SYLLABUS FOR CLASSES IX & X



BHUTAN CERTIFICATE OF SECONDARY EDUCATION

SYLLABUS FOR CLASSES 9 & 10

BHUTAN CERTIFICATE FOR SECONDARY EDUCATION (BCSE)



Royal Education Council Royal Government of Bhutan

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Foreword

Education is central to our development philosophy of promoting Gross National Happiness. The Ministry of Education is striving to fulfill the Royal Government's need to make education meaningful for our children. We are pleased that our endeavours have strengthened the introduction of Bhutan Certificate of Secondary Education (BCSE). The conduct of the BCSE (Class X) examinations by the Bhutan Board of Examinations starting in December 2001 has been a major step in pursuance of the Government directive in this regard.

It is gratifying to see that the revised English curriculum for Classes IX through XII under the curriculum reform project for English is now completed. Therefore, the implementation of the new English curriculum will commence in Class IX in 2006.

This document is intended to facilitate the conduct of Class X examinations by the Bhutan Board of Examinations (BBE) in December 2007. With this move, we will have established our own system of examination for all schools in the country. This is a testimony to the teamwork between the Bhutan Board of Examinations and the Curriculum and Professional Support Division (CAPSD), as well as the continued support and co-operation that we have received from the Council for the Indian School Certificate Examinations (CISCE).

This document is expected to help both the students and teachers understand the courses including the learning objectives, learning outcomes, and the examination rules and regulations for Classes IX and X. It is also hoped that this would be useful for parents as they support their children in attaining the learning objectives.

It is in the nature of curriculum to be dynamic and forward-looking. Therefore, some of the provisions in this syllabus document will change as per the needs of the time so that the learning outcomes attained by our students match the needs of the society.

Tashi Delek.

Thinley Gyamtsho MINISTER Ministry of Education

Introduction

The syllabus for Bhutan Certificate for Secondary Education (BCSE) includes the key learning areas – Dzongkha, English, Mathematics, Sciences (Physics, Chemistry, Biology), and History and Geography, and three optional subjects – Economics, Commercial Studies and Computer Applications. While Mathematics, Sciences, and Commercial Studies are modified versions of the Indian Certificate for Secondary Education (ICSE) syllabus, History, Geography, Economics have a considerable Bhutanese content to make the study of these subjects more relevant to the Bhutanese students; Computer Applications has been developed taking into account the practical relevance of the subject to the world of work.

Having completed the revision of the curriculum in English for Classes IX through XII under English curriculum reform project, the new English curriculum is included in this document.

The syllabus is structured in a way that reflects the rationale, aims, learning experiences, learning outcomes, structure of the course, mode of assessment, examination specifications and list of textbooks and references. The syllabus document also contains rules and regulations of the examination. For the implementation of the revised English curriculum, teachers are required to follow the *Curriculum Guides for Teachers* closely. Teachers of other subjects may also practise the procedures and activities along the lines presented in the *Guides*, with modifications relevant to their own subjects.

It must be noted that while the modes of assessment for the Bhutan Certificate of Secondary Education remain similar to the earlier syllabus, the modes of assessment in the revised English curriculum are substantially different from those of the past which necessitates a closer study of the provisions for the implementation of the curriculum.

Secretary

Bhutan Board of Examinations

Director Royal Education Council

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Rules and Regulations

1.0. Conduct of Examination

The Bhutan Certificate of Secondary Education (BCSE) Examination is conducted in the month of December of every academic year. It is conducted in the same school, which is then known as the examination centre, unless the number of candidates from that school is less than required. In which case the candidates will be sent to a nearby centre for writing their examination.

A Supervising Examiner and an Assistant Supervising Examiner are appointed by the BBE for each centre, based on their past experience and recommendations received from the heads of the school while invigilators are appointed by the respective Dzongkhags. However, if the number of candidates exceeds 400 two Assistant, Supervising Examiners are appointed.

2.0. Courses Offered

The courses offered in classes IX and X are categorized into two groups: academic courses and co-curricular courses. The first group of courses is for the national examination at the end of class X. It has 80% weighting, the remaining 20% being the internal assessment.

The second group of courses is non-academic and is to be assessed internally by the schools.

- **I** The **academic subjects** under the first group of courses are as follows:
- A. *Compulsory:* All students must take these subjects.
 - 1. Dzongkha (Indian Languages for Non Bhutanese students)
 - 2. English
 - 3. Mathematics
 - 4. Science (Physics, Chemistry, Biology)
 - 5. History-Civics and Geography
- B. **Optional:** In addition, all students must take a sixth subject, which may be ANY ONE of the following. (However, please note that all high schools do not offer all the options listed below.)
 - 1. Economics
 - 2. Computer Applications
 - 3. Commercial Studies

II The non-academic Co-curricular courses are as follows:

A. Socially Useful Productive Work (SUPW)

All candidates are required to do "Socially Useful Productive Work" (SUPW) during the course of the academic session for which assessment is done by the school as per the guidelines provided on page No. 135. The result is reflected in the statement of marks and certificate as grades.

B. Values Education

All candidates also take a course on values. Their performance in this area will be reflected in their Character Certificate and progress report form.

<u>NOTE</u>: Further, every school organizes extra-curricular activities for students and program them for the whole academic year. These activities include; games, sports, cultural programs, craft work, agriculture, social forestry, etc. The schools have a system of awarding certificates to students based on their participation and performance. Students must be informed that such certificates hold great value and will he useful in the future.

3.0. Affiliation

The existing Middle Secondary and Higher Secondary Schools having classes 9 - 10 are affiliated with the BBE. All established Middle Secondary Schools, schools upgraded from Lower Secondary School to Middle Secondary School should inform the BBE of their establishment or up gradation, so as to enable the BBE to make appropriate arrangements for the conduct of the examination. The private secondary schools offering BCSE courses should affiliate themselves with the Bhutan Board of Examinations for the same purpose.

4.0. Registration

4.1. Registration forms are sent directly to the concerned schools by the BBE.

Schools must ensure that all the entries in the registration forms are accurate (that is, entries must be the same as the information in the nationality citizenship identity card). The schools should return the completed registration forms on or before the deadline for submission as specified from time to time for each examination. Late submission of forms by schools shall not be entertained.

The BBE shall again send the computed registrations for final confirmation of the entries. This is to give the schools an opportunity to correct and confirm entries. Any change of entries will not be entertained after the examination has been conducted.

4.2. Conditions of eligibility for admission to class IX

Candidates who have been awarded Pass Certificate of LSSCE or its equivalent from recognized schools are eligible to be admitted in the course of study leading to the Bhutan Certificate of Secondary Education Examination.

4.3. Types of Candidates

- 4.3.1 Regular Candidate: refers to a candidate who is in regular attendance at an affiliated school and is appearing the examination for the **first** time. His/her registration shall be done through the Head of the School.
- 2.2.1 Private Failed Candidate: refers to a candidate who entered as a regular candidate and appeared the examinations set by the BBE, but was not awarded a Pass Certificate. Such a candidate wishing to re-appear for the examination {once only} in the year following his/her failure should contact his/her previous school and register himself/herself well in advance of the examination.

2.2.2 Private Supplementary Candidate: refers to a candidate who has been awarded a Pass Certificate but wishing to improve his/her result in one or more written subjects. However, Private Supplementary Candidates should be advised to resit all the subjects like the regular candidates to be eligible for admission at par with regular candidates. Such a candidate will be permitted to appear for a Supplementary Examination in the following year without attendance at the school. The candidate should apply for registration through the Head of the previous school on a special form for the examination available with the school/Center.

They must write their examinations from their own schools/centres. Change of centres is not permissible.

4.3.4. Private In-service Candidate: refers to an in-service Candidate (teachers and health workers) wanting to improve his/her qualification with recommendation and approval from the Head of the Department, Ministry of Education or the Ministry of Health.

Such candidates may be allowed to appear for the BCSE examination through a school affiliated to the BBE near his/her place of posting. A candidate must register him/herself with the Head of that school within a prescribed period of time as soon as he/she gets the approval from the Head of Department.

- **NOTE:** The Heads of schools must ensure that private in-service candidates appearing from their schools fulfil the following requirements before the candidates' names are entered in the Registration Form. Such candidates should be marked as **"Teacher Candidate"** or **"Health Candidate"** clearly against their names in the Registration Form.
- A candidate wishing to appear the examination must produce his/her Statement of marks for LSSCE issued by the Examination Board to the centre.
- A candidate can appear the examination only **ONCE.**
- The private in-service candidates are required to abide by the same rules and regulations as for the regular students appearing the examination. No special arrangements will be entertained.
- The candidates should meet the 20% internal assessment mark for each subject from the school, as the weighting of the external examination is 80% only.
- Each private in-service candidate must pay an examination fee of Nu. 200 to the examination centre. The head of the examination centre should make sure that the examination fees collected from the candidates are entered in the Revenue Receipt book.

5.0. Withdrawal of a Candidate

All candidates having 90% attendance and above of regular instruction are eligible for appearing the examination. A candidate can be detained/withdrawn only on special grounds (serious illness, accidents and death in the family, etc.) with written relevant documents from medical officers and concerned authorities.

6.0. Examination Results

- Results will be announced in the Kuensel or other appropriate/available media (Internet/intranet).
- Details of the results, Statement of Marks and Certificates shall be made available with Schools after the declaration of the result(s). Schools should inform the candidates to collect their examination documents from the school, well in advance before they leave the school.
- Results will not be communicated over phone or fax.
- All inquires regarding results should be made through the Head of the School. Individual inquires made directly to the BBE regarding results will not be entertained. However candidates who wish to come to see details of their results will be made available by the BBE Secretariat.

7.0. Conditions and Awards

- All candidates will be examined in SIX subjects at the end of class X FIVE being compulsory and ONE chosen from the optional subjects offered (page No. vi).
- The written examination in each subject will carry 80% weighting. The remaining 20% will be assessed internally by the school as internal assessment.
- The science subject will be taught in THREE disciplines Physics, Chemistry and Biology respectively and the candidates will be examined through THREE papers corresponding to the three disciplines named above. However, the mark obtained in each of the disciplines will be added together with the mark obtained in internal assessment in each of the three disciplines. The total marks will then be converted to 100% weighting and entered as the final mark obtained in science.
- History-Civics and Geography will be examined separately but the mark obtained in each will be added to the mark obtained in internal assessment. The total marks will then be converted to 100% weighting and entered as the final mark.
- English test consists of two papers, Language (English I) and Literature (English II). Marks obtained in the two papers will be averaged and awarded in one unit.
- Dzongkha test consists of two papers, Language (Dzongkha I) and Literature (Dzongkha II). Marks obtained in the two papers will be averaged and awarded in one unit. (The Non-Bhutanese have the options of taking any other languages based on the ICSE syllabus)
- To be considered successful and be awarded a PASS certificate, a candidate should have passed in FIVE subjects out of six including English.

If a candidate FAILS IN ENGLISH he/she is considered UNSUCCESSFUL and not awarded a Pass certificate.

If a candidate FAILS IN MORE THAN ONE SUBJECT he/she is also considered UNSUCCESSFUL and not awarded a Pass certificate.

A candidate who has qualified for admission to class XI but failed in Dzongkha has to reappear the written examination in Dzongkha in the next class X examination.

- The pass mark in each subject is 35/100.
- ALL candidates will be awarded a statement of marks. (*The latest* statement of marks *is considered in the case of Supplementary Candidates*). If a candidate loses his/her Statement of Marks, a duplicate Statement of Marks will be issued on an application countersigned by the Head of the School. The standard application form (appendix F, in the Rules and Regulations Booklet) for the purpose is available in the School on payment of the prescribed fee by Bank Draft in favour of the Bhutan Board of Examinations. Thimphu. (*Prescribedfee in cash/personal cheque or direct application to the BBE shall NOT be accepted*).
- Each SUCCESSFUL candidate will be awarded PASS CERTIFICATE. No duplicate Pass Certificate will be issued.

8.0. Rechecking of Answer Scripts

- ☆ Request for recheck can be made earliest two weeks after the declaration of the results and latest within one month after the school receives the results.
- ♦ A. candidate wishing to recheck must apply to the BBE through the head of the school and complete all formalities as mentioned below:
 - get the Recheck Application Form (appendix H, in the Rules and Regulations Booklet) from the Head of the school
 - fill m the Form accurately and get recommendation/signature from the Head of the School
 - deposit a recheck fee of Nu. 200/- per subject in cash/Bank Draft to the accounts section, Ministry of Education and obtain Revenue Receipt
 - attach the Revenue Receipt of the recheck fee to the Recheck Application Form and submit it to the BBE at the reception
 - wait at least two weeks for the recheck results
- \diamond A maximum of two subjects is recommended for recheck
- ♦ Recheck Application Form will not be accepted if:
 - the form is with incomplete information
 - the form is with wrong information
 - the form is without Revenue Receipt attached
 - the form is without the signature of the Head of the School

A committee will be responsible for carrying out the recheck, which will ensure the following:

- all the answers have been marked
- continuation sheets to the answer booklet as stated by the candidate are intact
- marks for each question have been correctly totalled
- the grand total has been correctly recorded
- marks from the individual questions and the total marks have been accurately carried forward to the cover page of the answer booklet
- total marks from the answer booklet to the mark list form have been accurately transferred
- total marks from the mark list form to the computer have been correctly computed
- that no errors occurred in the recording, collating or combining of marks which determined the result
- no answer scripts will be re-evaluated or shown to the candidates / parents / guardians.
- \diamond The recheck results will be displayed two weeks after the application is received by BBE.
- ☆ In case of a change in the marks/results of a candidate, a fresh certificate and statement of marks will be issued after receiving the previous ones through the school and the fee paid by the candidate will be re-imbursed. Accordingly, the School Liaison and Co-ordination Section (SLCS) will be informed for placement.

School should inform the candidates on the above award and conditions for the recheck well in advance, before the candidates leave the school. The Head of the school should recommend only genuine cases with reference to the candidate's performance in the school.

TIME AND PERIOD ALLOCATION

(number of periods and time per week)

Subjects		іх	x
Dzongkha	Period	5	5
	Time	(4.10)	(4.10)
English	Period	6	6
	Time	(of 50 min.)	(of 50 min.)
Maths	Period	5	5
	Time	(5.00)	(5.00)
Physics	Period	3	3
	Time	(2.30)	(2.30)
Chemistry	Period	3	3
	Time	(2.40)	(2.40)
Biology	Period	3	3
	Time	(2.40)	(2.40)
Optional (Economics/Commerce/ IT)	Period	2	2
	Time	(1.40)	(1.40)
History	Period	2	2
	Time	(2.00)	(2.00)
Geography	Period	2	2
	Time	(2.00)	(2.00)
Values/Health/CEC	Period	1	1
	Time	(0.50)	(0.50)
Library	Period	1	1
	Time	(0.40)	(0.40)
SUPW	Period Time	1 (0.40)	1 (0.40)
Total	Period	34	34
	Time	(28.20)	(28.20)

ENGLISH

READING & LITERATURE STRAND

Rationale

Literature embodies an experience of life expressed in a language that appeals. Literature reflects and expresses the human imagination. It brings understanding and enrichment to readers' lives. Through the study of literature, students learn to respond to ideas, issues, perspectives and actions of others more critically and analytically. It also enables students to understand the structure and intent of a variety of literary forms. At this level, students must learn to explore the techniques used by authors to convey messages, persuade and influence, evoke responses and feelings and connect literature to their own lives and daily experiences.

The literature in the syllabus provides the material to teach students how to read, while at the same time permitting them to read some of the best literature available in English. Students have to learn how to make meaning by themselves and to have met some of the best writers and their works in the course of their studies. If we can build classroom communities where that can be arranged, our readers will be drawn to travel through new worlds of experience whose horizons keep expanding.

Aims

The English literature course aims to help students to:

- 1. Read a wide range of texts with fluency and confidence using a full complement of reading strategies.
- 2. Show an understanding of the ways in which meaning and information are conveyed in a range of texts.
- 3. Articulate personal and critical responses to the literature they are reading showing an understanding of thematic, structural and linguistic features.
- 4. Select and synthesize a range of appropriate information to support their views.
- 5. Demonstrate some knowledge of major writers and their works.
- 6. Understand the effects that the writer is striving to achieve when she/he alters the standard form, plays with points of view and builds image patterns.
- 7. Share the feelings of characters in a story or play, or the speaker in a poem or an essay.
- 8. Evaluate the great ideas expressed in the literature texts they are studying and draw inspiration from them.

Learning Experiences

Through the study of literature, students will:

- 1. Gain exposure to different types of literary texts.
- 2. Prepare speeches for public performance; stage plays; and produces radio scripts and computer presentations.
- 3. Continue to use the reading strategies learned at each of the earlier levels as they read a wide range of texts, fiction and non-fiction.
- 4. Select, analyse, and synthesize information from a variety of sources to develop and support their responses to texts.
- 5. Understand and evaluate how authors achieve their effects in their writing with the use of linguistic, presentational and structural devices, point of view, flashback, figurative language, parallel arguments, and image and symbol patterns.
- 6. Synthesize information which they collect from other sources to support their views about major writers and their works.
- 7. Read, talk about and write about the works of major writers.

8. Reflect and engage regularly in debates and discussions about the ideas and values, such as separation, loss, love, compassion, beauty, truth, justice, and spirituality as discussed in major literary works.

Learning Outcomes

As a result of these learning experiences students will be able to:

- 1. Read and articulate personal and critical responses to fiction and non-fiction texts showing an understanding of the structural features of the different texts.
- 2. Talk and write about major classical and modern writers, including Bhutanese writers and their works.
- 3. Utilise the features of literary texts to help them understand the ideas they encounter in the texts they are reading.
- 4. Read and articulate their understanding of experiences such as separation, love, compassion, loss, and spirituality using situations encountered in the literature they are reading.
- 5. Evaluate the point of view of the writer on issues like right and wrong, justice and injustice, in literature.
- 6. Read, understand and engage with the ideas expressed by different authors in different forms of essays.
- 7. Compare and contrast different cultural values, traditions and beliefs, using situations encountered in the literature they are reading.
- 8. Read a modern one-act play and learn its elements.
- 9. Build their vocabulary and use the pronunciation skills to pronounce new words clearly.
- 10. Read 40 pieces of fiction and non-fiction.

LITERATURE TEXTS FOR STUDY

1. NOVEL

Novel for Study in Class IX

Title	Author	Form
Dawa: The Story of a Stray Dog in Bhutan	Kunzang Choden	

Novel for Study in Class X

Title	Author	Form
The Giver	Lois Lowry	Fantasy

2. POETRY

Poetry for Study in Class IX

Sl.No.	Title	Author	Form
1.	I Know Why the Caged Bird Sings	Maya Angelou	Lyric
2.	Buddha's Death	Romesh Chander Dutt	Lyric
3.	The Road Not Taken	Robert Frost	Lyric
4.	Amalkanti	Nirendranath Chakrabarthi	Lyric
5.	The Highwayman	Alfred Noyes	Ballad
6.	No More Clichés	Octavio Paz	Lyric

Sl.No.	Title	Author	Form
1.	Ode to the Dinosaurs	Anonymous	Ode
2.	The Slave's Dream	H.W. Longfellow	Ballad
3.	The Professor	Nizim Ezekeil	Monologue
4.	Forest and River	Zhaleh Esfahani	Lyric
5.	A Loaf of Poetry	Naoshi Koriyama	Lyric
6.	Without Hands	Lorna Crozier	Lyric
7.	My Grandmother's House	Kamala Das	Lyric
8.	Richard Cory	Edwin Arlington	
9.	Learning by Doing	Howard Nemerov	
10.	Snow	Sean Klabough	Haikus
11	Trees	Kellie Webster	
12	Cherry Tree	Amanda Hauschildt	
13	Snow	Chandra Morgan	
14	Autumn	Jared Hines	
15	Deer	Daniel Paulson	
16	Forest	Tyler Kenall	

Supplementary Poetry for Class IX

Poetry for Study in Class X

Sl.No.	Title	Author	Form
1.	Presents from my Aunts in Pakistan	Moniza Alvi	Lyric
2.	Dover Beach	Mathew Arnold	Dramatic Monologue
3.	A Red Palm	Gary Soto	Lyric
4.	To My Mother	George Barker	Sonnet
5.	"Hope" is the thing with feathers	Emily Dickinson	Lyric
6.	Absence	Elizabeth Jennings	Lyric

Supplementary Poetry for Class X

Sl.No.	Title	Author	Form
1.	Good	R.S. Thomas	Sonnet
2.	Those Winter Sundays	Robert Hayden	Lyric
3.	Let Evening Come	Jane Kenyon	Lyric
4.	Whispers	Omololá Ijeoma Ògúnvemí	Lyric
5.	Warning	Jenny Joseph	Lyric
6.	Miles Away	Carol Ann Duffy	Lyric
7.	The sun has burst the sky	Jenny Joseph	Lyric
8.	Ozymandias	Percy Bysshe Shelley	Sonnet
9.	High Flight (an Airman's Ecstasy)	John Gillespie Magee	Sonnet
10.	Haikus		

3. SHORT STORIES

Short Stories for Study in Class IX

Sl.No.	Title	Author	Form
1.	The Big Story	George Loveridge	Contemporary realistic fiction
2.	A Grain of Mustard Seed	Edith Pargeter	Contemporary realistic fiction
3.	I've Got Gloria	M.E. Kerr	Contemporary realistic fiction
4.	The Tiger's Heart	Jim Kjelgaard	Traditional realistic fiction

Supplementary Short Stories for Class IX

Sl.No.	Title	Author	Form
1.	The Night Train at Deoli	Ruskin Bond	Realistic fiction
2.	Too Soon a Woman	D. Johnson	Traditional realistic fiction
3.	Shelling Peanuts	Yvonne Vera	Contemporary realistic fiction
4.	The Parsley Garden	William Saroyan	Contemporary realistic fiction
5.	A Secret for Two	Quentin Reynolds	Contemporary realistic fiction
6.	Samphel's Pride and Woes	Rinzin Rinzin	Realistic fiction

Short Stories for Study in Class X

Sl.No.	Title	Author	Form
1.	Day of the Butterfly	Alice Munroe	Contemporary realistic fiction
2.	Hey-, Come On Ou-t!	Shinichi Hoshi	Fantasy
3.	Is He Living or Is He Dead?	Mark Twain	Classical satire
4.	The White Knight	Eric Nicol	Allegory

Supplementary Short Stories for Class X

Sl.No.	Title	Author	Form
1.	A Boy Grows Older	Morley Callaghan	Contemporary realistic
2.	Overseasoned	Anton Chekov	Classical realistic fiction
3.	D.B. Cooper	Max Haines	Mystery
4.	All Summer in a Day	Ray Bradbury	Science fiction
5.	Not Even a Corpse to Cremate	Kunzang Choden	Folk tale
6.	Penny in the Dust	Ernest Buckler	Traditional realistic fiction

4. ESSAYS

Essays for study in Class IX

Sl.No.	Title	Author	Form
1.	My Struggle for an Education	Booker T. Washington	Narrative
2.	Nature is Not Always Kind	Helen Keller	Descriptive
3.	Bhutan: A Biodiverse Diamond of the Himalayas	Robin Smilie	Expository
4.	The Dignity of Work	Charles Finn	Persuasive

Supplementary Essays for Class IX

Sl.No.	Title	Author	Form
1.	Dogs and Books	Christie Blatchford	Narrative
2.	I Ain't Sitting Beside Her	Shyrose Jaffer	Narrative
3.	A Small Cheese Pizza	Rachel Svea Bottino	Descriptive
4.	Restaurants	R.K. Narayan	Descriptive
5.	The Songs of Ap Dampel	Jigme Dukpa	Expository
6.	Working With Anger	Pema Chodron	Expository
7.	As You Can see from My Brand-Name Clothing, I Am Not Poor	M. Lucas	Persuasive
8.	New Images Bring New Values	Siok Sen-Pek Dorji	Persuasive

Essays for study in Class X

Sl.No.	Title	Author	Form
1.	Layaps Go Home	Kinley Dorji	Descriptive
2.	Toasted English	R.K. Narayan	Expository
3.	Beauty and Body Image in the Media	Jean Kiilbourne	Persuasive
4.	Progress	Alan Lightman	Argumentative

Supplementary Essays for Class X

Sl.No.	Title	Author	Form
1.	Trapped	Norah Burke	Descriptive
2.	The Death of the Moth	Virginia Woolf	Descriptive
3.	Preventing Conflict in the New Century	Kofi Annan	Expository
4.	Creating a Model of Conservation: Combining Development and Ecology	K.E.S. Kirby	Expository
5.	The Art of Living	Samuel Smiles	Persuasive
6.	People as Products	Jean Kilbourne	Persuasive
7.	Hard Edges, Soft Skills	Ann Coombs	Argumentative
8.	Does the Law Discriminate Against Fathers?	Kuensel	Argumentative

LANGUAGE AND GRAMMER STRAND

Rationale

Every living being strives to communicate with its own kind. One of the ways in which this need is fulfilled is by expressing thoughts in the medium of language. Language is the bridge between individuals that tells them they are needed, that they are not alone. Language thus gives us self-expression and, by extension, identity. It gives shape to thoughts and emotions, and communicates these to intended audiences. It is the basic element with which the history of the world has been recorded. It is a time capsule that allows us to view and re-view any moment in the past of literate man. It is a repository of information that envelops all recorded knowledge and so acts as a gateway to development. It allows peoples of the world to understand different cultures as well as belief systems, and to share ideas. In this regard, no other language has proved more useful than English.

Proficiency in English is therefore seen as a necessity in both academic and professional life. The proper study of English entails detailed study of grammar and conventions of usage, along with other language competencies (listening, speaking, reading, and writing).

In Bhutan where English is used as a second language and students use English frequently only in school, it is of utmost importance that our students receive direct teaching in the grammar, pronunciation and syntax of English in a consistent, thorough, and interactive manner.

Aims

The language and grammer course aims to help students to understand & appreciate the importance of:

- 1. Human Language.
- 2. Know the functions of language.
- 3. Know some theories of language acquistion.
- 4. Use direct and indirect questions in their speech and writing.
- 5. Use imperative and exclamatory moods appropriately.
- 6. Use participial phrases to form complex sentences.
- 7. Use grammatical conventions with accuracy and confidence.
- 8. Use syntactical patterns with accuracy.
- 9. Know and use common idioms and adages.
- 10. Distinguish between literal and figurative language and use them in communication.
- 11. Select appropriate language to express concrete and abstract ideas.
- 12. Discuss simple theories about how humans acquire language.

Learning Experiences

Through the study of Language, students will:

- 1. Learn the conventions of standard English.
- 2. Students will learn standard English word order and how it differs from the other languages they speak. Teachers need to take advantage of the fact that students speak several languages to show how language works.
- 3. Explore the relationship between language and grammar.
- 4. Engage in activities in which they practise language for formal and informal situations; discussions on the use of slang; to arrive an understanding of how a language changes over time to meet new demands particularly language that is sensitive to gender and age.
- 5. Engage in activities and discussions in which they try to imagine a world without language; invent a

language of their own; take advantage of the multi-lingual nature of Bhutanese classrooms to show how the same idea can be expressed in different languages and structures.

Learning Outcomes

As a result of these learning experiences students will be able to:

- 1. Use modal auxiliaries in increasingly complex ways.
- 2. Use indefinite pronouns appropriately.
- 3. Use antonyms, synonyms, homonyms correctly.
- 4. Use periodic sentences correctly.
- 5. Use a wider range of discourse markers correctly including "however", "in so far as", "therefore", "henceforth".
- 6. Use phrasal verbs correctly.
- 7. Use conjunction coordinators and correlatives (hardly...when; scarcely...when; no sooner...than) correctly.
- 8. Use gerunds and participles appropriately.
- 9. Use appropriate language in formal and informal contexts.
- 10. Understand the purposes that language serves in human interaction.

TOPICS FOR STUDY

In Class IX

- 1. Modal auxiliaries
- 2. Indefinite pronouns
- 3. Antonyms, synonyms, and homonyms
- 4. Periodic sentences
- 5. Discourse markers
- 6. Phrasal verbs

In Class X

- 1. Gerunds and participles
- 2. Phrasal verbs
- 3. Appropriate language for formal and informal situations
- 4. Modal auxiliaries
- 5. Purposes of language

WRITING STRAND

Rationale

The capacity of human beings to write down what they have thought, dreamed of and spoken about makes their language abilities unique. Thoughts expressed in writing can take on a life of their own. They can continue to engage the reader in discussions about ideas long after the writer has departed.

Writing is a way of thinking and learning. It is a process with which thoughts are refined and the language in which they are written made more precise. Writers draft what they want to say. That first draft is a rehearsal of the ideas and the structures in which they have chosen to present them. They will go on to draft and redraft their ideas in writing, to edit them, modify them after they have shared their ideas with their colleagues, and polish their language, until they arrive at a concise statement of what they want to say. Out of this matrix of thinking, drafting and redrafting, editing and modifying, emerges an understanding of the topic, which is much clearer and more precise than when the writers began. Now when the writers engage in conversations or debates on the topic, they can contribute to the discussion in concise ways.

Writers write for many different reasons. There is a need to write to friends. There are other kinds of personal writing as well. Journals, diaries, notebooks, wishes and dreams are written down for the writer alone to read. Writers write to do business with people whom they do not know. They write to explain their research to colleagues whom they have not met; to argue a position, to try to persuade people whom they do not know to accept their services. Writers write to delight their readers with imaginary people, lovable animals characters and worlds different but similar to their own.

Students need to practise so that they develop their abilities and skills in each of these kinds of writing, the personal, the transactional and the creative or poetic. They have to be exposed to the stages of writing and to the many strategies that writers use to make their writing say what they want it to say. Students will find tactics that work for them and incorporate these into their repertoire of writing strategies. They will discover that certain strategies work better for specific writing tasks while others work for them almost all the time. As they write they become more aware of their own writing processes, they will take control of their writing and become effective writers.

Aims

The Writing course aims to help students to:

- 1. Demonstrate fluency in spelling.
- 2. Use grammatical features and vocabulary correctly and effectively.
- 3. Use punctuation and paragraphing to make the sequence of events or ideas coherent and clear to the reader.
- 4. Use appropriate style in a range of forms.
- 5. Demonstrate general confidence and fluency in their writing.
- 6. Take notes and prepare reports from their notes.
- 7. Begin to apply criteria to evaluate good writing.
- 8. Continue building their portfolio and using the writing process.

Learning Experiences

Through the study of Writing, students will:

- 1. Write regularly for a wide range of purposes, not only to answer questions posed by the teacher.
- 2. Use the writing process.
- 3. Study examples of good writing selected from the general categories of fiction and non-fiction, which illustrate good models in each of personal, transactional and poetic writing.
- 4. Present their writing publicly to a variety of audiences classmates, schoolmates, parents and other groups.
- 5. Build a *portfolio* of their best work in each of poetic, personal and transactional writing.
- 6. Evaluate their own writing using the criteria for good writing.
- 7. Help with the editing of the work of their fellow students.
- 8. Have fun as they create their own work to entertain, inform and delight others

Learning Outcomes

As a result of these learning experiences students will be able to:

- 1. Respond in writing to examination questions and homework assignments at an acceptable level.
- 2. Write reports on assigned and self-selected topics.
- 3. Take notes at meetings and prepare minutes accurately.
- 4. Identify elements of good writing in their reading (fiction and non-fiction) and apply them to their writing.
- 5. Write for a variety of purposes and audiences using a wider variety of forms encountered in their reading to include biographies and narrative essays.
- 6. Use rhetorical devices, including antithesis and irony, in their writing.
- 7. Select and use diction appropriate to the writing task.
- 8. Explore personal, cultural and national beliefs in their writing.
- 9. Distinguish the best pieces of their writing and add them to their portfolio.

TOPICS FOR STUDY

Writing to be done in Class IX:

- 1. Responses to examination questions and homework assignments
- 2. Identifying elements of good writing and applying them to their writing
- 3. Write for a variety of purposes and audiences using a wider variety of forms to include biographies.
- 4. Using rhetorical devices, including antithesis, in their writing.
- 5. Using discourse markers in their writing

Writing to be done in Class X:

- 1. Responses to examination questions and homework assignments.
- 2. Write for a variety of purposes and audiences using a wider variety of forms to include narrative essays.
- 3. Reports on assigned and self-selected topics.
- 4. Notes at meetings and preparing minutes.
- 5. Use rhetorical devices, including irony, in their writing.

LISTENING & SPEAKING STRAND

Rationale

We are born into the world capable not only of speaking any language but also capable of listening to the language that we hear around us so that we can learn how to use it to communicate our thoughts and feelings. As we listen, we acknowledge the presence of people around us and learn to make sense of the sounds they make. The practice of the skill of listening, and the growing necessity to express what we need, think, feel and understand, leads us naturally to learn to use the spoken world.

To listen well is a skill that assists us in all aspects of our relationships with others. To listen with empathy allows us to share both messages and feelings. To listen well is to honour the thoughts of others and accept their contributions to the well being of our community. To listen well is to learn new ideas and perceptions, words and structures. To listen is to learn from good speakers their skills at rhetoric and gesture so we can use them for ourselves when we speak.

To speak is an art which we all practice. It is one of the important ways by which people know us. To learn to do it well gives us confidence in ourselves and gives others confidence in us. We need to learn to speak with ease and clarity so that we can, as people in the workplace, members of family, and citizens in our communities make contributions to the common good. Conversations of all kinds sharpen our understanding. They draw us closer, fulfilling the need for companionship as we share what we understand about what it is to be human.

In sum, we listen and speak for a variety of purposes on both formal and informal occasions. Whatever the circumstance, we need to learn to listen and speak well. The skills of Listening and Speaking are to be taught directly and practiced so that we become better at using them to help us in our quest for understanding the world we live in.

Aims

The Listening and Speaking course aims to help students to:

- 1. Take on formal roles in groups and conduct the business of the group appropriately.
- 2. Speak in public at different kinds of functions using appropriate conventional forms of address, lexicon, register and idiom, and know the social appropriateness of such use.
- 3. Listen to others, distinguish their message, tone and intention and respond appropriately.
- 4. Speak in clear and grammatically correct English in personal and public situations.
- 5. Listen to, understand and participate in oral presentations and conversations conducted at normal speed.

Learning Experiences

Through the study of Listening and Speaking students will:

- 1. Have regular and consistent practice in pronouncing sounds, words and sentences.
- 2. Engage in purposeful conversations, dialogues, and informal debates regularly.
- 3. Respond respectfully to those who express views different to their own.
- 4. Listen to examples of good oral presentations as they are delivered, either live or on tape, which demonstrate a range of purpose and tone.
- 5. Practise recounting and commenting on what has been listened to.
- 6. Practise speaking and listening regularly in small groups, first on simple topics and then gradually on

more complex issues and themes.

- 7. Listen for signals that indicate a speaker's tone, intent and message
- 8. Learn tone, language and messages which are appropriate for different audiences and purposes.
- 9. Observe appropriate body language which accompanies formal and informal speech acts.
- 10. Build their own speeches for use in public.
- 11. Speak in public for various purposes: debates, explanations, reports, introduction of visitors, responses to questions from an audience.

Learning Outcomes

As a result of these learning experiences students will be able to:

- 1. Use the conditional forms properly to express possibilities and probabilities in their speech.
- 2. Use reading and literature texts as a source for ideas for discussion or debate.
- 3. Conduct interviews to collect specific information on assigned topics or topics of their choice.
- 4. Participate actively in meetings.
- 5. Use idiomatic expressions appropriately in their speech.
- 6. Use the appropriate protocols when introducing a speaker and addressing a chairperson at a meeting.
- 7. Present reports orally to different audiences.
- 8. Ask questions and provide supportive comments after listening to oral presentations.
- 9. Explain explicit and implicit meanings in oral texts.
- 10. Speak with proper pronunciation

TOPICS FOR STUDY IN CLASSES IX & X

For Class IX

- 1. Appropriate use of conditional forms and idiomatic expressions in speech.
- 2. Discussions.
- 3. Debates.
- 4. Interviews to collect information.
- 5. Active participation in meetings.
- 6. Speaking with proper pronunciation.

For Class X

- 1. Using the appropriate protocols for introducing a speaker and addressing a chairperson at a meeting.
- 2. Presentation of oral reports.
- 3. Asking questions and providing supportive comments after listening to an oral presentation.
- 4. Explanation of explicit and implicit meanings in oral texts.
- 5. Proper pronunciation.

Textbooks

- 1. English Curriculum Guide for Teachers: Class IX. CAPSD/MoE. 2005.
- 2. English Curriculum Guide for Teachers: Class X. CAPSD/MoE. 2005.
- 3. English: Reading & Literature Texts for Class IX. CAPSD/MoE. 2005.
- 4. English: Reading & Literature Text for Class X. CAPSD/MoE. 2005.
- 5. English: Curriculum Framework for Classes PP-XII. CAPSD/MoE. 2005.
- 6. Language Aloud... Allowed. Gwen Mowbray.

- 7. Novel for Class IX: Dawa The Story of a Stray Dog in Bhutan by Kuenzang Choden
- 8. Novel for Class X: The Giver by Louise Lowry
- 9. Oxford Practice Grammar New Edition, Oxford India *by John Eastwood (*Students Copy for Class IX and X)

REFERENCES

- 1. A Critical History of English Literature David Daichess four volumes available in Indian Editions.
- 2. History of English Literature by Arthur Crompton Rickett available in Indian Editions
- 3. History of English Literature by Legouis and Cazamian
- 4. Dictionary of Literary Terms by M.H Abrahms
- 5. Dictionary of fables and phrases
- 6. An Introduction to English Literature by William Henry Hudson
- 7. A Handbook to Literature by William Harmon and C. Hugh Hormon Prentice Hall
- 8. Language and Linguistics: An Introduction John Lyons. Cambridge University Press, 1981.
- 9. A Biography of the English Language C.M Millward, Harcourt Brace College Publishers, 1996
- 10. Language and Linguistics: An Introduction by John Lyons. Cambridge University Press, 1981.
- 11. A Biography of the English Language by C.M Millward, Harcourt Brace College Publishers, 1996
- 12. CURRENT ENGLISH GRAMMAR AND USAGE WITH COMPOSITION by R.P Sinha, OUP, 2002
- 13. The Silken Knot: Standards for English for Schools in Bhutan Copyright © Centre for Educational Research and Development
- 14. The Short Oxford History of English Literature, Andrew Sanders OUP
- 15. Essays and Dissertations, Chris Mounsey, OUP
- 16. Oxford Concise Dictionary of Literary Terms, Chris Baldick, OUP
- 17. Cambridge International Dictionary of Phrasal Verbs, CUP
- 18. Practical English Usage, Micheal Swan, OUP
- 19. A Practical English Grammar, A.V.Martinet, OUP
- 20. Reading and Study Strategies, Nirmala Ballara, OUP
- 21. Punctuation, Robert Allen, OUP
- 22. Spelling, Robert Allen, OUP
- 23. Intermediate English Grammar, Raymond Murphy, OUP
- 24. ISC English Practice, J.A.Mason, OUP

Time allocation for teaching of English in Classes IX & X

This is a suggested annual timeline. It assumes a school year with 180 teaching days, exclusive of holidays and examination time. It assumes a school year divided into 2 terms of fifteen weeks each. It assumes that 80 classes of 50 minutes length will be allotted to Reading & Literature, 50 classes of 50 minutes length to Writing, 30 classes of 50 minutes length to Language and 20 classes of 50 minutes length to Listening and Speaking. It assumes as well, that 6 periods of 50 minutes will be allotted to the implementation of the English curriculum timetable (total = 180 PERIODS)

Reading and Literature	80 periods	Writing	50 periods
Language	30 periods	Listening and Speaking	20 periods

WEEKS	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	Reading& Literature	Reading& Literature	Reading & Literature	Writing	Writing	Language
2	Do	Do	Do	Do	Listening& Speaking	Do
3	Do	Do	Writing	Do	Do	Do
4	Do	Do	Reading& Literature	Do	Writing	Do
5	Do	Do	Do	Do	Listening& Speaking	Do
6	Do	Do	Writing	Do	Do	Do
7	Do	Do	Reading& Literature	Do	Writing	Do
8	Do	Do	Do	Do	Listening& Speaking	Do
9	Do	Do	Writing	Do	Do	Do
10	Do	Do	Reading& Literature	Do	Writing	Do
11	Do	Do	Do	Do	Listening& Speaking	Do
12	Do	Do	Writing	Do	Do	Do
13	Do	Do	Reading& Literature	Do	Writing	Do
14	Do	Do	Do	Do	Listening& Speaking	Do
15	Do	Do	Writing	Do	Do	Do
Total	15	15	Reading& Literature=10 Writing = 5	15	Listening& Speaking=10 Writing = 5	15

Term 1

Weeks	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
16	Reading& Literature	Reading& Literature	Reading & Literature	Writing	Writing	Language
17	Do	Do	Do	Do	Listening& Speaking	Do
18	Do	Do	Writing	Do	Do	Do
19	Do	Do	Reading& Literature	Do	Writing	Do
20	Do	Do	Do	Do	Listening& Speaking	Do
21	Do	Do	Writing	Do	Do	Do
22	Do	Do	Reading& Literature	Do	Writing	Do
23	Do	Do	Do	Do	Listening& Speaking	Do
24	Do	Do	Writing	Do	Do	Do
25	Do	Do	Reading& Literature	Do	Writing	Do
26	Do	Do	Do	Do	Listening& Speaking	Do
27	Do	Do	Writing	Do	Do	Do
28	Do	Do	Reading& Literature	Do	Writing	Do
29	Do	Do	Do	Do	Listening& Speaking	Do
30	Do	Do	Writing	Do	Do	Do
Total	15	15	Reading& Literature=10 Writing = 5	15	Listening& Speaking = 10 Writing = 5	15

Term 2

30 weeks of instructional time in a year.
30 weeks × 6 periods = 180 periods in an academic year.

MODES OF ASSESSMENT FOR CLASSES IX AND X

Introduction

In the new English curriculum the emphasis was given to improve the language skills - *reading, writing, listening and speaking* - of the students. The new curriculum also demands for a change in which students are assessed, a movement away from the formal or examination oriented approach to informal or alternative assessment. The targets of assessment are:

- to assess how well students are progressing in their studies
- to assess the performance level of the students in reference to the set Standards (*for promotion to a higher grade level*)
- to monitor the overall student achievement

Standards

The Standards are statements of what the public can expect students to know and be able to do in English when they graduate from the school system (The Silken Knot: *Standards for English for schools in Bhutan*). The Standards for Writing and Language are listed in the English Curriculum Framework Document – Pre-primary to Class XII.

Assessment Objectives

The Learning Objectives will serve as indicators of achievement at each class level in reference to the Standards. The assessment is guided by the Learning Objectives.

Scheme of Assessment

The overall assessment during the year will consist of the following:

- Continuous Formative Assessment
- Continuous Summative Assessment (CSA)
- Examinations
 - Mid-term examinations
 - o Annual Examinations

Continuous Formative Assessment

The Continuous Formative Assessment (CFA) is an assessment of student's learning that is carried out throughout the academic year involving a variety of organised, both formal and informal learning activities to facilitate quality teaching and learning in schools.

The main aims of Continuous Formative Assessment (CFA) are to:

- provide opportunities to both the teacher and the learner to reflect on the learning process and on the level of achievement
- help teachers to find out what teaching methods and materials work best
- help teachers pay attention to individual differences and learning styles of the learners
- make learners realize how well they can do certain types of work and what they need to improve
- enable learners to see the connection between efforts and results
- allow the learners to evaluate themselves and also in peer group
- enable learners to take on multiple roles as learners, helpers, evaluators and reviewers of the learning processes

- enable learners to appreciate each other's talents and accept the weaknesses
- develop and tap the higher level thinking and problem solving skills of learners

The following are some of the suggested Continuous Formative Assessment activities:

- Ask series of questions to the class verbally as the teaching is going on
- In pair provide opportunities for peer assessment among students
- Provide individual students with the opportunities for self assessment
- In group/pair work, observe students and keep notes
- In writing activities, keep ample time for corrections and giving feedback to students
- Rubrics can be used for assessing students' writing, class participation, listening speaking and reading skills
- Keep literacy Portfolios for both reading and writing activities
- Teachers could keep anecdotal records, observation notes and conference diaries for students as part of CFA, and follow the FA activities that are suggested in the teachers' manuals under various genres.

Continuous Summative Assessment:

The Continuous Summative Assessment consists of the school-based assessment on the Listening and Speaking Strand, Portfolios and the two written examinations.

The Listening and Speaking Strand carries 20 marks. The Portfolio Assessment consists of Reading portfolio (record of reading, journal writing, critical response, text talk or book talk)

and Writing portfolio (best pieces of writing selected by the students and best pieces selected by the teacher) maintained for each student in Reading & Literature and Writing Strands. Each portfolio values 10%.

There are two written examinations for Class IX: The Mid-term Examination conducted in the first term will be marked out of 30%. The Annual Examination conducted at the end of the year will be marked out of 70%

PAPER I: LANGUAGE AND WRITING

In Paper I the Assessment will consist of writing portfolio and the written examination.

The Writing Portfolio includes - Journal writing for books read and the best written pieces selected by the students on teacher's guidance, based on good writing criteria. The portfolio is to be maintained for each student and must be assessed and awarded 20% marks as part of CA.

Writing Portfolio : 20%
Best pieces of writing selected by the students
Best pieces selected by the teachers
Journal writing for books read
Process of work
The number and types of genre

There will be two papers for the Examination. Paper I will consist of Language and Writing strands. The time allotted for the written examination is as given below:

Time: 3 hours for writing and 15 minutes for reading the questions

Weighting: 100marks (60 marks for writing and 40 marks for Language)

Question Format:

The Paper I will have two sections-Section A and Section B

SECTION A

Section A is for Writing and it will be marked out of 60%. This section will test students' writing skills through extended response questions. This section will have two questions.

Question 1:

Students are required to choose and write an expository essay from the three choices provided. It will be worth 25 marks.

Question 2:

Students are required to write any of these letters, business letter or an invitation letter from the three choices provided. It will be worth 15 marks.

SECTION B

The questions under section B will test students' language skills through short answer questions. It will be worth 40marks.

Question 1:10 marks

The students will be examined on their understanding of origin of words (etymology) and purposes of language and its features.

Question 2: 30 marks

There will be questions on grammar which will require students to correct, rewrite, edit, and complete sentences. It will be worth 30 marks.

Examination weighting for:

Writing	
Essay	25%
Letter Writing	15%
Language	
Nature of Language	10%
Grammar Structure	30%

Total

80%

Suggested break up of CA Examination weightings

TERM ONE			TERM TWO		
Classes	Continuous Assessment	Examination	Continuous Assessment	Trial Examination	Total
IX -X	10% Writing Portfolio	30%	10% Writing Portfolio	50%	100%

Note:

- For class X, BCSE will be conducted out of 80%. Each school submits 20% marks for the writing portfolio to the BBE as internal assessment marks which will be added to the Board Examination marks to make it 100%.
- The schools should conduct term one examination out of 100% and convert it to 30%. Similarly, term two examination should be conducted out of 100% and convert it to 50%. By adding 20% CA for Writing Portfolio for Paper I, the overall weighting will be 100%.

PAPER II: READING & LITERATURE

In Paper II the Assessment will consist of Reading Portfolio, Listening & Speaking and the Written Examinations. The Reading Portfolio includes - Reading Record for books read, critical responses, text talk or book talk, and book reviews by the students on teacher's guidance based on the criteria.

The portfolio is to be maintained for each student and must be assessed and awarded marks as the part of CA.

The Listening & Speaking includes- Listening skills exercises, Reports, Debates, Extempore speeches, Presentations, and Book talk.

The Reading Portfolio carries 10%, Listening & Speaking carries 10% and the written examinations (Term 1 and Term 2) are of 80%.

Reading Portfolio : 10%	Listening & Speaking : 10%
Record of reading	Listening skills excercises
Critical response to books read	Reports
Text talk or book talk	Debates
	Extempore speeches
	Presentation of their written pieces
	Book talk

The second part is the written examination on the Reading & Literature strand. The time allotted for the written examination is as given below:

Time: 3 hours for writing and 15 minutes for reading

Weightings:

Short Stories: 20 marks Essay: 20 marks Poetry: 20 marks Novel: 20 marks

Question Format:

In Paper II there will be four sections as shown below: Section A: Short Stories Section B: Essay Section C: Poetry Section D: Novel In each Section there will be two sets of questions of which either set I or set II to be attempted. However students must attempt at least one set II (Extended Response) questions from any of the four sections.

Assessment Scheme and Question Pattern:

Section A: Short Stories Set I: 20 marks Multiple Choice Questions - 5 marks Short Answer Questions - 15 marks

Set II: 20 marks Extended Response Questions – Two questions: 10+10=20marks *Note: In section A questions will be set on seen texts.*

Section B: Essay Set I: 20 marks Multiple Choice Questions - 5 marks Short Answer Questions - 15 marks

Set II: 20 marks Extended Response Questions – Two questions: 10+10=20marks *Note: In section B questions will be set on unseen texts.*

Section C: Poetry Set I: 20 marks Multiple Choice Questions - 5 marks Short Answer Questions - 15 marks

Set II: 20 marks Extended Response Questions – Two questions: 10+10=20marks *Note: In section C questions will be set on unseen texts.*

Section C: Novel Set I: 20 marks Multiple Choice Questions - 5 marks Short Answer Questions - 15 marks

Set II: 20 marks Extended Response Questions – Two questions: 10+10=20marks *Note: In section D questions will be set on seen text.*

In each genre, the questions will test the students' ability to:

- Understand the text
- Give relevant interpretations of the contents in their own words
- Identify elements, points of view, themes, ideas, and analyse, synthesize, evaluate the texts and apply the ideas.

TERM ONE			TEI	RM TWO	
Classes IX -X	Continuous Assessment	Examination	Continuous Assessment	Trial Examination	Total
	5 % Reading Portfolio		10% Reading Portfolio		
	5 % Listening & Speaking	30%	5 % Listening & Speaking	50%	100%

Suggested break up of CA Examination weightings

Note:

- For class X, BCSE will be conducted out of 80%. Each school submits 20% marks for Reading Portfolio and Listening & Speaking strand to the BBE as internal assessment marks which will be added to the Board Examination marks to make it 100%.
- The schools should conduct term one examination out of 100% and convert it to 30%. Similarly, term two examination should be conducted out of 100% and convert it to 50%. By adding 20% CA for Reading Portfolio and Listening & Speaking strand to Paper II, the overall weighting will be 100%.

MATHEMATICS
MATHEMATICS

Rationale

Most pupils studying at these levels aim to pursue higher studies. For some, mathematics will become core to what they study later, while for others it will be a support in another area of study. The topics in classes IX and X not only go deeper than what the students have studied in earlier classes but also introduce them to abstract topics. This level of mathematics will adequately equip the students in functional numeracy as well as give them a good foundation for pursuing mathematics further.

Aims

Teachers should guide the pupils to develop their:

- Understanding of mathematical concepts and their applications for further studies in mathematics
- Logical reasoning skills
- Communication skills in mathematics
- Skills of accuracy and clear logical thinking for effective communication of mathematics ideas and understanding
- Confidence and skills in using mathematical procedures and solving problems

Learning Experiences

Students should be able to:

- Explore, discover, describe and record mathematical patterns and relationships
- Solve problems individually and in groups
- Share ideas and take risks in doing it
- Relate mathematics to the situations relevant to their daily lives

Learning Outcomes

These experiences will help the students to:

- Become alert to the reasonableness of results
- Read mathematical information and interpret formulae in problem solving
- Apply logical thinking pattern to draw conclusions
- Use reasoning to interpret the mathematical procedures and arguments used
- Gain adequate knowledge in mathematics to serve as a foundation to pursue it at higher levels and other subjects of specialization needing mathematics

MATHEMATICS SYLLABUS FOR CLASS IX

Course content

UNIT 1 NUMBER AND OPERATION

- The Laws of Exponents: The Product Law; The Quotient Law; The Power Law; Numbers with exponents of zero, negative numbers and fractions as special cases; proofs and derivations of these laws; their uses and applications in algebraic manipulations and contextual situation.
- Numbers in Scientific Notation: Writing numbers in scientific notation; large numbers in scientific notation; small numbers (Less than 1) in scientific notation; reasons and situations when scientific notations are used; use of scientific calculators with scientific notation mode.
- Rational and Real Numbers: meaning of rationale numbers, and hence that of irrational numbers; including checking the rationality of a number; order of operations; square roots – its meaning, estimation and representation; representing real numbers on number line;

UNIT 2 POLYNOMIALS

- Recognizing polynomials characteristics; types of polynomials (monomials, binomials, trinomials, etc); degrees of polynomials; representation of polynomials with algebra tiles; factoring (or factorization of) of polynomials; using polynomials to represent areas and lengths, and other situations.
- Adding and subtracting polynomials using algebra tiles and symbolically; knowledge and application of "zero principle".
- Multiplication and division of polynomials symbolically and using algebra tiles;

UNIT 3 LINEAR RELATIONS AND EQUATIONS

- Patterns and relationships; meaning of the term relation; different way of describing relationships; Types of relationships (linear, quadratic, and exponential)
- Scatter plot of discrete and non discrete data; line of best fit
- Graphs of Linear and non-linear graphs
- Equation of a straight line slope and y-intercept form, and standard form; meaning of slope and y-intercept;
- Line of Best Fit to describe data
- Solving linear equations and inequalities graphically and algebraically
- Solving small systems of linear equations

UNIT 4 DATA AND PROBABILITY

Data

- Displaying and analyzing data; constructing data displays stem and leaf plot; box and whisker plot; circle graph; line graph; bar graph;
- Using graphs to compare and organize data;
- Using graphs to examine change
- Misleading graphs
- Drawing conclusions from graphs

Probability

- Determining and comparing probabilities; probabilities of two independent events;
- Experimental versus theoretical probabilities
- Simulations its meaning, designing it and applications

UNIT 5 GEOMETRY

- Congruent triangles: meaning; conditions or test of congruency between two triangles (SSS, ASA, AAS, SAS); problems and applications involving congruent triangles
- Similar triangles: meaning; conditions or test of similarity between two triangles (AAA, SSS, SAS); solving problems with similarity
- Transformations: translation, reflection, rotation and dilatation; their meanings; problems involving transformations including the combination of the various forms of them

UNIT 6 MEASUREMENT

- Volume and capacity; their meanings and the difference between the two (for instance the difference between the volume and capacity of an object or a container including the use of appropriate units of their measurement)
- Volume of prisms (including cylinder), pyramids (including cones), spheres, and composite objects; the general formulas for finding the volumes of these shapes or objects including their derivations; applications and problems involving these objects
- Surface areas of prisms, pyramids and spheres: meaning, formulas and their derivations; applications and problems involving surface areas

UNIT 7 COMMERCIAL MATHEMATICS

- Income and expenditures: various sources of income including interest and dividend; calculating total income; various forms of expenses;
- Budgets; purpose; meaning of it and making a budget chart
- Taxes: reporting income and tax policy in Bhutan, especially the Personal Income Tax (PIT); exposure to tax policies in other countries around the world; applications and problems involving the tax policies

WEIGHTING OF MARKS FOR THE END OF THE YEAR EXAMINATION

	UNITS	PERCENTAGE MARK
1	Number and Operation	15
2	Polynomials	14
3	Linear Relations and Equation	20
4	Data and Probability	12
5	Geometry	14
6	Measurement	15
7	Commercial Mathematics	10
	Total	100

MODE OF ASSESSMENT

There are two types of assessment, depending on what you do with them: Formative Assessment and Summative Assessment. Formative Assessment is observation to guide further instruction; and the observation is normally not measured, or its measurement is not recorded to grade the students. Summative Assessment is used to determine is used to determine a mark or a grade. There are various ways provided to accomplish formative and summative assessment *(Please see the 'Teacher's Guide to Understanding Mathematics, Textbook for class IX''*). The mode of assessment given here is for summative assessment of students in class IX. However, observations and analysis made on students' performance in these summative assessments could very well be used for further instructions. The Summative assessment in class IX will be done as per the following break-downs:



A brief rationale on each of the components of the assessment above follows:

Year beginning to mid-year

Unit Tests: At the end of each unit, a unit test should be conducted. It should normally be carried out during one of the class periods. The test can be directly used or adapted from the ones provided in the Teacher's Guide, including the marking schemes. The teacher should keep proper record of the students' achievement in the series of unit tests. A minimum of two unit tests should be conducted before the mid term exams, and the average of the total should be worked out to be worth 5%, and entered onto student's progress report card. Please get more information on unit test from the Teacher's Guide.

Home Works: Reasonable amounts of home works should be assigned quite regularly. More importantly, they should be checked, and prompt feedback provided to the students on their works. The teacher will check at least two times each student's home works during the first half term of the year; they can devise their own marking scheme. The average mark from the total should be worked out to be worth 5% for entering onto the students' progress report card.

Performance Tasks and Assessment Interviews: *Performance Tasks* require students to perform some mathematical tasks usually requiring problem solving and communication: they are often hands on activities. It is not appropriate to give marks or numerical grades to assess students on performance task. So, a rubric is used to guide the assessment. *Assessment Interviews* involve interacting and interviewing students on the concepts learned; asking questions; asking for reasoning; and explanations; and evening demonstrations of their understanding. Both these two methods of assessments are excellent alternatives to paper and pencil test assessments. They can cater to assessing other important aspects of mathematics like problem solving, communication, and reasoning in a better and in-depth manner. Teachers should carry out at least one performance task and one assessment interview during the first half term of the year. The average from these two methods of assessment should then be worked out to be out of 5% for entering in the student's progress report card.

Please get more information on performance task and assessment interviews from the Teacher's guide (page, xviii) and the samples provided with some of the units.

Mid-term examination: The mid-term examination may be modeled on the end of the year examination provided below. The mark obtained in it should be brought down to 25% for entering into the progress report card.

Mid-year to Year-end:

Unit tests: To be done similarly as during the first half term of the year, but with the units covered after the mid term examination.

Home works: To be done similarly as during the first half term of the year.

Performance Tasks and Assessment Interviews: To be done similarly as during the first half term of the year, but with the units covered after the mid term examination.

Year-end Examination: The annual examination paper will be set for 100 marks, with the writing time of 3 hours. The paper will consist of three sections: Sections A, B and C.

- Section A will be composed of 10 multiple choice questions, and will carry a total of 20 marks.
- Section B will be composed of about 12 questions requiring short answers, and will carry a total of 38 marks.
- Section C will be composed of 7 pairs of questions, each pair set from one of the 7 units. Candidates are required to attempt only one question from each of the pairs provided. The questions making up the pairs should be of equivalent level of difficulty. Each single question will be worth 6 marks, which then gives a total of 42 marks to this section. The questions should be composed of inter-related sub questions, designed to test in-depth knowledge and understanding on a particular concept.

	UNITS	PERCENTAGE MARK
1	Number and Operation	15
2	Polynomials	14
3	Linear Relations and Equation	20
4	Data and Probability	12
5	Geometry	14
6	Measurement	15
7	Commercial Mathematics	10
	Total	100

Care should be taken to reflect the marks accorded for each unit as per the weighting given below:

- Care should also be taken in the preparation of questions having a balance of them requiring conceptual understanding, problem solving, communication, reasoning, and applications of procedural knowledge and skills. Some questions should cross strands or units. Along with these, test blue print based on Blooms Taxonomy would also be need to be used in the preparation of the paper.
- Candidates are permitted to use scientific calculators in the examinations.
- The marks obtained out of 100 in this examination should be worked out to be worth 45% for entering in to the students' progress report card.

TEXTBOOKS AND REFERENCES

- 1. Understanding Mathematics Textbook for class IX published by CAPSD 2007
- 2. Teacher's Guide to Understanding Mathematics *Textbook for class IX* published by CAPSD 2007, for teachers as reference

MATHEMATICS SYLLABUS FOR CLASS X

Course Content

UNIT 1 MATRICES AND NETWORK

- Meaning, and uses of matrix; description of a matrix in terms of the number of rows by columns; special matrices such as square matrix, column matrix, row matrix; describing the elements of a matrix by their positions within the matrix; using a matrix to display information; using a matrix to describe a shape on a grid.
- Addition and subtraction of matrices; applications and problems involving them
- Multiplying a matrix by a scalar; applications and problems involving it
- Multiplication of matrices; the compatibility of two matrices for multiplication; applications and problems involving multiplication of matrices
- Network: it meaning; describing a network with a matrix; applications and problems involving network and matrices

UNIT 2 NUMBER AND OPERATION

- Consumer math: profit, loss, discount, commission as actual amounts and percentages; their meanings, formulas and problems involving their applications
- Compound Interest: its meaning and its comparison with simple interest; the formula for the calculation of compound interest and its derivation; calculating compound interests compounded annually, semiannually, and quarterly; problems involving calculation of compound interest, and other related information given the other necessary information;
- The Rule of 72 and its connection with compound interest; why the Rule of 72 works may be explored
- Using consumer math to make decisions in purchasing and investment
- Radicals: their meaning; representing radicals in the form of powers with fractional exponents; simplifying radicals; representing radicals geometrically
- Operations with radicals: addition, subtraction, multiplication and division

UNIT 3 LINEAR FUNCTIONS AND RELATIONS

- Patterns: using patterns to predict
- Functions and relations: meanings and basic definitions of relations and functions; representing relations that are functions in function notation; ways of representing functions; determining if a given relation is a function either in the form of a table, a graph or an algebraic expression; recognizing different types of functions namely, linear, quadratic and exponential; using functions to describe some real life situations
- Linear Functions: Given a linear relationship in its standards form, determining which variable could be expressed as a function of the other (in other words which variable could be made the dependent variable and which could be made the independent variable); Transforming standard form of a linear relation to slope and y-intercept form;
- Application of Linear Functions: Using a Linear Function to solve a Financial Problem; Using Linear functions to represent a Line of Best Fit
- Linear Inequalities: meaning and algebraic expression of Linear Inequalities; Graphing Linear Inequalities; writing or determining Linear Inequality algebraically from its Graph
- Transforming Graphs of Linear Functions: express transformations either algebraically or with a mapping rule when given an image of a known graph

Systems of Linear Equations: Solving Systems of Linear Equations using various algebraic methods, namely The Comparison Strategy, The Substitution Strategy, The Elimination Strategy, and Using Matrices; Determining the solution of a system of Linear Equation from their graphs; realizing that the graphing method will not always give exact solutions easily; Translating real life problem situations into a system of Linear Equations and solving it to solve the real life problems, for example in determining the break even point in businesses.

UNIT 4 MEASUREMENT

- Review from earlier classes: area, perimeter, volume etc of various shapes
- Precision and Accuracy: meaning of precision in connection with the measuring units and instruments used to measure; meaning of accuracy of measurement.
- Significant digits: determining the number of significant digits in given number; Rules for determining the number of significant digits in calculations and the rationale for the rules
- 2-D Efficiency: Knowing which 2-D shape has the maximum area for the same perimeter or minimum perimeter for same area; application of this knowledge in problem situations
- 3-D Efficiency: the relationship between the surface area and the volume of a 3-D shape; determining which would have the maximum volume or capacity for a constant surface area or minimum surface area for a given volume; application of this knowledge in real life situations;
- Exploring occurrence of geometric principles in the nature's design of the animals shapes

UNIT 5 QUADRATIC AND ABSOLUTE VALUE FUNCTIONS

- Quadratic Functions: definition of quadratic function; various forms of quadratic function, namely the Standard Form, the Factored Form, and the Vertex Form; the shape or nature of the graph of any quadratic function, i.e, the parabola; means to check if a given quadratic function is equivalent to another one using table of values, graphs, or using algebra; using quadratic functions to solve problems
- Graphs of Quadratic Functions: Sketching the graph of quadratic function in factored form; constructing graphs from table of values; analyzing graphs to determine mathematics characteristics
- Transforming and Relating Graphs of Quadratic Function: realizing that the graph of any quadratic function is a parabola; and that its size, direction of opening and position are one or more transformation to the graph of the function f(x) = x², affected by the coefficients of the x², x, and the constant; describing these transformations algebraically or with a mapping notation when given an image of a known graph
- The Absolute value Function: meaning of absolute value of a number and its notation; geometrical representation of absolute value; the nature and shape of the graph of the absolute function f(x) = x
- Graphs of other forms of absolute value functions; realizing that the graph of any absolute value function has the shape of two rays meeting to form a "V" above the x-axis; and that it size is one or more transformation of the graph of the absolute value function f(x) = x
- Describing these transformations using mapping notation.
- Factoring Quadratic Expressions: Exposure to various method of factoring quadratic expressions including Using Algebra Tiles, Using an Area Model, and using Algebraic methods. The Algebraic methods include: Assuming that the factors are two binomials, (ax + b) and (cx + d), and equating the product of these two binomial factors with the original polynomial to get information about the coefficients and the constants; using common factors; and using the Sum and Product Rule.
- Solving Quadratic Equations: solving the quadratic equation by equating a quadratic function to 0; the meaning of the solution as finding the value of x; relating to its geometrical meaning should be clear
- Solving Absolute Value Equations: solving simple given Absolute Value Equation using algebraic methods, as well as by graphing the corresponding Absolute Value Functions

UNIT 6 DATA MANAGEMENT, STATISTCS AND PROBABILITY

- Review of mean, median, mode, the quartiles, range etc of a given set of data
- Data display and data analysis: comparing various methods of displaying data which are grouped in intervals and evaluate their effectiveness depending on the situations; Stem and Leaf plots, Box and Whisker plots, and Histograms.
- Correlation and Lines of best fit: meaning of correlation; examining the correlations between the variables; understand that a correlation coefficient is a description of how well a data fits a linear pattern
- Non-Linear data and Curves of Best fit: various types of curves like the quadratic curve, exponential curve, cubic curve, and periodic curves should be used to model the non-linear relationship for appropriate examples of data
- Data distribution and Normal Curve: understanding that a frequency polygon is created by joining the mid points of the top of each bar in a histogram; identifying situations that give rise to common distributions (e.g., U-shaped, skewed, and normal)
- demonstrating an understanding of the properties of the normal distribution (e.g., the mean, median, and mode are equal; the curve (and data) is symmetric about the mean); understand that a normal curve is based upon a certain type of histogram with infinitely small bins
- Probability: distinguish between two events that are dependent and independent using reasoning and calculations

UNIT 7 TRIGONOMETRY

- Similar Triangles: Observing relationships in similar triangles; using similarity properties of proportionality to solve problems;
- Trigonometric Ratios: Definition of the three trig ratios (Sine, Cosine, and Tangent) as the ratios of the sides of a right triangle; the reciprocals of the three primary trig ratios; understand that the primary trig ratios are equivalent for the equal angles in similar right triangles
- Trigonometric ratio Values of special angles: Use Pythagorean Theorem and analytical proofs to determine the exact values for the sine, cosine, and tangent of 0°, 30°, 45°, 60°, and 90°; use calculators to determine the values of trig ratios;
- Trigonometric Identities: Basic Trigonometric Identities like: understand what identities are; test statements to see if they are identities; and understand why each ones of these identities are identities
- Application of trigonometric ratios: Calculating the side lengths and angles of triangles; their use in the determination of lengths, distances and height, angles of elevations (measured from the horizontal up) and angles of depressions (measured from the horizontal down); their use in the calculation of areas of polygons; In all of these, calculators may be used as appropriate, in fact its use is encouraged where appropriate
- Vectors and Bearing: meaning of vectors and bearing; use of Pythagorean theorem and trigonometric ratios in solving vector and bearing problems

UNIT 8 GEOMETRY

- Reflectional or Mirror Symmetry: compare 2-D and 3-D mirror symmetry; lines of symmetry in a 2-D shape; planes of symmetry in a 3-D shape; properties of reflectional or mirror symmetry;
- Rotational or Turn Symmetry: compare 2-D and 3-D rotational symmetry; the centre of rotation; the order of turn symmetry; the axis of rotation for 3-D shapes;
- Reasoning: distinguish between inductive and deductive reasoning using both mathematical and nonmathematical reasoning; use inductive and deductive reasoning such as generalizing relationships, proving theorems and proving or disproving conjectures.

- Constructions: construction of perpendicular bisector of a line; construction of angle bisector; meaning of construction
- Construct circumcirles and incircles of a triangle using perpendicular and angle bisector constructions; location of cirmcumcentr and incentres;
- Construct the Centre of Gravity or Centroid of a triangle using median and altitudes constructions; explore the relationship among the medians; explore relationships among the altitudes
- Use paper folding: as a way to construct bisector of a line, bisector of an angle, altitude of a triangle; as a way to locate centre of gravity of a triangle, centre of a circle, etc

WEIGHTING OF MARKS FOR THE END OF THE YEAR EXAMINATION

	UNITS	PERCENTAGE MARK
1	Matrices and Network	11
2	Number and Operation	12
3	Linear Functions and Relations	13
4	Measurement	11
5	Quadratic and Absolute Value Functions	15
6	Data management and Statistics	14
7	Trigonometry	14
8	Geometry	10
	Total	100

MODE OF ASSESSMENT

There are two types of assessment, depending on what you do with them: Formative Assessment and Summative Assessment. Formative Assessment is observation to guide further instruction; and the observation is normally not measured, or its measurement is not recorded to grade the students. Summative Assessment is used to determine a mark or a grade. There are various ways provided to accomplish formative and summative assessments (*Please see the 'Teacher's Guide to Understanding Mathematics, Textbook for class X''*). The mode of assessment given here is for summative assessment of students in class X. However, observations and analysis made on students' performance in these summative assessments could very well be used for further instructions.

In class X, students' mathematical assessment will be done by two agencies: The School (or the subject teacher) and the Bhutan Board of Examinations Division (BBED). The overall weight the school has for the final assessment of the students is 20%, and the rest 80% is determined by the BBED. The school based assessment is called Internal Assessment, and the BBED carried out assessment is referred to as External Assessment.

Internal Assessment - 20%

The subject teacher will carry out the summative of the students, from the start of the academic session up to the Trail examinations, which lead to the final examinations in December, which is conducted by the BBED. The mode of the internal assessment will be as per the following break-downs:



A brief rationale on each of the components of the assessment above follows:

Year beginning to mid-year

Unit Tests: At the end of each unit, a unit test should be conducted. It should normally be carried out during one of the class periods. The unit tests can be directly used or adapted from the ones provided in the Teacher's Guide, including the marking schemes. The teacher should keep proper record of the students' achievement

in the series of unit tests. A minimum of two unit tests should be conducted before the mid term exams, and the average of the total should be worked out to be worth 5%, and entered onto student's progress report card. *Please get more information on unit test from the Teacher's Guide.*

Home Works: Reasonable amounts of home works should be assigned quite regularly. More importantly, they should be checked, and prompt feedback provided to the students on their works. The teacher will check at least two times each student's home works during the first half term of the year; they can devise their own marking scheme. The average mark from the total should be worked out to be worth 5% for entering onto the students' progress report card.

Performance Tasks and Assessment Interviews: *Performance Tasks* require students to perform some mathematical tasks usually requiring problem solving and communication: they are often hands on activities. It is not appropriate to give marks or numerical grades to assess students on performance task. So, a rubric is used to guide the assessment. Assessment Interviews mean interacting and interviewing students on the concepts learned; asking questions; asking for reasoning; and explanations; and evening demonstrations of their understanding. Both these two methods of assessments are excellent alternatives to the traditional paper and pencil test assessments. They can cater to assessing other important aspects of mathematics like problem solving, communication, and reasoning in a better and in-depth manner. Teachers should carry out at least one performance task and one assessment interview during the first half term of the year. The average from using these two methods of assessment should then be worked out to be worth 5% for entering in the student's progress report card.

Please get more information on Performance Task and Assessment Interviews from the Teacher's guide and the samples provided with some of the units.

Mid-term examination: The mid-term examination may be modeled on the Trial Examinations model provided below. The mark obtained in it should be brought down to 25% for entering into the progress report card.

Mid-year to Year-end:

Unit tests: To be done similarly as during the first half term of the year, but with the units covered after the mid term examination.

Home works: To be done similarly as during the first half term of the year.

Performance Tasks and Assessment Interviews: To be done similarly as during the first half term of the year, but with the units covered after the mid term examination.

Trial Examination (November): The Trial examinations paper will be set for 100 marks, with the writing time of 3 hours. The paper will consist of three sections: Sections A, B and C.

- Section A will be composed of 10 multiple choice questions, and will carry a total of 20 marks.
- Section B will be composed of about 10 to 12 questions requiring short answers, and will carry a total of 32 marks.
- Section C will be composed of 8 pairs of questions, each pair set from one of the 8 units. Candidates are required to attempt only one question from each of the pairs provided. The questions making up the pairs should be of equivalent level of difficulty. Each single question will be worth 6 marks, which then gives a total of 48 marks to this section. The questions should be composed of inter-related sub questions, designed to test in-depth knowledge and understanding on a particular concept.

	UNITS	PERCENTAGE MARK
1	Matrices and Network	11
2	Number and Operation	12
3	Linear Functions and Relations	13
4	Measurement	11
5	Quadratic and Absolute Value Functions	15
6	Data management and Statistics	14
7	Trigonometry	14
8	Geometry	10
	Total	100

Care should be taken to reflect the marks accorded for each unit as per the weighting given below:

- Care should also be taken in the preparation of questions having a balance of them requiring conceptual understanding, problem solving, communication, reasoning, and applications of procedural knowledge and skills. Some questions should cross strands or units. Along with these, test blue print based on Blooms Taxonomy would also need to be used in the preparation of the paper.
- Candidates are permitted to use scientific calculators in the examinations.
- The marks obtained out of 100 in this examination should be worked out to be worth 45% for entering in to the students' progress report card.

The assessments done up to the trial examinations, as would then be reflected or recorded onto the students progress report cards will be out of 100 %. This over all student achievement will then need to be brought down to be out of 20, and sent to the Bhutan Board of Examinations when asked by BBED in its specified format.

External Assessment – 80%

As already explained, the external assessment consists of the final examination conducted by the Bhutan Board of Examinations Division in December. This examination carries a weight of 80% of the overall student assessment in class X. It is therefore clear that this examination is high stake for the students. But, if done correctly and consistently during the course of the year with the series of internal assessments, the external examination will not be any strange, for it will be based purely on the syllabus. In fact, the paper will be the exact model of the Trial Examinations outlined above. For this reason it is not elaborated here.

TEXTBOOKS AND REFERENCES

- 3. Understanding Mathematics *Textbook for class X* published by CAPSD 2007
- 4. Teacher's Guide to Understanding Mathematics *Textbook for class X* published by CAPSD 2007, for teachers as reference

SCIENCE

SCIENCE

Rationale

With the rapid advancement of science and technology the knowledge in this area has become extremely important. People need to be made scientifically literate to understand and benefit from the fast changes that are taking place in the world of science and technology. Science in classes IX and X therefore, should cater to equip the students with the knowledge that will help them pursue higher studies in the field of science. For those who do not want to pursue higher studies, this course should enable them to understand the basic scientific principles useful in their lives and in particular, technology. At the same time, people should possess adequate knowledge and skills to maintain the informed balance between the development and the natural environment, vital for the wellbeing of the nation.

Goals

The goals of science education are:

- 1. To enable the learners to acquire knowledge and understanding of the natural sciences at a level appropriate to their developmental stage
- 2. To develop and apply the skills of inquiry, investigation, problem-solving, logical reasoning and communication
- **3.** As a result of goals 1 and 2, learners will be 'scientifically literate' and be able to participate in critical and informed debates on the key questions and issues that may affect their own lives, community, country, and the world at large
- 4. To prepare learners for higher studies in science and technology, and also to allow them to make a smooth transition into jobs that require an understanding of science
- 5. To equip the learners with the knowledge of local as well as global environmental and ecological problems, their consequences and solutions
- 6. To instil in the learners love and care for the natural environment and to develop the necessary understanding to be able to live harmoniously with nature and realise the goal of sustainable development
- 7. To develop a sense of health and well being and how to live a healthy life
- 8. To enable the learners to appreciate that while science can answer most questions, there are also questions which it cannot answer
- 9. To inculcate in learners a love of learning science and learning in general, which they will carry on throughout their lives

Learning Experiences

The development of the Science Curriculum Framework is informed and guided by the following ten principles that transpired from the series of consultations with science educators, science professionals and other stakeholders, but not compromising with global views.

Developmental Appropriateness: The Science Curriculum Framework emphasises the importance of a developmentally appropriate curriculum based on the knowledge and skills about how children develop and learn. Although, no one theory of development is sufficient, the Science Curriculum was informed by:

- (i) Stage theory of development proposed by Jean Piaget.
- (ii) Bloom's taxonomy of cognitive domain to inform the writing of the key learning outcomes.

(iii) The outcomes of the consultation meetings. At all stages of development, key stakeholders' views were sought to ensure that the Science Curriculum is developmentally appropriate and progressive for Bhutan's learners and that it fulfils the needs of the Bhutanese society

Learners and Learning: Children learn from birth, and learning continues throughout their lives. This view is supported by the science education literature which demonstrates that learners already bring an understanding of the natural world to the science classroom. As soon as learners start to interact with the environment, they start developing personal beliefs, concepts and skills about the world around them. Using their past experiences, beliefs and myths, children develop ideas and theories to explain the natural phenomena which may not always be consistent with the conventional scientific ideas. Therefore, children and scientists both have views about how and why things behave as they do and have meanings for words in science. However, the child's view may appear far more sensible and logical to him or her than the scientists' viewpoint. In order to develop children's ideas consistent with conventional science, the science education literature advocates that learning must take place through the active participation of learners.

Teaching for Constructing Knowledge: a number of constructivist approaches to science teaching are being proposed, which are summarised as:

- identification of the students' past experiences, ideas and views before the teaching;
- provision of opportunities for the students to explore their ideas and test their strength in explaining phenomena, accounting for events and making predictions;
- provision of stimuli for the students to develop, modify and, where necessary, change their ideas and views; and
- support the learner's attempts to rethink and reconstruct his or her ideas and views.

Effective Pedagogy: Learning is a result of active interaction a learner with teachers and the surrounding world to which they belong. The curriculum developers and teachers need to adopt to achieve effective learning in science. Through role playing, games, simulations, talking, reading, writing, and experimentation the students continue to explore their own understanding and begin to gain an appreciation of the views and understanding of others. A conducive learning environment is pivotal to the successful implementation of the Science Curriculum. The teachers must show respect to the individual learner's views and needs; create a safe and secure environment; and provide the learners with the opportunity to actively participate in teaching-learning process. It is crucial that the science teachers exhibit tolerance and respect for the diverse ideas, skills, and experiences of all learners.

ICT in science classes promotes cognitive acceleration in learners; enables a wider range of experience so that learners can relate science to their own and other real-world experiences; increases the learners self learning management and facilitates data collection and presentation. It is also important that the teachers ensure equal participation of boys and girls in all aspects of the science learning process, consistently use non-sexist language and avoid competitive approaches in curriculum design and teaching. Activities, materials and resources must be developed by the curriculum designers that will appeal to both girls and boys, and be relevant to their lives.

Language Learning: Scientific terminology and the grammatical structure of scientific English is vital for learners to effectively comprehend and communicate their ideas and study findings to the class and the wider world.

Therefore, it is suggested that new technical terms be introduced in a systematic way and at an appropriate pace so that not too many terms are introduced in a lesson. The language of Scientific English must be direct,

using commonly understood words. Appropriate use of writing frames, and DARTS activities also facilitate the learning of scientific English.

Knowledge and Understanding: The aspiration of the Science Curriculum is to develop in the learners the notion of a 'scientific temper' which is the spirit of enquiry, the courage to question objectivity, and to be divergent in independent thinking guided by the knowledge of scientific methods of enquiry and its use in solving problems.

Therefore, the Science Curriculum has been developed not only to give the learners a strong foundation in science so that they are factually well informed but also to develop scientifically literate citizens, which is consistent with the idea of developing a scientific temper imperative to pave the path to go beyond the prescribed course of studies. A scientific literate citizen is seen as one who is aware that science, mathematics, and technology are interdependent human enterprises with strengths and limitations; understands key concepts and principles of science; is familiar with the natural world and recognises both its diversity and unity; and uses scientific knowledge and scientific ways of thinking for individual and social purposes

Culture and Values: The Science Curriculum will contribute significantly to an individual's self-discipline. The fundamental law of nature is that all forms of life regardless of religion, law, creed or education survive by mutual cooperation based on their interconnectedness and the precept of *tha dhamtsi lay jumdrey* its profound influence on the learners' spiritual, cultural and traditional way of living. Science Curriculum ensures that the learners undertake investigative work in order to contribute to developing strong purposeful, caring and constructive relationships in the classroom.

Community Involvement: The Science Curriculum, to the maximum extent, is designed to offer the teachers opportunities to involve the members of local community in the teaching and learning of science on the local knowledge and practices. Science Curriculum encourages field work by taking the learners out to project sites, nature reserves in the local community to explore scientific ideas and to become aware of the applications of science in the real life situations

Local Knowledge: Communities are storehouses of knowledge and practices about different aspects of Bhutan's environment, and traditional and cultural values passed down over generations. The constructivist paradigm also states that the child's community and local environment forms the context for more effective learning and constructing knowledge. Therefore, the Science Curriculum has been designed so that, at different key stages, the learners' own thoughts and immediate contexts are drawn upon to construct knowledge.

Science and GNH: The Science Curriculum has been designed underpinning the principles of Gross National Happiness as an approach to science teaching so that, learners imbibe the essence of harmonious living in the society and with the environment, and to engender the students with full values of humanity and capability. Science is one of the learning areas that enhances the understanding of the natural world; hence, it is a vital medium for disseminating the values and principles of GNH through its myriad conceptual and pedagogical tools.

Learning Outcomes

The learning experiences should help the students to:

- 1. understand scientific concepts and acquire skills appropriate to their level of learning and for their lives as citizens or as future science professionals.
- 2. develop their skills of inquiry in order to carry out investigations and experiments.
- 3. be able to transfer the skills of inquiry to be active and critical citizens.

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- 4. develop the ability to use information critically from a wide range of sources to answer scientific questions, address misconceptions and issues in society and in life.
- 5. be able to apply their knowledge and understanding of science to solve key problems and for the conservation of the environment including adopting the principles of refuse, reduce, recycle and reuse.
- 6. develop their abilities for meeting the scientific and technological needs and aspirations of the country and day-to-day life.
- 7. develop a sense of ethics and responsibility by understanding that the knowledge of science has not only contributed positively to the human development, but also has harmful effects both on the environment and the human life.
- **8.** be able to share with others the skills learnt in science in order to develop effective scientific communication skills in the learners and in the society.
- 9. acquire qualities of commitment, self-confidence, curiosity, creativity, integrity and adaptability.
- **10.** develop a sense of honesty and the importance of their contribution to their family, community and country, and understand the value of working together as a team.

PART 1: PHYSICS (CLASS IX)

Course Content

Chapter 1: Forces and Motion

Speed and Velocity, Graphical representation of distance-time graphs (Distance – Time Graph, Speed – Time Graph and Velocity-Time Graph), Balanced and unbalanced forces, Momentum and Equations of linear motions, Newton's first law of motion, inertia, Newton's second law of motion, force as rate of change of momentum, Newton's third law of motion, action and reaction.

(Scope: Compare speed and velocity, explain distance, time and speed graphically and define acceleration, explain momentum and state its affect on vehicle stopping distances, explain that balanced forces do not alter the velocity of a moving object, demonstrate that mass is the property of a body which resists change in motion and apply equations of motions to simple numerical problems, explain Newton's first law of motion, derive the equation of Newton's second law of motion, use f = ma, and the equations of linear motion to solve simple numerical problems, explain Newton's third law of motion, explain the applications of Newton's laws of motion and define one newton of force).

Chapter 2: Pressure and its Applications

Pressure, thrust, units of pressure, pressure inside a liquid, pressure at a point inside a liquid, Atmospheric pressure and Atmospheric pressure and weather forecasting, Upthrust, Archimedes' Principle, Applications of Archimedes' Principle and Density and Archimedes' Principle, Forces on floating bodies, equilibrium pf floating bodies, Volume of body submerged in liquid and hydrometer.

(Scope: define pressure, state laws of liquid pressure, derive the expression, p = hdg, at a point inside a liquid, describe atmospheric pressure, explain the working of different types of barometer and appreciate the practical aspects of knowledge of fluid pressure in day to day life, explain upthrust, state factors affecting the upthrust on a body, derive the expression for calculating upthrust, state Archimedes' Principle, carry out an experiment to prove Archimedes' Principle, define density and relative density (R.D) of a substance and determine density of irregular solids and liquids, using Archimedes' principle, differentiate between the terms centre of gravity (C.G) and centre of buoyancy (C.B), describe the relationship between upthrust and the weight of a floating body, state the principle of floatation, explain some applications of the principle of floatation and function of a hydrometer and its applications in day today life).

Chapter 3: Energy

Measurement of Temperature (or Temperature Scales) and Thermal Energy, heat and thermal equilibrium, Thermal Insulation, application of thermal equilibrium, Specific Heat Capacity, principle of calorimetry, Latent Heat and Thermal Expansion of Matter and their applications.

(Scope: Convert temperatures from degree Celsius to Fahrenheit and vice versa, convert temperatures from degree Celsius to Kelvin and vice versa, measure temperature of hot and cold bodies using a thermometer, explain the transfer of thermal energy, explain the term thermal equilibrium and relate thermal equilibrium to our day-to-day life, explain the uses of insulation, define specific heat capacity, compare the specific heat capacity of various substances, calculate heat lost or gain using the relation $Q = mc \Box T$, apply Principle of Calorimetry ($Q = V \times I \times t$), explain the term latent heat of fusion, latent heat of vaporisation, describe thermal expansion with examples, Practical Applications of the Expansion of Solids, Understand Anomalous Expansion of Water, Effects of Anomalous Expansion of Water and appreciate the role of thermal equilibrium in a system).

Chapter 4: Electricity & Magnetism

Alternating Current and Direct Current (a.c. and d.c.), Force on a current carrying conductor placed in a magnetic field, a.c and d.c motors and Electromagnetic Induction, Charging by friction, types of charges, Static Electricity and Electric current and its measurement.

(Scope: Explain the term direct current (d.c.), define magnetic Lorentz force, demonstrate that a force is exerted on a current-carrying wire in a magnetic field ($F = q v B \sin \theta$), Fleming's left hand rule, describe the working of simple d.c.motors, carry out an experiment to exhibit electromagnetic induction (Faraday's laws, Lenz's law and Fleming's Right hand rule), measure potential difference across a d.c. source and appreciate the role of electromagnetic effects in modern electronic devices, explain charging of an insulating material by friction, describe the forces of attraction between unlike charges (positive and negative charges), and forces of repulsion between like charges, detect charge on bodies using gold leaf electroscope, explain electric current in terms of the flow of charge carried by free electrons in metals, or ions during an electrolysis, calculate steady current, charge and time using the formula $I = \frac{Q}{r}$ and uses of electricity in our daily life).

Chapter 5: Refraction & Dispersion of Light

Refraction of light, refraction of light through a glass slab, laws of refraction, refraction of light through a prism, dispersion of light and total internal reflection and its applications.

(Scope: Describe refraction through glass slab, Lateral displacement, determine the refractive index of a glass slab $\left(\mu = \frac{\sin i}{\sin r}\right)$, principle of reversibility, real and apparent depth $\left(\mu = \frac{real \ depth}{apparent \ depth}\right)$, discuss refractive index of different coloured light through a prism, define visible spectrum, explain dispersion, explain total internal reflection, discuss natural phenomena due to total internal reflection).

Chapter 6: Waves

Characteristics of waves, types of waves- transverse and longitudinal, properties of waves, terms used to describe waves and their relationship, transfer of energy through waves and uses of waves.

(Scope: describe the properties of waves, demonstrate properties of longitudinal waves using string or spring, define the terms time period, frequency, wavelength and amplitude of a wave and their relationship, measure time period of a simple pendulum $T = \frac{1}{f}$, solve problems using the equation $v = f\lambda$, appreciate the characteristics of waves, explain that waves transfer energy without transferring matter, describe uses of ultrasound e.g. medical scanning, SONAR (measuring depth of ocean, human and bats) and radio waves in RADAR and appreciate the applications of waves).

Chapter 7: The Earth and Beyond

Galaxy (elliptical galaxies, spiral galaxies and irregular Galaxies), Constellations, Asteroids, Comets, Meteors and Meteorites, Black holes and worm holes, Astronomical unit, positions of heavenly bodies, Astronomical instruments, Exploration of space.

(Scope: Describe universe and galaxies in our universe, identify and draw constellations and describe asteroids, comets, meteors and meteoroids black holes and worm holes), compare the relative sizes and positions of heavenly bodies in the universe (parallax method and Kepler's law), $1 A.U. = 1.496 \times 10^{11} \text{ m}$ and describe the development of technology that has helped our knowledge and understanding of the Solar System and the universe as a whole e.g. early telescopes, early satellites, modern space probes and space telescopes.)

PHYSICS (CLASS X)

Course Content

Chapter 1: Forces and Motion

Centre of gravity, stability of bodies and Equilibrium, Forces and equilibrium, Couple and Principle of moments, Force on falling objects.

(Scope: Describe gravity and gravitational field, define centre of gravity of an object, locating centre of gravity of a body, Position of C.G. of a body and Area of the Base of Support (B.S.) and explain stability of bodies in with reference to stable equilibrium, unstable equilibrium, neutral equilibrium, and system in equilibrium, describe resultant, equilibrant, moment and parallelogram law of forces and explain the couple, torque of a couple and the principle of moments (Moment of couple (τ) = Force (F) × Perpendicular distance (d) between forces, explain that the forces acting on falling objects change with velocity and describe free falling body, drag force, terminal velocity of falling objects).

Chapter 2: Pressure and its Applications

Thrust on a surface area and Body in a fluid, Pascal's law and application of Pascal's law

(Scope: Explain pressure $\left(p_{\text{pressure}} = \frac{F(tbrust)}{Area}\right)$, describe the factors affecting the magnitude of pressure (P= h p g), state and apply the equation for pressure, state Pascal's law and explain the applications of Pascal's law (hydraulic brake system and hydraulic jack system).

Chapter 3: Energy

Work and power, Potential energy and kinetic energy, Laws of conservation of energy, Sustainable use of energy, impact of power generation on environment.

(Scope: calculate the work done by a constant force using W = Fd (adjacent side)/ (hypotenuse side), calculate the power of a machine as a rate of work done, calculate the efficiency of a machine as a ratio of work output and input, state and use the equation for potential energy PE = mgh, state and use the equation for kinetic energy $KE = \frac{1}{2}mv^2$, state the principle of conservation of energy, Apply the principle of the conservation of energy to gravitational potential energy, kinetic energy and work done against resistive forces, describe efficient ways to use energy (using energy-efficient appliances and insulation), describe the need for economical and sustainable use of energy, wind energy and geothermal energy).

Chapter 4: Electricity and Magnetism

Flow of electric current, Resistance, potential drop, Ohm's Law and Heating effect of current, Electromagnetic induction, a.c generator and transformer, transmission of electrical energy.

(Scope: Explain potential drop, resistance, power, voltage and current $(I = \frac{Q}{t}, emf(E = V + Ir))$, describe that the flow of charges through a resistor results in heating of resistor (H = I² R t), explain and verify Ohm's Law (V = I R), interpret the graph of ohmic and non-ohmic conductors, define resistivity(ρ) and conductivity $\left(\sigma = \frac{1}{\rho}\right)$ of substances and, explain the working of simple a.c. generators and transformers using electromagnetic induction, calculate the voltages across the coils in a transformer from the numbers of turns in the coils, transformer ratio $\left(\frac{Ep}{Es} = \frac{Np}{Ns}\right)$ and describe transfer of electrical energy from power stations to consumers).

Chapter 5: Waves

The electromagnetic spectrum, types of electromagnetic waves, Communication over short and long distances, communication through sound waves, digital and analog signals.

(Scope: Identify the electromagnetic waves based on frequency and wavelength, describe the uses of microwaves, infrared and ultraviolet waves and their potential dangers and state some uses of X-rays and gamma rays in medical field, explain the transfer of information along optical fibres, explain that radio waves, microwaves, infrared and visible light carry information over large and small distances, including global transmission via satellites, describe the ways in which reflection, refraction and diffraction affect communication, verify laws of reflection of sound and describe the difference between analogue and digital signals).

Chapter 6: Earth and Beyond

Gravitational force and field, laws of universal gravitation, acceleration die to gravity, role of gravity, Formation and evolution of stars and galaxies, solar system, cosmic microwave background and redshift, life elsewhere in universe.

(Scope: Explain that gravity acts as a force throughout the universe and explain the role of gravity in the formation of solar system, planets, stars and the universe, describe cosmic microwave background and redshift that explain the origin and evolution of the universe and describe the search for evidence of life elsewhere in the universe).

Practical Works:

Learning by doing is fundamental to science education. Practical work is one of the means that helps students to develop their understanding of science, appreciate that science is evidence driven and acquire hands-on skills that are essential to science learning and in their future lives. The practical work as defined by SCORE (2009a) is 'a "hands-on" learning experience which prompts thinking about the world in which we live'. Therefore, the purposes of doing practical in science classes are to:

- i. help students to gain or reinforce the understanding of scientific knowledge.
- ii. develop students' understanding of the methods by which the scientific knowledge has been constructed.
- iii. increase a student's competence to engage in scientific processes such as in manipulating and/or observing real objects and materials with due consideration for safety, reliability, etc.
- iv. develop technical and scientific skills that improve science learning through understanding and application.
- v. develop manipulative skills, knowledge of standard techniques, and the understanding of data handling.
- vi. Inculcate excitement of discovery, consolidation of theory, and the general understanding of how science works.

Practical work is integral to the aspects of thinking and working scientifically in science, and must be built in as a full learning experience for students. Students are engaged in a range of practical activities to enable them to develop their understanding through interacting with apparatus, objects and observations.

The assessment of students' scientific skills and their understanding about the scientific processes through practical work is crucial in the process of science learning. To ensure the validity, assessment needs to sample a range of activities in different contexts; and reliability is ensured through the appropriate moderation procedures so that fairness in assessment is maintained.

The science curriculum envisages that students are given the opportunity to undertake work in which they make their own decisions. They should be assessed on their ability to plan, observe, record, analyze, communicate and evaluate their works.

The practical works are NOT to be treated as a separate fulfillment of the course requiring additional periods, rather they are to be integrated in lessons as activities following purposes:

- Open the lesson for content development
- Extend the conceptual understanding
- confirm laws and concepts

The following are the practical works carried out in classes IX and X.

Class IX

- 1. Measure potential difference across a d.c. source.
- 2. Measure time period of a simple pendulum.
- 3. Detect charge using gold leaf electroscope.
- 4. Prove force is directly proportional to acceleration (keeping the mass constant)
- 5. Prove that acceleration is inversely proportional to mass (keeping the force constant)
- 6. Demonstrate properties of longitudinal waves using string or spring.
- 7. Calculate density of irregular shape of solids (Displacement method).
- 8. Construct a simple telescope using lens.
- 9. Measure temperature of hot and coldbodies.
- 10. Calculate and compare the specific heat capacity of various materials.
- 11. Measure the angles of incidence and refraction of light passing through transparent blocks and hence calculate the refractive index of the material of the block.

Class X

- 1. Identification of center of gravity of objects of different shapes (regular and irregular objects).
- 2. Demonstration of couple force. as an activity)
- 3. Verification of principle of moments using a meter rule and weights.
- 4. Verification of Ohm's law using simple electric circuit (by changing p.d.)
- 5. Measurement of current with change in resistance (keeping p.d. as constant)
- 6. Identifying the electromagnetic waves based on frequency and wavelength comparing with given ranges of electromagnetic waves. (as an activity)
- 7. Verifying law of reflection of sound.
- 8. Application of Pascal's law (hydraulic system)
- 9. Working of simple transformer (using cell, galvanometer and coils)
- 10. ICT based practical Simulation on gravity and orbit (using PhET)

Assessment

Educational assessment is the process of documenting, usually in measurable terms, outcomes of knowledge, skills, attitudes and beliefs of the learners. This includes the processes of gathering and interpreting information about the progress of their learning.

The learners should be well informed about what will be assessed and how it will be assessed. This makes the teacher's expectations clear to the learners to set appropriate learning outcomes.

The teachers can play an important role in the learners' achievement by effectively monitoring their learning and giving them constructive feedback on how they can improve, and provide the necessary scaffolding for the needy learners as identified through the reliable assessment techniques and tools. Assessment is generally used to:

• inform and guide teaching and learning

A good classroom assessment plan gathers evidence of student learning that informs teachers' instructional decisions. It provides teachers with information about what students know and can do. To plan effective instruction, teachers also need to know what the student misunderstands and where the misconceptions lie. In addition to helping teachers formulate the next teaching steps, a good classroom assessment plan provides a road map for students. Students should, at all times, have access to the assessment so they can use it to inform and guide their learning.

• help students set learning goals

Students need frequent opportunities to reflect on where their learning is at and what needs to be done to achieve their learning goals. When students are actively involved in assessing their own next learning steps and creating goals to accomplish them, they make major advances in directing their learning, and what they understand about themselves as learners.

• assign report card grades

Grades provide parents, employers, other schools, governments, post-secondary institutions and others with summary information about student learning.

• motivate students

Research (Davies 2004; Stiggins et al. 2004) has shown that students will be motivated and confident learners when they experience progress and achievement, rather than the failure and defeat associated with being compared to peers that are more successful.

The achievements and performances of the learners in science are assessed on the following three domains:

- Work scientifically
- Scientific knowledge
- Scientific values and attitudes

1. The Assessment Process

Effective classroom assessment in Science:

- addresses specific outcomes in the program of studies
- shares intended outcomes and assessment criteria with students prior to the assessment activity
- assesses before, during and after instruction
- employs a variety of assessment strategies to provide evidence of student learning
- provides frequent and descriptive feedback to students
- ensures students can describe their progress and achievement and articulate what comes next in their learning
- informs teachers and provides insight that can be used to modify instruction.

2. Scheme of Assessment

These are assessed through the following schemes of assessment:

i. Continuous Formative Assessment (CFA)

Formative assessment is used to provide feedback to teachers and learners, so that teaching and learning can be improved through the provision of regular feedback and remedial learning opportunities for the learners when needed. It also enables the teachers to understand what teaching methods and materials work best.

CFA facilitates the teachers to diagnose the learning needs of the learners and recognize the individual differences in learning. Through the constructive feedback provided, the learners are able to understand their strengths and weaknesses. It also empowers them to be self-reflective learners who monitor and evaluate their own progress.

CFA should happen daily throughout the teaching-learning processes of the academic year. It is NOT graded, as it is to give continuous feedbacks to the learners.

The suggested techniques for CFA for the three domains are:

- Work scientifically: Class work, observations, immediate interaction with the students, etc.
- Scientific knowledge: Question and answer, homework, class work, etc.
- Scientific values and attitudes: Observations of students' conduct guided by scientific and social values.

The tools identified for CFA are checklists and anecdotal records.

ii. Continuous Summative Assessment (CSA)

Continuous Summative Assessment is another form of continuous assessment. It helps in determining the learner's performance and the effectiveness of instructions. The feedback from this assessment help to improve the learners learning and mandates the teachers to incorporate varied teaching strategies and resources to ensure quality teaching and learning in the science classes. It empowers learners to be self-reflective learners who monitor and evaluate their own progress.

In CSA, the learner's performances and achievement are graded. This ensures active participations of learners in the teaching-learning processes.

The suggested techniques for CSA for the three domains are:

- Work scientifically: Project work, science journal and scrapbook, and practical works.
- Scientific knowledge: Home work, and class tests.
- Scientific values and attitudes: Observation of the learners' conduct in the classroom guided by scientific and social values.

The main tools for CSA are rubrics and paper pencil tests.

iii. Summative (SA)

Summative assessment (SA) is conducted at the end of the first term and at the end of the year to determine the level of learning outcomes achieved by the learners. The information gathered is used by the teachers to grade learners for promotion and to report to parents and other stakeholders.

The identified techniques for SA are term examinations - first term and annual examinations. The questions for the term examinations should cover all the three domains of science learning objectives using the principles of Bloom's taxonomy.

Assessment Matrix								
Types of assessment	CFA			CSA			SA	
Definition	It is a continuous process of assessing student's problems and learning needs and to identify the remedial measures to improve student's learning. It also enables teachers to understand what teaching methods and materials work best.			It is a continuous process of grading student's performances and achievements. Teachers provide feedbacks for improvement. It also enables teachers to understand what teaching methods and materials work best.			Assesses student's cumulative performances and achievements at the end of each term.	
Domains	Scientific knowledge (SK)	Working scientifically (WS)	Scientific values and attitudes (SV)	Scientific knowledge (SK)	Working scientifically (WS)	Scientific values and attitudes (SV)	SK, WS & SV	SK, WS & SV
Techniques	Quiz & debate, class presentation, homework, class work, immediate interaction with students.	Immediate interaction with students, class work, home work, experiments, exhibition, case studies	Observation of student's conduct, in group work, field trip, excursion, etc.	Home work and chapter end test.	Practical work	Project Work.	Term exam.	Term exam
Assessment Tools	Q&A, checklist and anecdotal records.	Checklist and anecdotal records.	Checklist and anecdotal records.	Rubrics (HW) and paper pencil test (Chapter end test).	Rubrics (Practical work)	Rubrics (Project work)	Paper pencil test	Paper pencil test
Frequency interval (when &how)	Checklists and anecdotal records must be maintained for each topic throughout the academic year.			HW-for every chapter, Chapter end test – for every chapter.	Practical work once in each term	Project Work –Once for the whole year but assessed two times (half yearly)	Once in a term.	Once in a year.
Format in Progress Report				SK	WS	SV	Mid- Term	Annual Exam
Weightings				T1= 2.5 T2= 2.5	T1= 5 T2= 5	T1= 2.5 T2= 2.5	T1=30	T2=50
Note: The Ter	m Examinations	will be of two hou	irs and shall be asses	sed out of 100 r	narks.			

3. Assessment matrix for classes XI and XII

Chapters	Chapter title	Maximum time required (mins)	Weighting (%)
Chapter 0	Introduction to Physics	90	0%
Chapter 1	Forces and Motion	677	16%
Chapter 2	Pressure in Fluids	635	15%
Chapter 3	Energy	888	21%
Chapter 4	Electricity and Magnetism	677	16%
Chapter 5	Refraction and Dispersion of Light	508	12%
Chapter 6	Waves	508	12%
Chapter 7	The Earth and Beyond	338	8%
Total		4320	100%

Chapter-wise Weighting and Time allocation (Class IX)

Chapter-wise Weighting and Time allocation (Class X)

Chapters	Chapter title	Maximum time required (mins)	Weighting (%)
Chapter 1	Forces and Motion	605	14%
Chapter 2	Pressure in Fluids	432	10%
Chapter 3	Energy	950	22%
Chapter 4	Electricity and Magnetism	950	22%
Chapter 5	Waves	605	14%
Chapter 6	The Earth and Beyond	778	18%
Total		4320	100%

The total time required to complete the topics is 4320 minutes or 96 periods of 45 minutes in a period.

Textbooks & References

- 1. Physics Class Nine, Kinley Gyaltshen, Sumitra Subba, Kuensel Corporation Limited
- 2. Physics Class Ten, Kinley Gyaltshen, Sumitra Subba, Kuensel Corporation Limited

PART 2: CHEMISTRY (CLASS IX)

Course Content

1 Study of Gas Laws.

- (i) The behaviour of gases under changes of temperature and pressure; explanation in terms of molecular motion (particles, atoms, molecules); Boyle's Law and Charles' Law; absolute (Kelvin) zero; gas equation; simple relevant calculations.
- (ii) Standard temperature; and pressure *(reduction to s.t.p. required);* concept of Celsius and Kelvin temperature scales.

2. Elements, mixtures and compounds.

- (i) Main general characteristics and differences.
- (ii) Separation of mixtures involving use of a solvent, filtration, evaporation and distillation, fractional distillation, simple paper chromatography *(limited to separation of colouring matter in ink);* immiscible liquids (separating funnel).
- (iii) Types of mixtures; of two solids, a solid and liquid, two liquids.

3. The Language of Chemistry.

- (i) Symbol of an element-definition, symbols of elements used often.
- (ii) Valency-defination; hydrogen combination and number of valance electrons of the metals and nonmetals; mono, di, tri and tetravalent elements.
- (iii) Radicals-defination; formula and valencies of radicals and formula of compounds.
- (iv) Chemical equation-definition and examples of simple chemical equations with one reactant and two or three products, two reactants and one product, two reactants and two products, two reactants and three or four products, balancing of equations.

4 Physical and Chemical changes.

- Definitions and comparisons of physical and chemical changes simple experiments like dissolution of sugar in water, burning of paper should be shown to make the concept of physical and chemical change clear. More examples of such type may be given.
- (ii) Conditions of chemical change –close contact, heat, light, electricity, pressure, catalysts.
- (iii) Types of chemical change –direct combination, decomposition; displacement; double decomposition.
- (iv) Energy changes in a chemical change exothermic and endothermic reactions with examples; evolution/ absorption of heat, light and electricity.
- (v) Burning: definition and conditions of burning (combustible substance, supporter of combustion and ignition temperature), comparison of respiration and burning; students are to be made aware of how the balance of oxygen and carbon-dioxide is maintained in nature.

5. Water

(i) Water as a compound and as a universal solvent; its physical states and chief physical properties; solutions as 'mixtures' of solids in water; saturated solutions; qualitative effect of temperature on solubility *(e.g. solutions of calcium sulphate, potassium nitrate, sodium chloride in water)*.

- (ii) Water of crystallisation; idea of anhydrous substances; air dissolved in water *(its removal, approximate composition and biological importance)*.
- (iii) The action of sodium and calcium on cold water; the action of heated magnesium and iron on steam; reversibility of reaction between iron and steam; reactivity series.

6 Atomic Structure.

(i) Atom consists of nucleus (protons, neutrons) with associated electrons, mass number and atomic number.

Definition of an element, definition of an atom; constituents of an atom-nucleus (protons, neutrons) with associated electrons; mass number, atomic number. Atomic structure-an electron distribution in the orbit-2n2 rule.

(ii) Isotopes of hydrogen, carbon, chlorine. Reasons for chemical activity of an atom (electronic configuration). Octet rule. Definition and examples of isotopes.

7. The Periodic Table.

(i) Dobereiner's Triads, Newland's octaves, Mendeleev's contributions; modern periodic law, the representative periodic table for 8 groups up to period 3.

Examples for Dobereiner's triads (two examples) reasons for discarding the law; Newland's octaves: examples and reason for discarding the law; main defects of Mendeleev's periodic table and its correction; applications of Mendeleev's periodic table in prediction of undiscovered elements and correction of atomic weights should be mentioned. Students should be taught the main points of the modern periodic table (groups and periods).

(ii) Uses of periodic table and related properties of the elements, i.e., valency, nature of the element.

8. Study of the first element –Hydrogen

- (i) Hydrogen from water; displacement of hydrogen from dilute sulphuric acid or hydrochloric acid by zinc or iron *(no reaction with copper);* displacement of hydrogen from alkalis *(NaOH, KOH)* by Zn, A1, metal activity series
- (ii) The preparation and collection of hydrogen by a standard laboratory method other than electrolysis
- (iii) Evidence on the density and solubility of hydrogen.
- (iv) Burning of hydrogen in air or oxygen, water being formed (an oxide of hydrogen).
- (v) Reaction of hydrogen with heated copper (II) oxide leading to the idea of oxidation and reduction; oxidation and reduction in terms of hydrogen and oxygen addition/removal.
- (vi) Reaction of hydrogen with chlorine.

9. Study of the Group 14 (fourth Group) element Carbon.

- (i) Position of the non-metal (Carbon) in the periodic table and general group characteristics applied to the above mentioned element.
- (ii) Natural occurrence: Allotropy (definition); Allotropes of carbon-diamond, graphite and fullerene, burning of this in oxygen giving carbon dioxide: wood charcoal, bone charcoal, shoot and gas carbon-their uses.
- (iii) Comparison of physical properties of amorphous and crystalline varieties (only diamond and graphite): colour, rigidity, absorption, specific gravity, conductivity.
- (iv) Uses of wood and bone charcoal, graphite, diamond.
- (v) Reactions to be studied under the following heading- reactants, product, condition, equation.

10 Study of the Group 15 (fifth Group) element Nitrogen

- (i) Position of the non-metal (Nitrogen) in the periodic table and general group characteristics applied to the above mentioned element.
- (ii). Laboratory preparation of nitrogen and collection of nitrogen. It should be explained why a mixture of equimolecular weight of ammonium chloride and sodium nitrite is heated with water instead of ammonium nitrite alone and the gas collected over water.
- (iii) Properties of nitrogen. Reaction with oxygen, hydrogen, calcium, magnesium, aluminium and calcium carbide.

11. Study of the Group 16 (Sixth Group) elements - Oxygen and Sulphur..

- (i) Position of the non-metals (Oxygen, Sulphur) in the periodic table and general group characteristics applied to the above mentioned elements.
- (ii) In air, water and oxides.
- (iii) The preparation and collection of oxygen in the laboratory (e.g. from hydrogen peroxide and potassium chlorate with manganese (IV) oxide); oxygen from higher oxides like Pb₃O₄, PbO₂
- (iv) Density and solubility of oxygen.
- (iv) The burning of common elements in oxygen (e.g. carbon, sulphur, phosphorus, sodium, calcium, magnesium, iron); water and carbon dioxide are formed when a candle burns in air.
- (v) Conditions for and prevention of rusting.
- (vi) Sulphur –extraction by Frasch process: Allotropes of sulphur-Crystalline and amorphous (rhombic, monoclinic, plastic, milk of sulphur).Comparison of their physical properties and diagrammatic representation. Chemical properties of sulphur: Reaction with oxygen, hydrogen, chlorine, carbon, zinc, iron, copper, mercury, sulphuric acid and nitric acid. Uses of sulphur.

13. Study of the Group 17 (Seventh Group) element Chlorine.

- (i) Position of the non-metal (Chlorine) in the periodic table and general group characteristics applied to the above mentioned element.
- Preparation and collection of chlorine; refer to the density, solubility, poisonous nature of chlorine.
 Oxidation of concentrated hydrochloric acid manganese dioxide or lead dioxide or bleaching powder.
 By heating a mixture of sodium chloride and manganese dioxide with concentrated sulphuric acid.
- (iii) Reaction of chlorine with burning sodium, hot iron, potassium iodide solution, hydrogen sulphide, ammonia and sodium hydroxide solution.

Uses of chlorine in water purification, bleaching agent, manufacture of hydrochloric acid.

14. Study of Carbon monoxide and Carbon dioxide.

- (i) Carbon monoxide formed by incomplete combustion of carbon or carbon compounds (e.g. exhaust fumes from cars); methods of preparing and collecting carbon monoxide (preparation of CO from oxalic and formic acids); conversion of CO₂ into CO and vice versa; separation of CO₂ or CO. from a mixture of the two; reducing property of CO with reference to metallic oxides (refer to the density, solubility and poisonous nature of carbon monoxide).
- (ii) Carbon dioxide; its formation when charcoal, wood or other organic substance (e.g. ethanol) are burned in air or oxygen; an oxide of carbon; the main concept that hydrogen and carbon burn to form water and carbon dioxide should be understood *(e.g. burning of candle)*.
- (iii) Obtaining CO_2 from sodium hydrogen carbonate and carbonates; quicklime, slaked lime, lime water and their important uses.

- (iv) The preparation and collection of carbon dioxide by the action of hydrochloric acid on calcium carbonate (marble); reason why sulphuric acid is not used; refer to the density and solubility or carbon dioxide and the acid nature of the solution.
- (v) Use of carbon dioxide in refrigeration, fire extinguishers and manufacture of urea.

MODES OF ASSESSMENT

There will be no external examinations for Class IX. This course will be assessed internally by the school. The modes of assessment will include 'continuous assessment' and 'written examinations' as given below.

Continuous assessment – 20% weighting

Continuous assessment will include practical work, homework and class work. The distribution of weighting among the three is as follows:

Practical work - 10% HW & CW - 10%

Practical work

The students will be required to observe the effect of reagents and/or of heat on substances supplied to them. The exercises will be simple and may include the recognition and identification of certain gases listed below.

Gases: hydrogen, oxygen, carbon dioxide, chlorine, hydrogen chloride, sulphur dioxide, hydrogen sulphide, ammonia, water vapour, nitrogen dioxide.

The students are also expected to have completed the following minimum practical works:

Simple experiments, as suggested below:

- i. Heat the given (unknown) substance, make observations, identify any products and make deductions where possible.
 - a. mercuric oxide, red lead, lead dioxide
 - b. copper carbonate, zinc carbonate
 - c. washing soda, copper sulphate crystals
 - d. zinc nitrate, copper nitrate, lead nitrate
 - e. ammonium chloride, iodine, ammonium dichromate
- ii. Add dilute sulphuric acid to the unknown substance, warm if necessary, make observations, identify the product and make deductions.
 - a. a sulphide
 - b. a carbonate
 - c. a metal
- iii. Apply the flame test to identify the metal in the unknown substance.
 - a. a sodium salt
 - b. a potassium salt
 - c. a calcium compound
- iv. The percentage composition of a mixture of powdered salt and water-washed sand.
 The experiment will test techniques in dissolving, filtering or decanting and weighing. It may be counted out as taking too much time. This problem could be solved by supplying a given weight of the mixture; also by choosing sand of such grain size that filtering or decanting will not be slow and yet not so large

that separation of salt and sand can be done simply by sorting out mechanically the sand from the salt. The experiment will take about 20 minutes using 10g mixture (4g sand, 6g salt).

- v. Hardness of water. The students are expected to test the following practical work.
 - a) To study the causes of hardness of water using soap flakes, methylated spirit, distilled water, calcium bicarbonate, magnesium bicarbonate, calcium chloride, magnesium chloride, calcium sulphate, magnesium sulphate.
 - b) To check the type of hardness of water using soap solution on the salt solutions of calcium bicarbonate, magnesium bicarbonate, calcium chloride, magnesium sulphate, magnesium sulphate.
 - c) To compare the effect of soap and detergents on hard water. Materials required: hard water, ordinary soap, detergent.

Note: Teachers are advised to strictly incorporate the practical experiments in their daily lessons rather than conducting them separately. Further, teachers are advised to go beyond the list given above to make Chemistry leaning more practical oriented.

Criteria	Preparation	Procedure	Observation	Inference	Presentation
Grade I 10 marks	Follow instructions (written, oral, diagrammatic) with understanding; modifies if required. Familiarity with and safe use of apparatus, materials, techniques.	Analyses problem systematically. Recognises a number of variables and attempts to control them to build a logical plan of investigation	Records data/ observations without being given a format. Comments upon, recognises use of instruments, degree of accuracy. Recording is systematic.	Processes data without format. Recognises and comments upon sources of error. Can deal with unexpected results, suggesting modifications.	Presentation is accurate and good. Appropriate techniques are well used.
Grade II 8 marks	Follows instructions to perform experiment with step-by-step operations. Awareness of safety. Familiarity with apparatus and materials.	Specific sequence of operation; gives reasons for any change in procedure. Can deal with two variables, controlling one.	Makes relevant observations. No assistance is needed for recording format that is appropriate.	Processes data appropriately as per a given format. Draws qualitative conclusions consistent with required results.	Presentation is adequate. Appropriate techniques are used.
Grade III 6 marks	Follows instructions to perform a single practical operation at a time. Safety awareness. Familiarity with apparatus and materials.	Develop simple experimental strategy. Trial and error modifications made to proceed with the experiment.	Detailed instructions needed to record observations. Format required to record results.	Process data appropriately with a detailed format provided. Draws obvious qualitative conclusions as required.	Presentation is okay, but disorganised in some places. Over- writing, rough work is untidy.
Grade IV 4 marks	Follows some instructions to perform a single practical operation. Casual about safety. Manages to use apparatus and materials.	Struggles through the experiment. Follows very obvious experimental strategy.	Format required to record observations /reading, but tends to make mistakes in recording.	Even when detailed format is provided, struggles or makes errors while processing data. Reaches conclusions with help.	Presentation is poor, disorganised but follows an acceptable sequence. Rough work is missing or untidy.
Grade V 1 mark	Not able to follow instructions or proceed with practical work without full assistance. Unaware of safety.	Cannot proceed with the experiment without help from time to time.	Even when format is given, recording is faulty or irrelevant.	Cannot process results, nor can draw conclusions, even with considerable help.	Presentation unacceptable; disorganised, untidy, poor. Rough work missing.

MARKING CRITERIA FOR THE EXPERIMENTS

The students will be required to carry out a minimum of FIFTEEN EXPERIMENTS. Each experiment will be marked out of 10 marks according to the marking scheme given in the recording format. At the end of the year, the marks obtained for EACH of the experiments could be totalled together and then reduced to 10% weighting. For example, the final mark for the practical work could be calculated thus:

Mark obtained X 10 150

Class work and Homework.

The students are required to do home work and class work through out the year. Students' understanding of the lessons can be assessed through homework and class work. At the end of the year, the marks obtained for EACH assignment could be totalled and then reduced to 10% weighting. For example, the final mark for homework and class work put together could be calculated thus:

<u>Marks obtained</u> X 10 Maximum marks

The final mark for internal assessment will then be added to the mark obtained in the written examinations.

Note: For recording format please refer Sc.(12)-BBE/98/0001/0870, dated 20.08.98 and Marking criteria for the experiments

Written examinations - 80% weighting

The written examination will for 1 1/2 hours consisting of two sections and out of 80 marks.

Section A (compulsory) will contain questions requiring short answers and will cover the entire syllabus. Candidates will be required to attempt ALL the questions. This section will be assessed out of 40 marks.

Section B will contain six questions. Candidates will be required to answer ANY FOUR of these six questions. This section will also be assessed out of 40 marks.

EXAMINATION WEIGHTING

Chapter 1	Study of Gas Laws.	-	6%
Chapter 2	Elements, Compounds and Mixtures	-	5%
Chapter 3	The Language of Chemistry	-	5%
Chapter 4	Physical and Chemical Changes	-	6%
Chapter 5	Water	-	7%
Chapter 6	Atomic Structure	-	7%
Chapter 7	The Periodic Table	-	6%
Chapter 8	Study of the First Element- Hydrogen	-	6%
Chapter 9	Study of Group 14 (Fourth Group) Element – Carbon	-	7%
Chapter 10	Study of Group 15 (Fifth Group) Element – Nitrogen	-	5%
Chapter 11	Study of Group 16 (Sixth Group) Elements - Oxygen, Sul	phur -	8%
Chapter 12	Study of Group 17 (Seventh Group) Element - Chlorine	-	5%
Chapter 13	Study of Carbon Monoxide and Carbon dioxide		7%
			80%

Textbooks and references

Textbooks

1. ICSE Chemistry Vol I for Class IX, K.L Chugh, Kalyani Publishers (2008)

References

- 1. ICSE Chemistry 9, Anita Prasad, General Printers & Publsihers (2002)
- 2. New Edition Chemistry, Classes IX X, Richard Harwood, Cambridge University Press (2003)
- Coordinated Science Chemistry, Classes IX X, Mary Jones, Geoff Jones, David Acaster, Cambridge University Press (1999)
- 4. Chemistry IGCSE, Classes IX XII, B. Earl, L.B.R, Wilford, Cambridge University Press
- 5. Oxford Dictionary of Chemistry, Oxford University Press (2004)
- 6. ICSE Concise Chemistry Practical, Part I, Dr S.P Singh, Salina Publishers
- 7. Science Laboratory Management: A Guide for schools Cl PP X, CAPSD (2004)

CHEMISTRY (CLASS X)

Course Content

1 Periodic Properties and variations of properties

- Periodic properties and their variations in groups and periods: definition, explanation and variation of – atomic size, metallic character, on-metallic character, ionization potential, electron affinity, electro negativity.
- (ii) Relation between atomic number for light elements(proton number) and periodicity, atomic mass : the modern periodic table up to period 3(students to be exposed to the complete modern periodic table but no questions will be asked on elements beyond period 3 –argon) ;periodicity and other related properties to be described in terns of shells (not orbit):special reference to the alkali metals and halogen groups.

2. Chemical Bonding.

- (i) Types of bonding: electrovalent and covalent and causes: characteristic properties of electrovalent and covalent compounds and difference between them; oxidation and reduction in terms of loss or gain of electrons by atoms of an element.
- (ii) Structure of NaC1, MgCl₂, CaO, hydrogen, chlorine, nitrogen, water, ammonia, carbon tetrachloride, methane.
- (iii) Coordinate bond: the formation of hydronium ion and ammonium ion must be explained with the help of dot diagrams
- (iv) The oxygen atom of lone pair effect of the water molecule and the nitrogen atom of the ammonia molecule to explain the formation of H_{30}^+ and OH^- ions in water and NH_4^+ ions.

3. Study of Acids, Bases and Salts.

- (i) Simple definitions in terms of molecules and their characteristic properties.
- (ii) Ions present in mineral acids, alkalis and salts and their solutions; use of litmus to test for acidity and alkalinity. Salts are formed by partial or complete replacement of the hydrogen ion of an acid by a metal should be explained with suitable examples.
- (iii) Definition of salt: types of salts with examples.
- (iv) General properties of salts: deliquescence, efflorescence, water of crystallization: definition and examples.
- (v) Neutralization and its application

4. Analytical Chemistry –Use of Ammonium Hydroxide and Sodium Hydroxide and Standard Tests.

- (i) On solutions of salts; colour of salt and its solution; formation and colour of hydroxide precipitated for solutions of salts of Mg, Fe, Cu, Zn and Pb; special action of ammonium hydroxide on solutions of copper salts.
- (ii) On certain metals and their oxides. (*Relevant laboratory work is essential*) The metals include zinc and aluminium their oxides and hydroxides.
- (iii) Action of alkalis on certain metals and their oxides; action of acids on oxides and salts.

5. Mole Concept and Stoichiometry.

- (i) Avogadro's Law; Gay Lussac's Law of Combining Volumes with simple numerical problems.
- (ii) Refer to the atomicity of hydrogen, oxygen, nitrogen and chlorine (proof not required).
- (iii) Relative atomic masses (atomic weights) and relative molecular masses (molecular weights): either H=1 or ${}^{12}C = 12$ will be accepted; molecular mass = 2 x Vapour density (*formal proof not required*); percentage composition and the ratio of number of atoms; deduction of simple (empirical) and molecular formulae; the molecular volume of a gas at s.t.p.; simple calculations based on chemical equations, both reacting weight and volumes.

6. Electrolysis.

- (i) Electrolytes and non-electrolytes.
- (ii) Ions; substances containing molecules only, ions only, both molecules and ions.
- (iii) An elementary study of the migration of ions, illustrated by the electrolysis of: molten lead bromide; acidified water with platinum electrodes and aqueous copper (II) sulphate with copper electrodes; electron transfer at the electrodes; factors influencing discharge of ions at the electrodes
- (iv) Mechanism and application of electrolysis: electroplating with nickel and silver; purification of copper; extraction of meals.
- (v) Differences between ionization and dissociation.
- (v) Acids, bases and salts as electrolytes: reference should be made to the activity series as indicating the tendency of metals, e.g. Na, Mg, Fe, Cu, to form ions.

7. Metallurgy.

(i) General properties with special reference to physical properties: state, luster, melting point, density, ductility, malleability, brittleness, conduction of electricity *(exceptions to be specifically noted - e.g. graphite,*

mercury); Chemical properties: a metal forms at least one basic oxide; non-metal, an acidic or neutral oxide; discharge of metallic ions at the cathode from fused metallic chlorides *(link with bonding and ion formation)*; many metals liberate hydrogen from dilute HC1 and H2SO4.

- (ii) Reduction of metallic oxides; some can be reduced by hydrogen, carbon and carbon monoxide. *(e.g. copper oxide, lead oxide, iron (II) oxide)* and some cannot *(e.g. A12O3, MgO-refer to activity series)*.
- (iii) Metals and their alloys: common ores of iron, aluminium and zinc and their extraction; a flow chart to be used; a description of the changes occurring, purpose of the substances used and the main reactions with their equations is sufficient.
- (iv) Uses of iron, aluminum and zinc and their alloys.

8. Study of Compounds.

PART –A: HYDROGEN CHLORIDE: Preparation of hydrogen chloride from sodium chloride; refer to the density and solubility of hydrogen chloride (fountain experiment); reaction with ammonia; acidic properties of its solution.

PART – B : AMMONIA.

- (i) Ammonia; its laboratory preparation from ammonium chloride and collection; ammonia from nitrides like Mg3, N2 and AIN and ammonium salts; manufacture by Haber's process, the burning of ammonia; in oxygen; preparation from ammonium nitrate; density and solubility of ammonia (fountain experiment); aqueous solution of ammonia; its reactions with hydrogen chloride and with hot copper (II) oxide and chlorine; uses of ammonia.
- (ii) The catalytic oxidation of ammonia, as the source of nitric acid; simple diagram for a catalytic oxidation of ammonia in the laboratory *(with conditions and reactions only)*.

PART -C: NITRIC ACID.

- Nitric acid, one laboratory method of preparation from potassium nitrate or sodium nitrate; its reaction as an acid (e.g. on carbonates and basic oxides and alkalis, and as an oxidizing agent with copper, carbon, iron, sulphur).
- (ii) Nitrates: formation from nitric acid; the action of heat on the nitrates of potassium, sodium, lead, copper and ammonium.

PART – D: SULPHUR DIOXIDE, HYDROGEN SULPHIDE AND SULPHURIC ACID.

- (i) Formation of sulphur dioxide by burning sulphur and by the action of dilute acid on sodium sulphite and other sulphities; one laboratory method of preparing and collecting sulphur dioxide; density and extreme solubility; case of liquefaction and poisonous nature of sulphur dioxide; comparison of bleaching action of chlorine and sulphur dioxide; reactions of sulphur dioxide on water, sodium hydroxide solution and chlorine; uses, including: manufacturing of sulphuric acid by first converting SO₂ to SO₃; bleaching and food preserving.
- (ii) Hydrogen sulphide (refer only to the formula of the gas hydrogen sulphide); its peculiar smell and its tendency to from sulphides and be converted to sulphur *(study of its preparation not required)*.
- (iii) Sulphuric acid; its behaviour as an acid when dilute, the oxidation of carbon and sulphur and the dehydration of sugar and copper (II) sulphate crystals, when concentrated; its non-volatile nature. Manufacture by Contact process(reference only).Detail of the process to be avoided.Chemistry of the process to be studied in terms of reactant, product,condition and equation.
9. Organic Chemistry.

- (i) Introduction to Organic compounds, structure and Isomerism, Homologous series, simple nomenclature.
- (ii) Hydrocarbons: Alkanes; general formula, oxidation of methane and ethane to the corresponding alcohol, aldehyde and acid; reaction of methane and ethane with chlorine through substitution; ethene as an example of alkene (unsaturated hydrocarbon with a double bond) acetylene as an example of alkyle (unsaturated hydrocarbon with a triple bond): only main properties particularly addition products with hydrogen, halogen namely C1, Br and I; structural formula of hydrocarbons referred to methanol and ethanol (structural formulae, preparation, properties, uses, spurious alcohol).

MODES OF ASSESSMENT

This course will be assessed internally by the school and externally by the Bhutan Board of Examinations. The modes of assessment will include continuous assessment and written examination as per the format given below.

Continuous Assessment - 20% weighting

Internal assessment will follow the continuous assessment mode as given for class IX.

Practical work

The students will be required to observe the effect of reagents and/or of heat on substances supplied to them. The exercises will be simple and may include the recognition and identification of certain gases and ions listed below. However, the choice should not be restricted to substances containing the listed ions.

Gases: hydrogen, oxygen, carbon dioxide, chlorine, chlorine, hydrogen chloride, sulphur dioxide, hydrogen sulphide, ammonia, water vapour, nitrogen dioxide.

Ions: calcium, copper, iron, lea, zinc and ammonium, carbonate, chloride, nitrate, sulphide, sulphite and sulphate.

Knowledge of formal scheme analysis is not required. Semi-micro techniques are acceptable but students using such techniques may need to adapt the instructions given to suit the size of the apparatus being used.

The students are also expected to have completed the following minimum practical works:

- i Make solution of the unknown substance; add sodium hydroxide solution or ammonium hydroxide solution, make observations and deduction. Warming the mixture may be needed. Choose from substances containing Ca²⁺, Cu²⁺, Fe²⁺, Fe³⁺, Pb²⁺, Zn²⁺, NH⁴⁺.
- ii Supply a solution of a dilute acid and alkali. Determine which is acidic and which is basic, giving two tests for each.
- iii Add concentrated hydrochloric acid to each of the given substances, warm, make observations, identify any product and make deductions.
 - a) copper oxide, b) manganese dioxide

Note: Teachers are advised to strictly incorporate the practical experiments in their daily lessons rather than conducting them separately. Further, teachers are advised to go beyond the list given above to make Chemistry leaning more practical oriented.

The students will be required to carry out a minimum of FIFTEEN EXPERIMENTS. Each experiment will be marked out of 10 marks according to the marking scheme given in the recording format. At the end of the year, the marks obtained for EACH of the experiments could be totalled together and then reduced to 10% weighting. For example, it could be calculated thus:

Class work and Homework

The students are required to do homework and class work throughout the year as in class IX and recorded accordingly.

The Heads of the schools will send the mark obtained by each student out of 20 to the Bhutan Board of Examinations on Mark Sheets provided by the Board not later than November 15 of the year of the examination. The mark awarded by the school for continuous assessment will be added to the mark awarded by the Bhutan Board of Examinations for the written paper.

<u>NOTE</u>: For recording format please refer Sc.(12)-BBE/98/0001/0870, dated 20.08.98 and Marking criteria for the experiments

Written examination – 80% weighting

The external examination will be conducted by the BBE at the end of the academic year. It will be for $1 \frac{1}{2}$ hours consisting of two sections and out of 80 marks.

Section A (compulsory) will contain questions requiring short answers and will cover the entire syllabus. Candidates will be required to attempt ALL the questions. This section is assessed out of 40 marks.

Section B will contain six questions. Candidates will be required to answer ANY FOUR of these six questions. This section will be assessed out of 40 marks.

EXAMINATION WEIGHTING

Chapter 1	Periodic properties and variations of properties	-	10%
Chapter 2	Chemical Bonding	-	4%
Chapter 3	Study of Acids, Bases and Salts	-	6%
Chapter 4	Analytical Chemistry use of Ammonium Hydroxide and		
-	Sodium Hydroxide and standard test	-	6%
Chapter 5	Mole Concept and Stoichiometry	-	16%
Chapter 6	Electrolysis	-	8%
Chapter 7	Metallurgy	-	8%
Chapter 8	Study of Compounds (Hydrogen Chloride, Ammonia,		
Nitric Acid, S	Sulphuric Acid, Hydrogen Sulphide)	-	15%
Chapter 9	Organic Chemistry		7%
1	0		80%

Textbooks and references

Textbooks

1. ICSE Chemistry Vol II for Class X, K.L Chugh, Kalyani Publishers (2008)

References

- 1. ICSE Chemistry 10, Anita Prasad, General Printers & Publsihers (1995)
- 2. New Edition Chemistry, Classes IX X, Richard Harwood, Cambridge University Press (2003)
- 3. Coordinated Science Chemistry, Classes IX X, Mary Jones, Geoff Jones, David Acaster, Cambridge University Press (1999)
- 4. Chemistry IGCSE, Classes IX XII, B. Earl, L.B.R, Wilford, Cambridge University Press
- 5. Oxford Dictionary of Chemistry, Oxford University Press (2004)
- 6. ICSE Concise Chemistry Practical, Part II, Dr S.P Singh, Salina Publishers
- 7. Science Laboratory Management: A Guide for schools Cl PP X, CAPSD (2004)

PART 3: BIOLOGY (CLASS IX)

Course Content

Unit 1: Basic Biology

- 1. Introducing Biology: Growth of Biology, Branches of Biology, How study of Biology helps us.
- 2. Cell: The unit of life, protoplasm, basic differences between an animal and a plant cell.

Unit 2: Flowering plants

- 3. Outline of the external morphology of a simple herbaceous plant e.g. petunia and hibiscus through practical work. Life history of flowering plants, herbs, shrubs and trees.
- 4. Vegetative Propagation and Micro-propagation: a simple idea of vegetative reproduction illustrated by examples; (tubers, rhizomes, bulb, runners, suckers, adventitious buds, etc), artificial vegetative propagation, advantages and disadvantages of vegetative propagation, economic importance of propagation and hybridsation, brief idea of biotechnology and its role in medicine and industry.
- 5. The Flower: Structure of a bisexual flower, functions of the various parts.
- 6. Pollination and Fertilization: self and cross-pollination, Fertilization: to be treated without reference to *microscopic detail.*

Unit 3: Plant Physiology

- 7. Germination of seeds: types, and conditions for seed germinations.
- 8. Respiration in plants: The nature of the process and its significance in other vital activities; experiment on gaseous exchanges and on heat production.

Unit 4: Flowerless plants

9. Bacteria and fungi: a brief study of bacteria and fungus mould; life history of a mould, economic importance – role in medicine, agriculture and industry, a simple study of decay and disease, methods of preservation to include boiling, salting, dehydration, irradiation, pasteurization, etc.

Unit 5: Animal study

- 10. Digestive system: Organs and digestive glands and their functions (including enzymes and their functions in digestion; absorption, transportation and utilization of digested food); test for reducing sugar, starch, protein and fats.
- 11. Skin: Structure and functions of the skin.
- 12. The Circulatory system: The main features of the circulatory system, the structures of the heart, blood vessels, structure and functions of blood and circulation of blood; charts, models and specimens to explain the structure and functions of the circulatory organs; names will be required only of the main blood vessels of the liver and kidney and those entering and leaving the heart; examination of a blood smear under a microscope.
- 13. The Respiratory System: the respiratory organs and the mechanism of breathing and tissue respiration, charts, models to demonstrate the working of the lungs.

14. Excretion: elementary treatment of the structure and functions of the kidneys, kidneys treated as comprising of cortex and medulla and consisting of a branched system of tubules well supplied with blood vessels leading to the ureter; details of the course of the tubules and their blood vessels will not be required.

Unit 6: Health and Hygiene

- 15. Cause of diseases: bacteria- types of bacteria, bacteria control, three examples of diseases caused by bacteria; Virus nature of viruses, three examples of viral diseases, Introduction to HIV, its outline structure and spread; parasites-two examples and their control.
- 16. Hygiene: simple personal hygiene and social conditions affecting this; disease carriers e.g. flies, rats and cockroaches, contamination of water and water borne diseases.

MODES OF ASSESSMENT

There will be no external examinations for Class IX. This course will be assessed internally by the school. The mode of assessment will include continuous assessment and written examinations as explained below.

Continuous assessment-20% weighting

The continuous assessment will include practical work, home work and class work. The distribution of weighting among the three is as follows.

Practical work - 10%

Homework & Class work - 10%

Practical work

The practical work will be designed to test the ability of the candidates to make accurate observation from specimens of plants and animals. For this, students should be familiar with the use of hand lens of NOT LESS THAN x6 magnification. They should be trained to make both simple and accurate drawing and brief notes as means of recording their observations.

The students are required to carry out the practical works outlined below:

Plant life

- 1. Specimens of simple flowering plants of morphological study; the parts of the flower to be drawn in detail and labelled. Suggested specimens: petunia, hollyhock, hibiscus. sunflower, pea or the bean.
- 2. Specimens of different types of underground stems for examination, identification, drawing and labelling: e.g., potato, onion, ginger.
- 3. A cross-pollinated flower to be examined and identified and the parts to be drawn and labelled: e.g. hibiscus, petunia; the bean and the pea flower.
- 4 Specimens of germinating seed (e.g. the bean, maize, and castor) for examination, identification, drawing and labelling the parts.
- 5. Identification of sugar, starch, protein and fat.
- 6. The identification of different types of blood cells under the microscope.
- 7. Observation of onion and cheek cell
- 8. Identification of the structure of the following organs using models and charts, Kidneys, lungs, heart, and blood vessels.
- 9. Experiments to show the mechanism of breathing.

10. Experiments on pollution of air and water

Note: Teachers are advised to strictly incorporate the practical experiments in their daily lessons rather than conducting them separately. Further, teachers are advised to go beyond the list given above to make Biology leaning more practical oriented.

Criteria	Preparation	Procedure	Observation	Inference	Presentation
Grade I 10 marks	Follow instructions (written, oral, diagrammatic) with understanding; modifies if required. Familiarity with and safe use of apparatus, materials, techniques.	Analyses problem systematically. Recognizes a number of variables and attempts to control them to build a logical plan of investigation.	Records data/ observations without being given a format. Comments upon, recognize use of instruments, degree of accuracy. Recording is systematic.	Processes data without format. Recognizes and comments upon sources of error. Can deal with unexpected results, suggesting modifications.	Presentation is accurate and good. Appropriate techniques are well used.
Grade II 8 marks	Follow instructions to perform experiments with step-by- step operations. Awareness of safety. Familiarity with apparatus and materials.	Specific sequence of operation; gives reasons for any change in procedure. Can deal with two variables, controlling one.	Makes relevant observations. No assistance is needed for recording format that is appropriate.	Processes data appropriately as per a given format. Draws qualitative conclusions consistent with required results.	Presentation is adequate Appropriate techniques are used
Grade III 6 marks	Follows instructions to perform experiment with step by step operations Awareness familiarity. With apparatus and materials.	Develop simple experimental strategy. Trial and error modifications made to proceed with the experiment.	Detailed instructions needed to record observations. Format required to record results.	Process data appropriately with a detailed format provided. Draws obvious qualitative conclusions as required.	Presentation is okay, but disorganized in some places. Over writing, rough work is untidy.
Grade IV 4 marks	Follows some instructions to perform a single practical operation. Casual about safety. Manages to use apparatus and materials.	Struggles through the experiment follows very obvious experimental strategy	Format required to record observations/ reading, but tends to make mistakes in recording.	Even when detailed format is provided, struggles or makes errors while processing data. Reaches conclusions with help	Presentation is poor, disorganized but follows up an acceptable sequence. Rough work is missing or untidy.
Grade V 1 mark	Not able to follow instructions or proceed with practical work without full assistance. Unaware of safety	Cannot proceed with the experiment without help from time to time	Even when format is given, recording is faulty or irrelevant	Cannot process results, nor can draw conclusions even with considerable help	Presentation unacceptable; disorganized, untidy, poor. Rough work missing.

Marking criteria for the experiments

The students will be required to carry out a minimum of **FIFTEEN** experiments. Each experiment will be marked out of 10 marks according to the marking scheme given in the recording format. At the end of the year, the marks obtained for EACH of the experiments could be totalled together and then reduced to 10%. For example, it could be calculated thus.

$$\frac{\textit{Mark obtained}}{150}X\,10$$

Class work and Homework

The students are required to do home work and class work throughout the year. Students' understanding of the lesson can be assessed through home work and class work. At the end of the year, the marks obtained for EACH assignment could be totalled and then reduced to 10% weighting. For Example, the final mark for homework and class work put together could be calculated thus:

Mark obtained Maximum Marks X10

The final mark for internal assessment will then be added to the mark obtained in the written examinations.

NOTE: For recording format please refer Sc.(12)-BBE/98/0001/0870, dated 20.08.98 and Marking criteria for the experiments

Written Examinations - 80% weighting

The written examinations will be for 1 1/2 hrs consisting of two section and out of 80 marks.

Section A (compulsory) will contain questions requiring short answers and will cover the entire syllabus. Candidates will be required to attempt **ALL** the questions in this section. This section will be assessed out of 40 marks.

Section B will contain **six** questions; Candidates will be required to answer **ANY FOUR** of the six questions. This section will also be assessed out of 40 marks.

EXAMINATION WEIGHTING

Unit 1: Basic Biology:

1	Introducing Biology	3%
1.	The Cell: The unit of life, protoplasm	5%

Unit 2: Flowering plants

2.	Outline of the external morphology of a simple herbaceous plant	4%
3.	Vegetative Propagation and Micro-propagation	6%
4.	The Flower	5%
5.	Pollination and Fertilization	5%

Unit 3: Plant Physiology

6.	Germination of seeds	4%			
7.	Respiration in plants	4%			
Unit 4	Unit 4: Flowerless plants				

8. Bacteria and fungi 6%

Unit 5: Animal study

10.	Digestive system	4%
11.	Skin	4%
12.	The Circulatory system	9%
13.	The Respiratory System	7%
14.	Excretion	6%

Unit 6: Health and Hygiene

15.	Cause of diseases	4%
16.	Hygiene	4%
		80%

NB: The serial numbers of topics in the syllabus do not match with the chapter number in the textbook since some topics have been left out owing to vastness and repetition of topics elsewhere.

Textbooks and references

Textbooks

1. ICSE Concise Biology, Part I for Class IX, H.S. Vishnoi & Rekha Kumar, Selina Publishers (2003)

Reference

- 1. A Textbook of ICSE Biology, Class IX, Anita Prasad, General Printers & Publishers (2000)
- 2. Coordinate Science Biology, Classes IX X, Mary Jone, Geoff Jones, Cambridge University Press (1998)
- 3. Oxford Dictionary of Biology, Fourth Edition, Oxford University Press (2000)
- 4. Concise Practical Biology for Class IX, Vishnoi & Susiban Mukherjee, Selina Publishers (2003)
- 5. Science Laboratory Management: A Guide for schools Cl PP X, CAPSD (2004)

BIOLOGY (CLASS X)

Course Content

Unit 1: Basic Biology

- 1. Cell: The structural and functional unit of life, the examination of an onion peel and the ability to check a cell under the microscope to study various parts of the cell; references should be made to all the activity of living things/life.
- 2. Cell division: types; main features of the main stages of mitosis, mitosis versus meiosis, structure of chromosomes.
- 3. Fundamentals of genetics: a simple study of chromosomes and the role they play in inheritance, Mendel's law of inheritance and sex-linked inheritance of diseases.

Unit 2: Plant Physiology

- 4. Absorption by roots: diffusion and osmosis, osmotic pressure, turgidity and flaccidity, plasmolysis and deplasmoloysis; the absorption of water and minerals; the importance of root hairs; the whole of plant physiology should be treated experimentally with sufficient theory to explain the phenomena and their importance to the plant. The rise of water up through the xylem; a general of the causative forces; demonstrated by the use of dyes (questions will not be set on causative forces.)
- 5. Transpiration: process and significance; experimental work included the loss in weight of a potted plant or a leafy shoot in a test tube, the use of cobalt chloride paper, and the effect of external conditions on the rate of water loss; use of potometer and its limitations should be stressed, mechanism of stomatal transpiration, adaptations in plants to reduce transpiration, importance of transpiration, guttation and bleeding.
- 6. Photosynthesis: the nature of the process itself and the great importance of photosynthesis to life in general; experiments to show the necessity of light, carbon dioxide and chlorophylls and also the formation of starch and the output of oxygen; carbon cycle.

Unit 3: Animal Study (with reference to humans only)

- 7. Nervous system:
 - A. Simplified account of the brain (only the external structure of the brain is needed but reference should be made to the distribution of white and grey matter); and spinal cord; reflex action and how it differs from voluntary action.
 - B. Principal sense organs, their position and functions; the structure of the eye and ear simply treated; the use of spectacles for the correction of short and long sight; the ear should be treated as consisting of cochlea sensitive to vibrations (hearing) and semicircular canals sensitive to position; models; charts and specimens should be used.
- 8. Endocrine glands: the general duty of adrenal, pancreas, thyroid and pituitary gland.
- 11. Reproductive system:
 - A. Reproductive organs,
 - B. Fertilization and a general outline of nutrition and respiration of the embryo.
- 10. Population: Rising population; the problems posed by the increasing population in India, population control.

Unit 4 : Health, Disease and Hygiene

- 1. Aids to health: Need to keep healthy; immunity and kinds; an understanding of the use and action of the following vaccination; immunization; antitoxin, serum, antiseptics; disinfectant; penicillin; sulphonamide family of drugs; First Aid.
- 2. Health organizations: Categories of Health Organizations local and international bodies and reasons for formation; common health problems in India .

MODES OF ASSESSMENT

This course will be assessed internally by the school and externally by the Bhutan Board of Examination.

Continuous Assessment - 20% weigthing

Internal assessment will follow the continuous assessment mode as given for class IX

Practical Work

The practical work will be designed to test the ability of the students to make accurate observations from specimens of plant and animals. For this, students should be familiar with the use of a hand lens of not less than x6 magnification. Students should be trained to make accurate drawings and brief notes as a means of recording their observations.

The students are required to carry out the practical works outlined below:

Plant life

- 1. Experiments including osmosis, diffusion and absorption.
- 2. Physiological experiments on transpiration to be set up by the teacher and the pupils to identify the products, draw and label the apparatus.
- 3. Experiments to show the necessity of light, carbon dioxide and chlorophyll for the formation of starch. Students to write down their observations and draw and label the apparatus.

Animal life

- 1. Experiments to show the mechanism of breathing.
- 2. Identification of the structure of the following organs through models and charts. Brain, ear and eye (Students will be required to identify each structure in the models of these organs)
- 3. Simple experiments on pollution of air and water.

Note: Teachers are advised to strictly incorporate the practical experiments in their daily lessons

The students will be required to carry out a minimum of **FIFTEEN** experiments. Each experiment will be marked out of 10 marks according to the marking scheme given in the recording format. At the end of the year the marks obtained for EACH of the experiments could be totaled together and then reduced to 10% weighting. For example, the final mark could be calculated thus:

Mark obtained x 10 150

Class work and home work

The students are required to do class work and home work throughout the year as in class IX and recorded accordingly. The Heads of the school will send the mark obtained by each student out of 20 to the Bhutan Board of Examinations on marks sheet provided by the Board not later than November 15 of the year of the examination. The mark awarded by the school for continuous assessment will be added to the mark awarded by the Bhutan Board of Examinations for the written paper.

Note: For recording format please refer Sc.(12)-BBE/98/0001/0870, dated 20.08.98 and Marking criteria for the experiments

Written Examinations- 80% weighting

There will be an eternal examination conducted by the BBE at the end of the academic year. It will be for $1 \frac{1}{2}$ hours consisting of two sections and out of 80 marks.

Section A (compulsory) will contain questions requiring short answers and will cover the entire syllabus. Candidates will be required to attempt **ALL** the questions in this section. This section will be assessed out of 40 marks.

Section B will contain six questions. Candidates will be required to answer **ANY FOUR** of these six questions. This section will be also assessed out of 40 marks.

EXAMINATION WEIGHTING

Unit 1: Basic Biology

1.	The Cell: The structural and functional unit of life	5%
1.	Cell division: types	5%
2.	Fundamentals of genetics	5%
Unit 2	2: Plant Physiology	

3.Absorption by roots8%4.Transpiration6%5.Photosynthesis6%

Unit 3: Animal Study (with reference to humans only)

6.	Net	vous system:	12%
	А.	Simplified account of the brain	
	В.	Principal sense organs	
8.	Enc	locrine glands	6%
9.	Rep	productive system:	9%
	А.	Reproductive organs,	
	В.	Fertilization	
10.	Pop	pulation	8%

Unit 4: Health, Disease and Hygiene

11.	Aids to health	7%
12.	Health organizations	<u>3%</u>
		80%

Textbooks and References

Textbooks

a. ICSE Concise Biology, Part II for Class X, H.S. Vishnoi & Rekha Kumar, Selina Publishers (2003)

Reference

- 1. A Textbook of ICSE Biology, Class X, Anita Prasad, General Printers & Publishers (2000)
- 2. Coordinate Science Biology, Classes IX X, Mary Jone, Geoff Jones, Cambridge University Press (1998)
- 3. Oxford Dictionary of Biology, Fourth Edition, Oxford University Press (2000)
- 4. Concise Practical Biology for Class X, Vishnoi & Susiban Mukherjee, Selina Publishers (2003)
- 5. Science Laboratory Management: A Guide for schools Cl PP X, CAPSD (2004)

ENVIRONMENTAL SCIENCE (Optional subject)

ENVIRONMENTAL SCIENCE

Rationale

Environmental Science is the study of environmental systems, the threads of life that every life form is linked with. It offers an integrated, quantitative, interdisciplinary and students-centered approach. The multidisciplinary nature of the study integrating physical, chemical, biological and social sciences, peppered with cultural and spiritual belief of human societies brings the holistic perspective, making it unique and interesting among the widely taught school courses. It connects the concepts and principles of various sciences to the real life situations promoting practice. This quality of direct applicability attracts students to environmental science course as it touches students' lives enhancing its value to students and the society as well. This also makes environmental science easy to engage students in the demanding process of learning compared to other traditional disciplines.

The study of Environmental Science provides an insight into various inter-relationships, helps analyze the actions of human societies and guides policies and practices to improve the quality of environment on the planet for the wellbeing of all life forms including humans.

The study exposes students to fundamentals of physical, chemical, geological, biological, and social processes that interact to shape the environments of the planet that we inhabit. Stemming from this is the holistic understanding of the environmental systems which students gain, promoting them to draw and relate their learning from other disciplines. This helps students to connect various processes in the system together, which is extremely important in treating challenges as a whole and not in isolation.

The study of environmental science relies heavily on applied-learning, hence it will equip students with skills and competencies that are necessary to explore, analyze and build knowledge based on various aspects of environment. It engages students in hands on experiences, exposes them to complex challenges, encourages critical thinking, and assists them to develop problem solving skills. Since field studies require students to work together, it promotes team skills on one hand and leadership qualities on the other. With this array of skills, environmental science prepares students for a wide variety of career opportunities. The training that students undergo helps them in their general education as well.

Ultimately, the study of environmental science aims to empower students to make right choices for sustainable future with global perspectives, and transform them to become responsible and productive citizens of the 21st century world.

Aims

The goal is to build a cadre of young people equipped with knowledge, skills and values to engage them in the conservation of natural heritage, promoting sustainable and equitable use of natural resources, preventing all forms of environmental degradation in the pursuit of GNH.

Objectives

- 1. To develop knowledge and skills for conserving the natural heritage including rich biodiversity.
- 2. To equip them with tools for addressing sustainable production and utilization, and equitable distribution of natural resources.
- 3. To instill positive attitudes and values towards the environment so that they demonstrate environment friendly behavior in the sustainable management of the environment.

- 4. To motivate them to take actions towards environmental conservation and uphold the principles of GNH.
- 5. To empower them to make right choices for sustainable future with global perspectives and transform them to be responsible and productive citizens in the 21st century world.
- 6. To contribute towards the general education of learners.

Learning Experiences

The development of environmental science curriculum is guided by six principles as illustrated in Figure 1. These six criteria collectively are essential to students to develop relevant environmental knowledge, skills, values, and attitudes.

- i. **Environment in totality:** The environment integrates almost all disciplines- physical, biological, social, cultural and spiritual. The holistic understanding of the environmental systems is important for students to draw and link their learning from other disciplines, and for them to connect various processes in the system together and not in isolation. The understanding of interrelationships helps students to identify environmental concerns and enables them to assess alternative solutions for resolving the challenges.
- ii. **Inter-disciplinary:** The environmental science, by its nature, contains the concepts and principles from different disciplines such as biology, geography, physical sciences, social sciences, mathematics, history, and economics and so on. The study of environmental science, therefore, needs to provide students with the opportunity to extend their understanding of the disciplines better. Environmental science curriculum, therefore, must draw the essential concepts and principles from these disciplines.
- iii. Life long process: Environment is a part of everyday life as people live in it and live by it. There needs to be continuous interaction and interdependence of all living things with each other and the habitat. Environmental science perceives the learning about the environment as a continuous life long process, beginning at the pre-school and continuing through formal and non-formal stages, for people to take conscious decisions towards the use, preservation and conservation of the environment.
- iv. Environmental issues-based: The diverse learning context and approaches are crucial for the meaningful learning. Students should explore the natural environment by engaging themselves in hands-on activities, including the laboratory activities, to gain deeper understanding of the issues and concerns. Students should be able to examine major environmental issues from local, national, regional and global spheres with focus on the current emerging environmental situations. The content need to be effectively conveyed when embedded in a local context, giving students a chance to explore and experience what is around them. Effective environmental education should empower students with skills to address environmental issues, with a sense of personal and civic responsibility.
- v. Pursuit of GNH: The GNH, which is the country's developmental philosophy accords importance to the environment. Therefore, environmental sciences while deliberating on the elements of the environment need to incorporate the principles of GNH in the delivery process of the content.
- vi. Community involvement: It is evident that the local communities are the custodians of the environment; and they possess wider knowledge about the local environment passed on through many generations. Communities also play a major role in local environmental conservation. The study, therefore needs to engage students with the local communities to gain better understanding of the local environment. This understanding should serve as platform to apply to wider context.

Topic weighting and time required for Class IX

Chapters	Chapter title	Maximum time required (mins)	Weighting (%)
Chapter 1	Introduction to Environment Science	90	2%
	• define environment.		
	• identify the elements of environment.		
	• explain the scope and importance of environmental science.		
Chapter 2	Ecosystem: Structure and Functions	540	11%
	• recognize the subsystems of the Earth.		
	• describe different layers of atmosphere.		
	• appreciate the interactions amongst the subsystems of the Earth.		
	• describe the biogeographical regions and the biomes of the world.		
	• illustrate the biomes on the world map.		
	• <i>identify the biogeographical zone(s) that Bhutan belongs to.</i>		
	• name the predominant biomes of Bhutan and their salient features.		
	• distinguish between biome and ecosystem.		
	• differentiate between environment and ecology.		
	• explain the levels of organisation in ecosystems.		
	• describe 'niche' in the context of functional role (behaviour) of organisms.		
	• identify the types of ecosystems at global level and in Bhutan.		
	• appreciate the roles of components and interactions in an ecosystem.		
Chapter 3	Balance of Nature	450	9%
	• explain various interactions among living organisms, and between		
	living and non living components.		
	• recognise the interdependence of biotic and abiotic components, arising out of such interactions.		
	• appreciate various forms of interdependence.		
	• explain the phenomenon of greenhouse effect.		
	• list the natural greenhouse gases and their sources.		
	• illustrate the role of greenhouse effect on the temperature of the Earth.		
	• explain homeostasis.		
	• identify the external and internal factors responsible for the changes in ecosystem.		
	• appreciate the dynamic nature and resilience of the Earth's ecosystem.		

Chapton 1	People and Environment	585	12%
Chapter 4	list natural resources	505	12/0
	 elastify natural resources based on availability and utility 		
	• classify half a resources, based on abalabality and millity.		
	• appreciate the natural resources of Bhulan.		
	• explain the socio economic provisions of natural resources.		
	• list the natural resource based livelihoods.		
	• appreciate the cultural and spiritual significance of natural resources.		
	• relate the changes in human societies and the use of natural resources		
	• explain the impact of human activities on the natural resources.		
	• describe the pattern of migration and its impact on the livelihoods and environment of Bhutan.		
Chapter 5	Natural Resources Degradation	450	9%
	• identify the major causes of disturbance to the natural resources.		
	• differentiate between natural and anthropogenic causes.		
	• explain the pressure on the natural resources.		
	• identify the impacts of pressure on natural resources.		
	• identify human activities that lead to natural resource degradation.		
	 discuss the implications of natural resource deoradation on human 		
	and environmental well-being.		
Chapter 6	Pollution	450	9%
	• define pollution.		
	• explain pollutants and their forms.		
	 Jist different forms of pollution 		
	• <i>identify the causes and effects of air pollution.</i>		
	 differentiate indoor and outdoor air pollution 		
	 describe the effects of acid rain 		
	• explain measures to control air pollution		
	 identify the causes and effects of water pollution 		
	 describe entrophication and biomagnifications 		
	 active emoppication and biomagnifications. active massures to control mater tollution 		
	 adopt measures to control water pollution in your daily life 		
	 adopt measures to control water pollution in your daily life. discuss the causes and effects of land pollution. 		
	• relate land pollution to biomagnification.		
	• debate measures to control land pollution.		

Chapter 7	Disaster and Environment	450	9%
charge of the second se	• explain major causes and the impacts of disasters.		
	• identify natural and human induced disasters.		
	• describe disasters that are common in Bhutan.		
	• identify the causes and effects of disasters in Bhutan.		
	• explain the terms hazard, vulnerability, risk and response capacity.		
	• generate the relationship among disaster, hazard, vulnerability and		
	risk.		
	• alert the community about disasters.		
	• assess the preparedness for the hazards.		
Chapter 8	Biodiversity	450	9%
	Biodiversity		
	• define the term biodiversity.		
	• explain the levels of biodiversity.		
	• trace the role of evolution in the creation of diverse life forms.		
	• appreciate various adaptations and vital relations		
	• appreciate the richness of species on the Earth.		
	• illustrate the distribution of species diversity.		
	• explain the biodiversity hotspots.		
	• measure the species richness in a given area.		
	 explain the economic, social, cultural and ecological importance of biodiversity. 		
	• appreciate biodiversity as the lifeline and the basis of existence of life		
	• explain the economic, social, cultural and ecological relevance of		
	biodiversity to Bhutan.		
	• list major plants and animals of Bhutan.		
	• appreciate the rich biodiversity of Bhutan.		
Chapter 9	Watersheds Management	540	11%
	• describe watersheds with examples.		
	• explain the types of watersheds.		
	• list the key features of matersheds.		
	• explain the importance of watersheds.		
	• discuss the impact of human activities on the watershed.		
	• explain the principles of watershed management.		
	• list the steps involved in watershed management.		
	• develop a simple action plan to protect a small stream, or a small		
	pond in your locality.		
	• illustrate the major watersheds of Bhutan.		
	• relate the importance of watershed to Bhutanese lifestyle.		
	• explain the relevance of watershed management in Bhutan.		

Chapter	Energy Resources	450	9%
10	• <i>identify different forms of energy.</i>		
	• list various sources of energy.		
	• differentiate between renewable and non-renewable energy.		
	• outline the advantages and disadvantages of renewable and non- renewable		
	• outline the history of energy use in the development of human societies.		
	• compare the consumption pattern of various energy sources.		
	• compare the energy consumption and supply over a time line.		
	• explain energy as a development indicator.		
	 examine the advantages and disadvantages of various energy sources. 		
	• explain energy efficiency and energy conservation with examples.		
	• list energy sources and major energy consuming sectors in Bhutan.		
	• explain the consumption and supply of energy in Bhutan.		
Chapter	Environment and Development	405	8%
11	• explain various perspectives of development.		
	 explain the parameters and indicators in the measurement of development. 		
	• describe MDGs, targets and achievements of Bhutan.		
	• explain sustainable development.		
	• describe the dimensions of sustainable development.		
	• relate the importance of environment for sustainable development.		
	• identify sustainable development practices.		
	• describe the developmental perspectives of Bhutan.		
	• identify four pillars and nine domains of GNH.		
	 appreciate the GNH as Bhutan's contribution to the global community. 		
	• relate GNH to the global perspectives of sustainable development.		
Total	1	4860	100.00%

Maximum Weighting time Chapters Chapter title (%) required (mins) Ecosystem: Structure & Functions Explain carbon, nitrogen, calcium and phosphorus cycles. • Describe how humans affect biogeochemical cycles. • Identify the roles of biogeochemical cycles in maintaining the nutrient flow. Explain the various kinds of interactions that exist in an ecosystem . with examples. Chapter 1 585 12% Distinguish between interspecific and intraspecific competitions. Appreciate the roles of interactions amongst different organisms in sustaining a healthy ecosystem. Explain biodiversity including endemism. Distinguish levels of biodiversity with examples. . List the endemic species of Bhutan. . Evaluate the species richness in your local area. . Balance of Nature Explain carrying capacity. . Relate population, production and consumption to carrying capacity. • Calculate the carrying capacity of an ecosystem. 9% Chapter 2 450 Explain ecosystem stability. • Describe the factors influencing the equilibrium of an ecosystem. • Relate species diversity with ecosystem stability. • People and Environment Explain the term lifestyle. List factors influencing the lifestyle of people. . Discuss the relationship between lifestyle and the resource consumption. . Explain the concept of ecological footprint. Chapter 3 12% 585 Identify the factors influencing ecological footprint. • Calculate one's own resource consumption using the ecological footprint. . • Explain the term overharvesting. Describe the consequences of overharvesting. Discuss measures to prevent overharvesting. • Natural Resources Degradation Identify various forms of pressures on natural resources. . Explain carrying capacity of an ecosystem. • Chapter 4 Relate pressures, impacts and carrying capacity to natural resources 450 9% and environmental degradation. • Justify that the carrying capacity of earth is limited. Describe carrying capacity overshoot

Topic, weighting and time requirement for Class X

Chapters	Chapter title	Maximum time required (mins)	Weighting (%)
Chapter 5	 Disaster and Environment Relate environmental degradation to disasters. Discuss various impacts of environmental disasters on human wellbeing. Explain some of the strategies in reducing the impacts of disaster. Describe the importance of disaster management cycle. Practice all of the phases of disaster risk reduction in school or at home. 	450	9%
Chapter 6	 Pollution & Climate Change Relate enhanced greenhouse effect to global warming. Explain the relationship between the global warming and the climate change. Explain the effects of GHG on ozone layer with chemical equations. Explain the concept of climate change. Identify the factors which contribute to climate change. Explain the effects of climate change – global and country level. Define phenology. Identify factors effecting phenology of plants and animals. Explain the importance of phenology. Justify the roles of phenology as a sensitive biological indicator of climate change. Earplain the significance of global and national initiatives on climate change. Familiarize with the prevailing rules and policies on climate change of Bhutan. Suggest ways to minimize the causes of climate change. 	450	9%
Chapter 7	 Biodiversity Conservation Explain the need to conserve biodiversity. Explain various biodiversity conservation initiatives of Bhutan. Interpret the roles of traditional & indigenous practices in biodiversity conservation. Discuss the roles of communities in forest management and conservation. Describe ecotourism. Explain the benefits of ecotourism. Assess the impacts of ecotourism on biodiversity. 	450	9%

Chapters	Chapter title	Maximum time required (mins)	Weighting (%)		
	Land use & Management • Describe various land use in Bhutan.		11%		
	• Identify impacts of different land use.				
	• Identify impacts of change in land use on environment.				
	• Describe farming.				
Chapter 8	• Differentiate between traditional and modern farming.	540			
	• Explain the advantages and disadvantages of traditional and modern farming systems.	510			
	• Explain the types of waste.				
	• Assess the solid waste management in their locality.				
	• Draw a solid waste management plant to be implemented in the school.				
	 Energy Resources Explain the advantages of hydropower development in Bhutan. 		9%		
	• Investigate the impacts of hydropower on the environment.				
	• Explain wind energy as a source of green energy.	450			
Chapter 9	• Evaluate the wind potential of Bhutan.				
-	• State applications of solar energy.				
	• Evaluate the solar energy resource potential of Bhutan.				
	• Explain the concept of conservation of energy.				
	• Examine various methods of conserving energy.				
	 Environment and Sustainable Development Write the goals of sustainable development. 				
	• Explain sustainable consumption and production with examples.		9%		
Charten 10	• Describe un-sustainability to sustainability.	450			
Chapter 10	• Explain how international treaties and conventions are related to Bhutan.	450			
	• Identify sustainable development initiatives in Bhutan.				
	• Describe challenges of sustainable development efforts of Bhutan.				
	Total	4860	100.00%		
NB: The total time required to complete the topics is 4860 minutes or 96 periods of 45 minutes in a period.					

Assessment

Educational assessment is a process of documenting, usually in measurable terms, the outcomes of knowledge, skills, attitudes and beliefs of students. This includes the processes of gathering and interpreting information about the progress of students' learning. In order to be valuable to individuals and organization, an assessment must be accurate and objective. Students should be well informed about, what will be assessed and how will they be assessed. Teachers can play an important role in students' achievement by effectively monitoring their learning and giving learners the feedback on how they can improve.

Assessment is an integral part of teaching and learning process because it:

- i. helps improve students' learning through the provision of feedback and comments.
- ii. enables teachers to identify which strategies and resources work best.
- iii. empowers students to be self-reflective learners who monitor and evaluate their own progress.
- iv. assesses the strengths and weaknesses of students in learning, as well as in the personal development, and identify their special needs and help them to realise their innate talents.
- v. guides teachers to incorporate varied teaching and learning strategies and resources to ensure that the students are improving their academic learning, as well as, in their personal development.
- vi. provides evidences to grade and promote students to the higher level.
- vii. helps to inform parents and other stakeholders about the achievements of students.

A. Components of Assessment in Environmental Science

The assessment in environmental science focuses on measuring students' performance and achievements, based on the three domains of environmental science learning objectives, which are briefly described below.

i. Content knowledge

Through this domain, learners will be assessed on the following areas:

- *i. Systems in Nature:* students' understanding of physical and ecological systems such as, interdependent relationships in ecosystems; cycles of matter and energy transfer in ecosystems; interaction among Earth's major systems; the roles of water in Earth's surface processes; climate change and the effects of human activities on Earth's climate; conservation of energy and energy transfer. This area also includes humans as variables in ecosystems and Earth systems, which includes concepts associated with: the ecosystem services and natural capital on which humans (and all life) depend; adverse human impacts to these systems; and humans as agents in the protection and restoration of these systems;
- *ii. Environmental Issues and Concerns:* students' understanding of a variety of environmental situations that arise from biophysical impacts apparent in the natural world, and the causes and effects of those impacts; knowledge of environmental issues that arise from human conflicts about environmental problems and solutions, including the causes and effects of those conflicts; multiple solutions to environmental issues including knowledge of past, ongoing, and current efforts, as well as of proposed and future alternatives, aimed at helping to solve environmental problems; and the legacy of efforts, the both success stories and failures, aimed at solving environmental problems using a number of dimensions (from scientific and technical to economic, regulatory or educational efforts).
- *iii. Natural Resource Management:* students' understanding of the limited available natural resources and their classification; causes of natural resources degradation; the forms of citizen participation, action, and community service intended to preserve natural resources or improve the environment including: restoration projects, consumer and economic action, effective communication strategies, political action, and collaborative solution seeking.
- *iv. Sustainable Development:* students' understanding of the various social, cultural, and political systems, as well as the historical and geographic contexts in which human populations have developed

and now function; civic participation and the beliefs/practices associated with environmental problem-solving; concepts of development, sustainable development and Gross National Happiness and their measurement and indicators; and the role of environment in sustainable development and Gross National Happiness.

ii. Environmental Processes

Through the domain of environmental processes, students will be assessed on the following:

- i. Identifying environmental issues including the ability to describe and provide evidence for the dimensions of the issue, human disagreements central to it, and factors that cause or contribute to it;
- ii. Ask relevant questions about environmental problems as well as human dimensions and historical or geographical features of an issue. This also includes the ability to ask higher-order questions aimed at discovering conditions that have implications for the issue;
- iii. Analyse environmental issues by interpretation and use of knowledge regarding physical, ecological and sociopolitical systems, and of information about stakeholders, their positions, beliefs and value perspectives. Also, this includes the ability to determine relevant factors to discern interactions among those factors, and to predict likely consequences of issues;
- iv. Investigate environmental issues by gathering new information about an issue as well as locating and using relevant sources of additional information, synthesizing, and communicating the outcomes of the investigation;
- v. Evaluate and make personal judgments about environmental issues by constructing dispassionate evaluations and explanations based on available information and the beliefs and values of stakeholders, and articulating views about actions that may be warranted. Critical thinking is at the core of this competency;
- vi. Use evidence and experience to defend positions and resolve issues by constructing and defending a sound evidence-based argument about what it will take to resolve or help resolve an issue; and
- vii. Create and evaluate plans to resolve environmental issues by assuming the responsibility for acting, frequently with others, and engaging in planning based on the environmental conditions, available resources, and socio-political contexts to resolve or help resolve issues.

iii. Environmental values and attitudes

Through the domain of environmental values and attitudes, students will be assessed on the following attributes:

- i. Sensitivity, caring and positive feelings toward the environment;
- ii. Attitudes, concern, and world view by responding in a favourable or unfavourable manner toward objects, events, and other referents;
- iii. Personal responsibility, commitment and thoughtful processes that lead individuals to avoid or reduce behaviours that contribute significantly to negative environmental impacts as well as undertake behaviours that contribute significantly to positive impacts;

- iv. The belief and/or feeling that an individual (or collectively) will be able to influence or bring about the environmental change; and
- v. Motivation, intentions, willingness and verbal commitment to act based on beliefs or attitudes.

B. Types of Assessment

The achievement and performance of students in environmental science are assessed through the following schemes of assessment.

i. Continuous Formative Assessment (CFA)

Formative assessment provides feedback to teachers and students on a continual basis, so that teaching and learning improves through the provision of feedback, and remedial learning opportunities for the needy learners as identified from the assessment. It also enables teachers to understand, which teaching methods and materials work best.

CFA facilitates teachers to diagnose the learning needs of the students, and recognize and understand students' individual differences in learning. The feedback encourages students to reflect on their achievement and performance, by which they are able to understand their strengths and weaknesses.

CFA should happen daily throughout the teaching-learning processes of the academic year. It is not graded, therefore, not reflected in promotion forms and reports to the next level, as it is used only to give continuous feedback to the students.

The techniques and tools for CFA can be seen in the Assessment Matrix, wherein the identified techniques of CFA for each domain are as follows:

i. Content knowledge: Interview, homework, class work, etc.

ii. Environmental Processes: Class work, observations, project work, etc.

iii. Environmental values and attitudes: Observations of students' conduct guided by environmental and social values.

The tools identified for CFA are **checklists** and **anecdotal records**. The sample checklists provided in this book are only suggestive. Teachers must develop their own checklists for every lesson. Checklist must be maintained for each topic and recorded for future references.

ii. Continuous Summative Assessment (CSA)

Continuous Summative Assessment is another form of continuous assessment. Unlike the CFA, the CSA is to grade student's performance on a continual basis and provide feedback at the same time. It helps in determining the students' achievement and performance, and the effectiveness of the classroom instructions. The feedback from this assessment is to help them to improve their learning and mandates teachers to incorporate varied teaching strategies and resources in ensuring quality teaching and learning in science classes. The CSA grades students' performances and achievements. This ensures students' active participations in the learning processes.

The techniques and tools for CSA can be seen in the Assessment Matrix, wherein the identified techniques of CSA for each domain are as follows:

i. *Content knowledge:*

Teacher is required to check all the home works assigned. Although the home works are given regularly, teacher grades only one of the learners' homework for every chapter using the rubrics. This records the students' achievements at frequent intervals. Chapter-end test is conducted upon the completion of every chapter.

ii. Environmental Processes:

Project work begins at the beginning of the academic year. It must be assessed at different stages using the rubric. The summative marks for project work should be credited at the end of each term. This is to ensure that students undergo all the required processes of the project work and project work is a continual and progressive, not one time activity of each learner as a personal enterprise.

iii. Environmental values and attitudes:

Environmental Case Files must be maintained from the beginning of the academic year. It must be assessed at different stages using the rubric. The summative marks for Environmental Case Files should be credited at the end of each term. It is a continual and progressive, not one time activity of each learner as a personal enterprise.

The main tools for CSA are: rubrics for homework, Environmental Case Files and project work; and pencil paper tests for class test. The scores from the rubrics and paper pencil tests should be converted to the weighting prescribed for each technique for each domain in each term as prescribed in the **Assessment Matrix**.

iii. Summative Assessment (SA)

Summative assessment is conducted at the end of a term and at the end of the year to determine the level of learning outcomes achieved by students. The information gathered is used by teachers to grade students for promotion, and to report to parents and other stakeholders. The weighting for Term 1 is 30% and 50% for the end of the year examinations.

The identified tools and techniques for SA can be seen in the Assessment Matrix.

Assessment Matrix								
Types of assessment	CFA		CSA			SA		
Definition	It is a continuo problems and l to identify the improve studer to understand work best.	us process of assess earning needs; prov needs for the remed nt's learning. It also o what teaching metho	sing student's ide feedbacks and ial measures to enables teachers ods and materials	It is a continuous process of grading student's performances and achievements. Based on their performance, teachers provide feedbacks for improvement. It also enables teachers to understand what teaching methods and materials work best.		Assesses student's cumulative performances and achievements at the end of each term.		
Domains	Content knowledge (CK) (Cognitive)	Environmental Processes (EP) (Psychomotor)	Environmental values and attitudes (EV) (Affective)	Content knowledge (CK) (Cognitive)	Environmental Processes (EP) (Psychomotor)	Environmental values and attitudes (EV) (Affective)	CK, EP & EV	CK, EP & EV
Techniques	Quiz & debate,self & peer assessment, class presentation, homework, class work, immediate interaction with students.	Immediate interaction with students, class work, home work, experiments, exhibition, case studies	Observation of student's conduct, group work, field trip, excursion, self & peer assessment ,immediate interaction with students.	Home work and chapter end test.	Project Work	Environmental Profile- guided by environmental and social values.	Term exam.	Term exam
Assessment Tools	Q&A, checklist and anecdotal records.	Checklist and anecdotal records.	Checklist and anecdotal records.	Rubrics (HW) and paper pencil test(chapter end test).	Rubrics	Rubrics	Paper pencil test with: multiple choice questions, close test, matching, true or false Short answer questions and extended response questions	Paper pencil test with: multiple choice questions close test, matching, true or false Short answer questions and extended response questions
Components in books	Questions and Answers, Exercises, Activities	Experiments, outdoor activities, designing and making, field trip, survey, and interview.	Work: in pairs, in groups, individually, field trip, display of charts, precaution and safety.	Exercises, Topic end Questions	Experiments, outdoor activities, designing and making, field trip, interview, survey, and display of charts,	Facts, field trip, display of charts, awareness campaign, precaution and safety.	Term examination. Question should cover all the three domains.	Term examination. Question should cover all the three domains.
Frequency interval (when &how)	Checklists and anecdotal records must be maintained for each topic throughout the academic year.		HW-for every chapter, Chapter end test – for every chapter.	Project Work -assessed two times (half yearly)	Environmental Profile -assessed two times (half yearly)	Once in a term.	Once in a year.	
Format in Progress Report				CK	EP	EV	Mid-Term	Annual Exam
Weightings			T1= 2.5 T2= 2.5	T1= 5 T2= 5	T1= 2.5 T2= 2.5	T1=30	T2=50	

Textbook

1. DCRD & RSPN (2015). Environmental Science for Class IX, DCRD, MoE, Paro

HISTORY AND CIVICS

HISTORY AND CIVICS

Rationale

The history portion of the syllabus consists of 'Bhutan History', 'Indian History' and 'World Developments since 1945'. The Bhutan History course at this level is intended to build up the knowledge base and widen the skills and value orientation established in the lower classes. It is expected that the students at this level will, at least, acquire knowledge and understanding of Bhutan's historical evolution. It is also hoped that they will develop appreciation for their inherited traditions and culture, which are most essential and useful for their understanding of the society they live in.

For the students' deeper understanding of some aspects of Bhutan History some chapters from 'Indian History' and 'World Developments Since 1945' have been included. These topics will present historical concepts and ideas that complement or supplement those in the Bhutanese history and throw more light on those areas that may not be adequately covered in the Bhutan History Coursebook.

The civics portion of the syllabus is intended to develop in students an understanding of basic principles of civics such as, duties and responsibilities of citizens, and the structure and functions of various organs of the government in order to help them grow up as informed, dedicated and responsible citizens in a democratic society.

Aims

The history and civics course at this level aims at developing in students:

- 1. a wider and deeper understanding of how Bhutan came to be, what it is today in order to be able to appreciate its cultural heritage as well as its political structure;
- 2. a wider historical perspective in order to be able to understand the inter-relationship between different cultures of the world and the impact of history on the present status of the world as a whole;
- 3. knowledge and understanding of historical concepts of continuity and change;
- 4. the ability to analyse, interpret, synthesise and evaluate historical information;
- 5. an understanding and appreciation of rights and responsibilities of citizens; and
- 6. loyalty and dedication to the Tsawa Sum and commitment to work for the well-being of the nation.

Learning Experiences

In order to make the most out of the history and civics course offered, teachers should provide a wide range of learning experiences to students which should include:

- 1. group works in the classrooms;
- 2. use of media such as films, journals, newspapers, television and photographs;
- 3. first hand experiences in field trips to gather information through direct contact with historical monuments, people and places;
- 4. interacting with guest speakers;
- 5. making notes and summaries from the texts and other sources; and
- 6. carrying out project work.

Learning Outcomes

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

- 1. demonstrate an understanding of the historical developments in Bhutan from ancient times to the present and their impact on the socio-cultural and political system of the country;
- 2. show an understanding of some historical aspects of the Indian civilization, culture and freedom movement;
- 3. explain the formation of UN and its major agencies, and a few regional organisations and discuss their roles;
- 4. identify some basic principles of civics and explain their importance for good citizenship;
- 5. describe the system of government and structure of administration in the country and explain the main functions of different branches of the government;
- 6. list and sequence historical events to show an understanding of time, change and continuity;
- 7. locate, select, organise and present historical information;
- 8. make deductions from a variety of historical sources (e.g. photographs, graphs, written, oral);
- 9. value the rights and responsibilities of citizens and realise their duty as good citizens of the country;
- 10. value their country's cultural heritage and work towards its preservation and promotion;
- 11. value the contributions made by the past generations for safeguarding the security of the nation and ensuring peace and progress, and contribute towards nation building; and
- 12. value the contributions made by world organisations in maintaining peace and order in the world and solving problems facing humanity, and contribute towards global understanding.

COURSE CONTENT (CLASS IX)

BHUTAN CIVICS

UNIT ONE: CONSTITUTION

- History of the Constitution in Bhutan (Political Reforms, Making of the Constitution, Submission of the first Draft to His Majesty, Distribution of the Draft Constitution, Dissemination of the provisions of the Draft Constitution, Public Consultation with the Dzongkhags, Significance of the Constitution). (4%)
- The Salient Features of the Constitution of Bhutan [Salient Features of the Constitution of Bhutan, Main Features of the Preamble, Source of Constitution, Nature of State, Basic objectives of the Democratic Constitutional Monarchy, Significance of the Preamble, Features of the "Kingdom of Bhutan" (Article 1), The "Institution of Monarchy" (Article 2), Spiritual and Cultural heritage (Article 3 and 4), Directive Principles of State Policy (Article 9)]
- Fundamental Rights and Duties (Fundamental Rights (Article 7), Classification of Fundamental Rights, Features
 of Fundamental Rights, Reasons for incorporating Fundamental Rights in the Constitution, :Fundamental
 Duties (Article 8), Meaning of Fundamental Duties, Classification of Duties, Reasons for Incorporating
 Fundamental Duties in the Constitution, Relation between Fundamental Rights and Duties). (4%)

UNIT TWO: ELECTION AND FORMATION OF POLITICAL PARTIES

- Formation of Political Parties (Meaning of a Political Party, Formation of a political party, Roles of Political Parties).
 (4%)
- 5. *Election* (Need for Elections, Types of election, Election procedures of Bhutan, Election Campaigns, Funding, The Constituencies, Voting procedures). (4%)

BHUTAN HISTORY

6.	Ancient History Part I: Origins of early inhabitants, their social and economic life, and names of the country	(2%)
7.	Ancient History Part II: Religion of early inhabitants, the first advent of Buddhism Bhutan	in (2%)
8.	<i>Guru Padma Sambhava</i> : The second advent of Buddhism in Bhutan; Guru's early life, his visits to Bhutan	(3%)
9.	<i>Emergence of Ruling Clans (9th-17th centuries)</i> : Origin of the ruling clans; spread of their descendants; the socio-political pattern of the country	(3%)

10. Origins of a Distinct Religious Identity in Bhutan: Religious turmoil in Tibet and

	integration of different schools of Buddhism in Bhutan	(3%)
11.	<i>Drukpa Kagyupa</i> : Establishment of the Drukpa Kadgyud school in the western region by Phajo Drugom Zhigpo and his descendants; strengthening of the school the great works of other Drukpa Kagyud saints.	ol by (3%)
<i>12</i> .	The Tertoens: Their contributions to the Bhutanese nationhood	(3%)
13.	<i>Zhabdrung</i> Ngawang Namgyal and the Creation of the Nation State of Bhutan : His early life; his arrival in Bhutan; the internal and external oppositions; his achievements	(5%)
14.	Completion of the Unification of Sharchog Khorlo Tshibgyed: The expansion of Drukpa Kagyud school to other regions; unification of the entire country under one central rule; establishment of the State Religion	(4%)
15.	A Century of Instability : Internal strife and its effect; encounters with the British; th Battle of Cooch Behar - causes, the course and results; the British and the Bhutan bilateral missions	ne .ese (6%)
16.	The Second Century of Instability : Early British and Bhutanese squabbles over the Duars; missions of Pemberton and Ashley Eden; the Great Duar War of 1865	(6%)
	INDIAN HISTORY	
17.	The Indus Valley Civilization: Archaeological finding; religion, art and script; economic activity; period of existence	(6%)
18.	The Aryans: Origin of the Aryans; early settlements; the vedic religion; political life	

- the vedic literature (6%)
- 19. Buddhism: Gautama Buddha and his teachings; spread of Buddhism; Buddhist literature; Buddhist monasteries and cave temples; Hinayana and Mahayana forms of Buddhism; decline of Buddhism; Buddhist schools of art. (8%)

MODES OF ASSESSMENT

The learning of history and civics in class IX will be assessed internally by the school. The modes of assessment will include:

- Continuous assessment (20 %): This part of assessment will include CLASS WORK, HOMEWORK, PROJECT WORK. The weighting for each will be as follows: Class work: 5% Home work: 5% Project work: 10%
- 2. Written Examination (80 %): This part of assessment will include the terminal and the end of year examinations. (For details, refer 'Continuous Assessment, VI to X, Teachers' Guide', CAPSSD, 1999.)

The students will be required to do *class work* and *homework* throughout the year. These works will give both the teacher and the student opportunities to check on their progress and find ways for improvement in students.

However, only ONE class work and ONE homework should be marked in 2-3 weeks as part of continuous assessment. (For details, refer 'Continuous Assessment, VI to X, Teachers' Guide', CAPSSD, 1999.)

Students will be required to do ONE *project work*. The project work can be EITHER on Bhutan history OR Bhutan civics. The teacher should provide the students with a list of topics from which they can choose ONE. The students should be informed of the topics in the BEGINNING of the course. The project work may be based on field visits supplemented by library research. The write-up on the project work should be illustrated wherever necessary. (*The details on planning project work are given in the Continuous Assessment, VI to X, Teachers' Guide, CAPSSD, 1999*)

The students should make sure every detail of the project work is explained clearly, including their visits and the sources used for collecting the information. They should know that the marking of their project papers will look into the research and methods adopted in their findings, the illustrations and the presentation of their work.

<u>Note:</u> The teacher should give proper guidance to the students at every step of their project work. The length of the project work should be 700-1000 words ONLY.

Assessment criteria for project work:

Content	:	70
Presentati	on:	10
Process	:	20

Note: Teachers can also refer the ICSE marking scheme attached as Annexure at the end of this syllabus for extra assistance in marking project works.

All the works (class work, homework & project work) will be assessed by the teacher. At the end of the year, the final mark calculated for EACH of the works could be totalled together and then reduced to 20% weighting. For instance, the final mark for project work could be calculated thus:

$$\frac{\text{Mark obtained}}{100} \ge 10$$

The final mark for continuous assessment would then be added to the mark obtained in the terminal and end of year examinations.

Examinations (weighting - 80%)

The examinations will be for two hours and out of 80 marks. They will be a combined paper of history and civics as shown in the table below:

Content Area	Weighting
Bhutan Civics	17
Part I- Section A (compulsory)	7
Part II-Section A (essay questions-choice)	10
Bhutan History	45
Part I- Section A (compulsory)	15
Part II-Section A (essay questions-choice)	30
Indian History	18
Part I- Section A (compulsory)	8
Part II-Section A (essay questions-choice)	10
TOTAL	80

Allocation of marks in the written examination

Examination details:

Part I (30%) : There will be three sections (A,B and C) on Bhutan Civics, Bhutan History and Indian History. This part will comprise compulsory multiple choice and short answer questions to test factual knowledge, application and skills related to elementary/fundamental aspects of the entire syllabus. The number of questions in each section will be determined by the weighting for the chapters.

There will be question worth 7 marks from Bhutan Civics, 15 marks from Bhutan History, and 8 marks from Indian History.

Part II (50%) : There will be three sections (A,B and C) on Bhutan Civics, Bhutan History and Indian History. There will be nine sets of questions worth 10 marks each : two on Bhutan Civics, five on Bhutan History and two on Indian History. Students will attempt a total of five questions: one from Bhutan Civics, three from Bhutan History and one from Indian History. (1+3+1=5 questions).

TEXTBOOKS AND REFERENCES

- 1. Bhutan History Coursebook for Class IX, CAPSD, Education Department, Thimphu, Bhutan
- 2. Bhutan Civics Textbook for Classes IX and X, CAPSD, Education Department
- 3. I.C.S.E. History and Civics Part I, D.N. Kundra, Goyal Brothers Prakashan Educational Publishers, 1992

BHUTAN CIVICS (CLASS X)

UNIT THREE: THE GOVERNMENT

- The Legislature (Membership criteria, Removal of members of Parliament, Legislature: Powers and function, Gyalyong Tshogdu (National Assembly, Gyalyong Tshogde (National Council), Relation between the two Houses, Political Parties, Function of the Political Parties, Ruling Party and Opposition Party). 4%
- The Executive (Types of Executive, The Lhengye Zhungtshog, Appointment and tenure of the members of Lhengye Zhungtshog, Functions of the Lhengye Zhungtshog, The Administrative System, The Ministries, Autonomous Bodies).
- 3. The Judiciary (Formation and Codification of Laws, Judicial System, Jurisdiction of the Thrimkhangs or Courts, Salient features of our Judicial System, Judicial Reforms). 4%
- The Constitutional Bodies (The Election Commission, The Royal Audit Authority, The Anti-CorruptionCommission, The Royal Civil Service Commission, Constitutional Offices).
 2%
- 5. Local Government (Members of the Gewog Tshogde, Eligibility, Terms of Office, Removal of Gewog Tshogde members, Gewog Tshogde Meeting Procedures, Powers and Functions of Gewog Tshogde, Regulatory powers of the Gewog Tshogde, Members of the Dzongkhag Tshogdu, Eligibility, Terms of Office and Election Criteria, Powers and Functions of Chairman of Dzongkhag Tshogdu, Powers and Functions of Dzongkhag Tshogdu, Dzongkhag Tshogdu Meeting Procedures, Members of the Thromde Tshogde, Relationship between Gewog Tshogde, the Dzongkhag Tshogdu and the Thromde Tshogde). 3%
- Gross National Happiness and Good Governance (The Four Pillars of Gross National Happiness, Features of Good Governance).
 3%
 - <u>Note</u>: Those contents in Bhutan History (particularly class X) which overlap with the content in Bhutan Civics may please be treated as reference material for the latter.

BHUTAN HISTORY

- Jigme Namgyal: The Architect of United Bhutan his origin and early years; rise to power; his role in the Duar War; his achievements (7%)
 Druk Gyalpo Ugyen Wangchuck: The Founding Monarch and the King of Bhutan's Destiny his early life; rise to power; ascent to the throne; reforms (6%)
- Druk Gyalpo Jigme Wangchuck: The Consolidator his early life; ascent to the throne; reforms and consolidation works (4%)

INDIAN HISTORY AND WORLD DEVELOPMENTS S	SINCE 1945
12. Art, Architecture and Handicrafts: General characteristics; historical background; types and significance	(7%)
11. Druk Gyalpo Jigme Singye Wangchuck: A Monarch of the People - early life; ascent to the throne; reforms; foreign relations	(9%)
10. Druk Gyalpo Jigme Dorji Wangchuck: The Father of Modern Bhutan - early life; ascent to the throne; reforms; development plans; international relations	(7%)

13.	Gandhiji's contribution to India as a leader: Mahatma Gandhi's life-sketch, his ideals	
	and methods; Gandhi's contribution to the freedom movement and India's	
	independence	(7%)

- 14. The UNO: formation of UNO, its main organs and their functions; its major agencies and their functions; role of the UNO in maintaining peace and security (7%)
- 15. A Few Regional Organisations: the EEC; the SAARC; the ASEAN (6%)

MODES OF ASSESSMENT

The learning of history and civics in class X will be assessed internally by the school and externally by the Bhutan Board of Examinations.

1. Internal assessment (weighting - 20%)

Internal assessment will include the marks of the continuous assessment (home work, class work and project work) and the terminal and trial examinations. (*The details on the break up of marks are given in the Continuous Assessment, VI to X, Teachers' Guide, CAPSSD, 1999*)

<u>Note:</u> The teacher should give proper guidance to the students at every step of their project work. The length of the project work should be 1000-1500 words ONLY.

The Heads of the schools should send the final mark in internal assessment for students to the Bhutan Board of Examinations on the prescribed Mark Sheets NOT LATER THAN November 15 of the year of the examination. The mark awarded by the school for internal assessment will be added to the mark awarded by the Bhutan Board of Examinations on the written paper.

2. External assessment (weighting - 80%)

A written examination will be conducted at the end of the year by the Bhutan Board of Examinations. It will be a combined paper of history and civics as in class IX. The paper format and allocation of marks is as shown in the table on the next page.
Content Area	Weighting
Bhutan Civics	17
Part I- Section A (compulsory)	7
Part II-Section A (essay questions-choice)	10
Bhutan History	45
Part I- Section A (compulsory)	15
Part II-Section A (essay questions-choice)	30
Indian History and World	
Development since 1945	18
Part I- Section A (compulsory)	8
Part II-Section A (essay questions-choice)	10
TOTAL	80

Allocation of marks in the written examination

Examination details:

Part I (30%) : There will be three sections (A,B and C) on Bhutan Civics, Bhutan History and Indian History. This part will comprise compulsory multiple choice and short answer questions to test factual knowledge, application and skills related to elementary/fundamental aspects of the entire syllabus. The number of questions in each section will be determined by the weighting for the sections.

There will be question worth 7 marks from Bhutan Civics, 15 marks from Bhutan History, and 8 marks from Indian History and World Development Since 1945.

Part II (50%) : There will be three sections (A,B and C) on Bhutan Civics, Bhutan History and Indian History. There will be nine sets of questions worth 10 marks each : two on Bhutan Civics, five on Bhutan History and two on Indian History. Students will attempt a total of five questions: one from Bhutan Civics, three from Bhutan History and one from Indian History and World Development Since 1945. (1+3+1=5 questions).

Textbooks and references

- 1. Bhutan History Coursebook Class X, CAPSD, Education Department, Thimphu, Bhutan
- 2. Bhutan Civics Textbook for Classes IX and X, CAPSD, Education Department, Thimphu, Bhutan
- 3. Bhutan Civics Teacher's Guide for Classes IX and X, CAPSD, Education Department, Thimphu, Bhutan
- 4. I.C.S.E. History and Civics Part II, D.N. Kundra, Goyal Brothers Prakashan Educational Publishers, 1992

Internal Assessment in History and Civics - Guideline for Marking Project Work

Criteria Marks	Preparation/Research	Information	Concepts	Thinking Skills	Presentation
4 marks for each criterion	 Follows instructions with understanding Masters research techniques easily Reference work is orderly 	 A good deal of relevant matter Uses wide range of sources 	 Good understanding of historical concepts- sequence/ reconstruction causes andconsequences continuity and change empathy 	 Different interpretations of evidence Inferences/ deductions conclusions 	 Matter presented is clear and in coherent form (sub headings, sections, chapters etc.) Work is neat and tidy and not over elaborate
3 marks for each criterion	 Follows instructions but needs a little help in research techniques Reference notes quite orderly 	 Selects matter relevant to context Limited use of references/ sources 	• Understanding of concepts is adequate	 limited/single interpretation of evidence with some examples Some inferences/ conclusions etc. 	 Matter is presented in coherent form, but not organized into sections etc. Presentation neat and tidy but not over elaborate
2 marks for each criterion.	 Follows instructions but needs constant guidance Reference notes at times disorderly 	 Relevant matter but limited reference work Matter is sketchy 	Displays limited use of concepts	Few examples/ single example to support reasoning	 Work is presented in orderly way, but not organized into sections Overuse of "cosmetics" to hide lack of substance/ work is quite neatly presented.
1 mark for each criterion	 Struggles with research methods and needs constant guidance reference notes copied without reference to key words 	 Hardly any reference material Use of irrelevant matter Matter is quite sketchy 	 Minimal competency in concepts A few of the required concepts 	 Finds it difficult to make conclusions/ deductions/ inferences No examples to support reasoning 	 Matter presented in a confused way at times (no sub-headings, chapters, etc.) Tendency to copy from reference books Use of "cosmetics" to hide lack of substance Untidy work
0 mark per criterion	 Cannot follow instructions Works "blindly" without reference to key words 	No reference work/ copied from other textbooks/ sketchy matter	Unable to demonstrate concepts	Unable to make inferences/ deductions or come to any conclusions	 Matter presented in an incoherent/ disorganized way Copied from textbooks "blindly" Use of "cosmetics" to hide lack of substance Untidy work

Source: ICSE March 2000: Regulations and Syllabuses

GEOGRAPHY

GEOGRAPHY

Rationale

The geography syllabus in classes IX and X deals with the principles of Geography and World Studies, Bhutan Geography and study of topo sheet. It also provides pupils with opportunities to identify and locate and learn about important physical features, climate and vegetation belts of Asia; physical features, distribution of agricultural products, minerals, and population and chief cities of South Asia; and physical features and selected places and dzongs of Bhutan.

The Principles of Geography and World Studies cover all the phenomena on the earth's surface and explain the principles of day and night, seasons, climate, surface features, erosion, plant and animal life as well as distribution and development of different human communities and activities in different regions of the world. This is largely aimed at development of understanding in the learners the inter-relationship between different elements of the environment and the processes which take place in the environment leading to changes in the environment in order that such an understanding would help them to conserve the resources, protect and live in harmony with the environment.

Bhutan Geography deals with the natural and man-made systems. It is aimed at providing the learners with a good knowledge of the land formation, climatic conditions and their impact on the vegetation and the activities of the people in order to develop a better understanding of the country. It also helps them to become acquainted with the richness of Bhutan's natural resources and at the same time create in them an awareness of the likely consequences of overuse so that they would appreciate the need to make prudent decisions in the use of the available resources.

The study of topo sheet and other map works are intended to help students to read, interpret and use different types of maps.

Aims

The course aims at helping students to:

- 1. understand geographical principles, ideas and concepts;
- 2. appreciate the causal relationships of the natural phenomena;
- 3. understand the relationship between physical parameters and human behaviours in terms of living habits and development;
- 4. appreciate the stand of Bhutan and the neighbouring countries of South Asia under the influence of various geographical factors;
- 5. analyse, interpret and apply various geographical information in day to day activities;
- 6. develop skills in representing geographical information in the form of tables, graphs, sketches, and other diagrams and illustrations; and
- 7. develop respect, care and appreciation for diverse cultures and environments.

Learning Experiences

In order to make the most out of the course, varied learning experiences need to be provided to the students. These should include:

1. reading geographical information from the text and other sources and making notes and summaries;

- 2. collecting information from various sources, organising, analysing and sythesising the collected information;
- 3. reading and interpreting various diagrams, maps and toposheets;
- 4. representing information in tables, graphs, sketches and diagrams;
- 5. working in groups;
- 6. carrying out field visits;
- 7. measuring and recording various elements of weather; and
- 8. carrying out project work.

Learning outcomes

On completion of the course students are expected to be able to:

- 1. identify the main elements of weather and climate, and the factors affecting these elements, and explain how the factors affect each of the elements resulting in the variation of weather and climate in different places;
- 2. explain the causes and effects of internal and external forces that have carved varied landscapes on the earth's surface;
- 3. explain the uniqueness of the earth in relation to other planets and put forward various proofs through diagrams as evidences for the sphericity of the shape of the earth;
- 4. define geographical terms and concepts;
- 5. explain the effects of the movements of the earth and uses of lines of latitude and longitude, and apply the knowledge in explaining natural phenomena of night and day, seasons and varying length of night and day, and locating places, determining climate and time of a place;
- 6. explain the basis for dividing the earth into natural regions and compare and contrast one region with another in terms of climate, vegetation, wildlife and human activities;
- 7. demonstrate an understanding of the natural and man-made systems of Bhutan and their impact on each other;
- 8. demonstrate care and concern for maintaining the balance in the ecosystem for making sustainable use of resources;
- 9. use weather instruments for recording various elements of weather;
- 10. read and interpret maps, diagrams, graphs, tables and other illustrations;
- 11. identify and locate various relief features, main countries, climatic and vegetation belts of Asia, physical features, distribution of agricultural products, minerals and population and chief cities of South Asia and physical features, selected places and dzongs of Bhutan;
- 12. locate, select, organise and present information ; and
- 13. represent information in various forms such as maps, diagrams, graphs, tables and pictures.

COURSE CONTENT CLASS IX

Principles of Geography

The Atmosphere

- i Difference between weather and climate
- ii Elements of weather and climate
 - Temperature factors affecting the temperature of a place; isotherms.
 - Pressure factors affecting pressure; simple explanation of the pressure belts; shifting of the pressure belts; formation of cyclonic and anti-cyclonic weather features; prevailing winds; land and sea breezes; monsoons; isobars
 - Rainfall types of rainfall; isohyets

<u>Note:</u> Students should be familiar with the use of weather instruments such as maximum and minimum thermometer, hygrometer, rain gauge, barometer, wind vane, etc.

The Lithosphere

- i The earth's crust formation and examples of igneous, sedimentary and metamorphic rocks; volcanoestheir causes and effects; earthquakes - their causes and effects; areas affected by volcanoes and earthquakes
- ii Meaning of weathering; mechanical and chemical weathering; soil formation
- iii Permeable and impermeable rocks water table, wells, springs and artesian wells

GEOGRAPHY OF BHUTAN

The Natural System

- i. Formation of the Himalayas: the theory of plate tectonics and the evolution of the Himalayas from the pre-tertiary Tethys sea to the present mountain systems
- ii. Rocks and Minerals: formation of rocks and occurrence of minerals
- iii. Soils: formation of soils; factors helping formation of soils; their usefulness to farming
- iv. Climate: factors determining the climate in Bhutan; climatic zones and their effect on human activities
- v. Forest and Wildlife: types of forest; wildlife and their relationship with humans
- vi. Rivers and their erosional works

MAP WORKS

This section is to be examined through map works only.

Asia

- a. Physical features
 - i Mountains: Urals, Altai, Yablonoi, Khingan, Stanovoi, Caucasus, Armenian Highlands, Elburz, Zagros, Tian Shan, Kunlun, Himalaya, Yoma

- ii Plains and Plateaus: Northern Lowlands, Mongolian Plateau, Plateaus of Arabia and Iran, Tarim Basin, Tibetan Plateau, Indo Gangetic Plains, Shan Plateau and Great North China Plain
- iii Rivers and Seas : Ob, Yenesi, Lena, Euphrates, Tigris, Irrawaddy, Mekong, Sikiang, Yangtse, Hwang Ho, Amur, Black Sea, Caspian Sea, Sea of Aral, Sea of Okhotsk, Sea of Japan, Yellow Sea, South China Sea, Arabian Sea
- iv Main countries of the continent: Particularly the South East Asian Archipelago
- b. Climatic and vegetation belts

Arctic, Cold Temperate, Temperate Desert, Hot Desert, Tropical Monsoon, Equatorial

South Asia

- a. Physical features
 - i The Himalaya, Pamirs, Hindu Kush, Sulaiman, Karakoram, Deccan Plateau, Western Ghats, Eastern Ghats, Aravalli Hills, Satpura and Mahadeo Hills, Nilgiris, Thar Desert, Rani of Kutch, Khyber and Bolan Passes, Khasi Hills, Garo Hills
 - ii Indus, Chenab, Sutlej, Ganga, Gomti, Kali Gandaki, Koshi, Yamuna, Gagra, Chambal, Son, Damodar, Brahmaputra, Mahanadi, Narmada, Tapti, Godawari, Krishna, Padma and Mahaweli
- b. Distribution of Agricultural Products and minerals
- c. Distribution of population
- d. Chief cities

Bhutan

- a. Physical Features
 - i Jumolhari, Jowo Durshing, Gangkar Punsum, Masa Gang, Tsenda Gang, Jiwuchu Drakey
 - ii Zele La, Tremo La, Ya La, Mon La Karchung, Lhodrak La, Karchung La, Me La, Bod La, Thrumseng La, Yutong La, Pele La, Dochu La, Jele La
 - iii Wang Chu, Amo chu, Puna Tsang Chu, Pho Chu, Mo Chu, Mangde Chu,

Chamkhar Chu, Kuru Chu, Dangme Chu, Kulong Chu, Ngyera Ama Chu

b. Selected places and dzongs

Daifam, Manas, Pasakha, Damphu, Zhemgang, Samtse, Tsima Lakha, Ha Dzong, Gasa Dzong, Daga Dzong, Lhuentse Dzong, Yangtse Dzong, Pema Gatshel Dzong

STUDY OF TOPO SHEETS

Concept of contours; symbols; recognition of simple land forms (valleys, spurs, ridges, plateaus, waterfalls, cliffs, gaps, mounds); finding height and direction; meaning of scale and its representation; measuring distances; grid reference; drainage patterns (dendritic, trellis, radial)

Identification and description of the features of a river valley, man-made and relief features; means of transport in relation to relief

Types of settlements; their growth in relation to their environment and position; inferring the occupation of the people; location of natural vegetation types, cultivated areas and irrigation types

MODES OF ASSESSMENT

The learning of geography in class IX will be assessed internally by the school. The modes of assessment will include:

- Continuous assessment (20 %): This part of assessment will include CLASS WORK, HOMEWORK, PROJECT WORK. The weighting for each will be as follows: Class work: 5% Home work: 5% Project work: 10%
- 4. Written Examination (80 %): This part of assessment will include the terminal and the end of year examinations. (For details, refer 'Continuous Assessment, VI to X, Teachers' Guide', CAPSSD, 1999.)

The students will be required to do *class work* and *homework* throughout the year. These works will give both the teacher and the student opportunities to check on their progress and find ways for improvement in students.

However, only ONE class work and ONE homework should be marked in 2-3 weeks as part of continuous assessment. (For details, refer 'Continuous Assessment, VI to X, Teachers' Guide,' CAPSSD, 1999.)

Students will be required to do ONE *project work*. The project work can be EITHER on Bhutan Geography OR on Principles of Geography. The teacher should provide a list of topics from which the students can choose ONE. The students should be informed of the topics in the beginning of the course. The project work may be based on field visits supplemented by library research. The write-up on the project work should be illustrated wherever necessary. (For details, refer 'Continuous Assessment, VI to X, Teachers' Guide,' CAPSSD, 1999.)

The students should be informed that every detail of the project work needs to be explained clearly, including their visits and the sources used for collecting the information. They should be made aware that the marking of their project papers will look into the research and methods adopted in their findings, the illustrations and the presentation of their work.

<u>Note:</u> The teacher should give proper guidance to the students at every step of the execution of their project work. The length of the project work should be 700-1000 words ONLY.

Assessment criteria for project work: (The details are in the Continuous Assessment, VI to X, Teachers' Guide, CAPSSD, 1999)

Content	:	70
Presentation	:	10
Process	:	20

<u>NOTE:</u> Teachers may seek further help in marking scheme from the ICSE internal assessment guidelines attached as Annexure at the end of this syllabus.

All the works (class work, homework & project work) will be assessed by the teacher. At the end of the year, the final marks calculated for EACH of the three types of works could be totalled together and then reduced to 20% weighting. For instance, the final mark for the project work would be calculated thus:

$$\frac{\text{Mark obtained}}{100} X 10$$

The final mark for continuous assessment would then be added to the mark obtained in the terminal and end of year examinations.

Examinations (weighting - 80%)

The examination will consist of ONE PAPER OF TWO HOURS. The paper will be divided into four sections:

- Section A will have questions on interpretation of survey maps. This portion is COMPULSORY.
- *Section B* will have questions from Principles of Geography and World Studies. Three questions will be set out of which candidates must attempt any TWO.
- *Section C* will have questions from Geography of Bhutan. *Five* questions will be set out of which candidates must attempt any THREE.
- Section D will have questions on map work on Asia, South Asia and Bhutan. This portion is COMPULSORY.

Content area (sections)	No. of questions	Weighting
Sec. A - Topo Sheets	1	15
Sec. B - Principles of Geography	2	20
Sec. C - Geography of Bhutan	3	30
Sec. D - Map work	3	15
TOTAL	9	80

Distribution of Marks for the Examination

Textbooks and references

- 1. Geography of Bhutan Coursebook for classes IX and X (text), CAPSSD, Education Department, Thimphu
- 2. Principles of Geography Book I, Charles Farro, General Printers & Publishers, 1977
- 3. Gem's School Atlas, Ratna Sagar, Ratna Sagar P. Ltd, 1995
- 4. Monsoon Asia Book II, Charles Farro, General Printers & Publishers, 1985 (reference)
- 5. A Text Book of Geography 9, Rita Rajan, General Printers & Publishers, 1998 (reference)
- 6. A Text Book of Geography 10, Rita Rajan, General Printers & Publishers, 1998 (reference)

CLASS X

Principles of Geography and World Studies

Astronomical Geography

- i Shape of the earth : appearance in reality; conditions favouring life on earth
- ii Position on the globe: concepts of latitude and longitude; relation between longitude and time; local and international time. great circle routes; international date line
- iii Movements of the earth and their effects: rotation- day and night; revolution- seasons and variations in length of day and night

World Studies

A brief introduction of the major natural regions (an idea of their location, temperature, rainfall and vegetation) which leads to the knowledge of humans in their natural environment, humans in their every day aspects of life such as food, clothing, tools, housing and transport; activities in different seasons of the year, products, their marketing and use. The following sample studies taken from the major natural regions should be studied:

- i Equatorial forests: Rubber cultivation in Malaysia and cocoa in Ghana
- ii Tropical grasslands- Savannah : the Masai herder of Tanzania
- iii Mediterranian lands: orchard farming in the Mediterranean Lands of Western Europe (Spain, Portugal, France, Italy) and California
- iv Hot Deserts: the dwellers of the Sahara including those of the Nile Valley
- v Temperate grasslands: Prairies (Canada) and the Steppes (Russia)
- vi Coniferous forest : lumbering and trapping in Canada
- vii Tundra: its dwellers

<u>Note:</u> Teachers should make use of outline world map to help students grasp the location of places in relation to other features.

GEOGRAPHY OF BHUTAN

The Man-made System

- i Rural and Urban Settlements
- ii Farming Practices and Agriculture Land Use
- iii The Growth of Industries
- iv Sources of Energy
- v Trade, Transport and Communication
- vi People and Environment

Map Works

This section is to be examined through map works only. The exercises on maps will be continuous from class IX to X. Questions on map work will include the entire contents. The details of contents for this section is given in Class IX course content.

STUDY OF TOPO SHEETS

Refer to Class IX course content (page 86).

MODES OF ASSESSMENT

The learning of geography in class X will be assessed internally by the school and externally by the Bhutan Board of Examinations.

1. Internal assessment (weighting - 20%)

Internal assessment will include the marks of the continuous assessment (home work, class work and project work) and the terminal and trial examinations. (*The details on the break up of marks are given in the Continuous Assessment, VI to X, Teachers' Guide, CAPSSD, 1999*)

<u>Note:</u> The teacher should give proper guidance to the students at every step of their project work. The length of the project work should be 1000-1500 words ONLY.

The learning of geography in class X will be assessed internally by the school and externally by the Bhutan Board of Examinations.

The Heads of the schools should send the marks obtained by each student out of 20 to the Bhutan Board of Examinations on prescribed Mark Sheets provided by the Board NOT LATER THAN November 15 of the year of examination. The mark awarded by the school for internal assessment will be added to the mark awarded by the Bhutan Board of Examination for the written paper.

2. External assessment (weighting - 80%)

The examination will consist of ONE PAPER OF TWO HOURS. The paper will be divided into four sections:

Section A will have questions on interpretation of survey maps. This portion is COMPULSORY.

- *Section B* will have questions from Principles of Geography and World Studies. *Three* questions will be set out of which candidates must attempt any TWO.
- *Section C* will have questions from Geography of Bhutan. *Five* questions are set out of which candidates must attempt any THREE.
- Section D will have questions on map work on Asia, South Asia and Bhutan. This portion is COMPULSORY.

Content Area (sections)	No. of Questions	Total Weighting
Sec.A - Topo Sheets	1	15
Sec.B - Principles of Geography and World Studies	2	20
Sec.C - Geography of Bhutan.	3	30
Sec.D - Map work	3	15
TOTAL	9	80

Distribution for the Examination

Textbooks and references

- 1. Geography of Bhutan Coursebook for classes IX and X, CAPSS, Education Division, Thimphu, Bhutan
- 2. Principles of Geography Book I, Charles Farro, general Printers & Publishers, 1977
- 3. Gem's School Atlas, Ratna Sagar, Ratna Sagar P. Ltd, 1995
- 4. Monsoon Asia Book II, Charles Farro, General Printers & Publishers, 1985
- 5. A Text Book of Geography 9, Rita Rajen, General Printers & Publishers, 1998
- 6. A Text Book of Geography 10, Rita Rajen, General Printers & Publishers, 1998

ECONOMICS

ECONOMICS

Rationale

The economics course in Classes IX and X is intended to provide economic literacy to the students at this level and to lay the basic foundation for those who would like to study it further. Irrespective of what the students do after Class X they have to have a basic understanding of the operation of the Bhutanese economy, to function as an effective member of the Bhutanese society in the international community.

This syllabus treats theoretical concepts and basic economic terms in the light of their application to Bhutanese economy rather than treating theory in isolation. The impact of the neighbouring South Asian economy and changing international economic scenario on the Bhutanese economy, is considered wherever it is applicable. All the topics are issue based requiring the students to analyse the relevant and important issues rather than just learning economic information.

There is a separate syllabus for Classes IX and X but they are closely interlinked and follow a logical sequence. The syllabus for Class IX treats the basic economic concepts such as scarcity, choice, opportunity cost, market demand and supply, prices, money, production and so on. The syllabus for Class X on the other hand, focuses on broader topics such as wages and employment, interest and rent, management of the economy, economic growth, trade and population which require the use of basic concepts covered in class IX.

Aims

More specifically this course aims at making students:

- 1. understand basic economic concepts;
- 2. relate basic concepts to the structure and operation of the Bhutanese economy;
- 3. develop the skills of representing economic information in the form of tables, graphs, and other illustrations;
- 4. analyse economic information in newspapers, radios, television and other media;
- 5. assess the impact of the economic activities and issues to their personal life and to the economy;
- 6. assess the changing nature of economic institutions like agricultural practices, banking, tourism and transportation with the development of the country;
- 7. demonstrate the economic values of stringency, making the best use of limited resources, taking initiative to enhance one's economic status and others around them; and
- 8. develop the competency in economic decision-making.

Learning experiences

In order to facilitate learning in economics, students should be provided with a variety of learning experiences. These may include:

- 1. group works in the classroom;
- 2. use of print media such as newspapers and magazines;
- 3. carrying out field visits to gather information through direct contact with people and places;
- 4. carrying out project work; and
- 5. opportunities to use real life cases and situations to understand economic concepts and ideas.

Learning Outcomes: For Class IX

On completion of the course students are expected to be able to:

- 1. develop a foundation on various important thoughts governing present day Economics;
- 2. explain the problem of scarcity faced by households and the nation, and the economic choice that they make;
- 3. describe the economic systems and the way each system solves the basic economic problems;
- 4. compare different types of economic activities and their contributions to the economy;
- 5. examine the forces of demand and supply under different types of markets and the process of determination of prices;
- 6. understand and explain various concepts in production like cost, revenue, profit, economies of scale and specialisation with emphasis on agriculture in Bhutan;
- 7. examine the different types of industries in Bhutan, their role in the economy and their organization, and discuss the role and function of money and the financial institutions in the economy.

COURSE CONTENT: FOR CLASS IX (2012 ONWARDS)

1. Introduction to Economics (5%)

- 1.1. Meaning and definitions of Economics
- 1.2. The importance of Economics as a subject of study
- 1.3. The brief study of the economic thoughts

2. The problem of scarcity and choice (10%)

- 2.1. Resources their meaning and types
- 2.2. Distinction between needs and wants; comforts and luxuries
- 2.3. The nature of economic problems
- 2.4. Reasons for economic problems
- 2.5. The concept of opportunity cost

3. Economic Activities (5%)

- 3.1. Distinction between economic and non-economic activities
- 3.2. Factors affecting economic activities in a locality
- 3.3. Types of economic activities and their relationship to income
- 3.4. Analysis of the changing nature of economic activities which happens as a result of Economic growth

4. Understanding an Economy (10%)

- 4.1. Economy- its meaning and types
- 4.2. Economic system
- 4.3. Central problems of an economy: What to produce? How to produce and for whom to produce?
- 4.4. Types of economic system: Laissez-fair capitalistic system; planned socialistic system and mixed economic system and how these economic systems solve the central economic problems.

5. Market (10%)

- 5.1. The necessities for exchanges
- 5.2. Barter system and its difficulties
- 5.3. Market its meaning and types
- 5.4. Advertisement: persuasive and informative

6. The Theory of Demand and Supply (15%)

- 6.1. Demand and supply : their meanings and types
- 6.2. Factors affecting demand and supply
- 6.3. Law of demand and supply
- 6.4. Demand and supply schedules, demand and supply curves and their types
- 6.5. Movement along the demand curve and shift in demand curve
- 6.6. Movement along the supply curve and shift in supply curve

7. Determination of Market Price and Elasticity (7%)

- 7.1. Price its meaning and types
- 7.2. Influence of demand and supply on price
- 7.3. Determination of market price
- 7.4. Concepts of price elasticity of demand and supply
- 7.5. Factors affecting price elasticity of demand and supply

8. Production (10%)

- 8.1. Meaning of production in Economics
- 8.2. Utility and its types
- 8.3. Distinction between subsistence production and commercial production with particular reference to agricultural activities
- 8.4. Analysis of the benefits and limitations of division of labour and specialization
- 8.5. Meaning of total cost and total revenue and their relationships to each other with an emphasis on how the production units use these concepts
- 8.6. Profit as a motive of production and how it is calculated.

9. Industries (8%)

- 9.1. Meaning of a firm and industry
- 9.2. Organisation of different types of business firms: Sole Proprietorship, Partnership, Joint Stock Company, Public Corporations and Multi-National Corporations
- 9.3. Sectors of Bhutanese economy and their contributions in terms of income, employment and the future prospects for growth.
- 9.4. The role of public and private sectors in the Bhutanese economy and an analysis of government policy on privatization.
- 9.5. Localisation of Industries meaning and factors affecting it.

10. Money (8%)

- 10.1. Money its meaning, characteristics and functions
- 10.2. Historical development of money
- 10.3. The emergence of money in the Bhutanese economy

11. Financial Institutions (12%)

- 11.1. Meaning of a financial institution
- 11.2. Historical development of banks
- 11.3. Types of financial institutions in Bhutan
- 11.4. Royal Monetary Authority and its functions as the central bank of Bhutan
- 11.5. Banking institutions: Bank of Bhutan Limited; Bhutan National Bank Limited; Druk PNB Bank Limited; T-Bank Limited; Bhutan Development Bank Limited.
- 11.6. Non-Banking Financial Institutions: Royal Insurance Corporation of Bhutan Limited; Bhutan Insurance Limited; National Pension and Provident Fund Limited

MODES OF ASSESSMENT

There will be no external examinations for class IX. This course will be assessed internally by the school. There will be two parts in the assessment of the course at this level.

Continuous Assessment (weighting - 20%)

The students will be required to carry out TWO OR THREE small coursework (assignments). Each assignment will comprise of some data collection and a short write up of NOT MORE THAN 3 OR 4 PAGES. Different students could be asked to do extended pieces of work on topics covered at different times of the year.

MARKING CRITERIA FOR THE COURSEWORK:

•	Collection of data from sources other than the textbook	3 marks
•	Interpretation of the data putting forth a coherent and logical argument a understanding of economic concepts involved	and demonstration of the 5 marks
•	Presentation: neatness, language and layout of the coursework	2 marks

<u>Note:</u> This marking scheme is based on two pieces of coursework. If three pieces are done marks could be distributed accordingly.

The final mark for coursework out of 20 marks will be added to the final mark for written examinations out of 80 marks.

Written examinations (weighting - 80%)

The written examination will be of two hours consisting of two sections and out of 80 marks.

Section A will consist of multiple choice and short answer questions and will cover the whole syllabus. There will be NO CHOICE of questions. This section will be assessed out of 40 marks.

Section B will consist of essay-type questions. There will be a choice of questions and candidates will be required to answer ONLY FOUR questions. This section will be assessed out of 40 marks.

Textbooks and references

- 1. Introductory Economics A Coursebook for class IX, CAPSSD, Education Department, Thimphu, Bhutan
- 2. A Textbook of ICSE Economics Part I (reference), V.N. Nigan & A. Banerjee, Oswal Printers, 1992

Learning outcomes: For Class X

On completion of this course the students are expected to be able to apply the basic economic concepts and principles learnt in Class IX to broader economic issues and concerns. In doing this they will:

- 1. examine the employment market in the Bhutanese economy and discuss how wages are determined;
- 2. analyse the costs and benefits of the various jobs open to them after class X;
- 3. understand the concept of rent, interest and profit as returns of land, capital and enterprise;
- 4. examine the factors which influence rent, interest and profit;
- 5. study some of the main influences on savings and investments in the Bhutanese economy;
- 6. discuss the various sources of revenue and pattern of government expenditure in building a sustainable economy;
- 7. examine Bhutan's international trade in terms of the exports and imports and discuss its impact on the economy;
- 8. explain balance of payment and its effects on exports and imports of a country;
- 9. describe the features of economic growth of Bhutan and examine the factors contributing towards it;
- 10. explain the concept of sustainable development and examine effects of Bhutan's economic growth to sustainable development;
- 11. explain the influence of the size and composition of population to the Bhutanese economy;
- 12. analyse the effects of rising population on the scarce resources and examine the need for population control measures.

COURSE CONTENT: FOR CLASS X (2013 ONWARDS)

1. Wages and Employment (10%)

- 1.1. Labour: its meaning and types
- 1.2. Meaning of wage
- 1.3. Demand for and supply of labour as determinants of wage rate
- 1.4. Factors affecting demand for and supply of labour
- 1.5. Determination of wage rate
- 1.6. Effects of shift in demand for and supply of labour on wage and quantity demanded and supplied
- 1.7. Employment trends in Bhutan
- 1.8. Factors affecting the trend of employment
- 1.9. Difference in earning and reasons for it.

2. Factor Earnings: Rent, Wage, Interest and Profit (15)

- 2.1 Income: its meaning and types
- 2.2. Circular flow of income in an economy
- 2.3. Rent as factor earning
- 2.4. Interest: meaning and reasons for payment of interest
- 2.5. Determination of interest rate
- 2.6. Relationship among saving, interest and investment
- 2.7. Effect of interest on economy
- 2.8. Profit as a regulating force of economic activities

3. Public Finance (10%)

- 3.1. Public Finance: Its meaning, importance and scope
- 3.2. Public Expenditure and its classification
- 3.3. Borrowing as a source of Revenue
- 3.4. Government budget and its importance
- 3.5. Sources of revenue for the government: revenue from taxes, non-tax sources and grants and their relative contribution to the government exchequer.

4. Trade (10%)

- 4.1. Trade: meaning and types
- 4.2. Internal and external trade-their similarities and differences
- 4.3. Reasons for trade: theories of trade
- 4.4. Free trade versus protectionism-arguments for and against free trade and protectionism
- 4.5. Trade liberalization and globalization

5. Trade in Bhutan (15)

- 5.1 Nature of Bhutanese Trade
- 5.2. Bhutan's Trade Composition: Bhutan's exports and imports
- 5.3. Bhutan's trade in services
- 5.4. Bhutan's bilateral and multi-lateral trade partners

- 5.5. Bhutan and the World Trade Organization
- 5.6. Impacts of international trade on Bhutanese economy
- 5.7. Bhutan's trade strategy

6. Balance of Payments (10%)

- 6.1. Meaning and component of balance of payment
- 6.2. Concept of surplus and deficit in balance of payments
- 6.3. Causes of deficit in balance of payment
- 6.4. Measures to correct deficit in the balance of payments
- 6.5. Status and trends of Bhutan's balance of payments
- 6.6. Exchange rate: meaning, importance and determination of exchange rate
- 6.7. Effects of exchange rate on trade, balance of payments and economy

7. Economic Growth (15%)

- 7.1. Meaning of economic growth
- 7.2. Use of production possibility frontier to explain economic growth
- 7.3. Factors affecting economic growth
- 7.4. Features of economic growth in Bhutan
- 7.5. Measurement of economic growth and development
- 7.6. Economic growth and Gross National Happiness
- 7.7. Comparison between GNP and GNH approaches of economic growth

6. Population and the economy (15%)

- 8.1. Meaning and importance of population
- 8.2. Meaning of labour force
- 8.3. Age dependency ratio and sex ratio
- 8.4. Age and sex distribution of population
- 8.5. Impact of development on age and sex structure of population
- 8.6. Population density
- 8.7. Population growth rate
- 8.8. Reasons for change in population growth rate in the light of following population theories:
 - i. Theory of demographic transition
 - ii. Malthusian theory of population
 - *iii.* Theory of optimum population
- 8.9. Impact of population growth on the economy

8.10. Causes and effects of rural-urban migration and its remedies

MODES OF ASSESSMENT

The course in Class X will be assessed in two parts. Part one will be examined through internal assessment. Part two will be examined through an external written examination at the end of the academic year.

Internal Assessment (weighting – 20%)

The internal assessment will consist of:

- Project work : 50 marks i.
- ii. Class work : 25 marks
- ... 111. 25 marks Homework :

Project

50 marks

The students are required to carry out a project on any relevant topics in the syllabus. The marking criteria will be as follows:

- i. Collection of relevant information/data on the topic under study from sources other than the 10 marks textbook
- ... 11. Analysing the data and making observations and deductions (i.e. finding patterns and trends, making generalization, making intelligible comments based on understanding of economic theory)

25 marks

Presentation: Language, neatness, organization of information and ideas to form a coherent 111. 10 marks argument

Proper referencing and acknowledging the sources of information 5 marks iv.

The teacher should encourage the students to develop their own topics out of some of the activities that are suggested in the textbook or develop topics of their own choice related to some of the issues that they cover in this course. It should be original work of about 1000-1500 words. No extra marks will be given on lavish cover, attractive design and unrelated photographs.

Class work

The class work will consist of participation in learning activities in the class. Marking criteria for the class work will be:

i. completion and consistency of work 10 marks 15 marks ii. participation in classroom activities (sharing, taking initiative, asking/answering questions)

Homework

As in the case of class work, homework will be given to students and checked continuously. The students will be encouraged to produce original work as against copying. The marking criteria is as follows:

25 marks

25 marks

 111.	Presentation of the work	5 marks
 11.	originality of the work presented	10 marks
i.	completion and consistency of work	10 marks

<u>NOTE</u>: For both class work and homework teachers are required to maintain an assessment book with the record of all students' performance. Students must keep all their homework and class work to produce them when required.

External Examinations (weighting - 80%)

There will be one paper of two hours of maximum 80 marks. The paper will be divided into two sections.

Section A will consist of multiple choice and short answer questions covering the whole syllabus. There will be NO CHOICE of questions in this section and it will be assessed out of 40 marks.

Section B will consist of essay-type questions. There will be a choice of questions and the candidates will be required to answer FOUR questions. This section will be assessed out of 40 marks.

Textbooks and references

- 1. Introductory Economics A Coursebook for class X, CAPSSD, Education Department, Thimphu, Bhutan
- 2. A Textbook of ICSE Economics Part II, V.N. Nigan & A. Banerjee, Oswal Printers, 1992

Suggested Topics for Project Work in Economics for class X

Students could do a project selecting ONE of the topics listed below taken out from the learning activities in different chapters of the textbook.

- 1. In groups of eight to ten, students visit two of the industries established in the Dzongkhag and study the number and type of people employed. Find out the people employed in these industries.
- 2. Select any three jobs from any of the organisations in the Dzongkhag. Find out what attracts people to these jobs compared to other jobs; what incentives they offer and what future prospects they hold.
- 3. Take up a survey of all jobs, existing in the district and find out the differences of earning in these jobs. Students must find out the reasons for differences in earning.
- 4. Carry out a survey of import and export of Bhutan. This could include items imported and exported, countries to which Bhutan exports and countries from which Bhutan imports. It could also include the effects of export and import to industrial development and trade in Bhutan.
- 5. Effects of Tourism in Bhutan. This could include the number of tourists arrival during different years, revenue generated and the impact of tourism on Bhutan and the Bhutanese people.
- 6. Carry out a comprehensive survey of labour force in a nearby village or the community.
- 7. Collect information on the growth and development of a town that a student knows and make forecasts on the growth and development of that centre in the next 10 years.
- 8. In groups of 3 to 5 students each carry out a project on the amount and type of capital expenditure that was incurred for your district in a year plan.
- 9. What can students do to maintain the capital investment in the School? Students can do a survey of the sample of students' views in the school and compile the findings.
- 10. Collect information on the environmental effect of development in the district you are studying. Tabulate the information. Suggest measures that the government should take up in order to overcome these problems. A survey of the class or school seeking their opinion could form a part of the suggestion.
- 11. Carry out a survey of the saving habits of the people in the district you are studying. Put the information in a pie chart. Explain the saving habits of Bhutanese people based on this and its effects on the economy.
- 12. Carry out a survey of the profit made by a farmer, industrialist or businessman. Discuss the reason for profitability and its prospect in the future.

<u>NOTE</u>: As far as possible different students may be encouraged to take up different topics within the class. The students may be asked to present their project findings to the class for enriching their learning.

COMPUTER APPLICATIONS

COMPUTER APPLICATIONS

RATIONALE

A multitude of computing tools are now an integral part of business, industry and government offices where computer technologies such as email, Internet, spreadsheet and word processor all serve to enhance communication and information access, and thus improve work efficiency and productivity. Knowledge and skills in these areas have become a valuable skill, if not a prerequisite, in the job market.

Up until class 9, students in Bhutan have, in general, little exposure to Information and Communication Technology (ICT), and hence do not possess the relevant skills. There are substantial numbers of students who will leave the formal educational system at the end of class 10 and class 12. Students who leave at classes 10 and 12 will, in general, join the workforce shortly afterwards.

Computer Applications, therefore, has been introduced in view of market demand for computer literate employees and student demand for relevant courses on modern computing technologies. This course aims at making students computer literate. Increasingly, the term literacy would encompass the knowledge and skill of using the online information. Preparing our children with necessary computer knowledge, skills and values will prepare them to cope with the knowledge-based economy.

For students pursuing higher studies in the area of ICT, this course provides encouraging experience and "soft" lead-in to higher level of computing technologies in classes XI and XII.

AIMS

Teachers should help the students to:

- Understand the computing terminology and fundamental concepts.
- Acquire skills in applying healthy and safe practices of computing.
- Understand the history and evolution of computers and the Internet.
- Acquire skills and knowledge to use appropriate resources both within and beyond the classroom.
- Develop confidence in using a variety of computing technologies in relation to real-world situations.
- Establish the foundation upon which ICT skills can be developed.

LEARNING EXPERIENCES

Students should:

- Be encouraged to learn through inquiry, exploration and experimentation.
- Have opportunities to relate their activities to real-world situations/examples/cases.
- Have opportunities to familiarize with and practice different computing applications independently and in groups.

- Be provided opportunities to acquire proper knowledge about computers.
- Be provided adequate hands-on experiences in using computers.

LEARNING OUTCOMES

These experiences should help the students to

- Demonstrate understanding of historical evolution of computers and the Internet.
- Identify the common components of a computer and describe their functions.
- Employ safe and healthy practices when operating computers and accessing online information.
- Demonstrate knowledge and understanding of computing concepts through the use of appropriate terminology in the correct context.
- Use relevant online information to enhance their work productivity.
- Learn independently through inquiry, exploration and experimentation.
- Use appropriate tools/applications to solve a variety of tasks or problems.

COURSE CONTENT FOR CLASS 9

Recommended teaching time for each topic is indicated within brackets

Evolution and History of Computers (5%)

• A brief background only

Hardware and Peripherals (15%)

- Basic computer components: monitor, keyboard, mouse, CPU
- Memory: RAM (volatile), ROM/firmware (non-volatile), capacity (bit, byte, KB, MB, GB)
- Storage devices: fixed drives (hard disk), removable drives (floppy drive, Zip drive, CD ROM drive), storage capacity (bit, byte, KB, MB, GB)
- Printers: dot matrix, line printer, ink jet printer, laser printer

Software (5%)

- System Software and Application Software: concept, definition and differences
- Operating System: concept, definition and functions
- Explanations and examples of various software programs such as word processor, spreadsheet, presentation, email, web browser, antivirus, etc.

Introduction to Windows (10%)

- Windows terminologies: menus, icons, title bar, menu bar, scroll bar, maximise, minimise, restore, cursor, mouse pointer, dialog box, application window, document window, desktop, program, taskbar, screensaver, wallpaper
- Mouse operations: left click, right click, double click, drag and drop, select, copy and paste, cut and paste (use Paint program to practise mouse skills)
- Keyboarding skills: use Typing Tutor to practise (software on PGCTIS Resource CD)
- Windows shortcuts: using combined keys and function keys as alternative to using mouse

File and Computer Management (15%)

- Files and folders: concept, create, rename, delete
- Directories and paths: concept, create, rename, delete
- Managing Desktop and Recycle Bin
- Backing up files on a floppy
- Searching files: using wild cards * and ?
- Using essential MS DOS commands and wild characters: copy, dir, md, rd, del, cls, time, date, *, ?
- Using Windows disk maintenance tools: ScanDisk, Disk Defragmenter, Disk Cleanup
- Hardware maintenance: protecting from dust and liquid, and power fluctuations (stabiliser/CVT/MCB/UPS)
- Healthy operation practices: proper start up and shut down procedures, disconnecting mains before opening computer cabinets, using proper voltage settings, keeping computers clean, taking break from computer screen regularly, etc.

Word Processing using Microsoft Word (25%)

- Concept, and orientation of screen, menu and toolbars
- Creating and editing (backspace, delete, copy, cut, paste, selecting text) document
- Saving, opening and deleting documents
- Character formatting (font attributes)
- Paragraph formatting (indent, line spacing, justification)
- Page formatting (orientation, size, margin, border, number)
- Bullets and numbering
- Header and footer
- Spell check, thesaurus, search and replace, help
- Previewing and printing (print menu features)
- Using clipart and drawing tools (WordArt, AutoShapes)
- Using tables (insert/delete row and column, shading)
- Using Equation Editor

Spreadsheet using Microsoft Excel (25%)

- Concept, and orientation of screen, menu and toolbars
- Spreadsheet terminologies (cell, worksheet, workbook)
- Using cell references, and selecting cells and ranges
- Data entry and editing data (AutoFill, sort, copy, cut, paste)
- Cell formatting (fonts, shading, alignment, text wrap, merge, split, borders)
- Using in-built functions and creating simple formulae (with arithmetic operators +, -, *, / and with functions such as SUM, AVERAGE, etc.)
- Using and modifying charts
- Previewing and printing (print menu features)

MODES OF ASSESSMENT

The course at this level will be assessed internally by the school. The assessment will consist of two modes – continuous assessment and written examination – as explained below.

1. Continuous Assessment (20%)

The continuous assessment consists of *class work* and *course work* (small project work/assignments). Both class work and course work will carry a credit of 10% each.

Class work will be assessed regularly after every unit or topic. This will provide teachers the opportunities to judge how well the student is faring in the topic and accordingly try new strategies to help him learn better. Students will be required to do *two assignments*. Each assignment will not be more than 5 pages or three sheets, and should be submitted as a soft copy (i.e. on a floppy). These assignments will be based on a topic or a related set of topics already covered.

For details on assessment of class work and project work (referred here as course work), refer Continuous Assessment Classes VI to X Teachers' Guide, CAPSD, 1999.

2. Examination (80%)

There will be two papers for examination – *theory* and *practical*. There will be no choice of questions in either paper.

Paper I

Questions will be in the form of multiple choice, fill in the blanks, short answer type or mix of the three covering the entire syllabus. It is *one-hour* written examination and will be evaluated out of 30 marks. Use of computers is not required. Answers must be written in the question booklet only.

Paper II

This paper will contain questions which require the use of computers and therefore, it should be conducted in the computer laboratory. The focus here will be on assessing the word processing skills using Microsoft Word, and spreadsheet skills using Microsoft Excel. This paper will be evaluated out of 50 marks. It is *two-hour* practical examination. The completed work should be submitted on a floppy disk provided.

WEIGHTING OF TOPICS FOR EXAMINATION

Evolution and History of Computers	2	
Hardware and Peripherals	10	Paper I 30
Software	3	
Introduction to Windows	5	
File and Computer Management	10	Paper II
Word Processing (Microsoft Word)	25	
Spreadsheet (Microsoft Excel)	25	50
Total Marks	80	80

SUPPLIED TEXTBOOKS AND REFERENCES

Textbook

• Computer Applications Class 9 (2004). Sangeeta Panchal and Alka Sabharwal. Oxford University Press, India.

References

- Introductory Information Technology. The Complete Textbook for Class IX (2002). Satish Jain and Shashank Jain. BPB Publications, India.
- PGCTIS course handouts and reference books
- PGCTIS resource CD

COURSE CONTENT FOR CLASS 10

Recommended teaching time for each topic is indicated within brackets

1. Introduction to Computer Networks (5%)

- Concept
- Advantages and disadvantages
- Types: based on area coverage (LAN, WAN) and based on topology or layout (linear, bus, ring, star)
- Network protocols: basic concepts only
- Network devices: cable (co-axial, UTP, fiber optic, etc.), hub, switch, router, server (web, mail, etc.)

2. Internet and Email (25%)

- Concept and brief history of the Internet
- Resources required for dial-up Internet connection: modem, phone line, web browser, and demonstration
- Common terminologies: ISP, URL, domain types (.com, .edu, .org, .bt, .sg, .info), web page, email, download, hyperlinks, home page, etc.
- Using search engines (<u>www.google.com</u>, <u>www.yahoo.com</u>, <u>www.altavista.com</u>), Boolean search techniques (using +, AND, OR, NOT)
- Using bookmarks (Favorites in Internet Explorer)
- Printing: directly and using a word processor (copy-paste)
- Downloading from the Internet
- Creating email: account, user ID, password
- Using email: sending mail and attachment, replying, forwarding, sending copies (cc, bcc)
- Using email: blocking spam, netiquettes

3. Data Security and Computing Issues (10%)

- Computer virus concept, effects, types (worms, macro, boot sector, multipartite, etc.)
- Using antivirus: examples (Norton, Panda, McAfee, Inoculate) and demonstration
- Updating virus definitions
- Health issues: RSI, ergonomics
- Copyright issues: software piracy, illegal or unethical contents
- Privacy protection: password, ID, data encryption

4. Presentation using Microsoft PowerPoint (20%)

- Concept, and orientation of screen, menu and toolbars
- Create and save presentation files
- Insert and delete slides
- Formatting slides (fonts, alignment, design, layout)
- Adding custom animation and sound effects
- Adding clip arts and drawings
- Running slide shows
- Previewing and printing (print menu features)

5. Database using Microsoft Access (40%)

- Concept, and orientation of screen, menu and toolbars
- Creating tables using appropriate data types
- Table relationships
- Creating queries
- Designing forms (using proper button layouts, colour and font choice)
- Creating reports
- Previewing and printing (tables, queries, forms)

MODES OF ASSESSMENT

Assessment at this level will be of two types. Continuous assessment will be done internally by the school. The examination will be conducted by the Bhutan Board of Examinations Division.

1. Continuous Assessment (20%)

The continuous assessment consists of *class work* and *course work* (small project work/assignments). Both class work and course work will carry a credit of 10% each.

Class work will be assessed regularly after every unit or topic. This will provide teachers the opportunities to judge how well the student is faring in the subject and accordingly try new strategies to help him learn better.

Students will be required to do *two assignments*. Each assignment will not be more than 5 pages or three sheets, and should be submitted as a soft copy (i.e. on a floppy). These assignments will be based on a topic or a related set of topics already covered.

For details on assessment of class work and project work (here referred to as course work), refer Continuous Assessment Classes VI to X Teachers' Guide, CAPSD, 1999.

2. Examination (80%)

There will be two papers for examination – *theory* and *practical*. There will be no choice of questions in either paper.

Paper I

Questions will be in the form of multiple choice, fill in the blanks, short answer type or mix of the three covering the entire syllabus. It is *one-hour* written examination and will be evaluated out of 30 marks. Use of computers is not required. Answers must be written in the question booklet only.

Paper II

This paper will contain questions which require the use of computers and therefore, it should be conducted in the computer laboratory. Students will have to design a database using Microsoft Access. They will also have to prepare a write-up in the form of a Microsoft PowerPoint presentation on the database they designed. This paper will be evaluated out of 50 marks. It is *two-hour* practical examination. The completed work should be submitted on a floppy disk provided.

WEIGHTING OF TOPICS FOR EXAMINATION

Computer Networks	3	
Internet and Email	20	Paper I 30
Data Security and Computing Issues	7	Paper II
Presentation (Microsoft PowerPoint)	15	
Database (Microsoft Access)	35	50
Total Marks	80	80

SUPPLIED TEXTBOOKS AND REFERENCES

Textbook

• Computer Applications Class 10 (2004). Sangeeta Panchal and Alka Sabharwal. Oxford University Press, India.

References

- Introductory Information Technology. The Complete Textbook for Class X (2002). Satish Jain and Shashank Jain. BPB Publications, India.
- ICSE Computer Application for Class IX (2006). Dr Gautam Roy. Allied Publishers Pvt Ltd., India.
- PGCTIS course handouts and reference books
- PGCTIS course CDs

COMMERCIAL STUDIES

COMMERCIAL STUDIES

Rationale

Commercial Studies as a discipline in classes 9&10 is the first platform which introduces the students to learn the basic concepts, principles and terminologies of Business Studies. It also provides the students with the opportunity of applying the principles as an occupation if need may arise. Knowledge about the basic principles and the applications there of will give them a good point of departure for further studies or carrying out sound business activities.

In part this move towards commercial studies reflects the transition from total dependence on public sector to independent private sector and thus lessening the burden from the public sector enterprises to a new clan of entrepreneurs. Which can be entrepreneurs with new ideas in small businesses or Shareholders with big stakes in Blue-Chip Organizations or Chief Executive Officers (CEOs) in Corporations and Companies

These careers are coming into prominence in the recent years through out the world .Hence, making it all the more necessary to be included in the High School level in the form of Commercial Studies. The topics like commercial organization, their functions, communication, accounting and trade for class 9 can confirm the same and the topics like stakeholders, regulatory structure, marketing, finance and human resources in class 10 makes it a complete course for the students to use it as a launch pad to the Commercial World.

Aims

Commercial studies aims at facilitating students:

- 1. To understand basic concepts in Commerce.
- 2. To help students to develop an analytical, sensitive, critical and stringent response to the local, national and international business.
- 3. To enable students to be able to strike a balance between the general demands and individual aspirations and goals.
- 4. To facilitate students to develop 3n1bitions and destinations, be it a petty .entrepreneur or a dynamic CEO in a multinational company.
- 5. To help students develop values like- the value of resource management to human resource management, values related to various skills of organization, values of communication, accounting, economy etc..
- 6. To give access and promotion to the students so that they can translate various commercial information from the news paper, radio, T.V. and other media.
- 7. To develop in efficiency, management, decision making, planning and organizing.

Learning Experience

In order to facilitate learning in commerce, the students should be provided with a variety of learning experiences. Like:

- 1. Learning commerce from the text books, reference books, case studies, annual reports of companies etc.
- 2. Group activities in the classroom.
- 3. Use of newspapers, magazines, carrying out surveys etc.
- 4. Chances of real life cases and situations to understand commercial concepts and ideas.
- 5. Carrying out project works.

Learning outcomes

These experiences will help the students to:

- 1. Differentiate between different types of business organization and should be able to list the merits and demerits.
- 2. Describe/ understand the functions of a commercial organization. Like marketing and sales, finance, human resource, production, purchase and general administration etc.
- 3. Identify different types of communicational skills.
- 4. Know basic accounting terminology-capital, liability, asset, revenue debtors, creditors etc.
- 5. Show an understanding of accounting principles, journals, ledgers, cash book, and petty cash book. Trial balance, bank reconciliation statement
- 6. Describe the meaning and types of trade.
- 7. Understand the concept of stake holders in commercial organizations.
- 8. Understand the regulatory structure related to commercial organization.
- 9. Assess the key concepts of marketing like advertising and brand promotion, sales and sales promotion, qualities of a good sales man etc.
- 10. Identify the purpose of finance, financial recording, understand financial accounting principles, interpreting financial reports, budgeting, banking and fundamentals of accounting.
- 11. Understand the meaning of human recourse, method, selection, training and appraisal.
- 12. Have simple understanding of industrial relations and the role of trade unions.

SYLLABUS FOR CLASS IX

Course contents

1. Commercial organizations – distinctions between the various types, merits and demerits.

- i. Understanding of what is meant by commerce, business, industry, trade, organization, firm, company.
- ii. Commercial organizations grouped according to activities; industrial groupings.
- iii. Grouping according to sectors primary, secondary and tertiary.
- iv. Profit making and non -profit organizations.
- v. Ownership structures- proprietorship, partnership, joint stock Company, public limited company, public corporation, co-operative society, franchise, charitable organization.

2. Understanding the functions of a commercial organization,

The following topics should be studied as departments in a typical firm only

- i. Marketing and Sales.
- ii. Finance
- iii. Human Resources (personnel, training) Production
- iv. Purchasing and Stores
- v. General Administration and Legal

3. Communication

- i. The need for communication in commercial organizations.
- ii. Verbal (written, spoken) and non-verbal communication.
- iii. Inter-personal skills in communication.
- iv. Different methods of communication (letter, facsimile, e-mail, video conference, memo, telephonic conversation, etc.)

4. Accounting- objective and basic accounting terminology

- i. Objectives- to maintain records of business, calculation of profit and loss, depiction of financial position, to make the information available to various groups and users.
- ii. Basic accounting terminology- capital, liability, asset, revenue, expense, purchase, sales, stocks, debtors, creditors.
- iii. Simple understanding of the use of journals, ledgers, cash book, petty cash book, trial balance, bank reconciliation statement (no questions are to be set on recording of entries or on calculationsmerely an understanding of the use of the above is required).

5. Trade

- i. Meaning and types of trade.
- ii. Home trade and international trade, import, export and entreport trade, role of WTO.
MODE OF ASSESSMENT

There will be no external examinations for class IX. It will be internally assessed by the school. The modes of assessment will include "*Continuous Assessment*" and "*written examination*" as given below.

1. Continuous Assessment - 20 marks

This part of the assessment should be conducted by the respective subject teachers. Within this assessment, it consists of class work, homework, and a Project work. (For details please refer to the "Continuous Assessment – Classes VI to X", Teachers' Guide, Provisional Edition, CAPSD, 1999)

2. Written Examinations - 80 marks

The written examinations will be conducted twice, once in each of the two terms of the academic sessions. The weighting of marks for the two terms will be decided by the school. In each term, there will be an examination of two hours each. In addition, this paper will consist of two sections.

Section A will consist of questions requiring short answer covering the whole syllabus. There will be no choice of question in this section and it will be assessed out of 40 marks.

Section B will consist of essay-type questions. There will be a choice of questions and candidates will required to answer FOUR questions from this section. This section will also be assessed out of 40 marks.

<u>Note:</u> All the chapters may be given more or less same weighting.

Text books

1. Commercial Studies ICSE: by A .Ghosh and A Banerjee. Oswal Printers and Publishers Pvt. Ltd. 14/131, Hospital Road, Agra-282003

Reference

- 1. ICSE Commerce A New Approach by J. Chirayath and M. Maveley Frank Bros. and co.4675-A Ansari Road, 21 Daryaganj, New Delhi; 110002
- 2. ICSE Commerce by Ghosh and Y.N Nigam. Oswal Printers and Publishers Pvt. Ltd. 14/131, Hospital Road, Agra-282003.
- 3. Books by Kalyani Publications.
- ICSE Accounts: by Ghosh and S.C Mittal Oswal Printers and Publishers Pvt. Ltd. 14/131, Hospital Road, Agra-282003

SYLLABUS FOR CLASS X

Course content

1. Stakeholders in Commercial Organizations

- i. Distinction between stakeholders customers.
- ii. Internal and external stakeholders.
- iii. Expectations of stakeholders employers (owners and managers), employees, associates, and the general public.

2. Regulatory structure related to commercial organizations - simple understanding only

- i. Simple understanding of the scope only of the Companies Act.
- ii. Sales and marketing (concepts behind: code of conduct for advertisers, fair trade, role of MRTP, Consumer Protection Act).
- iii. Employment and labour legislation (including an emphasis on the ban on child Charter).
- iv. Concept and Enforcement of social security laws (including brief reference to Provide Fund, Gratuity, Pension, Group Insurance).
- v. Financial regulation (accounting standards and ethics; taxation).
- vi. Regulation on intellectual property (copyright, trade marks, patents)

3. Marketing

- i. Purposes and Key types of marketing activities- with examples from consumer goods, consumer services.
- ii. Difference between a product and a service (with examples).
- iii. Assessing demand including use of market research tools.
- iv. Advertising and brand promotion.
- v. Sales and the selling process, including the difference between marketing and sales, qualities of a good salesman.

4. Finance

- i. Purpose of finance recording in commercial organizations (the accounting cycle), elementary understanding of manual and computerized systems.
- ii. Principles of financial accounting and reporting a simple understanding without calculations of the use for non trading organizations (receipts and payment account, income and expenditure account, balance sheet); trading organizations (trading account, profit and loss account, balance sheet).
- iii. Interpreting financial reports given the financial statements for a trading organization, students should be able to interpret and make deductions.
- iv. Budgets and their utility in planning (including the concept of Cash Flow statements).
- v. Banking functions of the central bank and commercial banks, types of accounts and banking transactions.
- vi. Fundamental concepts of Cost (direct and variables).

5. Human Resources

- vii. Methods of recruitment, selection and training (including the use of appraisal systems).
- viii. Simple understanding of industrial relations and the role of trade unions

MODE OF ASSESSMENT

There will be an external examination for class X. It will be conducted and assessed by the Bhutan Board of Examinations (BBED). The modes of assessment will include "Internal Assessment" and "External written examination" as given below.

1. Internal Assessment - 20 marks

This part of the assessment should be conducted by the respective subject teachers. Within this assessment, it consists of class works, home works, project works and half-yearly examinations. (For details please refer the "Continuous Assessment – Classes VI to X", Teachers' Guide, Provisional Edition, CAPSD, 1999)

2. External Written Examination - 80 marks

This is conducted and assessed by the Bhutan Board of Examination (BBED), at the end of the year. The paper will be set for a duration of two hours, and will consists of two sections as given below:

Section A will consist of questions requiring short answer covering the whole syllabus. There will be no choice of question in this section and it will be assessed out of 40 marks.

Section B will consist of essay-type questions. There will be a choice of questions and candidates will required to answer FOUR questions from this section. This section will also be assessed out of 40 marks.

<u>Note:</u> All the chapters may be given more or less same weighting.

Text Books

1. Commercial Studies ICSE: by A .Ghosh and A. Banerjee. Oswal Printers and Publishers Pvt. Ltd. 14/131, Hospital Road, Agra-282003

Reference

- ICSE Commerce A New Approach by J. Chirayath and M. Maveley Frank Bros. and co.4675-A Ansari Road, 21 Daryaganj, New Delhi; 110002 2
- ICSE Commerce by Ghosh and V.N Nigam. Oswal Printers and Publishers Pvt. Agra-282003.
- 3. Books by Kalyani Publications.
- ICSE Accounts: by Ghosh and S.C Mittal Oswal Printers and Publishers Pvt. Ltd. 14/131, Hospital Road, Agra-282003

SOCIALLY USEFUL PRODUCTIVE WORK (SUPW)

SOCIALLY USEFUL PRODUCTIVE WORK (SUPW)

Rationale

Socially Useful and Productive Work is an integral part of the school curriculum. This program is very useful to students to keep abreast of the day-to-day realities that surround them. It helps to promote and instill the attitude of being useful to others and develop practical skills that will be required to the students later in life.

Besides, it will help individuals to choose areas of work that they are interested in and pursue them further. They will also develop the attitude to initiate and take up activities that are socially useful and productive.

Aims

To develop:

- 1. positive attitude towards work;
- 2. the healthy habits of work;
- 3. interest in community and nation-building activities;
- 4. participatory skills in community and nation-building activities; and
- 5. awareness of social, personal and environmental issues.

Learning experiences

Students should be given opportunities to be engaged in organised gainful and productive activities. They should be encouraged to take initiative, organise and conduct such activities. They should be given experiences that will enable them to undertake socially useful and productive activities in future, whether they are at work, at home or in a community. Their experiences can be both independent and in a group.

Learning outcomes

Students will be able to:

- 1. do any given work willingly and confidently;
- 2. practice the habit of planning any type of work;
- 3. co-operate with others;
- 4. contribute to community and nation building;
- 5. deal with social, personal and environmental issues; and
- 6. exhibit responsible behaviour whenever required to do so.

Suggested areas and activities

Provided below is a suggested list of areas and activities that students can choose from. It has been developed from a study of the status of SUPW in classes nine to ten in our schools conducted in November, 1999. You may also refer the ICSE syllabus booklet (any edition) for more ideas.

1. School campus beautification

- i School park management
- iii Drain and toilet cleaning
- v Waste disposal

2. Maintenance works

- i Furniture
- iii Volleyball court

3. Horticulture

- i Flower garden
- iii Vegetable garden
- v Any other

4. Nature conservation

- i Tree plantation
- iii Bamboo/banana plantation

5. Animal Husbandry

- i Piggery
 - iii Beekeeping

6. Art and craft

i	Weaving	ii	Knitting
 111	Needle work	iv	Basket making
V	Photography	vi	Clay modelling
vii	Paper craft	viii	Making useful things out of waste materials
Painting		x A	Any other

7. Home science

ix

- i. Cooking
 - iii. Any other

8. Construction works

- i Chorten construction
- iii Firewood shed construction
- v Dungkhor construction

9. Community service

- i Cleanliness of village and town
- iii Literacy (non-formal) classes

10. Voluntary works

- i. Shoe mending
- iii. Social service in the hospital

- ii Paths and pavements cleaning
- iv Room decoration
- vi Any other
- ii Electrical works
- iv Any other
- ii Orchard
- iv Mushroom cultivation
- ii Nature exploration
- iv Any other
- ii Poultry
- iv Any other

- ii. Interior decoration
 - ii Basketball gallery extension
 - iv Garage construction
 - vi Any other
 - ii Educate villagers on health and hygiene

iv. Any other

- ii. Hair cutting
- iv. Any other

Organisation of the activities

The activities for SUPW could be organised in several ways. Below are a few suggestions extracted from the same study mentioned above:

- 1. All classes IX-X students could be grouped into CLUBS or COMMITTEES with a teacher in charge. The clubs or committees could be based on the above suggested areas and activities.
- 2. EACH SECTION could be given AN AREA with the class teacher in charge.
- 3. EACH SECTION could be EQUALLY DIVIDED into groups for different areas and activities and each group could be looked after by a teacher.

To give a specific example, each student could plant and take care of 3 saplings as well as manage a plot of vegetable garden. In addition, groups of 6-7 students could visit the villages for bealth and bygiene related exercises or any other community service. That way, each student would have three different areas of work.

Allocation of time

One period of 40 minutes a week is allotted for SUPW. This time is meant for teacher contact and consultation on the progress of work. It is upto the individual students or the groups to spend any time on SUPW outside of the scheduled time table.

MODES OF ASSESSMENT

It is left to the discretion of the schools as to how students might be assessed on their SUPW. However, the concerned teachers MUST follow some criteria for awarding grades to students and maintain an assessment record similar to the sample given in annexure on pages 109 to 111.

References

- 1. The Purpose of School Education in Bhutan, A Curriculum Handbook for Schools, CAPSSD, Education Department, Thimphu, 1996
- 2. The ICSE Syllabus and Regulations, March 2002 2004

ANNEXURE

CRITERIA FOR THE AWARDING OF SUPW GRADES

Tangmachu High School Lhuentse

For all work given by the school authorities

	<u>Points</u>
Completion of work	2
Quality of work	3
Time input (for every hour spent) 2	
Management of tools/equipments	3
	10
For all voluntary work	
Time input (for every hour spent)	4
Completion of work	2
Quality of work	3
Management of tools/equipments	3
	12

The final grades will be awarded as follows:

А	1000+ points
В	800 - 1000 points
С	600 - 800 points
D	400 - 600 points
Е	200 - 400 points

<u>NOTE:</u> Tangmachu High School claims that the above criteria has been useful in assessing SUPW works. We would like to acknowledge and thank them for sharing their ideas with us.

RULES FOR AWARDING AND DEDUCTION OF POINTS

A. One point will be deducted from the student's total,

- 1. each time there is mention by teachers or captains about his/her misbehaviour.
- 2. each time his/her name is mentioned in the morning assembly for disturbing school rules.
- 3. each time he/she is away from the school without informing the school authorities.
- 4. each time he/she claims others' work to be his/her own.

B. To gain points, the following rules apply:

- 1. The student may work with students of other classes on voluntary basis to improve his/her points.
- 2. If a student brings a certificate signed by ALL THE CAPTAINS for any good work, he/she will be awarded 1 point.
- 3. For group work, points will be awarded to the group and every member will be entitled to the group points. (e.g. if the group gets 10 points, ALL members will get 10 points.)

C. The following rules should also be noted:

- 1. All teachers have the authority to award 1 point to any of the students (at one time) for exemplary behaviour or voluntary work.
- 2. The Principal has the authority to award or deduct upto 5 points (at one time) to any student.
- 3. A student needs to work for a minimum of 100 hours to gain 1000 points and qualify for grade A.
- 4. Those students who accumulate more than 900 points will be awarded merit certificates by the school.
- 5. Students will not be given permission to do voluntary work during class/study/games hours.

<u>NOTE</u>: The above rules also belong to Tangmachu High School and are transparent to students as well.

A SAMPLE PAGE FROM THE SUPW RECORD BOOK TANGMACHU HIGH SCHOOL LHUENTSE

Tshewang N	10 B Roll No. 28 Bumpa House			
Time Taken	Date	Work Done	Points Awarded	Signature
5 hr	27/8	Levelling of parking area	60	
2 hr	29/8	Grasscutting – Archery range	24	
41/2 hr	3/9	Stage decoration	45	
6 hr	24/9	Went to clean water source	60	
3 hr	17/10	Mending of latrine wall	30	
1 hr	18/10	Cleaning of Block A latrine	12	
1 hr	21/10	Unloading WFP ration from truck	12	
1 hr	3/11	Cleaning the staffroom	12	

<u>NOTE:</u> Tangmachu High School maintains an SUPW record book and claims that their way of organising the SUPW programme has proven worthwhile for students in terms of attitudinal and behavioural changes. Students show a lot of interest and keep track of their own record. They strive harder to gain more points. Voluntary works increase over the year.

VALUES EDUCATION

VALUES EDUCATION

Rationale

Teaching of values is regarded very important to develop children intellectually, physically, socially, emotionally and spiritually. The existing school curriculum has values embedded in it. Bhutanese youth have a huge responsibility of keeping and shaping Bhutan th away our beloved King and our forefathers have always desired. To do this successfully, it is imparative that our children have positive experiences in the way they think, act and grow up. The development of values should take place through the formal courses, the personal relationship in the school and through the total school organisation and life. Teaching of values is a complex phenomenon where it is difficult to assess and takes longer time for the outcome to be visible.

Aims

Teaching of values is expected to help to:

- 1. develop in students a desirable social behaviour.
- 2. develop patriotism.
- 3. grow up into responsible citizens.
- 4. promote self discipline.
- 5. make them understand the importance of the preservation of culture and tradition.
- 6. build self confidence and reliance.

Learning experiences

The students should be provided with opportunities to deal with various values systems so that they are engaged in experiences that will help them understand the concepts and realize their importance in the day-to-day lives. The experiences should further help the students internalize the values and make them an integral part of their actions.

Some of the experiences suggested below will be useful in teaching values:

- encouraging students to read *namthars*, life stories of great historical personalities and stories of real life experiences followed by discussions based on them
- maintaining a diary or journal on values-related thoughts, feelings and issues
- helping students write creative stories related to values
- conducting art competitions on value themes
- assigning specific responsibilities for students to carry out
- arranging moral talks by guest speakers and students and staff during the morning assembly
- carrying out project works related to values

It may be noted, however, that the development of values requires continuous reinforcement, whether inside the classroom or outside. Every day incidents of school life

offer innumerable opportunities for students to learn values (*e.g. punctuality, good manners, cleanliness, responsibility and respect*). What teachers say and do, how they reward and punish, the way they smile and frown also teach values. Therefore, it is important for schools to be organised in a way conducive to the learning of values.

Learning outcomes

These experiences will help students to:

- be loyal to the King, country and the people;.
- recognize their own worth as individuals and develop a personal belief and value system;
- display an attitude of resourcefulness and self reliance;
- be honest, open and cooperative in their dealing and relationship with other people;
- develop a pride in being Bhutanese in a world community;
- contribute and participate in public life, conservation of heritage and environment and care for public and private properties as one's own.

Suggested Topics for values education in schools

FOR CLASS IX:

1. Honesty

Demonstrating honesty in:

- i duty/work ii economic transactions of all kinds
- iii dealing with others

2. Obedience/Respect

- i Showing obedience and respect to ii Respecting the laws others
- iii Keeping in mind the Bhutanese code of conduct and acting accordingly

3. Gratitude

- i Showing gratitude to the King ii Showing gratitude to the country
- iii Showing gratitude to the iv Showing gratitude to parents government
- v Showing gratitude to teachers

4. Responsibility

- i Showing a sense of duty in whatever one does
- ... 111 Being responsible for the family

5. Loyalty/Patriotism (National Identity)

Showing an understanding of all the i national symbols (crest, flag, National Anthem, and being able to talk about them

6. Unity

i Fostering a sense of unity among citizens

7. Creativity

- i Demonstrating creativity in one's daily activities
- ... 111 Employing one's creativity in community development

8. Perseverance & determination

- i Showing perseverance and determination in whatever one does
- ... 111 Indicating a sense and dedication and acting accordingly

- ii Caring for public property
- iv Being responsible and reliable in using resources
- ii Indicating a love for the national language, the King, the national dress and behaving appropriately
- ii Developing a sense of unity between communities
- ii Indicating creativity in the school activities
- ii Showing a sense of commitment

FOR CLASS X:

1. Honest γ

Demonstrating honesty in:

- i duty/work
- iii dealing with others

2. Obedience/Respect

- i Showing obedience and respect to others
- iii Keeping in mind the Bhutanese code of conduct and acting accordingly

3. Gratitude

- i Showing gratitude to the King
- iii Showing gratitude to the government
- iv Showing gratitude to teachers

4. Responsibility

- Showing a sense of duty in whatever i one does
- iii Being responsible for the family

5. Loyalty/Patriotism (National Identity)

i Showing an understanding of all the national symbols (crest, flag, National Anthem, and being able to talk about them

6. Unity

i Fostering a sense of unity among citizens

7. Creativity

Demonstrating creativity in one's daily i activities

- ii economic transactions of all kinds
- ii Respecting the laws
- ii Showing gratitude to the country
- v Showing gratitude to parents
- ii Caring for public property
- iv Being responsible and reliable in using resources
- ii Indicating a love for the national language, the King, the national dress and behaving appropriately
- ii Developing a sense of unity between communities
- ii Indicating creativity in the school activities

iii Employing one's creativity in community development

8. Perseverance & determination

- i Showing perseverance and determination in whatever one does
- iii Indicating a sense and dedication and acting accordingly

9. Dignity

- i Have a sense of dignity of labour.
- iii Nurture a sense of contentment.

10. Compassion

- i Show empathy.
 - iii Have broadmindedness.
 - v Be caring and compassionate to the less fortunate, animals and the disabled.

- ii Showing a sense of commitment
- ii Develop a sense of self-worth-self/social status.
- ii Show understanding.
 - iv Show compassion to other living beings/older people, people younger than the self.

Allocation of time

One period of 40 minutes in a week is allotted for values education.

MODES OF ASSESSMENT

Maintaining a record of students' behaviour would help the teachers to see their changing behaviour over time and to provide guidance and counselling as and when necessary.

Teachers must keep in mind that values-oriented learning cannot be assessed formally as done for the academic subjects. It is a continuous process and teachers need to make observations and maintain records of student behaviours over a period of time. Observations can be carried out with a small group of students.

Reference for teachers

Teaching Learning to be, A Curriculum Guideline for Classes PP to X: Part I, CAPSS, Education Division, 1999

<u>NOTE:</u> Teachers are expected to follow the above-mentioned guideline which provides a more detailed syllabus with suggested lessons/activities and other values learning experiences within the school organisation.