG population is 4 million what was the HIV infection rate in year 2000. (Divide the cumulative total for Year 2000 by 4 million).
- 5 Comment on how this compares to a rate of 3.4 in 1993.
- 6 Suggest reasons for the apparent drop in reported cases of HIV in 1992.

Year	No. HIV cases reported each year	Cumulative total
1987	6	6
1988	12	18
1989	19	37
1990	36	73
1991	37	110
1992	32	142
1993	40	182
1994	75	257
1995	128	385
1996	196	581
1997	359	940
1998	696	1636
1999	815	2451
2000	970	3421
2001		

Note: Infection rates are generally expressed as number per 100 000 of population.

Suggested answers

- 1 See the table.
- 2 Students should realise that the increase is not a simple linear growth. It is becoming exponential!
- 3 Students may need assistance to establish a suitable scale for this exercise.
- 4 The HIV infection rate in 2000 was $970/4\ 000\ 000 = 24.3$ per 100 000 population.
- 5 This rate is about TEN TIMES the 1993 figure.
- 6 More undetected or unconfirmed cases.

Activity 5. What are HIV and AIDS?

Read the booklet, *New Horizons in Health: Protection of life – Your Questions answered on HIV/AIDS*.

Lecturers and students alike should read this booklet that has been distributed to all colleges and students. More should be obtained from the AIDS council if need be.

Activity 6. Malaria and treatment in PNG

The lecturer will need to obtain the latest information about malaria treatment from the nearest hospital and/or health workers.

Activity 10. Alcohol abuse

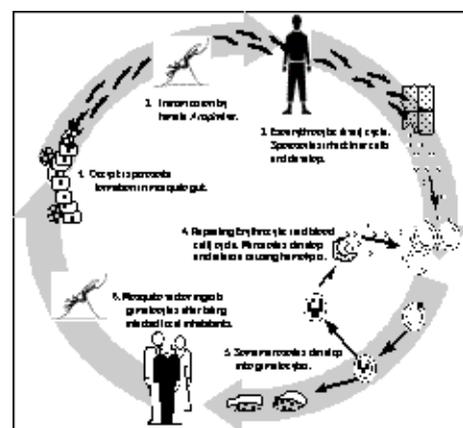
This topic/activity should be taught with reference to the materials produced for Social Science modules.

Additional lecturers' notes

Life cycle of malaria parasites

The life cycle of malaria is complex, (see Figure), with developmental stages and corresponding symptoms differing according to the *Plasmodium* species involved.

Sporozoites, the infective stage of plasmodia, are injected from the salivary glands of infected mosquitoes during feeding (2). Following inoculation, the sporozoites disappear from the blood within 30 minutes. Many are destroyed by white blood cells but some enter liver cells. **Exoerythrocytic Phase.** Sporozoites that enter liver cells multiply asexually in a process called exoerythrocytic schizogony. Thousands of uninucleate merozoites form, displacing the nucleus of the liver cell, but causing no inflammatory reaction in the liver. Eventually, invaded liver cells rupture, releasing thousands of merozoites into the bloodstream. This occurs 6 to 16 days after initial infection depending on the infecting *Plasmodium* species.



Mosquito Life cycle.

(Source: Virtual Naval Hospital Web Site.

www.vnh.org/Malaria/...)

Dormant or Hypnozoite Phase. All infections due to *P. falciparum* and *P. malariae* have a single exoerythrocytic form. All infected liver cells parasitised with *P. falciparum* and *P. malariae* rupture and release merozoites at about the same time. In contrast, *P. vivax* and *P. ovale* have two exoerythrocytic forms. The primary type develops, causes liver cell rupture, and releases merozoites just as described for *P. falciparum* and *P. malariae*. The other form, which develops concurrently, is known as the hypnozoite. Sporozoites that enter liver cells differentiate into hypnozoites that remain dormant for weeks, months, or years. At some future time, the hypnozoites activate and undergo exoerythrocytic schizogony, forming a wave of merozoites that invade the blood and cause a delayed case or a clinical relapse.

Erythrocytic Phase. Released merozoites invade red blood cells (erythrocytes), where they develop into trophozoites. After a period of growth, the trophozoites divide and develop, eventually forming 8-24 merozoites in each red blood cell. When this process is complete, the host red blood cells rupture, releasing mature merozoites. The symptoms associated with malaria occur at this point. The merozoites then invade fresh erythrocytes and another generation of parasites develops in the same manner. This process occurs repeatedly during the course of infection and is called erythrocytic schizogony. The length of this development cycle differs according to the species of parasite, varying from 48 hours in *vivax*, *ovale*, and *falciparum* malaria, to 72 hours in *P. malariae* infections. In the early stages of infection there is no characteristic periodicity as groups of parasites develop at different times.

The febrile episodes caused are inconsistent. Later, the erythrocytic schizogony development cycle becomes synchronized, and the febrile paroxysms become more consistent. Some merozoites differentiate into sexual forms (female macrogametocytes, male microgametocytes) and develop in invaded red blood cells.

Vector Phase. Anopheles mosquitoes feeding on infected hosts ingest sexual forms developing in red blood cells. The female macrogametocytes and male microgametocytes mature in the mosquito's stomach and combine forming a zygote that undergoes mitosis. The products of mitosis are ookinetes, which force themselves between the epithelial cells to the outer surface of the stomach, and form into small spheres called oocysts. The oocysts enlarge as the nucleus divides, eventually rupturing and releasing thousands of motile sporozoites into the body cavity. The sporozoites migrate to the salivary glands, making the female mosquito infective. The vector phase of the life cycle, called sporogony, is complete in 8 to 35 days depending on species and environmental conditions.

Parasitic infections common to humans

This list should be completed by the lecturer or students by referring to the appropriate health books and/or health workers in your area.

Disease	Cause	Vector	Symptoms	Treatment
Amoebic dysentery	Protozoan	Food and water		
Acariasis	Roundworm	Food		
Athletes foot	Fungus	Contact		
Filariasis	Roundworm	Mosquito		
Tinea imbricata	Fungus	Contact		
Tinea versicolor	Fungus	Contact		
Hookworm	Roundworm	Soil - foot		
Malaria	Protozoan	Mosquito		
Ringworm	Fungus	Contact		
Scabies	Mite	Contact		
Tapeworm	Flatworm	Food		
Threadworm	Roundworm	Mouth/food		

Suggested student activities

Infectious diseases

1. Conduct an Inspection and/or observation in a village, school or in a town
2. Analyse and prioritise work in identifying health needs.
3. Carry out a library research on modern theory on causes of diseases and identify scientists who were famous.
4. Present, as a seminar, of research work on any environmental issue.
5. Carry out a community project as part of health promotion in a school.

STDs - HIV - AIDS

1. Research one of the sexually transmitted diseases (STDs). Describe clearly how the disease is contracted (caught). Describe the symptoms of the disease and the treatment.
2. Research the occurrence and spread of AIDS in PNG. Report to your group on your findings.
3. Organise class debates on the topic: "You do not need to take precautions against AIDS if your partner appears to be healthy".

Parasitic infections

Malaria

1. Research the topic of malaria. (a) Construct a table for malaria giving the (i) causes (ii) effects and (iii) prevention measures that should be taken.
2. Research the life cycle of a mosquito. Make a chart that shows each of the stages in this cycle as it relates to malaria.
3. Research the occurrence of malaria in PNG. Draw a map of PNG and on it show the rates of malaria in each province. Identify the different death rates from malaria in each province and explain to your partner the possible causes of such differences.
4. Draw a bar graph to show the differing death rates from malaria in the different provinces in PNG. Use the graph to explain to your group the distribution of the deaths.
5. Invite a guest speaker from the Hospital, Department of Health, an Aid Post or hospital to speak to your class about the incidence of malaria in your area.
6. Create two charts suitable for Grade 4 children, which could be used to explain (a) the causes of malaria and (b) how malaria can be prevented. Make up slogans that could be used with the charts.
7. Make a model of a mosquito out of second hand materials. Use your model to explain how you would give a lesson on the effectiveness of mosquito nets to a Grade 3 class.
8. Organise a class debate on the topic "Every village chief should be required to supply a mosquito net to every person in the village".
9. Role-play an event of a mosquito injecting into a person's arm and the effect of that person getting malaria.
10. Research the relationship between nutrition and malaria. Explain to your partner why this relationship exists. (Refer to Module H3, *Nutrition*).

Drugs

1. Research the concept of a drug. Explain what a drug is (a chemical) and what it does (affects some part of the body).
2. Research and make a list of some of the main useful drugs and the useful effect each has. Explain how even useful drugs can be harmful if taken in too great a quantity.
3. Research and explain how penicillin was discovered and the effect it had on human life. Explain why penicillin is now not as effective as it was initially.
4. Research and make a list of some of the harmful drugs and their effects on humans.

5. Make a list of the reasons why people consume drugs. Organise a group discussion of how drug taking can be minimised.
6. Compose a chart or poster that would help you explain to your group why drug taking is harmful to humans.
7. Research and report to your group the effects excessive alcohol consumption has on the human body.
8. Write a short dramatic play on the effects of excessive alcohol consumption on family life. Act out the play with members of your group.
9. Organise a class debate on the topic "Alcohol consumption should be banned in PNG".
10. Visit a drug rehabilitation centre and talk to some of the patients and the people looking after them.

Module H3 Nutrition

9 hours

Rationale

This module provides a knowledge and understanding of nutrition and its benefit to human growth, health and performance. It is fundamental to teaching health in PNG primary schools.

Objectives

At the end of this module students should be able to

- Identify the main food groups, nutritional values and nutrition related diseases and be able to prepare a balanced diet.
- Name and describe the structures and functions of the digestive system and its related diseases.
- Identify factors that contribute to healthy bodies and minds.

Main ideas developed

Digestion provides essential raw materials for growth and development of the body. The digestive system functions to extract as much useful material from the food we eat as possible.

The digestive system supports a number of organisms that aid digestion but some exotic organisms that can cause major disruptions to digestion.

The different foods can be classified into a few important groups.

Different foods contain particular substances that are essential for proper growth and development of people.

A balanced diet requires consumption of some components from each food group.

Some foods have very little nutritional value and may contain ingredients that can be harmful if consumed in large quantities.

Some eating habits or foods taken in excess can cause preventable diseases.

Clean drinking water and safe sanitation practices are essential for healthy living.

Many forms of food poisoning can occur from unsafe food handling practices.

Content and sequencing

Nutrients and food groups

- Energy requirements
- Food groups
- Vitamins and minerals

Digestive system

- The digestive system
- Digestion of food

Diet and nutritional health

- Diet
- Balanced diet
- Some foods of PNG

Diseases of nutrition and digestion

- Nutritional diseases
- Diseases of the digestive system

Contamination of food and water

- Contamination
- Hygiene and food handling
- Water contamination

Suggested teaching strategies

The three modules on health should be treated together rather than separate entities. First Aid issues and treatments should be discussed in a contextual setting, i.e., talk about the first aid for a heart attack while students are studying the topic on the circulatory system. In this way the modules will be more integrated. Continuous reference should also be made to the links to everyday health and general well being.

- Charts and models are essential aids for the teaching of this module. These should be ordered for the college. (See procurement order suggestions).
- The lecturer should also draw on students' personal experiences with health matters. There are always plenty of stories in this area.
- Dissections of systems (rat, cow, and fish) will also be useful to show the parts of a real system, e.g., heart, lungs, kidneys, etc.
- Slides (35mm) or prepared sections are also useful when teaching about concepts that are not easily seen, i.e., microscopic.

Nutrients and food groups

Energy (see P2: Energy) might need to be reviewed before talking about the energy value of various foods. The unit used is kilojoules (used to be calories).

It is good to point out to students that there is no difference between the heat given off when burning substances like sugar than there is during metabolism. For this reason food energy values are determined using calorimetry. The food is burnt under controlled conditions and the heating effect on water is measured.

The lecturer should bring in samples of traditional and processed foods to illustrate the main food types to students and begin the discussion about the various food types.



Activity 1. Food groups

Comments

1. If there is not a local market then garden produce may be brought to class. Maybe the Community Development or Agriculture students can help out?
2. The local store may be surveyed using discarded cans, jars with labels. Students may also collect labels.



Activity 2 Vitamins and minerals

Refer to a Nutrition book for the answers to the missing entries in the tables.

Use charts to illustrate the Vitamin and Mineral needs.

Personal experiences would also be useful here. Students may know of examples of nutritional disorders in their home villages.

 **Activity 3 Digestive system**

1. Labels are shown at right.
2. Refer suitable textbook.
3. Refer a to a suitable reference.
4. Give students a choice of story format (big book, poster, play, etc)

Digestion of food

Use of good anatomical charts is a must to teach this topic.

Additional activity

It is a good idea to demonstrate the iodine - starch experiment here.

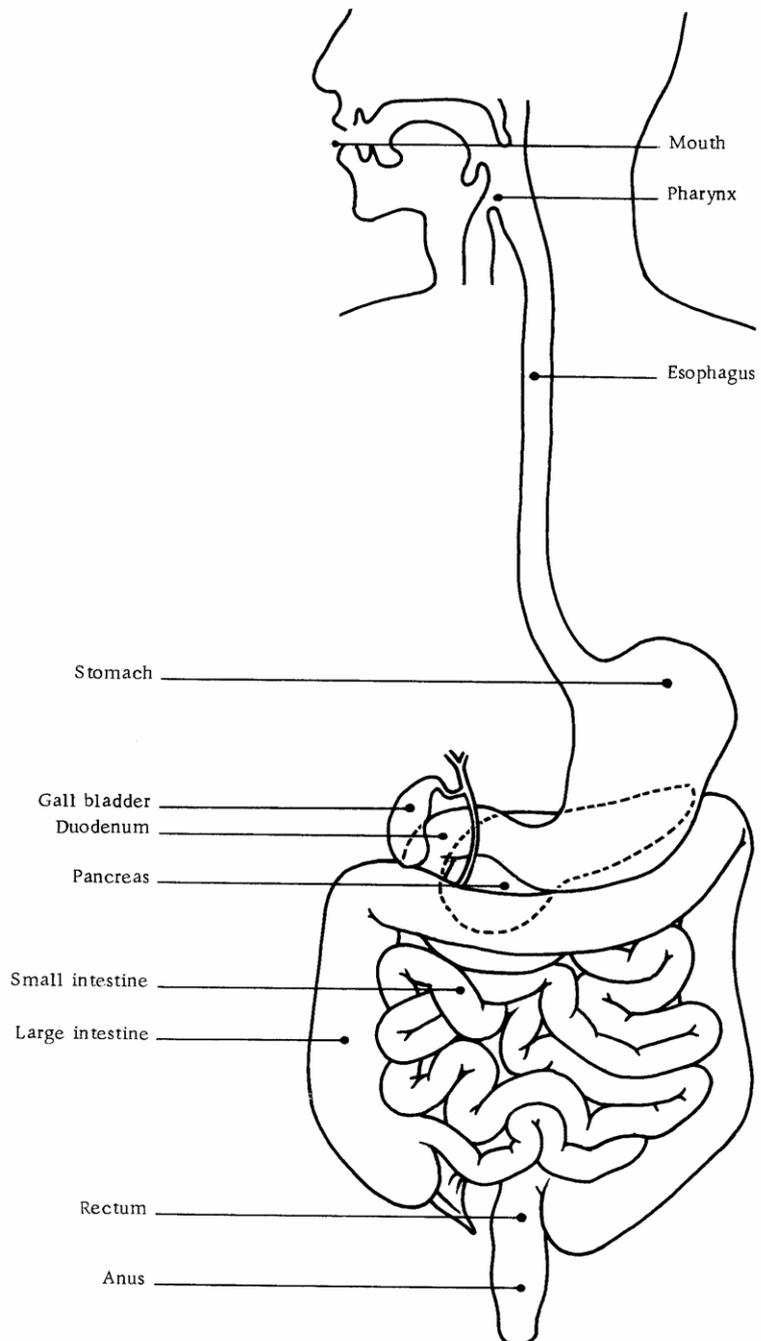
Set up four test tubes:

The first has a saliva solution.

The second has starch solution (could use bread soaked in water for a while).

The third has sugar solution (glucose).

The fourth has starch and saliva together. Add iodine solution (about 5 drops) to each and check the colour over an hour.



Diseases of nutrition and digestion

Diseases of the digestive system

Even though a number of these diseases have been discussed in the Diseases module, it is worthwhile reviewing these while teaching the digestive system.

- Diarrhoeal diseases, e.g., - gastroenteritis (pig bel); dysentery
- Worm infestations - hookworm, threadworm, roundworm
- Typhoid fever
- Appendicitis
- Bowel cancer
- Cirrhosis of liver

Contamination of food and water

The importance of this topic cannot be over emphasised. PNG has many fatalities that could be avoided if the community was aware of the need for safe drinking water and good sanitation practices. Food poisoning is also very common in PNG due to food spoilage resulting from bad handling and storage practices.

The following suggestions may be incorporated by lecturers' into the teaching of this topic and as discussion points:

Safe clean water

- Discuss the types of water supplies in PNG in terms of the likelihood of contamination
- What diseases associated with unclean water?
- What are some of the advantages/disadvantages of types of water supplies in PNG?
- How would you construction of a simple safe water supply for a village?

Rubbish disposal

- How is rubbish disposed of in villages, towns, and cities?
- What are the advantages and disadvantages of the forms of disposal?
- What diseases associated with bad practice in rubbish disposal?

Faeces disposal

- What toilet types are used in the village (coastal and inland)?
- What are the advantages and disadvantages of the forms of disposal of feces?
- How would you construction of a simple safe toilet for a village?
- What diseases associated with bad practice in feces disposal?

Animal life in the environment

There are many animals (including insects) in PNG that live in close association with humans. Some (rats, flies, sandflies and mosquitoes) carry diseases while others (lice, etc) are parasitic.

It is important that these are controlled in the environment to maintain a healthy lifestyle in the community.

Discuss the main pests with the students drawing on their village and town experiences.

- Rats – discuss life cycle, habit, habitat and diseases caused and prevention.
- Flies – life cycle of fly, habit, habitat and disease associated /prevention
- Cockroaches – life cycle, habit, disease spread

The animals that carry disease are discussed in detail in module H2, *Diseases*.

Balanced diet**Activity 5 *Balanced diet***

Lecturer guidance may be needed to complete this activity. Students need to keep a diary of what they eat. They should also be given guidelines for volume – weight equivalents for the common foods.

The lecturer should check the weights beforehand and, if need be, refer to a cookbook, which generally relates weights to cups, tablespoons, etc.

The lecturer could compile a suitable chart to assist students.

Nutritional diseases

Give an explanation of the changes that occur to some foods when cooked. Try eating raw kau kau! Why are raw carrots better for you?

Try to obtain a video and photos of nutritional disorders.

Collect current information about nutrition in PNG and display in the classroom.

Diabetes

Try to use a local person who suffers from diabetes to talk to students so that they hear first hand the problems in living with diabetes.

Contamination of food and water

A culture plate could be prepared with care to show students the growth of bacteria. Soil works well. Just scrape a sterile loop through the soil and then drag over the prepared agar plate. Care needs to be taken when doing this. Do not take the lid off the petri dish. Burn the culture when students have seen the result.

If you do not know how to make a culture then you should look up a standard biology or biochemistry textbook.

There are also other good examples that students may be shown: orange peel with green penicillin mould; rotten cucumber; rotten cabbage; raw chicken left out for a day, etc. Students could discuss why these have a bad smell. What is the cause?

Give examples of the types of poisoning that occurs in restaurants in PNG due to poor food handling and storage. Many of the fish sold at local markets are well on the way to be spoiled before they get to the market. Why?

Suggested student activities

Digestive system

1. Research the topic of digestion. Explain what happens when food is digested and why the human body needs food.
2. Copy a labeled diagram of the digestive system onto a piece of paper. Cut up the diagram into each of the parts and cut out the labels. Mix up all the pieces and give them to a partner to reassemble.
3. Explain what the function of each part of the human digestive system is and how it achieves that function.
4. Explain to your partner the mechanical and chemical methods used by the digestive system to achieve the breakdown of food.
5. Work with a partner. (a) Lie on the floor and have your partner trace around your body with a piece of chalk. (b) On the body outline draw to scale the positions of the parts of the digestive system. (c) Explain to a larger group the functions of each of the parts.
6. Cut the toe off an old sock and, with a tennis ball or ball of paper, demonstrate how peristalsis pushes a bolus of food down the gullet. Explain how hiccups and vomiting occur.
7. Write a short story in which you take the part of a piece of food that is eaten by a person. Describe your journey through the digestive system of the person.
8. Research diseases of the digestive system. Explain to your partner the causes and effects of some of the major diseases.
9. Draw up a chart of major digestive diseases. Include methods of preventing those diseases. Make sure you include tooth decay.
10. Make a list of the foods, which may be harmful to the digestive system if taken in large quantities, e.g., sugar. List some of the consequences of too great an intake of such foods.
11. Describe how the body gets rid of materials that are not useful. Explain to your partner why feces must be disposed of carefully and proper hygiene maintained.

Nutrition

1. Research the topic of food groups. Construct a chart showing the main food groups with a local example of each.
2. Conduct a survey of a local market. Estimate the total amounts of each type of food and place all the foods in your survey into the main food groups.
3. Research and explain the substances contained in each major food group that are important for humans.
4. Research and write definitions in your own words for the terms ingredients, junk food, balanced diet.
5. Research and explain to your partner why an intake of food from each of the major food groups (a balanced diet) is important. Explain what happens to the different types of food when they are absorbed into the body.
6. Keep a diary for one week recording the name of each food you eat and approximately how much you eat at each meal (you should record this in grams). Check your weekly diet against a suggested balanced diet and determine whether you need to change what you eat.
7. Research and explain to your group the effect of cooking on some common foods. Explain why some foods are better eaten raw. Make a list of the foods that are better eaten raw.
8. Survey the food available in a local store. List the foods according to the food group to which they belong. List those foods which are called "junk food". Explain why they are called "junk food".
9. Define the term "bad eating habits". Make a list of the effects of bad eating habits. Draw up a chart suitable for explaining to Grade 4 students the effects of bad eating habits.
10. Role-play a family situation where there are bad eating habits. Discuss the effects of these habits on the family, especially the children.
11. Write a story about a family that does not care about providing good food and a balanced diet for the children.
12. UNICEF figures show that PNG has almost twice the rate of children less than 5 years being underweight for age than Vanuatu and Solomon Islands. List the likely effects of malnutrition on children's health. Explain to your group the possible causes of malnutrition in children in PNG.
13. Research infant mortality. Suggest possible causes for the fact that PNG has the highest infant mortality rate in the Pacific -230 children die each week in PNG. Why should this rate be three times the rate in Fiji?

Contamination of food and water

1. Research the topic of hygiene. Make a list of the simple rules that children should follow to remain healthy. Explain why each of these rules is important.
2. Draw up a poster of good hygiene practices that would be suitable for explaining the need for hygiene to a Grade 3 class.
3. Explain to your group why the provision of clean water to a community is the most important factor in maintaining the health of that community.
4. Draw up a poster that emphasises the things a community should do to prevent contamination of a community's water supply.
5. Research the "Health Promoting Schools" project and explain to your group the aims of the project and how it may be introduced into schools.

Module H4 Human Movement

9 hrs

Rationale

This module introduces students to the knowledge of human movement and its benefit to improve the general health of the human body. Teacher understanding of the functions of muscles and joints is essential to teach physical education and movement skills. Movement skills form the basis of all games and sports.

Objectives

By the end of this module the students should be able to:

- Understand the importance of skeleton/muscular system and its function
- Name common bones of the human skeleton.
- Explain the important of taking preventive measures for injuries to bones and muscles
- Explain the functions of joints in movements
- List the procedure for treating different types of bone fractures
- Research and discuss the definition of fitness and exercise
- Perform varieties of fitness activities
- Plan and teach fitness activities in sequence
- Plan and teach the content in their Physical Education

Main ideas developed

Skeletal/muscular systems (optional)

The skeleton acts to support and protect the soft parts of the body.

Bones are important in the production of blood cells.

Bones show adaptations, which allow animals to exist in a wide variety of environments.

Bones are important in the production of blood cells.

Animals with external skeletons grow by shedding the skeleton, growing quickly then growing a new skeleton

Muscles attached to and pulling on bones allows movement to take place.

Fitness and exercise

Knowledge about fitness and health is a basic right for all citizens.

A fitness regime for children in classrooms is a useful way of keeping them alert and ready for learning.

Teachers have a special responsibility to ensure that the children in their care are fit, happy and healthy.

Sequencing of topics/concepts

This module is a very practical one in that students are able to relate experiences first hand and also participate in a number of activities to explore their own bodies (bones, muscles and ligaments).

Skeletal/muscular system (optional)

This topic may be covered in Human Body (H1)

- Body framework, nature of bones, bone growth and development
- Major muscle types, joints and function of limbs
- Muscle metabolism, tone
- Prevention of muscle injuries
- First aid - Fractures, strains and sprains

Fundamental movement

- Introduction
- The importance of motor skills
- Fundamental movement patterns
- Analysis of control changes in the fundamental movement patterns
- Guide lines for observing the fundamental movement patterns
- Observational check lists of the fundamental movement patterns

Fitness and exercise

- What is fitness? Definition and components of fitness – cardiovascular, muscular strength and endurance
- Physical fitness for health- relationship between fitness and health - regular exercise
- Physical fitness for sport performance - metabolism of exercise (burning fat and building muscle); aerobic movement
- Fitness regime – types of training, e.g. circuit, sports, cross-country
- Sequencing of fitness activities

Skill acquisition

- Skilled performance
- Motor performance
- Organisation of a skill
- Pacing and anticipation
- Fine and gross motor skill
- Open and closed skills
- Phases of skill learning
- Suggested teaching strategies

Suggested teaching strategies

Thoroughly understanding the basic or fundamental movement patterns enables the teacher to construct movement activities in sequential progression through the developmental levels in different groups of children.

Movement behaviour, in normally developing children, has traditionally been viewed as progressing through a relatively predictable sequence of movement patterns that increase in complexity as the child matures.

Motor development is viewed as a more or less continuous process that begins in-utero and persists throughout adult life. Part of this process is the interaction between biological and environmental factors, which partly explains individual differences in children's movement behaviour. Distinguish the different opinions people have about what physical fitness is and understand their opinions by relating it to either fitness for health or for performance in sport.

Listening can be employed during discussions and story telling.

A consequences chart can be drawn as a class exercise to show what causes injuries to bones and muscle.

Students should be encouraged to use charts and posters to discuss the various functions of the human skeletal and muscular system.

There are also many good videos and slides that could be utilised to teach this module.

Suggested student activities

Skeletal/muscular system

1. List all the different functions of the various bones in the body. Give an example of bone acting in each function and explain how it performs that function.
2. Draw or photocopy a human skeleton. Cut out the different parts, e.g., an arm or leg, and try to reassemble an accurate skeleton.
3. Obtain and display an X-ray showing bone and surrounding flesh. Explain how an X-ray is obtained and what use it is for a doctor and patient.
4. Make a model of a human forearm. Use sticks or bamboo to represent bones, plasticine or other material to represent muscles and strings to represent tendons. Show how the biceps (flexor) and triceps (extensor) muscles work. Use your model to explain to the group the relationships between bones, muscles, tendons and ligaments.
5. Research muscle tiredness. Lift a weight up and down with your forearm until it is impossible to continue. Explain what is happening.

6. Make a list of animals with external skeletons. Examine some animals with external skeletons, e.g. crabs, prawns, etc. Explain how animals with a hard, external skeleton can still grow in size. Draw up a poster showing the difference between external and internal skeletons.
7. Examine diagrams or photographs of skeletons of different animals. Explain to your group how the skeleton of the animal is adapted to its way of living.
8. Obtain some clean chicken and pig or cattle bones and compare them. Explain to your group why there are major differences between the bone structures.
9. Obtain a fresh bone from the kitchen or the butcher, boil it to remove the flesh and use a saw to cut the bone lengthways. Research and explain to your partner the different structures outside and inside the bone.
10. Draw a diagram of a typical joint, such as the elbow. Make a model of a joint from scrap materials such as wood and plasticine. Use your model (or a diagram) to explain how the parts of a typical joint work.

Fitness and exercise

1. Research simple body fitness exercises. Explain why physical fitness is important for healthy growth and development.
2. Test yourself for physical fitness. Measure your pulse rate before and after some vigorous exercise, e.g., 50 step-ups, 25 push-ups, etc.
3. Draw up and follow a personal physical exercise routine. Keep a diary of what you do and note how you feel and any other changes you notice.
4. Research and draw up a fitness regime for a person with a particular medical problem, e.g. overweight, back pain, etc.
5. Investigate the facilities available for fitness exercises in your college or a nearby school. Suggest how low cost facilities might be made available.
6. Organise your class to set up a fitness track around the college grounds. Different groups could be responsible for each particular station.
7. Check your own breathing pattern and posture. Design a series of exercises that improve efficiency of breathing. Draw up a poster that would remind students in a Grade 4 class to carry out regular exercise.
8. Research and explain the mechanism of breathing and the process of respiration of body cells. Explain why efficient breathing helps a person to remain healthy.
9. Organise a class debate on the topic "Fit and healthy people look better and have more fun than unfit and unhealthy people".
10. Analyse the exercise involved in digging and caring for a village garden. Explain to your group why a teacher or public servant would need to carry out regular exercise to maintain a similar fitness to that of a villager.
11. Write a justification for presentation to parents for the inclusion of an exercise regime into your classroom program.

Module H5 Movement Skills**9 hours****Rationale**

The purpose of this module is to provide the student teachers with wide understanding of the terms and concepts involved in learning of skills in physical education and enhance student teacher's knowledge of how people acquire skills in physical and sports education. It also is intended to provide the student teachers with basic skills of minor, athletics, gymnastics and major games as well as the ability to teach these skills and develop proficiency in rules of these games and procedures of officiating them.

Objectives

At the end of this module students should be able to:

- (a) develop some basic knowledge on athletics, gymnastics and sports skills and physical activities through the following:
 - the skills of movement and sports;
 - enhancement of performance and devising strategies for practicing and refining skills, tactics, techniques and form; and
 - factors which influence attitudes towards and participating in physical activities, including success to resources, community attitudes & values, cultural beliefs and experiences of success, failure, enjoyment or frustrations.
- (b) explain the terms and concepts involved in learning of skills in physical education.
- (c) distinguish between individual differences and implications for physical education.

Main ideas developed**Athletics**

Detailed knowledge about the skills and equipment of a sport or athletic activity is required to teach it effectively.

Confidence and competence in conducting athletic activities are required of all teachers.

Athletic activity and sports are effective methods of ensuring good health.

Athletics provides opportunity for individual development and performance in selected track and field events.

Gymnastics

Rotational and balancing activities as an individual, in pairs and groups contribute to the development of coordination of body movements, confidence and strengthening of groups of muscles.

Game and sports skills

Detailed knowledge about the rules and skills of games and events is required to teach it effectively.

Confidence and competence in refereeing games to enhance good school and local community relationship through local sports competition.

Games and sports are effective methods of ensuring good health.

Sports organisation

Knowledge of recording goal scores, goal average and point ladder.

Knowledge about, and skills in, sports organisation are important for teachers in becoming valued members of the local community.

Content and sequencing

Athletics

- Track and Field
- Track Events
- Field Events

Gymnastics and acrobatics

- Balancing activities
- Rotation
- Individual activities - balancing, stands, cartwheel
- Group activities, e.g., pyramid and partner balance

Games and sport Skills

- Use of sports for exercise and ensuring good health
- Game skills
- Game skill lesson

Suggested student activities

Athletics and acrobatics

Select one common athletic or acrobatic activity that is popular in PNG and for that activity or sport:

- (a) Obtain a copy of the rules of the sport or athletic activity and read them carefully. Make notes of any terms or particular rules you do not understand.
- (b) Ask a knowledgeable person or conduct research to find out the meanings of any terms or rules you do not understand.
- (c) Research and compile a list of the equipment and facilities needed to practice the chosen sport or athletic skill.

- (d) Make up a list of the major sub-skills required to play the sport or activity well. Restructure your list to put the skills in the order you think they should logically be practiced.
- (e) For each major skill you identified in (d) above write out a detailed plan of exercises and activities you could conduct to teach and improve that athletic skill for school students.
- (f) Conduct a number of short practices using your classmates as participants. Stop the session and briefly explain particular important points as they arise.
- (g) Prepare and lead a discussion with the rest of your group on the benefits of participating in that particular athletic activity.
- (h) Prepare and lead a discussion with your group on the possible injuries that could occur conducting the activity. Explain the first-aid skills you would need to have to deal with such injuries.
- (i) Present a report on your findings and reflections about the athletic activity.

Games and sport skills

1. Select a common game popular in your area and for that game:
 - obtain a copy of the rules of the game and read them carefully make notes of any terms or particular rules you do not understand
 - mark the field for that game and describe the procedures in making the field.
 - identify all the basic skills for that game
 - outline teaching points for three main skills
 - plan a teaching program of three (3) weeks for the three main skills
 - List the skills of the game in sequence that you would teach them.
 - Select two activities for practicing each skill
2. Prepare and lead a discussion with a group or class on the benefits and how to improve the quality of playing the game

Sports organisation and management

This is an elective module, which should be conducted as part of sports meetings and games.

Rationale

This is a topic within the core modules, however a separate module as been produced as an elective. All colleges are encouraged to conduct this module as part of the compulsory sports and games programs that are conducted as extracurricular activities at the College.

Most Colleges already have programs where students are actively engaged in organising and conducting sports meets and games. This approach is to be encouraged to ensure that all students have practice for their future teaching roles in the community.

Students should be taking an active part in college sport organisation and management.

Objectives

At the end of this module students should be able to:

- Confidently umpire a game
- Explain the importance of teacher participation in local sports competitions
- Write draws for different games
- Draw a club and sports constitution
- Observe and write minutes of meetings
- Record scores, goal average and ladders
- Organise sports activities for students

Main ideas

A basic understanding of the rules and umpiring of a number of minor and major sports is necessary to teach in and contribute to community schools.

Knowledge of recording goal scores, goal average and points ladder.

Knowledge about, and skills in, sports organisation are important for teachers in becoming valued members of the local community.

Content and sequencing

- Rules and skills of minor, major and traditional games
- Training principles
- Knowledge of refereeing
- Field measurement and management
- Codes of conduct – Players, coaches, administrators and spectators
- Draws, round robins and elimination competitions
- Sports constitutions, affiliations and meeting procedures

- Fund raising and financial management

Suggested teaching strategies

- Illustrations of playing fields
- Marking of playing fields
- Design competition draws
- Devise sports and game constitutions
- Observe sports meetings

Suggested student activities

1. Research the dimensions of, and then mark out on the college sports field, a running track, softball diamond, etc. Use initiative to make clear markings with non-standard equipment.
2. Construct a piece of track and field equipment, e.g., an adjustable hurdle, a high jump apparatus, etc. using bush scrap/secondhand/recycled materials.
3. Visit the provincial sports office and determine what help is available to schools for promoting particular games and sporting activities.
4. Arrange for a visit to your class of a sporting official to talk about a particular sport or sports organisation.
5. Construct a round robin draw for 8 or more teams.
6. Construct a single elimination draw or knockout draw for six teams.
7. Plan an athletics carnival for a school of 500 students. Justify to your group how you have planned to involve all students from the school in activities.
8. Take responsibility for a college or local community team to learn about team and sports organisation.
9. Officiate at a college or local sporting competition as a referee, lines person, umpire, scorer, etc.
10. Research the ordering of sporting equipment.