National School Curriculum

INSTRUCTIONAL GUIDE FOR GEOGRAPHY

CLASSES IX & X

Department of Curriculum and Professional Development

Ministry of Education, Royal Government of Bhutan

“Your parents, relatives, and friends would be very proud of what you have achieved. At your age, to have completed your studies is your personal accomplishment. Your knowledge and capabilities are a great asset for the nation. I congratulate you for your achievements. Finally, your capabilities and predisposition towards hard work will invariably shape the future of Bhutan. You must work with integrity, you must keep learning, keep working hard, and you must have the audacity to dream big.”

- His Majesty Jigme Khesar Namgyel Wangchuck

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We would like to sincerely acknowledge the retrieval and use of ideas and pictures from various sources. We reaffirm that this book is purely for educational purposes.

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Foreword

The erstwhile Royal Education Council (REC) developed an Adapted and Prioritized curricula for schools so that students can continue learning during the disruptions caused by the COVID 19 pandemic since March 2020. With the commencement of the 2021 academic session, the new normal curriculum, later renamed as the National School Curriculum (NSC), was embraced as a paradigm shift of education from the conventional knowledge-based learning to competency based, open source and experiential learning leveraged on digital technologies. In order to facilitate the effective implementation of the curriculum change, Instructional Guides were developed in all subjects, and the teachers were oriented through virtual and short contact modes as per the prevailing pandemic situations. The curricula were aimed at minimizing the learning loss for learners as it was designed for implementation in different situations - during school closure or during regular contact instructional hours.

While these measures served as a solution to problems brought about by the pandemic and the global changing trend in education, a resilient and more dynamic curricula and instructions remain the current priority of the Government. In cognizance of some the shortfalls in the provisional edition of Instructional Guides (IG), the Department of Curriculum and Professional Development reviewed and revised the existing Instructional Guides across all subjects with the aim of enforcing the competency-based learning, and making teaching-learning happen 'anytime anywhere' commensurate to an inclusive education, so that all learners are provided the opportunity to learn at their pace and situation.

The revised Instructional Guides have drawn ideas and inspiration from various educational philosophies and principles, particularly the Delors Report, Learning: The Treasure Within (1996). The report prioritizes the development of the whole person and not just academic knowledge through the four pillars: "learning to know", "learning to do", "learning to be", and "learning to live together". Therefore, the New Curriculum and the Instructional Guide is an attempt to transform education from the teaching of "what" to learning of "how" and "why" towards empowering learners with the transversal competencies and the 21st century skills, and preparing them to be lifelong learners.

It must be noted that the New Curriculum and the Instructional Guide are not just a response to the pandemic, but a culmination of the curriculum reform work for the last four years by the Royal Education Council. The school curricula are to be perceived as integrated, and based on themes and problems that inspire learners to learn and to live in peace with our common humanity and our common planet. This has the potential in the development of a strong base of knowledge about one's self and about the world, find purpose of learning, and be better able to participate in social and political milieu. Thus, this initiative is envisaged to orient our educational process towards nurturing 'nationally rooted and globally competent' citizens.

Wish all our learners and teachers a life enriching experiential teaching and learning.

Tashi Namgyal

Director

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Introduction

This guide has been developed for teachers teaching Geography in schools across the country for the implementation of the Geography curriculum. As all the schools follow the same curriculum aimed at equipping the students with the same set of competencies, it is crucial for all the teachers to have the same understanding about the intent of the curriculum so that they would be able to implement it as desired.

The Geography curriculum consists of four strands, according to the language competencies to be taught; they are Time and Space, Physical Environment, People and the Environment, and, Essential Skills, and Geographical competencies to be acquired and demonstrated by the learners at each stage of learning are outlined as Standards, Competencies and Objectives. While guiding teachers on what to teach, these standards, competencies and objectives will also inform the stakeholders about the levels of knowledge and skills expected from the learners at various stages of education.

The sample activities given in the guide are suggestive in nature. Teachers can negotiate to adapt and design their own teaching learning activities or experiences that best suit their learners and their environment. What is non-negotiable is the teaching of the competencies that the learners must acquire at each class before they move on to the next class.

The curriculum has a wide range of knowledge, concepts and skills that the students need to master. There are those which the learners can explore, acquire and practice to master on their own, and there are also more complex ones which need to be taught explicitly and practised consistently to gain a satisfactory level of mastery. Classroom teaching and instructional time should focus on teaching those concepts and skills that the students cannot learn on their own, while encouraging learners to explore some areas to learn and practice on their own.

A major shift in the curriculum is the teaching and development of skills by the learners. Therefore, the curriculum contents should be used as vehicles to move towards the acquisition of competencies. The competencies for each class are further broken down as objectives that should serve as signposts for teachers to decide what to teach.

Since, competencies are at the heart of curriculum and its implementation, teachers should make conscious choice of the most suitable teaching-learning approaches. And, because the teaching focusses on acquiring skills/competencies, assessment will also be on the acquisition and demonstration of the skills - skills in terms of Geospatial concepts, social, behavioural and affective domains that are demonstrable and measurable. Various assessment approaches, tools and rubrics have been devised and suggested in the Instructional Guide. Teachers are enquired to be consistent to meaningfully assess students and report to stakeholders at various levels. Further, the focus of assessment should be for learning rather than assessment of learning which would happen periodically.

Purpose of Instructional Guide

Among the many definitions of 'curriculum' this Instructional Guide underscores the meaning of curriculum as a standard and competency-based sequence of planned learning experiences where learners practice and achieve the proficiency in applying the learning experiences in real life scenarios. These proficiencies, in the curriculum framework, have been stated as competencies and objectives for each class. In keeping with the principle, 'less is more' as stated the National School Curriculum, the contents of the curriculum have been reduced so that learners can be engaged more in activities/learning experiences that can lead to the acquisition of geographic knowledge and skills rather than having them cover the syllabus. This Instructional Guide believes that the classroom teachers, as professional individuals, can make the most authentic and reliable judgment about each learner's learning needs and the learning experiences to be provided to propel the learners in the learning continuum. With these beliefs and principles as the background, the following are the purposes of this document:

i. Facilitate learners acquire language skills and competencies using literature as a medium.

ii. Strengthen blended learning, including flipped classroom with multimedia, digital pedagogies and ICT devices and websites as tools to share the responsibility of learning amongst the learners, teachers, the parents and other stakeholders.

iii. Facilitate the use of Continuous Formative Assessment for learning using diverse appropriate assessment techniques and tools commensurate with individual differences in learning, and gather evidence to guide planning of educational programmes and activities for learners.

iv. Promote inclusive learning through the blended learning which facilitates learning anywhere, any time with the learner being responsible for the learning.

v. Provide suggestive means of teaching language skills by building interrelationship among, and through, the integration of the four strands of the curriculum.

vi. Help teachers assume the roles of facilitator, guide, motivator and evaluator.

vii. Guide teachers, parents and other stakeholders in helping learners achieve their potential.

viii. Empower teachers to design their own 'course of study' or 'class curriculum' for their students in line with the National School Curriculum Framework.

ix. Enhance sharing the burden responsibility and accountability for learning amongst the

stakeholders, including the learners themselves.

In this age of advanced communication and information technology, contents are widely available from a number of sources, therefore, the contents of the curriculum have been kept flexible enough for teachers to select, structure and sequence them to best suit the learners need while maintaining coherence and consistency. In other words, while the contents of the curriculum are negotiable, the competencies and objectives are not. While, teachers may have access to number of materials, it should be kept in mind that the teaching and learning should be focused on achieving the competencies rather than 'covering of the syllabus. The teaching learning materials should be used as means to create a learning environment that is competency-based where the learners need to master the skills presented to them. While designing lesson plans and teaching learning activities, teachers need to ensure that the materials are relevant and appropriate for the given task.

The assessment should be competency-based wherein the teachers should assess the learners' mastery of the skills stated as competencies and objectives for each class. Teachers should use appropriate assessment tools and techniques depending on the nature of the learning experiences. The learners should be clearly informed about the success criteria, the areas of assessment and the tools to be used so that they know exactly what tasks are to be performed or expected of them. In the process of the performance, the teacher should continuously provide feedback and, if necessary, modify instructions. Efforts have to be made to ensure that every learner has mastered the skills.

National School Curriculum

Instructional Guide for Geography

Class IX

STRAND I: TIME AND SPACE

Theme 1: The Solar System

We live on a planet called the Earth that orbits the Sun once every 365 days. The Earth is one of eight known planets, while the Sun is a ordinary star about half way through its lifetime with another 5000 million years to go. The only reason the Sun does not look like the other stars is because it is much nearer to us. Even so, at 147 million kilometres away, it still takes about 8 minutes for light to reach us from the Sun. All the planets orbit the Sun in more or less the same plane. This is called the plane of the ecliptic.

The planets are not evenly spaced but are in three groups: the inner planets, Mercury, Venus, the Earth and Mars ; the gas giants, Jupiter and Saturn; the outer planets, Uranus, and Neptune.

1.1 Competency

Explore the significance of the solar system to comprehend the relative motions of the planets.

1.2 Objectives

- Compare the Earth with other planets in the solar system.
- Discuss the uniqueness of the Earth.
- State the evidence to prove the sphericity of the Earth.
- Explain the consequences of rotation and revolution.

1.3 Learning Experiences

Strategies such as brainstorming, project-based learning, cooperative learning, basic questioning, exploration, illustration, peer learning, group discussion and inquiry-based learning are suggestive teaching learning processes.

a. Explore the uniqueness of the Earth using various sources and present their findings to the class.
b. In groups, explore the evidences to prove the sphericity of the earth and share the findings.
c. Using the link **https://www.youtube.com/watch?v=libKVRa01L8** students in pairs, compare the earth with others planets in the solar system (size, distance, satellite, motion and temperature) and share their findings to the class.
d. Using the link https://www.youtube.com/watch?v=L18-brRutcw , find out the differences between rotation and revolution and its consequences. Students prepare notes.

Reflective Questions

- What are the two forces responsible for the Earth's shape? Explain these forces.

1.4 Assessment

Use assessment tools such as rubrics, checklist, anecdotal record, quiz, question and answer, any other relevant tools to assess a student's task.

1.5 Resources

1. Website Links:

    - https://www.youtube.com/watch?v=L18-brRutcw (Motions of the Earth)
    - https://www.youtube.com/watch?v=iPp2KZWBR5k (Latitude and Longitude)
    - https://www.youtube.com/watch?v=swKBi6hHHMA(Latitude and Longitude)
    - https://www.youtube.com/watch?v=libKVRa01L8 (The Solar System)
    - https://www.nios.ac.in/media/documents/316courseE/ch9.pdf(Compositionof Atmosphere)
    - https://www.youtube.com/watch?v=dnvk-mP3FCE (Structure of the atmosphere)
    - https://www.youtube.com/watch?v=ySSyT44nma4 (Weather instruments)
2. Principles of General Geography by Charles Farro
3. Intermediate Geography Class IX, REC (2019)
4. Globes and Atlas

2.1 Competency

Assess the significance of geographical coordinates with reference to location and time.

2.2 Objectives

- Evaluate the importance of latitude and longitude.
- Calculate the time and longitude.

2.3 Learning Experiences

a. Using the link https://www.youtube.com/watch?v=iPp2KZWBR5k or https://www.youtube.com/watch?v=swKBi6hHHMA, students in shoulder partners discuss the concept and importance of the latitude and longitude. Prepare notes.

b. Use the link https://www.youtube.com/watch?v=bWnEZCBvrsU&t=68s or https://www.youtube.com/watch?v=3YrNM4RMMro or any other relevant resources for time calculation. Demonstrate a few examples of calculation for time and longitude. Students solve the questions by referring to Principles of General Geography (Chapter 4) or any other relevant resources.

Reflective Questions

- Longitude lines help in calculating time of the places, what are the important roles of the parallel of latitudes?

2.4 Assessment

Use assessment tools like rubrics, checklist, anecdotal record, quiz, question and answer or any other relevant tools to assess a student's task.

2.5 Resources

Website Links:

- https://www.youtube.com/watch?v=L18-brRutcw (Motions of the Earth)
- https://www.youtube.com/watch?v=iPp2KZWBR5k (Latitude and Longitude)

- https://www.youtube.com/watch?v=swKBi6hHHMA(Latitude and Longitude)
- https://www.youtube.com/watch?v=libKVRa01L8 (The Solar System)
- https://www.nios.ac.in/media/documents/316courseE/ch9.pdf(Compositionof Atmosphere)
- https://www.youtube.com/watch?v=dnvk-mP3FCE (Structure of the atmosphere)
- https://www.youtube.com/watch?v=ySSyT44nma4 (Weather instruments)

3.1 Competency

Examine the significance of the atmosphere and its impact on the Earth.

3.2 Objectives

- Describe the composition of the atmosphere.
- Analyse the characteristics of different layers of atmosphere.
- Explain the basic working principle of weather instruments with the help of illustrations

3.3 Learning Experiences

a. Use the link https://www.youtube.com/watch?v=dnvk-mP3FCE **OR** https://www.nios.ac.in/media/documents/316courseE/ch9.pdf **OR** any available resources to explore the composition of the atmosphere and write about it. Illustrate a labelled diagram to show the layers of the atmosphere and explain the significance of each layer.

b. Assign a project work on the weather instruments **OR** students illustrate weather instruments and explain the function of each instrument.

Reflective Questions

i. How does the composition of the atmosphere affect the climate?

ii. Which gas despite its small proportion is crucial in atmospheric processes?

3.4 Assessment

Use assessment tools such as rubrics, checklist, anecdotal record, quiz, question and answer, any other relevant tools to assess a student's task.

3.5 Resources

1. Website Links:

- https://www.youtube.com/watch?v=L18-brRutcw (Motions of the Earth)
- https://www.youtube.com/watch?v=iPp2KZWBR5k (Latitude and Longitude)
- https://www.youtube.com/watch?v=swKBi6hHHMA(Latitude and Longitude)
- https://www.youtube.com/watch?v=libKVRa01L8 (The Solar System)
- https://www.nios.ac.in/media/documents/316courseE/ch9.pdf(Compositionof Atmosphere)

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- https://www.youtube.com/watch?v=ySSyT44nma4 (Weather instruments)

2. Principles of General Geography by Charles Farro
3. Intermediate Geography Class IX, REC (2019)
4. Globes and Atlas

STRAND I: TIME AND SPACE

Theme 2: Map Reading and Interpretation

Map is a scaled representation of a part of the earth or whole of the earth's surface on a flat surface such as sheet of paper, wall, piece of wood or plastic, etc. It is a drawing which represents physical features.

Map interpretation is the process of examining a given topographical map of an area represented for the purpose of identifying the geographical information of an area. It has two basic process; Map reading and Map analysis. Map reading is the process of examining the given topographical map, conventional symbols and signs. Map analysis is the process of relating the identified information on the map with other geographical information which are not directly shown on the map.

4.1 Competency

Use appropriate technology to design maps for interpretation of geographical concepts.

4.2 Objectives

- Interpret topographic maps.
- Locate the important physical and cultural features on a map.
- Design maps using geo spatial technology.

4.3 Learning Experiences

Strategies like activity-based learning, think pair share, cooperative learning, basic questioning, demonstration, visualization, exploration, illustration, group discussion, interpretation and brainstorming are suggestive teaching learning processes.

a. Use the links: https://www.youtube.com/watch?v=ypinpNiDXV and https://www.youtube.com/watch?v=zqPMYGDxCr0 to understand the features of topographic map.

   In groups, use any available topographic map to interpret its features (contours, index contours, scales, grid references, directions, conversion of scales, measurement of distance on maps, finding areas on the map, settlement patterns, drainage patterns, human made and physical features, conventional signs and symbols, significance of colours, occupation and map features). Share the interpretation.

b. Using QGIS software, students generate a map of Bhutan (major river system, population, settlement, dzongkhag, gewog, transportation, and mineral distribution).

Reflective Questions

- What is Geospatial Technology?

4.4 Assessment

Use assessment tools such as rubrics, checklist, anecdotal record, quiz, question and answer, any other relevant assessment tools and techniques can be used to assess a student's task.

4.5 Resources

1. Website Links:

- https://www.youtube.com/watch?v=zqPMYGDxCr0 (Topographical Map)
- https://www.youtube.com/watch?v=CoVcRxza8nI&t=79s (Topographical Map)
- https://www.youtube.com/watch?v=4-t04F2KhUQ (Topographical Map interpretations)
- https://www.youtube.com/watch?v=q2lJZV1yC6o&t=150s (Physical features)

STRAND II: PHYSICAL ENVIRONMENT

Theme 3: Land Formation Processes

Landforms are formed due to the action of two natural processes on the surface of land. External processes which take place in the atmosphere and hydrosphere and affect the land surface. These act slowly, wearing down the highland and depositing materials in lowlands and internal processes that take place in the interior of the earth and cause changes on the land surface.

These processes cause movements of the Earths' crust leading to formation of mountains and plateau. The nature of landforms at any place is thus the result of interaction of these processes at a given period of time. In the external processes changes in weather conditions affect most the rock, exposed on the surface and break them up into smaller particles. This process of breaking up of rocks by changes in weather phenomena such as temperature, moisture and precipitation is called weathering. Weathering takes place in situ.

5.1 Competency

Assess the significance of natural resources to conserve the ecosystem for sustainable use.

5.2 Learning Objectives

i. Explain the factors affecting soil formation.
ii. Explain the properties of different types of soil.
iii. Explore different types of soil found in Bhutan.
iv. Describe the importance of soil and the ways to conserve it.
v. Explain the sources of the rivers and hydrological cycle.
vi. Describe the river as an important agent of denudation.
vii. Interpret various features formed by rivers in the different stages.
viii. Evaluate the importance of river in the socio-economic development of a nation.
ix. Discuss alternative sources of energy in Bhutan.

5.3 Learning Experiences

Brainstorming, basic questioning, power point presentation, fieldtrip, video lesson, observation, simulation, illustration, geo inquiry and sampling are some of the suggestive strategies of teaching and learning.

a. Use the link https://www.youtube.com/watch?v=lgoLzst6jw0 or any other resources to discuss and comprehend the factors affecting soil formation.

b. Explore soil types and its properties in the vicinity of the school. Prepare a report based on the observations and share the findings.

c. In groups, discuss the importance of soil and suggest measures to conserve the soil **OR** Use the link https://www.youtube.com/watch?v=UXlSoaSAJlI to understand the importance of soil and measures to conserve it. Write the findings on a chart and do Gallery Walk.

d. Use library, IT lab or any other available sources to prepare presentation on sources of rivers and hydrological cycle.

e. Brainstorm on river as an agent of denudation. In groups, explore fluvial processes to understand the associated landforms.

f. Organise a field trip to observe and note the various features formed by a river **OR** make a model of different features formed by rivers in the different stages **OR** illustrate and interpret different land features formed in each stage of the river **OR** carry out a virtual tour using Google Earth to observe different landforms.

g. Using the links https://www.youtube.com/watch?v=q8HmRLCgDAI and https://www.youtube.com/watch?v=AcxRQJKD0LE , discuss and list the importance of river.

h. In groups, explore the alternative sources of energy using any available resources and write the importance of it.

5.4 Assessment

Assessment tools such as rubrics, checklist, rating scale, anecdotal record, quiz, question and answer, and any other relevant tools and techniques to assess a students' task.

5.5 Resources

1. Website link:

    - https://www.youtube.com/watch?v=7iyxocIhfu0(Soil formation)
    - https://www.youtube.com/watch?v=voWgADFhh (Soil Formation)
    - https://www.youtube.com/watch?v=lgoLzst6jw0(Factors affecting Soil)
    - https://www.youtube.com/watch?v=dnvk-mP3FCE (Composition of atmosphere)
    - https://www.youtube.com/watch?v=nsK4hq29gWE (Generation of hydroelectricity)
    - https://www.youtube.com/watch?v=q8HmRLCgDAI (Generation of hydroelectricity)
    - https://www.youtube.com/watch?v=XJ_FNS8Z_ek(Landforms in different stages of river)

2. Principles of General Geography by Charles Farro
3. A Geography of Bhutan (Course book for class IX-X)
4. Intermediate Geography Class IX, REC (2019)

STRAND III: PEOPLE AND THE ENVIRONMENT

Theme 4: Population and Spatial Diversity

Population geography is the study of the ways in which spatial variations in the distribution, composition, migration and growth of populations are related to the nature of places. Population geography involves demography in the geographical perspective. It focuses on the characteristics of population distributions that changes in a spatial context, especially with reference to size and density, distribution and vital statistics (births, marriages, deaths, etc.).

Settlement geography is the study of human land, water and resource use, population density patterns, and settlement growth. It is essential to urban planning and urban landscape. Group of people living together forms a settlement. Settlement geography studies the villages, towns, etc. and also the types of relationships they generate.

6.1 Competency

Examine human activities to understand spatial diversity for a just and harmonious co-existence.

6.2 Objectives

- Interpret population pyramid.
- Interpret the data on distribution of population.
- Explain the factors affecting the distribution of population.
- Analyse the factors affecting settlement.
- Discuss types and pattern of settlement with examples.
- Generate population distribution of Bhutan using QGIS.

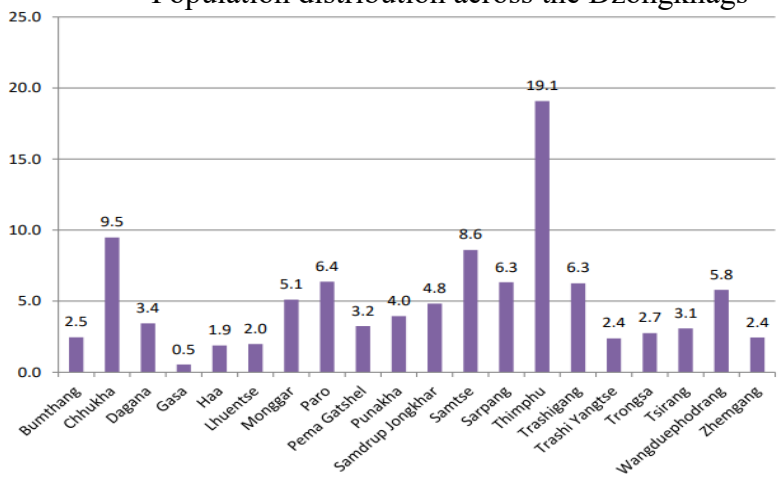
6.3 Learning Experiences

Brainstorming, basic questioning, power point presentation, fieldtrip, video lesson, number heads together, round table, think pair share, lecture method, cooperative learning, gallery walk, and fishbowl are some of the suggestive strategies.

a. Use the link youtube.com/watch?v=Cx7KFyasW6A&t=239s to interpret population pyramid and describe its characteristics.

b. Interpret and analyse the population distribution graph in groups. Prepare a report and share it to the class.

Population distribution across the Dzongkhags



Source: Population and Housing Census of Bhutan, 2017

c. Assign the factors affecting the distribution of population to groups. Discuss and prepare a presentation.

d. Use the links: https://www.nios.ac.in/media/documents/316courseE/ch29.pdf about Settlements and https://www.internetgeography.net/topics/patterns-of-settlement/ Pattern of settlement. In groups, discuss and share the findings.

e. Brainstorm on the factors affecting the patterns of settlement. Assign factors to the groups to further explain how it affects the distribution of settlement (weather and climate, soil type and quality, water supply, vegetation, flat river valleys, raw materials/natural resources).

f. Use the link https://www.thethirdpole.net/en/livelihoods/photo-story-abandoned-houses-haunt-rural-bhutan/ to understand about *Gungtong* (empty households) in the rural areas of Bhutan and suggest measures to curb it. Share the findings.

Students generate population distribution map of Bhutan using QGIS software.

6.4 Assessment

Use assessment tools such as rubrics, checklist, rating scale, anecdotal record, quiz, question and answer, and any other relevant assessment tools and techniques to assess a student's task.

6.5 Resources

URL links:

- https://www.youtube.com/watch?v=Cx7KFyasW6A (Population pyramid)
- https://www.populationpyramid.net/bhutan/2019/(Population pyramid of Bhutan, only 2019)
- https://www.youtube.com/watch?v=b-ilETXFRIk(Pattern of settlement)
- https://www.greenfacts.org/en/ecosystems/millennium-assessment-2/4-factors-changes.htm (Factors that change ecosystem)
- https://www.manage.gov.in/studymaterial/FSA-E.pdf (Farming as a system)
- https://byjus.com/questions/5-difference-between-traditional-and-modern-methods-of-farming/
- https://avirtech.co/what-is-the-difference-between-traditional-and-modern-farming (Traditional and Modern farming)

STRAND III: PEOPLE AND THE ENVIRONMENT

Theme 5: Human Environment Interaction

Humans shape the landscape through their interaction with the land, which has both positive and negative effects on the environment. As an example of the human-environment interaction, think about how people living in cold climates have often mined coal or drilled for natural gas in order to heat their homes.

3.2 Competency

Analyse the interaction amongst the spheres and its impact on the people and biodiversity.

7.2 Learning Objectives

i. Describe the components of an ecosystem.
ii. Explore types of ecosystems.
iii. Identify natural and human induced factors responsible for the change in the ecosystem.
iv. Discuss the environmental concerns and conservation measures.
v. Describe farming as a system.
vi. Differentiate between traditional and modern farming.
vii. Explain the factors influencing agriculture.
viii. Analyse the importance of agriculture.

7.3 Learning Experiences

a. Explore any relevant resources on ecosystem to understand the components of an ecosystem. Draw flow chart and display in the class.

b. In groups, explore the types of eco-system using internet or any other relevant materials and prepare power point presentation.

c. In groups, classify natural and human induced factors that change the ecosystem. (climate change, earthquake, landslide, increase in population, land-use change, pollution, new species, resource exploitation, deforestation). Discuss the factors and suggest measures to mitigate environmental issues.

d. Classify these (soil, climate, ploughing, food crops, cash crops, sowing seeds, relief, seeds, watering, fodder crops, meat, weeding, plants, fertilizers, animals, dairy products, harvesting,

labour, water, eggs) under input, farm processes, output to learn farming as a system. Display the work.

Inputs	Farm Processes	Outputs

e. In groups, discuss and find out the differences between traditional and modern agriculture. Students prepare notes.

f. In groups, explore the factors influencing agriculture. Discuss and prepare presentation.

g. In pairs, brainstorm on the importance of agriculture and share the findings.

Reflective Questions

i. How do you relate global warming with environmental degradation?
iii. Suggest measures to overcome modern agriculture problems.

7.3 Assessment

Use assessment tools such as rubrics, checklist, rating scale, anecdotal record, quiz, question and answer, and any other relevant assessment tools and techniques to assess a student's task.

7.4 Resources

URL links:

- https://www.youtube.com/watch?v=Cx7KFyasW6A (Population pyramid)
- https://www.populationpyramid.net/bhutan/2019/(Population pyramid of Bhutan, only 2019)
- https://www.youtube.com/watch?v=b-ilETXFRIk(Pattern of settlement)
- https://www.greenfacts.org/en/ecosystems/millennium-assessment-2/4-factors-changes.htm (Factors that change ecosystem)
- https://www.manage.gov.in/studymaterial/FSA-E.pdf (Farming as a system)
- https://byjus.com/questions/5-difference-between-traditional-and-modern-methods-of-farming/
- https://avirtech.co/what-is-the-difference-between-traditional-and-modern-farming (Traditional and Modern farming)

STRAND III: PEOPLE AND THE ENVIRONMENT

Theme 6: Hazards and Disasters

A hazard is a natural process or phenomenon that may pose negative impacts on the economy, society, and ecology, including both natural factors and human factors that are associated with the natural ones. Hazards are the origins of disasters.

Disasters are violent events that are outside the control of humans. They are caused by the forces of nature and may result in loss of life, injury, and damage to property. There are many types of natural disaster, including avalanche, drought, earthquake, flood, volcanic eruption, storm and wildfire.

8.1 Competency

Use indigenous and scientific knowledge to understand measures to minimise disasters.

8.2 Objectives

- Discuss major disasters and their causes.
- Describe common disasters in Bhutan.
- Explain disaster management approach
- Explore indigenous knowledge to mitigate disasters.

8.3 Learning Experiences

Use of methods such as field trip, project method, cooperative learning, brainstorming, basic questioning, power point presentation, video lesson, number heads together, round robin & round table, think pair share, lecture method, gallery walk, illustrations, explorations, guest Speaker, observation, simulation are some of the suggestive methods or the teachers may use any other relevant teaching strategies.

a. Using the link https://www.youtube.com/watch?v=9WIwlljva_s&t=104s (Types of disasters, students identify major disasters and explain its causes to the class.

b. Using the link https://www.youtube.com/watch?v=mekJcjoe0ws, Students explore the common disasters in Bhutan. Suggest measures to reduce risk to life and properties.

c. Refer the flow chart, discuss and explain the cycle in groups. Choose a disaster event and prepare its plan as per the Disaster Management Cycle. Display in the class.

d. Guest speaker gives a talk on cultural and traditional knowledge on disasters. In groups, compare cultural and traditional with scientific approaches in response to disasters.

8.4 Assessment

Use assessment tools such as rubrics, checklist, rating scale, anecdotal record, quiz, question and answer, and any other relevant assessment tools and techniques that can be used to assess a student's task.

8.5 Resources

1. URL links:

- https://www.youtube.com/watch?v=aYmdrJWLQ4Y(Ecosystem)
- https://www.google.com/search?q=farming+system+in+bhutan&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjLiJO5spPvAhVh7nMBHUg0DiAQ_AUoAXoECBAQAw&biw=1366&bih=625(Land use & Farming system, pictorial information only)
- https://www.youtube.com/watch?v=Cx7KFyasW6A&t=239s (major Disaster)

2. A Geography of Bhutan, Course book for class IX-X (Chapter 8)

Instructional Hours and Weighting Based on Competency

Sl No	Strand	Competencies	Weighting %	Instructional Hours	In minutes	Period (40')
1	Time and Space	Explore the significance of the solar system to comprehend the relative motions.	6	3.6	216	5.4
		Examine the significance of geographical coordinates with reference to location and time.	8	4.8	288	7.2
		Examine the significance of the atmosphere and its impact on the Earth.	8	4.8	288	7.2
		Use appropriate technology to design maps for interpretation of geographical concepts.	25	15.0	900	22.5
2	Physical Environment	Assess the significance of natural resources to conserve the ecosystem for sustainable use.	18	10.8	648	16.2
3	People and environment	Examine human activities to understand spatial diversity for a just and harmonious co-existence.	10	6.0	360	9
		Analyse the interaction amongst the spheres and its impact on the people and biodiversity.	15	9.0	540	13.5
		Use indigenous and scientific knowledge to minimise disasters.	10	6.0	360	9
		Total	**100**	**60.0**	**3600**	**90**

Appendix/Annexure

Map Work: Bhutan and Asia

Bhutan (6 Marks)

Physical Features

i. ***Mountain****s: Jumolhari, JowoDurshing, GangkarPunsum, Masa Gang, Tsenda Gang, Jiwuchu Drakey*
ii. ***Passes:*** *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. ***Rivers:*** *Wang Chhu, Amochhu, Puna Tsang Chhu, Pho Chhu, Mo Chhu, MangdeChhu, Chamkhar Chhu, KuriChhu, DangmeChhu, KholongChhu, NgyeraAmaChhu*
iv. ***Selected places:*** *Jomotshangkha, Manas, Pasakha, Dungkhar, Buli, Tendu, Lunana, Phobjikha and Merak.*
v. *All the Dzongs and Dzongkhag headquarters.*

Asia Map (4 marks)

a. Physical features

i. ***Mountains:*** *Urals, Altai, Yablonoi, Khingan, Caucasus, Zagro, Kunlun, Himalaya, Yoma.*

ii. ***Plains and Plateaus:*** *Northern Lowlands, Mongolian Plateau, Plateaus of Arabia and Iran, Tarim Basin, Tibetan Plateau, Indo Gangetic Plains and Great North China Plain*

iii. ***Rivers and Seas:*** *Ob, Yenesi, Lena, Euphrates, Tigris, Irrawaddy, Mekong, Yangtse, Hwang Ho, 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 and South East Asian Archipelago***

v. ***Climatic and vegetation belts***

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

Note: Suggested Question Components

Section A:

i. Topographical Map – 15 Marks
ii. Map Works-Bhutan, Asia – 10 Marks
iv. *MCQ - 10 Marks*
v. *Fill in the blanks - 5 Marks*
vi. *Match the following - 5 Marks*
vii. *True or False - 5 Marks*

Section B: (to attempt 5 out of 6 Questions for 50 marks)
Time & Space, Physical Environment & People and the Environment - 50 Marks

National School Curriculum

INSTRUCTIONAL GUIDE FOR GEOGRAPHY

CLASS X

STRAND I: TIME AND SPACE

Theme1: Map Reading and Interpretation

Map is a scaled representation of a part of the earth or whole of the earth's surface on a flat surface such as sheet of paper, wall, piece of wood or plastic etc. OR, It is a drawing which represents physical features.

Map interpretation is the process of examining a given topographical map of an area represented for the purpose of identifying the geographical information of an area. It has two basic process; Map reading and Map analysis. Map reading is the process of examining the given topographical map, conventional symbols and signs. Map analysis is the process of relating the identified information on the map with other geographical information which are not directly shown on the map.

1.1 Competency

Apply appropriate geo-spatial technology to design maps and interpret geographical concepts.

1.2 Learning Objectives

i. Discuss the basic techniques of layout and numbering of topographical maps.
ii. Interpret the topographical map.
iii. Explain the concept of survey.
iv. Design maps using geo spatial technology.
v. Interpret diagrams, graphs, illustrations and maps to draw logical conclusions.

1.3 Learning Experiences

Strategies such as brainstorming, project-based learning, cooperative learning, basic questioning, exploration, illustration, Peer learning. Experiential learning, group discussion, inquiry-based learning, KWL, and 5Es are suggestive teaching learning processes.

a. Use the link https://www.youtube.com/watch?v=4-t04F2KhUQ OR https://www.youtube.com/watch?v=7FBeIHEmaAU OR Any other relevant sources to discuss and interpret India and Adjacent Countries (IAC) map numbering system. In groups, discuss and explain how topographic map of Bhutan 78 M/11 or any other topographic maps are generated.

b. Use any available topographic map to interpret features (contours, index contours, scales, grid references, directions, conversion of scales, measurement of distance on maps, finding areas on the map, settlement patterns, drainage patterns, human made and physical features,

conventional signs and symbols, significance of colours, occupation and map features). Share the interpretation.

c. Use the link http://pstu.ac.bd/old/uploads/resources/L-021.pdf to understand the concept of survey. Explore different types of survey and its importance by using internet or any other relevant sources. Prepare notes.

d. Students generate population distribution map of Bhutan using QGIS software and interpret it.

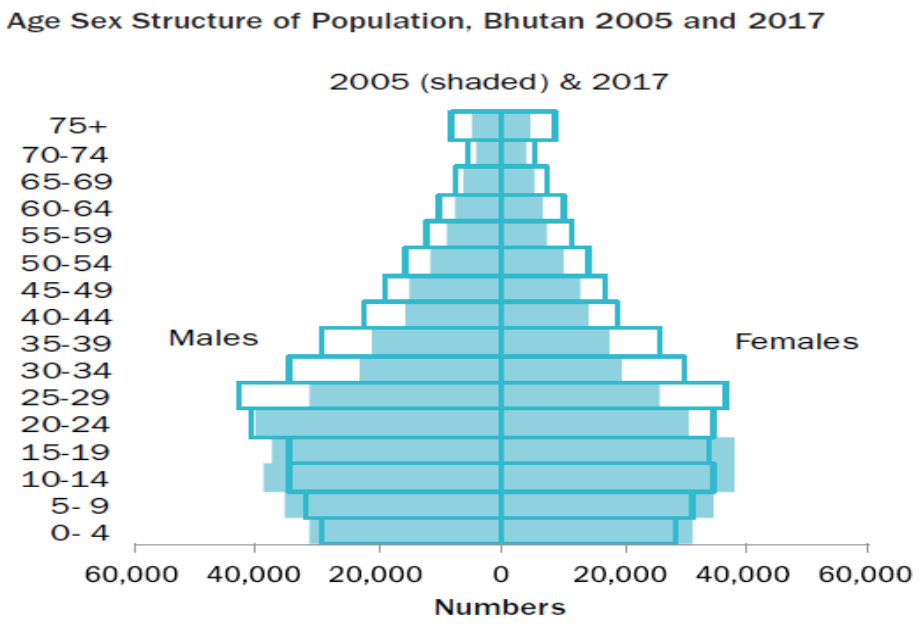


Figure: 1.1

Source: Population and Housing Census of Bhutan (2017)

e. Interpret Figure 1.1 to make comparative study between the population pyramid of 2005 and 2017. Discuss the possible reasons for the change in the characteristics of population pyramid. Share the findings.

1.4 Assessment

Use assessment tools such as rubrics, checklist, anecdotal record, quiz, question and answer and any other relevant tools to assess student's task.

1.5 Resources

1. URL Links:

- https://www.youtube.com/watch?v=4-t04F2KhUQ (Interpretation of Topographic Map)
- https://www.youtube.com/watch?v=7FBeIHEmaAU
- http://pstu.ac.bd/old/uploads/resources/L-021.pdf
- https://www.slideshare.net/misterbatroms/topographic-maps-presentationmine
  https://www.youtube.com/watch?v=7FBeIHEmaAU (Map Numbering System)
- https://www.youtube.com/watch?v=nNM6B6yAMcc (Survey equipment of survey)

2. Globes, Maps and Atlas

STRAND I: TIME AND SPACE

Theme 2: The origin and evolution of the Universe

The Universe originated around 13.7 billion years ago. It is the whole of space that has matter and energy in it. Scientific and spiritual perspectives help to clarify the origin of the Universe. Several scientific theories like the Big Bang and Solar Nebula have attempted to explain the origin of the Universe more appropriately than others. The Milky Way is one of the billions of galaxies in the observable universe. The Sun is one among hundreds of billions of stars in the Milky Way galaxy, and most of those stars have their own planets that revolve around them.

2.1 Competency

Examine the origin of the universe to understand the astronomical geography.

2.2 Learning Objectives

- Discuss the origin of the Earth with reference to the Big Bang and Solar Nebula Theory.

2.3 Learning Experiences

Strategies such as brainstorming, project-based learning, cooperative learning, basic questioning, and inquiry-based learning, guest speaker, simulation, lecture method, presentation, KWL, and 5Es are suggestive.

a. Use any of the links or other relevant materials to explore about the Big Bang Theory to understand the origin of the universe. Share the findings to the class. https://www.youtube.com/watch?v=HdPzOWlLrbE https://www.youtube.com/watch?v=wtDTWYBTAGQ https://www.esa.int/kids/en/learn/Our_Universe/Story_of_the_Universe/The_Big_Bang

b. Using the links: https://www.youtube.com/watch?v=PL3YNQK960Y https://www.youtube.com/watch?v=2ESGUAU2Du0 https://www.slideshare.net/prabhu97/nebular-hypothesis-theory or any other relevant resources on Solar Nebula Hypothesis, identify the key ideas of the Solar Nebular hypothesis and discuss it in class.

c. Use the link http://www.columbia.edu/~vjd1/origins.htm to compare and discuss the differences between Big Bang and Solar Nebula Theory. Share the findings.

Reflective Questions

- How did the solar system form from the Big Bang Theory?

2.4 Assessment

Use assessment tools such as rubrics, checklist, anecdotal record, quiz, question and answer and any other relevant tools to assess student's task.

2.5 Resources

URL links:

- https://www.youtube.com/watch?v=HdPzOWlLrbE (Big Bang Theory)
- https://tmisd.us/documents/Middle%20School/8th%20Grade%20Science/Big%20Bang%20TheoryJM.ppt (Big Bang PPT)
- https://www.youtube.com/watch?v=PL3YNQK960Y (Solar Nebula Hypothesis)
- https://www.youtube.com/watch?v=2ESGUAU2Du0 (Solar Nebula Hypothesis)
- https://www.slideshare.net/prabhu97/nebular-hypothesis-theory (Big Bang and Solar Nebula theory)

STRAND I: TIME AND SPACE

Theme 3: The Earth's Grid System

A system of lines is used to find the location of any place on the surface of the Earth. This is commonly called as grid system. It is made up of two sets of lines that cross each other. One set of lines of latitude that runs in an east-west direction. The other set of lines of longitude that runs in a north-south direction. Although these are only imaginary lines encircling the Earth, they can be drawn on globes and maps as if they actually existed.

3.1 Competency

Examine the significance of geographical coordinates with reference to location and time.

3.2 Objectives

i. Evaluate the significance of latitudes and longitudes.
ii. Determine longitude and time.

3.3 Learning Experiences

Strategies such as brainstorming, project-based learning, cooperative learning, demonstration, peer learning, experiential learning, basic questioning, and inquiry-based learning, KWL, and 5Es are suggestive teaching learning processes.

a. Examine the significance of latitudes using any available resources. Share the findings.

b. Examine the significance of longitudes using any available resources and share the findings.

c. Demonstrates steps to calculate time and longitude of a place. In pairs, solve questions related to it. Use the link https://www.slideserve.com/elkan/longitude-and-time for further understanding.

Reflective Questions

- How is latitude and longitude important in every day life?

3.4 Assessment

Use assessment tools such as rubrics, checklist, anecdotal record, quiz, question and answer and any other relevant tools to assess student's task.

3.5 Resources

1. URL links

   - https://www.youtube.com/watch?v=iPp2KZWBR5k (Latitude and Longitude)
   - https://www.slideserve.com/elkan/longitude-and-time (Longitude and Time)
   - https://www.youtube.com/watch?v=PE04XuxgXzI (How to locate places using Google Earth)

2. Principles of General Geography by Charles Farro

3. Globes and Atlas

STRAND II: PHYSICAL ENVIRONMENT

Theme 4: Climate and Vegetation

A visual comparison of climate and vegetation on a global scale immediately reveals a strong correlation between climatic and vegetation zones: the moist tropics are associated with tropical forest, the dry subtropics with subtropical deserts, regions of temperate climate with temperate/boreal forests, and polar regions with tundra/polar desert.

The central thesis for plant ecology is that climate exerts the dominant control on the spatial distribution of the major vegetation types on a global scale, while on a smaller scale, the contribution of secondary factors such as soil type or topography are important as well. Climate, in the given context defined as a seasonal course of solar radiation, temperature, and precipitation, primarily determines the predominant type of terrestrial vegetation (e.g., broadleaved forest, grassland) and the biogeochemical properties of the land surface (e.g., CO_2 flux, carbon storage in biomass and soil). In turn, vegetation cover affects climate via alteration of the physical characteristics of the land surface like albedo, roughness, water conductivity (biogeophysical mechanisms) and atmospheric gas composition, for example, CO_2 and CH_4 (biogeochemical effects).

4.1 Competency

Explore the function of places and regions in determining the cultural identity that unifies the society.

4.2 Learning Objectives

i. Examine the factors affecting the climate of a place.
ii. Analyse the relationship between climatic zones with vegetation zones of Bhutan.
iii. Discuss the impact of the climatic zone on its inhabitants.
iv. Explore cultural similarities and differences of regions in Bhutan.

4.3 Learning Experiences

Brainstorming, basic questioning, PowerPoint presentation, fieldtrip, video lesson, exploration, illustration, peer learning, group discussion, lecture method, KWL and 5Es are some of the suggestive teaching and learning strategies.

a. Brainstorm on factors affecting the climate of a place. In groups, discuss the factors (Altitude, latitude, monsoon winds, orientation of mountain ranges, vegetation, etc) and present the findings to the class.

b. Explore the characteristics of climatic and vegetation zones of Bhutan. Students analyse the relationship between climatic and vegetation zones.

c. Examine the impacts of the climatic zone on its inhabitants in terms of food habit, language, dwelling, dress, occupation. Share the findings.

d. Explore the similarities and differences of the regions in Bhutan to understand the cultural diversity. Display the findings in the class.

Regions	Similarities	Differences
Southern		
Central		
Eastern		
Western		

4.4 Assessment

Use assessment tools such as rubrics, checklist, rating scale, anecdotal record, quiz, question and answer, and any other relevant assessment tools and techniques to assess student's task.

4.5 Resources

1. URL links:

- **https://www.bbc.co.uk/bitesize/guides/zyj9v4j/revision/3** (Factors affecting climate)
- **https://www.google.com/search?q=climatic+zones+of+bhutan&oq=climatic+zones+of+bhutan&aqs=chrome..69i57j0i512j0i22i30.10781j0j15&sourceid=chrome&ie=UTF-8** (Climatic Zones)

2. Intermediate Geography Class 10

STRAND II: PHYSICAL ENVIRONMENT

Theme 5: Land Formation Processes

Landforms are formed due to the action of two natural processes on the surface of land- external processes which take place in the atmosphere and hydrosphere and affect the land surface. These act slowly, wearing down the highland and depositing materials in lowlands and internal processes that take place in the interior of the earth and cause changes on the land surface.

These processes cause movements of the earths' crust leading to formation of mountains and plateau. The nature of landforms at any place is thus the result of interaction of these processes at a given period of time. In the external processes changes in weather conditions affect most the rock, exposed on the surface and break them up into smaller particles. This process of breaking up of rocks by changes in weather phenomena such as temperature, moisture and precipitation is called weathering. Weathering takes place in situ.

5.1 Competency

Analyse the geomorphic processes to understand the significance of the land features.

5.2 Objectives

i. Interpret geological time scale.
ii. Explain the formation of Himalayan Mountain system with reference to Continental Drift and Plate Tectonics Theory.
iii. Discuss wind as an agent of gradation.
iv. Discuss groundwater and Karst Topography.

5.3 Learning Experiences

Brainstorming, basic questioning, PowerPoint presentation, fieldtrip, video lesson, exploration, visualization, illustrations, presentations, KWL and 5Es are some of the suggestive strategies.

a. Using the link https://sci.waikato.ac.nz/evolution/Geoltimescale.pdf, in groups, discuss and explain Eon, Era, Period and Epoch to understand the evolution of life on the earth.
b. Discuss the Continental Drift and Plate Tectonic Theory using the links: https://www.youtube.com/watch?v=mh5yu24DeQE and

https://www.youtube.com/watch?v=zbtAXW-2nz0&t=52s to understand the formation of the Himalayas.

c. Use the link: https://www.thehindu.com/society/history-and-culture/aftermath-of-the-great-collision/article19882356.ece to explore the evidences to prove that the Himalayas were formed from the Tethys Sea and prepare notes.

d. Using the link https://www.youtube.com/watch?v=kOf_xdgqpk8, In pairs, explore and discuss wind as an agent of gradation to comprehend an **Aeolian** processes.

e. Using the link https://www.youtube.com/watch?v=TklLvoPXgH8 , in groups, discuss underground water as an agent of change in the formation of different landforms. Share it to the class.

f. Using the links https://www.youtube.com/watch?v=wh8AvuX12-E and https://www.slideshare.net/pramodgpramod/karst-topography-160977772 , in groups, discuss and illustrate stalagmite, stalactite, cavern, lapies, sinkhole, and doline to relate geo-cultural heritage. Make a model of any feature of Karst topography.

Reflective Questions

- What is the main significance of the geological time scale to geology?
- What process is responsible for karst topography?

5.4 Assessment

Use assessment tools such as rubrics, checklist, rating scale, anecdotal record, quiz, question and answer, and any other relevant assessment tools and techniques to assess student's task.

5.5 Resources

1. URL links:

- https://sci.waikato.ac.nz/evolution/Geoltimescale.pdf (Geological time scale)
- https://www.youtube.com/watch?v=PDrMH7RwupQ (Formation of Himalayas)
- https://www.youtube.com/watch?v=QbomCXrW0v8 (Formation of Himalayas)
- https://www.youtube.com/watch?v=sC9iqGb94hc (Geological time scale)
- https://www.youtube.com/watch?v=TklLvoPXgH8 (Ground Water)
- https://www.youtube.com/watch?v=wh8AvuX12-E (Karst Topography)
- https://www.slideshare.net/pramodgpramod/karst-topography-160977772

2. Course book for classes IX and X (Geography of Bhutan)

3. Intermediate Geography Class X, REC (2019)

STRAND III: PEOPLE AND THE ENVIRONMENT

Theme 6: Biodiversity

Biodiversity describes the richness and variety of life on earth. It is the most complex and important feature of our planet. Without biodiversity, life would not sustain. It is important in natural as well as artificial ecosystems. It deals with nature's variety, the biosphere. It refers to variabilities among plants, animals and microorganism species.

Biodiversity includes the number of different organisms and their relative frequencies in an ecosystem. It also reflects the organization of organisms at different levels. Biodiversity holds ecological and economic significance. It provides us with nourishment, housing, fuel, clothing and several other resources. It also extracts monetary benefits through tourism. Therefore, it is very important to have a good knowledge of biodiversity for a sustainable livelihood.

6.1 Competency

Analyse the effects of interaction amongst the spheres to understand biodiversity.

6.2 Objectives

i. Explain the components of biodiversity.
ii. Compare ecosystem with biodiversity.
iii. Analyse the significance of biodiversity.

6.3 Learning Experiences

Strategies such as brainstorming, project based learning, cooperative learning, basic questioning, group discussion, peer learning, video lesson, field trip and inquiry based learning are suggestive teaching and learning experiences.

a. Refer Environmental Science class X, REC, (2019), page no 124-132 or any other relevant resources to explore about genetic species and ecosystem diversity to understand the components of biodiversity. Draw a flow chart and display it.

b. Use the link https://www.youtube.com/watch?v=BSkk2R5psp4 to compare biodiversity with ecosystem. In groups, list the similarities and differences and present the findings to the class.

c. Watch the video: https://www.youtube.com/watch?v=b6Ua_zWDH6U to understand the significance of biodiversity and prepare notes individually.

Reflective Questions

i. How does ecosystem influence biodiversity?
ii. How are the major factors affecting biodiversity in the world?

6.4 Assessment

Use assessment tools such as rubrics, checklist, rating scale, anecdotal record, quiz, question and answer and any other relevant assessment tools and techniques to assess student's task.

6.5 Resources

URL links:

- https://www.youtube.com/watch?v=BSkk2R5psp4 (Biodiversity and Ecosystem)
- https://www.slideshare.net/SMZahidHasan1/ecosystem-and-biodiversity-76475879
- https://slideplayer.com/slide/9086205/ (Importance of biodiversity)

STRAND III: PEOPLE AND THE ENVIRONMENT

Theme 7: Natural Resources

A natural resource is one that is afforded by nature without human intervention; hence, the fertile lands or the minerals within them, rather than the crop that grows on them, are examples of a country's natural resources. Although what is considered a "resource" (or, for that matter, "natural") has varied over time and from one society to another, resources are, ultimately, riches provided by nature from which can be derived some form of benefit, whether material or immaterial.

Under some definitions, only those natural resources that can renew themselves and whose exploitation relies on their regenerative capacities properly necessitate management. For example, oil is not usually considered a subject of natural resource management, whereas forests are. The use of nonrenewable resources is subject to regulation rather than management. The management of renewable natural resources seeks to balance the demands of exploitation with a respect for regenerative capacities.

7.1 Competency

Assess the significance of natural resources to understand resource conservation and sustainable use.

7.2 Learning Objectives

i. Discuss mineral resources and its distribution.
ii. Discuss alternative sources of energy in Bhutan.
iii. Classify different sectors and types of industries.
iv. Explain factors affecting location of industries.
v. Analyse the impact of industries.
vi. Identify challenges associated with farming.
vii. Suggest measures to overcome or mitigate problems of farming.
viii. Explore the concept of smart agriculture.

7.3 Learning Experiences

Strategies such as brainstorming, project-based learning, cooperative learning, basic questioning, and inquiry-based learning are suggested teaching learning processes.

a. Using the link https://byjus.com/chemistry/types-of-minerals/, discuss the characteristics and properties of minerals to understand the types of minerals.

b. Using QGIS software, prepare a mineral map of Bhutan.

c. In groups, explore the alternative sources of energy using internet or any other available resources to understand the importance of alternatives sources of energy. Prepare presentations.

d. Refer Intermediate Geography class X, REC (2020), in groups, classify industries as primary, secondary, tertiary and quaternary to understand sectors of an economy. Fill in the table with relevant information.

Sectors	**Characteristics**	**Examples**
Primary		
Secondary		
Tertiary		
Quaternary		

e. Using the link https://www.knowledgiate.com/location-of-industries/, discuss the factors affecting location of industries. Explain these factors with examples.

f. Use the links: https://www.yourarticlelibrary.com/environment/7-major-effects-of-industries-on-environment/12328 and https://penpoin.com/effects-of-industrialization/, to assess the impact of industries. Write on a chart and display it.

g. Using the links https://blog.agrivi.com/post/farm-production-challenges-and-solutions and https://msfagriculture.com/2020/09/23/10-biggest-issues-farmers-2020/ or any other relevant sources, in groups, explore and analyse the challenges of farming and suggest measures to overcome it. Prepare notes.

h. Using the link https://ondo.io/what_is_smart_agriculture/#:~:text=The%20term%20smart%20agriculture%20refers,optimizing%20the%20human% , explore the concept of smart agriculture and prepare notes and share with the class.

Reflective Questions

i. What is the difference between renewable energy and alternative energy?
ii. What is Climate Smart Agriculture (CSA)?

7.4 Assessment

Use assessment tools such as rubrics, checklist, rating scale, anecdotal record, quiz, question and answer, and any other relevant assessment tools and techniques to assess student's task.

7.5 Resources

URL links:

- https://byjus.com/chemistry/types-of-minerals/ (Minerals and types)
- https://niu.edu.in/sla/online-classes/Location-of-Industries.pdf (Factors affecting the location of industries)
- https://www.knowledgiate.com/location-of-industries/ (factors affecting location of industries)
- https://www.yourarticlelibrary.com/environment/7-major-effects-of-industries-on-environment/12328 (Impacts of industries)
- https://penpoin.com/effects-of-industrialization/ (Impacts of industries)
- https://rec.gov.bt/textbooks-and-manuals/#683-946-wpfd-science-1586093616(Environmental Science class X, REC, 2019)
- https://ondo.io/what_is_smart_agriculture/#:~:text=The%20term%20smart%20agriculture%20refers,optimizing%20the%20human% (Concept of smart agriculture)

STRAND III: PEOPLE AND THE ENVIRONMENT

Theme 8: Population and Spatial Diversity

Population geography is the study of the ways in which spatial variations in the distribution, composition, migration and growth of populations are related to the nature of places. Population geography involves demography in the geographical perspective. It focuses on the characteristics of population distributions that changes in a spatial context, especially with reference to size and density, distribution and vital statistics (births, marriages, deaths, etc.).

Settlement geography is the study of human land, water and resource use, population density patterns, and settlement growth. It is essential to urban planning and urban landscape. Group of people living together forms a settlement. Settlement geography studies the villages, towns, etc. and also the types of relationships they generate.

8.1 Competency

Examine the role of human activities to understand the distribution of population and settlement.

8.2 Objectives

i. Discuss the causes of population growth.
ii. Assess the impact of population growth.
iii. Project the population trend.
iv. Discuss spatial distribution of settlement with reference to Central Place Theory.
v. Explain migration and its type.

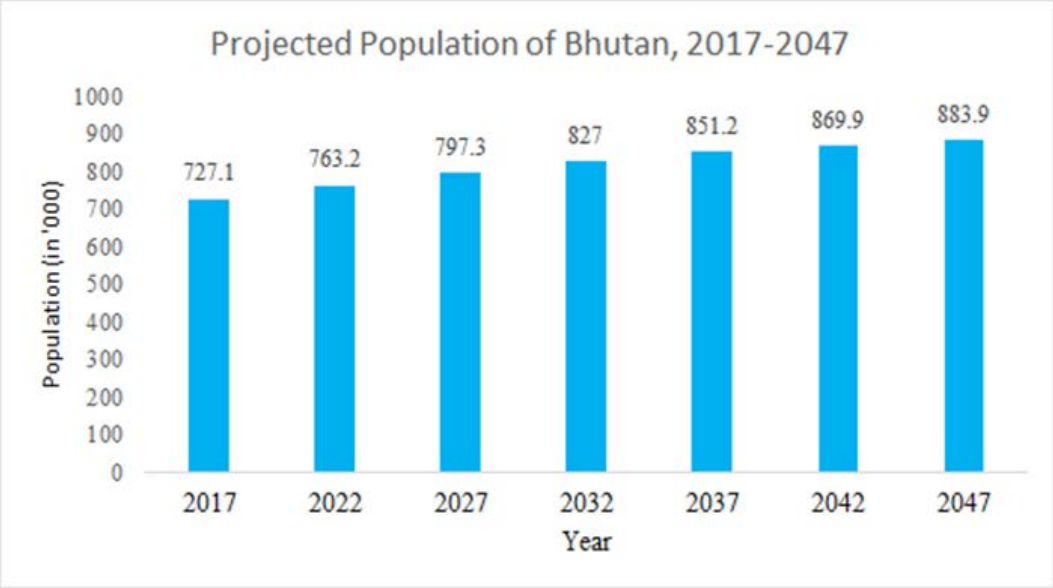
8.3 Learning Experiences

Pedagogies such as brainstorming, project based learning, cooperative learning, basic questioning, KWL, 5Es and inquiry based learning are suggestive and may use any relevant pedagogy in teaching learning process.

a. Using cooperative learning methods, discuss the causes of population growth (fertility, mortality and migration) in home groups and expert groups.

b. Using the link, https://www.slideshare.net/AiyzaKhan/impact-of-population-growth-on-national-development, explore the impacts of population growth and share with the shoulder partners.

c. Study the graph and analyse the future scenario of population growth. Discuss the problems and suggest measures to overcome these problems.

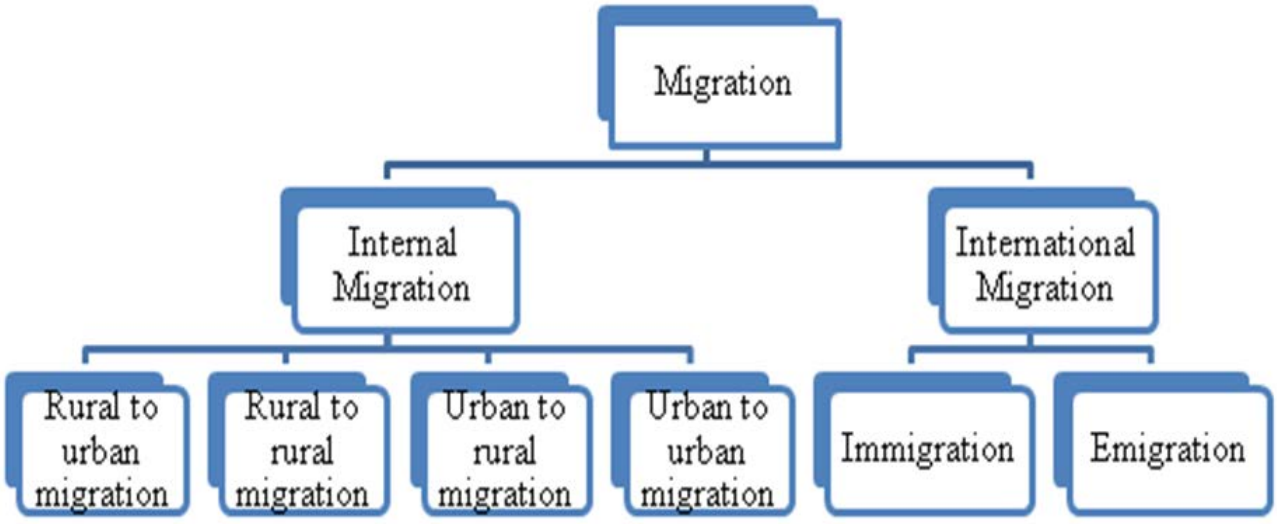


Source: Population Projection 2017-2047 (National Report)

d. Using the link https://www.youtube.com/watch?v=u5XuY04D23s, explore the concept of Central Place Theory and its relevancy in our context.

e. Study the flow chart and explain it with suitable examples to understand the types of migration. Share the findings.

Types of Migration



f. Use the link https://thebhutanese.bt/water-roads-gungtong-human-wildlife-conflict-and-tourism-top-poll-issues-in-6-eastern-dzongkhags/ and discuss the reasons for having high rate of *Gungtong* in rural Bhutan. Explore measures to reduce this issue. Share the findings.

8.4 Assessment

Use assessment tools such as rubrics, checklist, rating scale, anecdotal record, quiz, question and answer, and any other relevant assessment tools and techniques to assess student's task.

8.5 Resources

URL links:

- https://www.slideshare.net/AiyzaKhan/impact-of-population-growth-on-national-developmen (Population Growth)
- https://www.youtube.com/watch?v=u5XuY04D23s (Central Place Theory)
- https://thebhutanese.bt/water-roads-gungtong-human-wildlife-conflict-and-tourism-top-poll-issues-in-6-eastern-dzongkhags/ (*Gungtong)*

STRAND III: PEOPLE AND THE ENVIRONMENT

Theme 9: Hazards and Disasters

A hazard is a natural process or phenomenon that may pose negative impacts on the economy, society, and ecology, including both natural factors and human factors that are associated with the natural ones. Hazards are the origins of disasters.

Disasters are violent events that are outside the control of humans. They are caused by the forces of nature and may result in loss of life, injury, and damage to property. There are many types of natural disaster, including avalanche, drought, earthquake, flood, volcanic eruption, storm and wildfire.

9.1 Competency

Use indigenous and scientific knowledge to explain ways of managing disasters.

9.2 Objectives

i. Describe common disasters in Bhutan.
ii. Suggest mitigation measures to reduce impact of disaster.
iii. Apply lifesaving skills to minimise disaster risk.

9.3 Learning Experiences

Use of methods such as field trip, project method, cooperative learning, brainstorming, basic questioning, power point presentation, video lesson, number heads together, round robin & round table, think pair share, lecture method, gallery walk, KWL, 5Es and fish bowl are some of the suggestive strategies.

a. Watch the videos: https://www.youtube.com/watch?v=Pn28evaXaOU and https://www.youtube.com/watch?v=mekJcjoe0ws. In groups, discuss common disasters of Bhutan and prepare presentations **OR** Students explore the common disasters of Bhutan and write a project work on any one of the disasters.

b. In groups, suggest measures to reduce the risk of disasters. Display the work and do a Gallery walk.

c. Using the links:https://www.ddm.gov.bt/wp-content/uploads/downloads/Earthquake_Safety_in_schools.pdfhttps://www.ddm.gov.bt/wp-content/uploads/downloads/fire.pdfhttps://www.ddm.gov.bt/wp-

content/uploads/downloads/GLOF.pdf, in groups, discuss and suggest lifesaving skills during disaster for preparedness and disaster risk reduction. Display the work.

Reflective Questions

- What are the main elements of disaster risk reduction? Explain these elements.

9.4 Assessment

Use assessment tools such as rubrics, checklist, rating scale, anecdotal record, quiz, question and answer, and any other relevant assessment tools and techniques to assess student's task.

9.5 Resources

URL links:

- https://www.youtube.com/watch?v=9WIwlljva_s&t=104s (Types of disaster
- https://www.youtube.com/watch?v=mekJcjoe0ws (Floods in Bhutan)
- https://www.ddm.gov.bt/wpcontent/uploads/downloads/Earthquake_Safety_in_schools.pdfhttps://www.ddm.gov.bt/wp-_content/uploads/downloads/fire.pdfhttps://www.ddm.gov.bt/wp-content/uploads/downloads/GLOF.pdf (Life saving skills)

Instructional Hours and Weighting Based on Competency

Sl No	Strand	Competencies	Weighting %	Instructional Hours	In minutes	Period (40')
1	**Time and Space**	Apply appropriate geospatial technology to design maps and interpret geographical concepts.	25	15.0	900	22.5
		Examine the origin of the universe to understand astronomical geography.	6	3.6	216	5.4
		Examine the significance of geographical coordinates with reference to location and time.	8	4.8	288	7.2
2	**Physical Environment**	Explore the function of places and regions in determining the cultural identity that unifies the society.	8	4.8	288	7.2
		Analyse the geomorphic processes to understand the significance of land features.	15	9.0	540	13.5
3	**People and Environment**	Analyse the effects of interactions amongst the spheres to understand biodiversity.	6	3.6	216	5.4
		Assess the significance of natural resources to understand resource conservation and sustainable use.	15	9.0	540	13.5
		Examine the role of human activities to understand the distribution of population and settlement.	10	6.0	360	9
		Use indigenous and scientific knowledge to explain ways managing disasters.	7	4.2	252	6.3
		Total	**100**	**60.0**	**3600**	**90**

Note: Question Components

Section A: 50 Marks

i. Topographical Map – 15

ii. Map Works-Bhutan, Asia – 10

iii. MCQ - 10

iv. Fill in the blanks – 5

v. Match the following – 5

vi. True or False - 5

Section B: 50 Marks (One optional question)

Time & Space, Physical Environment& People and Environment-

APPENDIX

Map Work: Bhutan and Asia Map

Bhutan (6 Marks)

Physical Features

I. **Mountains:**
Jumolhari, JowoDurshing, GangkarPunsum, Masa Gang, Tsenda Gang, Jiwuchu Drakey

II. **Passes:**
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. **Rivers:**
Wang Chhu, Amochhu, Puna Tsang Chhu, Pho Chhu, Mo Chhu, MangdeChhu, Chamkhar Chhu, KuriChhu, DangmeChhu, KholongChhu, NgyeraAmaChhu

IV. **Selected places:**
Jomotsangkha, Manas, Pasakha, Dungkhar, Buli, Tendu, Lunana, Phobjikha and Merak.

V. **All the Dzongs and Dzongkhag headquarters**.

Asia (4 marks)

Physical Features

I. **Mountains:**
Urals, Altai, Yablonoi, Khingan, Caucasus, Zagro, Kunlun, Himalaya, Yoma.

II. **Plains and Plateaus:**
Northern Lowlands, Mongolian Plateau, Plateaus of Arabia and Iran, Tarim Basin, Tibetan Plateau, Indo Gangetic Plains and Great North China Plain

III. **Rivers and Seas :**
Ob, Yenesi, Lena, Euphrates, Tigris, Irrawaddy, Brahmaputra, Ganga, Mekong, Yangtse, Hwang Ho, 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 and South East Asian Archipelago**

V. Climatic and vegetation belts
Arctic, Cold Temperate, Temperate Desert, Hot Desert, Tropical Monsoon, Equatorial

Assessment Rubrics and Criteria (Class IX-X)

Criteria for Project work and field work

Name	Criteria					Total 20
	Content (4)	Language (4)	Presentation (4)	Process (4)	Originality & creativity (4)	

Rubrics for project and field work

Criteria	Marking Range				Score
	4	3	2	1	
Content	Information presented is relevant, accurate and in logical order.	Information presented is substantially relevant, accurate and in logical order.	Information presented is to some extent relevant, accurate and in logical order.	Information presented is not relevant, accurate and in logical order.	
Presentation	Exceptionally clear and precise expression of ideas, transfer of ideas into product with appropriate illustrations.	Clear and precise expression of ideas, transfer of ideas into product with appropriate illustrations.	Little expression of ideas, transfer of ideas into product with appropriate illustrations.	No clear and precise expression of ideas, transfer of ideas into product with appropriate illustrations.	
Process	Proper planning with regular consultations.	Partial planning with some consultations.	Little planning with little consultations.	No proper planning and Consultation.	
Language	Language without grammatical error	Language with few grammatical errors.	Language with few grammatical errors.	Language full of grammatical errors.	
Originality & Creativity	Display of original and creative ideas.	Partial display of original and creative ideas.	Little display of original and creative ideas.	No display of original and creative ideas.	
Total Score					

Teachers may use the above rubric for assessing project and field work.

(Sample rating scale for Affective domain)

Name	Criteria										Teacher's comments
	Participation in learning Activities	Respect for others views	Curiosity for exploration	Responsibility	Empathy for others	Punctuality	Honesty	Intellectual drive	Concern for environment	Collaboration	

Note: The above parameters to be rated as: A-Outstanding, **B** - Very Good, **C-** Good, **D -** Fair and **E**- Need improvement. This rating scale is to be used at least once in a term to assess the development of values and attitudes.

Criteria for Home Work

Criteria				
Completion (4)	Accuracy (4)	Presentation (4)	Originality & creativity (4)	Timely submission (4)

Rubric for Home Work

Criteria	Marking Range				Score
	4	3	2	1	
Completion	100% complete	75% complete	50% complete	25% complete	
Accuracy	100% correct	75% correct	50% correct	25% correct	
Presentation	Work is crystal clear and legible	Work is clear and legible	Poor clarity and less legible	Not clear and illegible	
Originality & Creativity	Display of original and creative ideas.	Partial display of original and creative ideas.	Little display of original and creative ideas.	No display of original and creative ideas.	
Timely submission	Work submitted on Time	Work submitted one day late	Work submitted two days late	Work submitted three days late	

Note: Homework as per the requirement