

Training Module Geography and Environment

Class IX



West Bengal Board of Secondary Education
School Education Department, Govt. of West Bengal
Planning and Development: Expert Committee,
School Education Department

Training Module

Geography and Environment

Class IX



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School Education Department, Government of West Bengal

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July, 2020

The Teachers' Training Programme under SSA will be conducted according to this module, developed by the Expert Committee and approved by the WBBSE, which will be coordinated by the SCERT.

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FROM THE BOARD

In 2011 the Honourable Chief Minister Smt. Mamata Banerjee constituted the Expert Committee on School Education of West Bengal. The Committee was entrusted upon to develop the curricula, syllabi and textbooks of the school level of West Bengal. The Committee therefore had developed school textbooks from Pre-Primary level, Class I to Class VIII based on the recommendations of National Curriculum Framework (NCF) 2005 and Right to Education (RTE) Act 2009. In 2015 the new curriculum and syllabus of Geography and Environment for Class IX came into effect and textbooks were developed accordingly. However, certain questions evoke in our minds: (i) How will the competencies of the learners modified, refined or improved in Class IX? (ii) How far can the learners establish themselves as citizens with values and responsibilities at the end of Class IX? (iii) How far can the learners go beyond the limits of academic disciplines to apply knowledge in their social life? And in trying to find suitable answers to these questions the Expert Committee developed the framework of the Constructivist methodology for knowledge construction.

Following the recommendations of Samagra Shiksha Abhiyan (SSA), the Govt. of West Bengal has arranged an orientation programme of Geography and Environment for Class IX on the method of learning and evaluation. This 'Training Module' has been developed for the said orientation programme.

The Hon'ble Minister in Charge for Education, Dr. Partha Chatterjee, has enriched with his views and comments. We express our sincerest gratitude to him.

We hope that the orientation programme will be successful and have a lasting effect in the teaching-learning process of the future.

July, 2020
77/2, Park Street,
Kolkata - 700 016



President
West Bengal Board
of
Secondary Education

Preface

The Honourable Chief Minister Smt. Mamata Banerjee constituted the Expert Committee on School Education of West Bengal in 2011. The Committee was given the responsibility to review, reconsider and reconstitute all the aspects of the school curriculum, syllabi and textbooks. The new curriculum, syllabi and textbooks were developed based on the recommendations of the Expert Committee.

The school textbooks for all classes, from Pre-Primary level to Class VIII, were developed following the guidelines of NCF 2005 and RTE Act 2009. The textbooks for Class IX were developed based on the new curriculum and syllabus.

Following the recommendations of Samagra Shiksha Abhiyan (SSA), the Govt. of West Bengal has organized an orientation programme on the method of learning and evaluation of Geography and Environment for Class IX. This 'Training Module' has been developed for the said orientation programme.

The Hon'ble Minister in Charge for Education, Dr. Partha Chatterjee, has enriched us with his views and comments. We express our gratitude to him.

The State level Teachers' orientation programme on the methodology of learning and evaluation has been planned and executed in assistance with School Education Department, Govt. of West Bengal, West Bengal Board of Secondary Education and Samagra Shiksha Abhiyan (SSA). It is hoped that the 'Training Module', developed on behalf of School Education Department, Govt. of West Bengal, West Bengal Board of Secondary Education and Samagra Shiksha Abhiyan (SSA), will help in the effective implementation of the methodology of learning and evaluation.

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Samagra Shiksha Abhiyan (SSA)

Introduction

The Right of Children to Free and Compulsory Education (RTE) Act, 2009, seeks to ensure that children enjoy the benefits of the three aspects of Access, Equity and Quality in school education across the nation. To this effect, the Ministry of Human Resource & Development (MHRD) in line with the proposal of the Union Budget, 2018 -2019 has initiated the scheme of SAMAGRA SHIKSHA ABHIYAN (SSA). The scheme takes a holistic stance in treating school education from Pre-Primary to Class XII as a continuum by merging the erstwhile Sarva Shiksha Abhiyan and Rashtriya Madhyamik Shiksha Abhiyan schemes in one, unified whole.

Scope of SSA

The Samagra Shiksha Abhiyan (SSA) collates the three Schemes of Sarva Shiksha Abhiyan, Rashtriya Madhyamik Shiksha Abhiyan and Teacher Education. The SSA scheme aims at improving school effectiveness measured in terms of equal prospects for schooling and equitable learning outcomes. In harmonizing the different and major effectual factors of school education, the SSA scheme provides for the operational mechanisms and transaction costs at all levels, particularly in using state, district and circle level systems and resources, besides envisioning one comprehensive strategic design for advancement of school education. The shift in the focus is from project objectives to refining systems level performance and schooling outcomes which will be the emphasis of the SSA scheme, alongwith encouraging States towards improving quality of education.

Major Objectives of SSA

The holistic nature of the scheme envisages Universal Access, Equity and Quality, promotion of Vocational Education, refurbishment of the use of Soft or e-Materials in schools and strengthening of Teacher Education.

The major objectives of the scheme are summarized below:

- **Provision of Quality Education and enhancing learning outcomes of students**
- **Bridging Social and Gender Gaps in School Education**
- **Ensuring Equity and Inclusion at all levels of School Education**
- **Ensuring minimum standards in schooling provisions**
- **Support States in implementation of Right of Children to Free and Compulsory Education (RTE) Act, 2009**

Dimensions of Quality Education

The quality in education depends on curriculum, learning objectives, learning materials, teaching methodology, evaluation framework in classroom and school management.

In all aspects of the school and its surrounding education community, the rights of the whole child, and all children, to survival, protection, development and participations are at the centre this means that the focus is on learning which strengthens the capacities of children to act progressively on their own behalf through the acquisition of relevant knowledge, useful skills and appropriate attitudes; and which creates for children and helps them create for themselves and others, places of safety, security and healthy interaction. (Bernard, 1999)

There are many definitions of quality in education testifying the complexity and multifaceted nature of the concept. According to Prof. Adams the terms efficiency, effectiveness, equity and quality have often been used synonymously. However, considerable consensus exists around the basic dimensions of quality education today. Quality education includes—

Learners who are healthy, well-nourished and ready to participate and learn, and supported in learning by the families and communities;

Environment that are healthy, safe, protective and gender-sensitive, and provide adequate resources and facilities;

Content that is reflected in relevant curriculum and materials for the acquisition of basic skills, especially in the areas of literacy, numeracy and skills for life, and knowledge in such areas as gender, health, nutrition, HIV/AIDS prevention and peace;

Processes through which trained teachers use child-centred teaching approaches in well-managed classrooms and schools and skillful assessment to facilitate learning and reduce disparities;

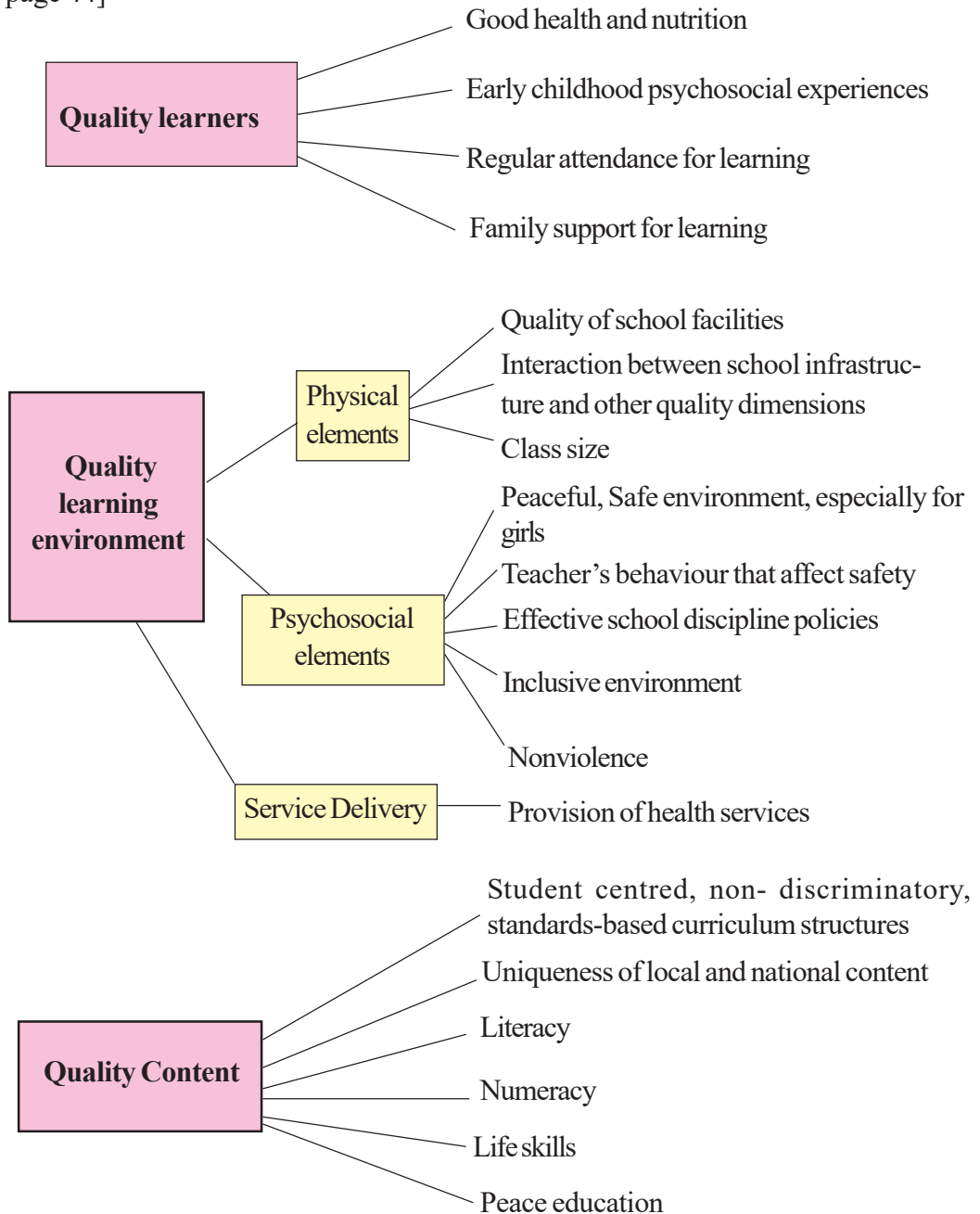
Outcomes that encompass knowledge, skills and attitude, and are linked to national goals for education and positive participation in society.

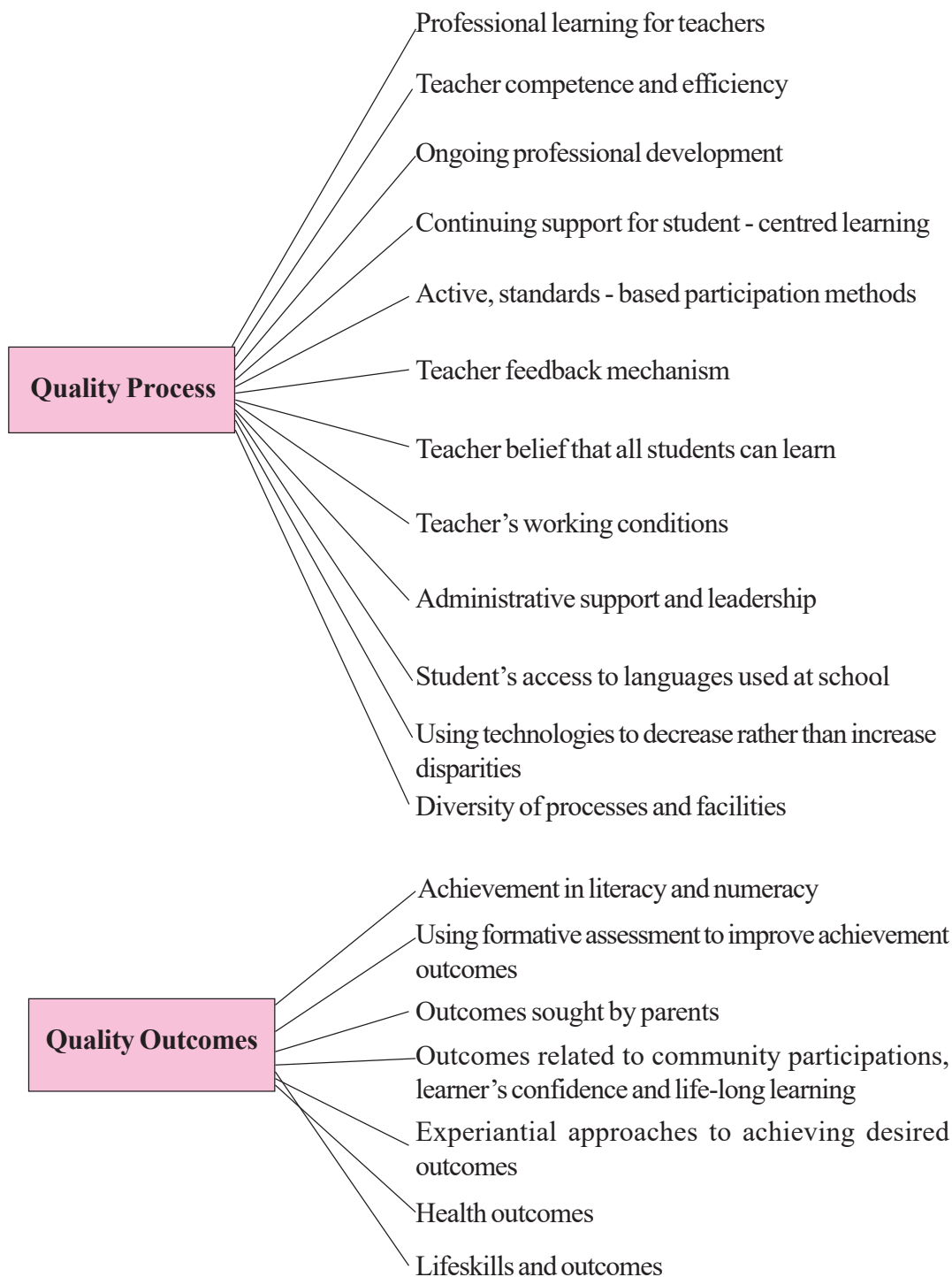
At the end of a lesson the desired competency that the learner is able to reach is known as Expected learning competency. The pedagogical process does not indicate what kind of activities that can be given to the learners in a teaching-learning situation. In fact it also does not indicate the methodology of discussion that the teacher executes while transacting a lesson in a classroom situation. The teacher ensures the desired competency of the learners through the action verbs. This helps to overcome misconceptions and the learning outcome also becomes measurable.

Learning objective is the desired level to which the learner expects to reach through the teaching learning process of the given content and at the end of the process the competency

gained by the learners is known as **learning outcome**. If the learner is able to grasp all the concepts and thereby could reach the desired learning outcome, then the learning objective and the learning outcome become identical.

Cognitive skills of Blooms Taxonomy helps to measure learning outcome of the learners. [See page 44]





Reference : <https://www.unicef.org> > education > files

Traditional Teacher-Training Methodology and Methodology proposed by NCFTE 2009: A comparative study

Comprehensive development of education requires, among other things, to make arrangements for teacher education. With this objective in view the National Council of Teacher Education (NCTE) organized an expert committee which composed a draft document after prolonged fruitful deliberation with a multitude of experts, professors of Education, departments of several universities, teachers, trainee-teachers, NCERT, SCERTs, DIETs and various NGOs. The draft was subsequently revised and published as a book. This important document is widely known as National Curriculum Framework for Teacher Education (NCFTE) 2009. This valuable document has served us as a beacon to compose and design the present teacher training module. While discussing the general principles of Teacher Education NCFTE 2009 states that “.. *we have realized the tentative and fluid nature of the so-called knowledge-base of teacher education. This makes reflective practice the central aim of teacher education. Pedagogical knowledge has to constantly undergo adaptation to meet the needs of diverse contexts through critical reflection by the teacher on his/her practices.*”

Comparison between the Dominant Current Practice and Proposed Process-Based Teacher Education Curriculum Framework

Dominant Practice of Teacher Education	Proposed Process-Based Teacher Education
Focus on psychological aspects of learners without adequate engagement with contexts. Engagement with generalised theories of children and learning.	Understanding the social, cultural and political contexts in which learners grow and develop. Engagement with learners in real life situations along with theoretical enquiry.
Theory as a “given” to be applied in the classroom.	Conceptual knowledge generated, based on experience, observations and theoretical engagement.
Knowledge treated as external to the learner and something to be acquired.	Knowledge generated in the shared context of teaching, learning, personal and social experiences through critical enquiry.
Teacher educators instruct and give structured assignments to be submitted by individual students. Training schedule	Teacher educators evoke responses from students to engage them with deeper discussions and reflection. Students

Dominant Practice of Teacher Education	Proposed Process-Based Teacher Education
packed by teacher-directed activities. Little opportunity for reflection and self-study.	encouraged to identify and articulate issues for self-study and critical enquiry. Students maintain reflective journals on their observations, reflections, including conflicts.
Short training schedule after general education.	Sustained engagement of long duration professional education integrated with education in liberal sciences, arts and humanities.
Students work individually on assignments, in-house tests, field work and practice teaching.	Students encouraged to work in teams undertaking classroom and learners' observations, interaction and projects across diverse courses. Group presentations encouraged.
No "space" to address students' assumptions about social realities, the learner and the process of learning.	Learning "spaces" provided to examine students' own position in society and their assumptions as part of classroom discourse.
No "space" to examine students' conceptions of subject-knowledge.	Structured "space" provided to revisit, examine and challenge (mis) conceptions of knowledge.
Practice teaching of isolated lessons, planned in standardised formats with little or no reflection on the practice of teaching.	School Internship – students teach within flexible formats, larger frames of units of study, concept web-charts and maintain a reflective journal.

Reference :

National Curriculum Framework for Teacher Education : Towards Preparing Professional and Humane Teacher, National Council for Teacher Education, New Delhi, 2009

Curriculum of ‘Geography & Environment’ (Class IX)

Objective of studying Geography

Geography is the study of the relationship of man and the earth. The environment in which man resides is the place that controls his lifestyle. Geography also discusses about three realms of the earth: lithosphere, atmosphere and hydrosphere. The study of geography is even connected with other natural and social sciences. Economic progress depends on Geography. Geographical environment affects agriculture, industry, commerce and other factors of economic growth. Geography also has an independent nature like the other disciplines of social science. Since Geography procures its contents from natural science as well as from social science, so Geography does not discuss only about logical human behavior, it also interprets natural phenomenon that are cause-effect related.

Objective of studying Environment and Geography

In the Geography textbooks of class IX, there are some items apparently connected with various disciplines so that the learners can construct a holistic idea about them. The main objectives of this syllabus are:

1. Understanding the development of themes, concepts and terminologies of Geography.
2. Understanding the ways of human reaction in natural environment and the ideal principles
3. Understanding the use and importance of natural resources and the development of human race in respect of the areas
4. Understanding the appropriate use of natural environment and the realizing the necessity for its conservation
5. Knowing about various resources of the environment
6. Developing concept about how the factors of environment and climate affecting our lifestyle
7. Developing concept of the natural and social environment of the learner and expanding outlook
8. Developing concept about the various geographical incidents that happen in our surroundings
9. Developing imagination, logic and critical thinking among the learners
10. Developing creativity and innovativeness among the learners
11. Understanding the diversities of West Bengal and their localities in relation with the population
12. Understanding the mutual dependence of the various regions of India which includes West Bengal

13. Developing skill to use map and globe, ability to draw and measure and the skill to apply the geographical instruments
14. Helping the learner to acclimatize in various geographical conditions
15. Helping the learners to develop scientific outlook, decision making skill and innovative thoughts
16. And finally, helping to develop values in the learners.

Curriculum of 'Geography & Environment': Main characteristics

- **Integrated Curriculum**

From the stage of planning and designing the curriculum and syllabus of 'Geography and Environment' for class VI, VII, and VIII, environment as a topic has been integrated with Geography. The main policies adopted in this respect are: learning about environment, learning through the environment and learning for the environment.

These three principles have been implemented in the syllabus of 'Geography and Environment' for class VI, VII and VIII.

This trend has also been followed in the syllabus of 'Geography and Environment' for class IX. Learning about the environment has been implemented in the topic 'Geomorphic process and landforms of the earth'. Again, the principle of learning through the environment is followed in the lesson 'Hazards and Disasters'. Similarly, the lesson 'Resources of India' which states about the concept of conservation of resources and the significance of excessive use of nonconventional energy basically reflects the principle of learning for the environment.

- **Investigative activity-based curriculum**

The curriculum and syllabus of 'Geography and Environment' have been so designed as to generate in learners an attitude of seeking, investigation & query. While discussing the various themes in the curriculum, the general and background knowledge of the learners are considered for introducing the topic. Certain questions and topics are included in the textbooks that incite higher order thinking ability (HOTS) of the learners and also encourage them to investigate and apply in real life situation. Inquisitive questioning, concept mapping, drawing and interpreting line-diagrams, studying photographs and observation of maps will encourage the learners in hands-on activities and also generate interest for the subject.

- **Learner-centric approach**

Based on the theory of constructivism recommended by NCF 2005, the curriculum and syllabus of 'Geography and Environment' have been designed to be learner-centric. With the help of various attractive diagrams and photographs, the topics are presented such

that they are directly or indirectly connected with the daily experiences of the learners. Various instances of daily life have been presented before the introduction of main topic so that the subject becomes easily comprehensible.

- **Evaluation: an integral part of the curriculum**

Evaluation is a continuous process in the light of constructivism. In this ongoing process of teaching-learning, the teachers judge the level of knowledge formed. In this respect, the most significant issue is that the learner can be evaluated at any stage of the learning process. Analyzing the result of their assessment, the areas of pitfalls of the learners can be identified and the teachers can henceforth decide on the approach of future lesson plans. According to the concept of Constructivism, evaluation has an integral relation to learning progress. Appropriate implementation of Internal Formative Evaluation (IFE) within the classroom will eventually do away with the conventional concept of assessment with pen & paper at the end of the teaching process. Six tools have been mentioned in this regard. They are: **Survey, Nature Study, Case Study, Creative writing, Model Making and Open Text book Evaluation.** The Internal Formative Evaluation should be conducted within span of the classroom. There is no need to go beyond the classroom. This enables the teachers to assess the advancement or lacuna of the learners even before the summative evaluation. So there is scope for adopting appropriate measures. Consequently, both the teachers and the learners get ample scope to be familiar with different methodologies and tools used for evaluating the knowledge or skills of the learners.

- **Use of ICT as learning aid**

Teaching-learning is like flowing river. Time and again various philosophical thoughts, learning methodologies, technologies etc. flow into the main drainage of teaching process like tributaries and make the methodology even more attractive and lively. Information Communication Technology (ICT) is an efficacious mode of learning in the present era. It opens up many windows of information to the learners. It helps the learners to explore geographical patterns and relationships through interpretation of data. After collecting the data, the learners can use ICT to organize as well as modify it for presentation. There is little doubt about its significant role in the daily use of modern man. It arouses curiosity and interest among the learners towards the study of Geography, both within the classroom and beyond. The advantages of ICT for the study of Geography are given below:

- ICT presents many multifarious facts on natural and human characteristics and process to the learners
- It provides varied experiences of different places and environment to the learners.
- It increases knowledge of Geography and investigative skills

- It enhances skill in geographical expressions
- It helps the learners to make models of geographical process, methods and environment
- It helps them to come in touch with environment through the use of email, webcams and video-conferencing
- It helps them in the concept of measurement
- Any topic of geography becomes easy and accessible through slide-shows and power point presentations (PPT). It provides useful data about the changing situation of the earth and its effect

ICT provides up-to-date data to the teachers and students. The importance of ICT for the topics of class is presented here:

If a video on weathering caused by snowfall is presented before the learners they can easily comprehend the matter. In high altitude areas water accumulated in the crevices of rocks condenses to form frost and pressurizes on the wall of the crevice. Again, the ice melts to water during the day and the pressure reduces. This constant change of pressure causes the rock to crack and it finally breaks down. This entire process can be shown through an audio-visual mode. Such videos make various topics easily comprehensible to the learners.

Care should be taken so that copyright laws are not violated for downloading and using information, pictures and power-point presentations of those websites.

The teacher's active role is desirable for using ICT in the process of learning. Care should be taken that the teachers and the learners can collectively collaborate in co-creation and exploration for successful implementation of the concept of constructivism by the use of ICT.

Some areas of development of life skills

Some skills are required to successfully cope with the diverse demands and challenges of the individual and the society. These skills are in fact life skills. Life skills enable us to translate knowledge, attitude and values into actual abilities, i.e. what to do and how to do. So, Life skill education is necessary for holistic development of man. Here, holistic development implies development of various physical, mental and social abilities as well as of cognitive abilities.

The skills essential for developing oneself into a complete human being can be termed as Life skills. In fact, any skill essential to move ahead in daily life is actually a life skill. Some instances of life skills can be cited from our daily life: arranging different books at the study place in respect of disciplines so that the required book can be easily found whenever necessary; selecting proper food for healthy life style; in course of a conversation seeking suggestions from a stranger about visiting to an unknown place; boarding the exact bus for going to a specific place etc.

The areas for discussion and subsequent development of probable life skills given in the following table are mere samples. Other life skills barring the ones mentioned here in the table below can be developed. It is possible to develop effective communication skill in almost all the areas of discussion mentioned in the table. Hence, it is not referred here.

Curricular area	Areas of discussion	Possible areas of life skill development
1. The earth as a planet	Concept of shape of the earth developed from different testaments of the earth's shape	Critical thinking, decision making ability
2. The motion of the earth	Inclined position of the earth's axis and its significance	Critical thinking
3. Location of a place on the earth's surface	Importance of international dateline	Critical thinking, ability for application, problem solving
4. Geomorphic process and different types of landforms	Ability to adjust in the physical environment of the mountaneous region	Critical thinking, ability for application, decision making ability
5. Weathering	Biological weathering related problems and solutions	Critical thinking, ability for application, decision making ability

Curricular area	Areas of discussion	Possible areas of life skill development
6. Hazard and Disaster	Natural hazards and disaster related problems and its measures	Critical thinking, decision making ability
7. Resources of India	Emphasis on non conventional resources in stead of conventional resources	Critical thinking, ability to differentiate
8. West Bengal	Understanding the climate of West Bengal as a whole	Critical thinking, ability for application, decision making ability

In this context, it can be said that the study of Geography not only develops the critical thinking, skill to apply in real situation, ability to take decisions etc of the learners, but it also facilitates them to identify a particular event or issue of real life and can take immediate decision based on their knowledge developed in the syllabus of Geography. Some instances will substantiate this matter:

- The learner who has studied about earthquake can easily identify it when it happens in real life and can save the life and property of many by taking expedite measures and alerting members of the family and community.
- The knowledge of the structure, characteristics and effect of mountains help the learners in cultivation, business, and construction of houses and in daily livelihood.
- The knowledge of landforms, drainage system, climatic condition of West Bengal will help the learner, at a later stage, in selecting the time and place of tour.

This discussion can thus be winded up with a reference to a true incident which indicates the importance of studying Geography for developing life skills :

The incident occurred on 26 December 2004. Tili Smith is a ten year old British girl. Before setting off for Thailand on a vacation she learnt about Tsunami from her Geography teacher. As she was enjoying her vacation at Mai khao beach with her parents and sister, she saw the retreating waves and immediately alerted her mother of the possible attack of Tsunami. Soon all the people of Mai Khao beach of Fuket left the place and thus the lives of many tourists, hotel officials and other persons were saved.

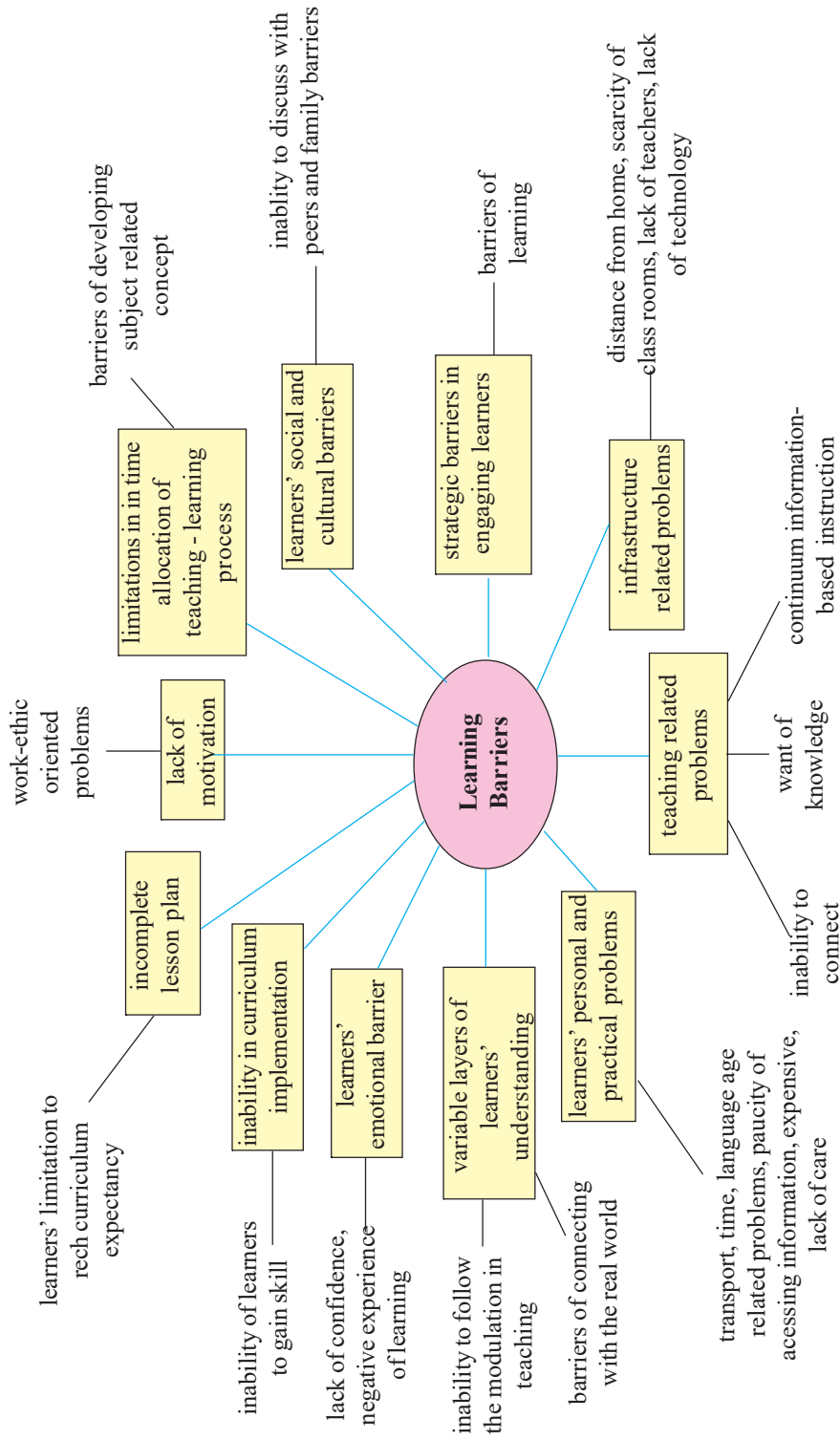
Concept of equity and the curriculum of ‘Geography and Environment’

Equity in education has two main aspects: provisioning and retention. Whereas the first creates enough potential for provision of educational facilities to weak learners, the second aims to create opportunities of success for differently-able learners and minimize the chance of failure of all students. Enhancement of equity level diminishes the chance of school dropouts, increases the scope to develop life skills and also creates new opportunities in the professional world. Hence, we need to explore about the possible measures to be adopted at different levels for ensuring equity:

- Providing equal opportunities in co-curricular activities to all learners of different race, religion, creed, and gender also to the differently-able.
- Providing equal opportunity to all learners to express opinions about class management in the classroom.
- Assessing the competency of all learners while setting question papers and maintaining balance in the evaluation process for proper reflection in their cognitive abilities.
- No special credit be given to any learner irrespective of creed, race, religion, gender or differently-able while evaluating answer scripts.
- During curriculum development, the contents of the curriculum should be such that they are acceptable to all.
- Alternative question papers would have to be designed for students with mental and physical challenges.
- Evaluation manual has to be drawn up in discussion with learners and faults detected through evaluation should be discussed later for correction.

Equity in education implies that personal or social circumstances such as gender, ethnic origin or family background that are not barriers to achieving educational potentiality and ensures learners to reach minimum level of skills (definition of inclusion).

Learning barriers during teaching-learning to address the issues of equity



Misconceptions in Geography

NCFTE 2009 for Teacher training observes that “Specific tasks related to how learner engage with school subject-content misconceptions need to be addressed through a rigorous study of disciplinary knowledge, besides a specific focus on content area literacy and tasks of writing observations and analysis for enhancing conceptual understanding.” (NCFTE 2009, pg 38)

According to researcher Mary B. Nakhleh, “*Once integrated into a student’s cognitive structure, these misconceptions interfere with subsequent learning....the new information cannot be connected appropriately to their cognitive structure, and weak understanding or misunderstanding of the concept will occur.*”⁽¹⁾ The learners develop knowledge through multifarious experiences. These experiences include the teacher’s lecture, laboratory experiments, studying textbooks, homework assessments, peer learning, watching various audio-visual shows or films etc. Sometimes misconceptions grow through these mentioned modes of experiences.

Some samples of content-related misconceptions

Effect of corioles force: There is a general conception that water releasing from a wash basin or bathtub tends to sway anti-clockwise in the northern hemisphere and clockwise in the southern hemisphere. It is assumed that due to the effect of carioles force the water tends to sway. However, the time of water release, distance traversed and the velocity of release is so less that the effect of carioles force is negligible. Rather other controls like— speed of water release, shape of the sink or bathtub, person’s manner of coming out from the bathtub etc— these have more impact than carioles force.

Reasons of season change: Since the earth revolves around the sun in an elliptical orbit, the distance of the earth from the sun varies at different time of the year. This is the reason for the season change—is the misconception of most students. Some students think the sun being at the focus instead of the centre of the elliptical path, the distance of the earth from the sun varies. Hence, season change occurs. Some also think that the axis of the earth is inclined causing varied distance from the sun and so the season change occurs.

The fact is the elliptical orbit of the earth, the sun being the focus of the orbit or the inclination of the earth’s axis—none is responsible for the varied distance from the sun. Actually, the latitude of the poles being inclined, the sunrays falling on different latitudes differ in their angles at different time of the year. This is actual reason of season change.

Reference :

1. Nakhleh, M. Why Some Students Don’t Learn Chemistry *J. Chem. Educ.* 1992, 69, 191-196

Integration of certain contents of the curriculum of ‘Geography and Environment’ with Science and Social Sciences

NCFTE 2009 recommends that the “teachers need to be prepared to view subject content especially within the frames of the disciplines as well as with in interdisciplinary disciplines” (NCFTE 2009, pg 25). Geography is said to be “mother of all sciences”. Various disciplines of science like Zoology, Mathematics, Anthropology, Geology, Astronomy, Chemistry, Economics etc. has connection with Geography and likewise Geography has great influence on these subjects. The goal of human cognizance is to explore or discover new place or country, new idea or culture. Now, education is a dynamic discipline. So, the objective of the new curriculum of ‘Geography and Environment’ is manifestation of knowledge in an integrated form. In the textbooks on ‘Geography and Environment’ for class VI-VIII the contents have been presented in integrated manner with Zoology, Mathematics, Anthropology, Geology, Astronomy, Chemistry and Economics. In the new syllabus of class IX, if certain topics are transacted with reference to the content areas of other disciplines, it will create interest among the learners and their knowledge will be complete. However, in the summative evaluations questions should not be set on such interface areas. The objective is to spread the outlook of the students.

Conceptual areas	Interface areas	Related subject
Oblate spheroid shape of the earth	How does the oblate shape of the earth created by the effect of centripetal and centrifugal force due to gravitation and rotation?	Physics
Rotation	Why can’t we feel the force even though we live on earth?	Physics
Creation aurora	How does the gas molecules break up to form atoms and thereby the fusion of protons and electrons generate light waves?	Physics
Relationship of time and longitude	How does the difference of time become 4 minutes due to the difference of longitude of 1°?	Mathematics
Age of mountains	Role of fossils to determine the age of a mountain.	Paleontology
Oxidation	How does chemical weathering occur due to the reaction of iron with oxygen?	Chemistry
Formation of cloud and rain	Explanation of the formation of cloud, rainfall and lightning.	Physics

Conceptual areas	Interface areas	Related subject
Resource extraction from mines	Discussion about the process of extracting resources like coal, petroleum	Mineralogy, Engineering
Economic possibility of the plateau regions of West Bengal	The means of overcoming the physiographic challenge and mobilizing the resource for economic development	Geomorphology, Mineralogy, Economics
Maps and scale	Mathematical interpretation of the scale drawn or written in the maps provided in the text books	Mathematics

Pedagogical analysis of some lessons of ‘Geography and Environment’

Lesson unit	Theme	Sub-theme	Previous knowledge and class wise discussion		Learning Outcome with respect to the curriculum of class ix
			Previous knowledge	Class	
2.	Motion of the earth	Introduction Rotation of the earth	<ul style="list-style-type: none"> Mentioning about the nature revolution of the earth along the orbit Mentioning about the motion of 8 planets of the solar system 	V	(i) will be able to compare the motion of the earth with other planets of the solar system
			<ul style="list-style-type: none"> Concept of rotation in respect real experience Concept of the apparent daily motion of the sun 	VI	
			<ul style="list-style-type: none"> Basic concept of formation of day and night Understanding the significance of clear concept of dawn and dusk Concept of calculating time based on different positions of the sun Understanding the significance of International date line Basic concept of local time and cosmic time 	V, VI	(iii) Will be able to interpret the reason for not feeling rotation of the earth due to differences in rotational speed
			<ul style="list-style-type: none"> Mentioning the inclined axis of the earth in respect of the orbital plane; developing concept of the earth’s axis, orbit and orbital plane 	VI, VII	(iv) Will be able to interpret the formation of day and night due to earth’s rotation
					(v) will be able to analyse sea current and wind direction logically
					(vi) will be able to mention the effect of poles night with diagrams

Lesson unit	Theme	Sub-theme	Previous knowledge and class wise discussion		Learning Outcome with respect to the curriculum of class ix
			Previous knowledge	Class	
		Revolution of the earth	<ul style="list-style-type: none"> ● Concept of revolution by referring to gravitation—mentioning relevant incidents 	VII	(ii) Will be able to write with reasons the phases of increase and decrease of days and nights.
	<ul style="list-style-type: none"> ● Mentioning the basic concept about leap year ● Apparent movement of the sun at different times of the year 		VII	(iii) Understanding the significance of leap year on the basis of the time of revolution of the earth and identifying leap year by mathematical calculation	
	<ul style="list-style-type: none"> ● Concept of increase and decrease of duration of day and night and observation 		VII	(iv) Will be able to understand the difference of temperature on the basis of angle of incidence of solar rays on the earth.	
	<ul style="list-style-type: none"> ● Mentioning about the effect of seasonal variety on animal world with examples 		VII	(v) Able to explain seasonal change on the earth's surface based on change temperature	
	<ul style="list-style-type: none"> ● Identifying seasons in respect of characteristics 		III	(vi) will be able to correlate the apparent annual movement of the sun with increase and decrease of the duration and day and night	
				(vii) Will be able to differentiate between rotation and revolution	
				(viii) Will be able to understand the significance of the two motions of earth in daily life	

Lesson unit	Theme	Sub-theme	Previous knowledge and class wise discussion		Learning Outcome with respect to the curriculum of class ix
			Previous knowledge	Class	
7. Resources of India	Introduction	<ul style="list-style-type: none"> ● Basic concept of resource ● Mentioning about various factors of resource ● Role of resources in the development of the history of man 	V	<ul style="list-style-type: none"> (i) Will be able to explain with examples how a neutral substance forms a resource (ii) Will be able to classify resources on the basis of functionality and nature (iii) Will be able to analyse with logic about the necessity of conservation of resources (iv) Will be able to mention the process of conservation of resources 	
					<ul style="list-style-type: none"> ● Concept of wastage resource
	Mineral resource	<ul style="list-style-type: none"> ● Basic concept of about the source of coal ● Referring to various uses of coal in human life ● Identifying difference in coal production 	V	<ul style="list-style-type: none"> (i) Will be able to identify the uses of iron ore, coal and mineral oil (ii) Will be able to explain the application of these three mineral resources in daily life (iii) Will be able to classify iron ore, coal and petroleum on the basis of internal composition (iv) Will be able to differentiate each mineral on the basis of its utility (v) Will be able to locate regional distribution of these three minerals on the outline map of India. 	

Lesson unit	Theme	Sub-theme	Previous knowledge and class wise discussion		Learning Outcome with respect to the curriculum of class ix
			Previous knowledge	Class	
					<p>(vi) Will have the understanding of depositing of coal, iron ore, petroleum as fund resource.</p> <p>(vii) Understand the trend of demand and supply of these three mineral resources</p>
		Resource of energy	<ul style="list-style-type: none"> ● Identifying various sources of energy ● Basic concept of conventional and non-conventional energy 	V	<p>(i) Will be able to compare between the sources of conventional and non-conventional resources</p> <p>(ii) In spite of the limitation of conventional and non-conventional resources, the energy which is getting more importance and its reasons to be analysed</p> <p>(iii) Will be able to explain the importance of thermal, hydroelectric and atomic energy in practical uses</p> <p>(iv) Will be able to locate the centres of thermal, hydro-electricity and atomic energy in the outline map of India</p> <p>(v) Will have basic concepts on solar, wind and geothermal energy production</p> <p>(vi) Will be able to explain the importance of wind, solar and geothermal energy in practical uses</p>

Application of constructivism in the teaching-learning process

In the document of NCF 2005 mention has been made about Interpretation Construction (ICON) model. In this model there are seven stages. An example of knowledge construction through teaching-learning situation in a classroom is presented here.

Presentation of topic and seven stages of knowledge construction by ICON model

Class IX

Unit: West Bengal

Sub-unit: Soil and natural vegetation of West Bengal

Stages	Presentation
Observation	The teacher may introduce the topic of discussion based on the learner's experience gained through observation. He/she may demonstrate illustrations of soil and natural vegetation or refer to an education excursion or ask questions based on the learners' experience. For example: (i) What is the colour and nature of the soil of your locality? Give two examples. etc.
Contextualization	In this stage, the teacher may refer to the discussion on 'General introduction of West Bengal' included in class V to consolidate their concept of the difference of soil and natural vegetation in different regions. The teacher will try to correlate their previous knowledge or observations with the topic for discussion.
Cognitive apprenticeship	In this stage, the teacher will try to overcome their lacuna that remained while developing their basic concept. Here, the teacher may ask some questions. For example: What are the other natural elements, barring soil, have an effect on the natural vegetation of West Bengal? Why do we find three types of natural vegetation in the mountainous regions (including eastern Himalayas) in respect of difference of altitude? The learners can also enquire in course of the discussion. What impact does soil diversity of the plains have on the nature of its natural vegetation?

Stages	Presentation
Collaboration	The learners will prepare a list through group discussion and mutual cooperation on the characteristics of the soil and natural vegetation in different regions of West Bengal. They will write down the examples and indicate them on the map of West Bengal.
Interpretation Construction	Here they will be able to correlate climate, soil and natural vegetation through mutual discussion. This concept of correlation will be consolidated with reference to maps. Here, the teacher will modify their concept if required
Multiple Interpretation	In this stage the learners get the scope to expand their knowledge. Various activity based tasks or questionnaire help them to apply their developed concept. For example: (i) Identifying any five trees of their locality or school area and the ability to classify them. (ii) Ability to find out the type of soil in which that natural vegetation have grown. (iii) Ability to mention nature of rainfall and temperature of that locality. (iv) Ability to tell the feature on the basis of which they could identify the class of the natural vegetation.
Multiple Manifestation	Based on the discussion the learners will develop a fair concept of the diversity of soil and natural vegetation. In this respect, they will be able to discuss the need and means to conserve diversity. They can also express their opinion on the impact of climate on soil and natural vegetation.

Five stages of knowledge construction through 5E Model

CLASS IX

UNIT: Causes of earthquake and various landforms

Sub-unit: Mountains

Phase	Presentation
(Engagement Phase)	<p>Before starting a lesson it is important to arouse curiosity among the learners. Hence they can be involved into various discussions, activity based tasks, photo exhibition etc. and thereby their curiosity for the topic can be enhanced. The background knowledge of the learners, correlating their previous experience with the new, and preparing them for activity based tasks occur in this phase of teaching-learning. With this objective the following can be discussed:</p> <p>Discussion can be initiated about places (Darjeeling, Kurseong, Kalimpong) in West Bengal with natural scenic beauty or by demonstrating photos and asking questions about them. For example—Why do you think the tourists like the place? Which time of the year is ideal for visiting the place? What kinds of dress, shoes, bags, food etc should be taken for visiting the place? What is the altitude of the place? What is its physiography? etc. The learners' curiosity and interest can also be aroused and they can be involved into discussion by referring to tales, travelogues or novels composed about the place.</p>
Exploration	<p>In this phase the learners get the chance to form their own idea of the topic. Here the learners get actively involved with the topic and work in groups on the various aspects of the lesson. So they gain experience through mutual cooperation. This experience they share among themselves by interacting with each other. In this phase the learners get maximum opportunity to be involved in activity based tasks. Here the teacher will facilitate them by imparting necessary information or any other help to carry forward the exploration process. The students' urge to explore will help them to construct their knowledge.</p> <p>The learners can be divided into two groups. These groups will discuss among themselves about the topic. At the end of their task, each group will share with the class about their activity.</p>

Phase	Presentation
	<p>Group 1: They will work on fold mountains and block mountains. They can draw sketches or procure photos or data of fold mountains, block mountains, fold, fault, rift valleys etc. They can identify different fold mountains and block mountains in the world map and can make a list of these two types of mountains found in different continents.</p> <p>Group 2: They will work on volcanic mountains and erosional mountains. They can draw sketches or procure photos or data of volcanic mountains, erosional mountains, volcanic eruption, crater, different types of volcanoes etc. They can also identify different volcanic mountains and erosional mountains in the world map and can make a list of these two types of mountains found in different continents.</p>
Explanation	<p>Here, the learners will explain to the class what they have learnt through exploration. In this phase the teacher will remain as a facilitator and will help them to find out their conceptual errors and rectify them. Through the discussion the learners will be able to identify their own misconceptions and develop knowledge. For example:</p> <p>Group 1: They will discuss and explain fold mountains formed due to tectonic movement; characteristics, creation of block mountains, rift valleys, features of block mountains, location of important block mountains and rift valleys in India and in other countries etc.</p> <p>Group 2: They will try to interpret about the process of forming volcanic mountains and erosional mountains, characteristics, location of important volcanoes in India and in other countries, ring of fire etc.</p>
Elaboration	<p>In this phase, the learners will apply the newly developed knowledge and try to correlate with the concepts mentioned in the topics. They will be further engaged into some new activities. They will be able to apply their previous notion in this activity. For example: They will be able to give explanation about various fold mountains in different parts of the world, Alps, Rocky etc on the basis of tectonic movement. They will also explain why the volcanoes are located on the plates, why fold and volcanic mountains are earthquake prone, unstable and unsuitable for living. At the end of the discussion the teacher and the learners will assemble the concepts mutually.</p>
Evaluation	<ul style="list-style-type: none"> ● Draw a sketch on the source of the Himalayas and identify the various issues. ● Mention the mountains that are connected with following: river Narmada, Mount Abu, Japan, Switzerland.

Internal Formative Evaluation: guidelines for implementation

The WBBSE in consultation with the Expert Committee has issued a circular mentioning the framework for evaluation procedure in respect of the revised curricula and syllabi being followed in all affiliated schools of WBBSE from January 2015. On further recommendation of the Expert Committee, the WBBSE is now issuing the following guidelines for smooth implementation of the Internal Formative Evaluation programme for Class-IX in the academic session in 2015:

Internal Formative Evaluation (IFE) has to be conducted on the following six areas:

1. Survey Report
2. Nature Study
3. Case Study
4. Creative Writing
5. Model Making
6. Open Book Evaluation

Any three out of the six areas given above are to be chosen for Internal Formative Evaluation in a calendar year for each of the seven curricular subjects. Therefore, each term will have one area for evaluation on a particular subject. Subject teacher(s) are expected to correlate the modalities of Internal Formative Evaluation with the learning competencies of the concerned subjects. It may be noted that for a particular class, one modality is to be applied for one term. There should not be any repetition of a particular modality for a particular class in an academic year.

1. This programme of Internal Formative Evaluation (IFE) should be considered as an integral part of teaching-learning process for enhancement of learning.
2. The IFE programme should be carried out in the classroom scenario in a stress-free manner before the respective summative evaluation for each term.
3. The assessment techniques should be integrated with the classroom processes and should focus on enhancement of understanding and application of knowledge.
4. During implementation of the IFE, innovative teaching-learning processes are expected to emerge. While planning for such processes, the diverse needs and capacities of students should be taken care of and school should ensure that students are able to participate and derive benefit.
5. The teachers in respective subjects in each school will decide the nature and difficulty level of the activities to be carried out under the banner of Survey, Nature Study, Case Study, Creative Writing, Model Making and Open Textbook Evaluation in a student-friendly manner according to the needs of the students of the school and accordingly design such IFE programme. However, some exemplar activities for different subjects for IFE are provided herewith.

6. It will be expected that the assessment will be done on the basis of innovative approaches adopted by the students and not necessarily on the accuracy of the end-results.
7. The written records of activities carried out in the classroom for IFE, duly endorsed and assessed by the subject -teacher and signed by the guardian will be preserved by each student until completion of Class- IX and will have to be produced at the school for any future requirement.
8. A student will be expected to demonstrate her/his abilities in the following manner during the innovative teaching-learning processes adopted for IFE:
 - Describing a case/event/phenomenon/situation/picture in her/his own language.
 - Exploring further- a case/event/phenomenon/situation/picture and produce new examples, alternative explanations, new vocabulary in conformity with the respective discipline.
 - Providing innovative opinions and suggestions in conformity with the discipline.
 - Elaborating the clues, ideas, dialogues, conversations etc.
 - Suggesting innovative approach for presentation of a concept and in problem-solving in conformity with the discipline.
 - Drawing conclusions, making inferences, and taking decisions in respect of a case/ event/ phenomenon/situation in conformity with the discipline.
 - Creating something new on her/ his own.

Tools for Internal Formative Evaluation: a brief note

1. Survey:

The term survey is often used to mean collect and interpret information to demonstrate the achievement or otherwise of well-defined goal(s) or specified objective(s) (Devin Kowalczyk,2013). As a part of the Internal Formative Evaluation, the goals or objectives are those expected learning outcomes specified in each subject domain. A survey focuses on factual information and helps surveyors, who are students in the present context, to reinforce their learning under the able monitoring provided by teachers.

2. Case study:

Case studies are stories or contexts. They present realistic, complex, and contextually rich situations and often involve a dilemma, conflict, or problem that students are expected to analyze/solve by applying their acquired learning skills. It provides an indepth look into a subject/context of study (the case), as well as its related contextual conditions. A case study involves an intensive study of a learning unit and inspires students to examine as condition, situation, or value of the given context.

3. Nature study:

“NATURE-STUDY, as a process, is seeing the things that one looks at, and the drawing of proper conclusions from what one sees” (Hyde Bailey, 1904).Nature study involves observation of plants, animals, natural phenomena, and human activities as a mode of learning. Nature study attempts to reconcile scientific investigation with spiritual, personal experiences gained from interaction/study with the world/contexts that students live in or are aware of.

4. Model making:

A model connotes a pattern, ideal, reproduction or draft of things (increased, reduced or in actual size). “Apart from real things, models can also be mental constructions” (Mueller Science, 1971). Model making is a logical next step in the thinking process for many ideas. It helps students to concretize abstract and complex concepts/ideas through hands-on experience. A model may be a two-dimensional or three-dimensional representation of the concepts or ideas. Model making provides scope for reinforcement of critical and creative thinking skills as well as the problem-solving and decision making skills.

5. Creative writing:

Creative Writing involves written expression that draws on creative and critical thinking to convey meaning. Creative writing focuses upon learning competencies in the subject domains, while harnessing the CCT skills. It provides scope or students to apply multiple learning strategies vis-a-vis demonstrating clarity of concepts and their application underlined by aesthetic appreciation a value judgements.

6. Open Text Book Evaluation:

OTBE implies an application of theory to real life situations. It is based upon the principle that the whole objective of learning is not about constant delivery. There must be effective transaction of learning, not just content in the classroom. Therefore, OTBE not only reinforces learning competencies, but also provides scope for transference learning skills. It inspires students to use a range of strategies including accurate decoding of meaning, to describe, select or retrieve information, events or ideas from texts and to deduce, infer or interpret information, events or ideas from texts.

Geography and Environment

(A) Survey

1. Activity - Survey of drinking water in your school

Time – 40 min. [group discussion- 5/10 min, group/ individual work 20/25 min, exchange of opinion 5/10 min.]

Teacher's role- The students are to be divided into groups. A list of points/issues on which the group-discussions will be conducted has to be written on the blackboard. Time has to be provided for writing the report (individual/group). The students are to be encouraged for presentation of the report (individual/group).

Student's activity –The learners Participate in group discussion on the points given on the blackboard. The exchanged ideas are to be written individually/in groups (depending on the number of students present in the class) and give opinions on them. Individual/group report (within 80 words) has to be presented.

Topic- Water resources of West Bengal

Sub topic- Ground water.

In school :

- * Source of drinking water
- * Sufficient availability of drinking water
- * Depth of tube well (if necessary, teacher's help may be taken)
- * Taste of Drinking Water
- * Purity
- * Maintenance
- * Wastage and its reason
- * Measures to be taken for preventing wastage

Desired competency: - Awareness development on prevention of wastage of drinking water

2. Activity- Survey on relief and drainage map of West Bengal

Time- 40 mins. [Group/individual map observation- 5/10 mins., Group/individual collection of information -5/10 mins, Group discussion- 5mins, Report making and exchange of opinion- 10/15 mins.]

Teacher's role: The students are to be divided into groups. They are told to observe the relief and drainage map of West Bengal. Points are to be written on the black board on which observations have to be made. Later, the reports are to be submitted to the teacher on the

basis of the collected information, enlisting, exchange of opinion etc.

Students' activity : Relief and drainage map of West Bengal has to be observed on the basis of the given points and individual notes are to be made. Inferences are to be drawn on the basis of the exchange of opinion. Individual report is to be submitted.

Topic- Physical Environment of West Bengal

Sub-topic : Relation between relief and drainage of West Bengal

The following points to be noted after minute observation of the relief and drainage map of West Bengal :

- * A river has to be selected each from the northern, western and southern part of West Bengal.
- * The flow direction of three rivers have to be observed.
- * Confluence of the river has to be observed.
- * The districts through which the rivers are flowing are to be observed.
- * Different types of physiographic region through which the rivers are flowing are to be observed.
- * Length of the rivers is to be measured with thread and the respective lengths are to be compared.
- * A report has to presented on the slopes indicated, based on the direction of flow of the rivers.

Desired competency -Understanding the relation between slope and drainage of different regions of West Bengal.

Rubric of evaluation-

1. Collection of primary data and assimilation- 2
2. Analysis and explanation- 2
3. Inference and Evaluation -2
4. Correlating textual objective with acquired competence- 4

(B) Nature Study

1. Activity- Water logging due to flood and sewage system

Time- 40 mins [Group discussion 5/10 mins, registering information, drawing inference and writing-20/25mins, exchange of opinion- 5/10mins]

Teacher's work - It is natural to the students to observe nature. Students should be allowed to make a report individually on nature related topic (written on the black board) on the basis

of their personal experience. Individual reports are to be collected.

Students' activity: Collected information is to be written on the basis of group discussion. Individual reports (within 80 words) are to be submitted after exchange of opinion.

Topic: Hazards and disaster

Sub-topic: Flood

Most of the regions of West Bengal are prone to flood. Almost all the students have heard/ seen flood or water logging in an area for a period of time.

- * Possible reasons of water logging caused due to heavy rain/opening of log gates are to be written down.
- * Brief discussion should be made on human interference causing flood/water logging.
- * The sewage systems of the students' locality are to be explained.
- * Students' individual opinions are to be collected.

Desired competency- To increase awareness of sewage system of his/her locality and understanding the measures to be taken

Rubric for Evaluation:

1. Observation and exchange of experience-2
2. Registration/enlisting-2
3. Realisation and critical presentation-2
4. Correlating textual objective with acquired competence-4

(C) Case Study :

1. Activity- Aruna's dream.

Time- 40 mins [Individual/ group reading of the given story- 5/10mins., Understanding the problem and suggesting solutions through group discussion- 20 mins., writing of answers individually/group -5/10 mins.]

Teacher's role- Students are to be divided into groups. The matter (or case) is to be written on a paper and supplied to each group. The questions are to be written on the blackboard.

Students' activity: Questions (written on the blackboard) are to be discussed in groups and to be written individually. (within 80 words)

Topic- Major economic activities of West Bengal

Sub topic- Causes of development, problems and solutions of tourism industry in West Bengal.

The place is five minutes walking distance from Aruna's house. While going to her uncle's

house with her mother, Aruna stands under the shaggy-headed sisoo tree for two minutes. A wide spread lake called Ayanamoti lies in front. Migratory birds visit here during winter. There is a hillock behind the *sisoo* tree. A little effort can take one to the top of the hillock. River Monbhasi can be seen from the top of the hillock. Sunlight gleams on the river. To the north of the hillock a stone quarry can be seen. A faint sound of cutting of rocks comes from the quarry. An asphalt road has passed by the quarry towards the large town. Aruna feels that this place could have been a tourist spot. But she is very hopeful. She wants to see, that someday this little known place in the tourist map of West Bengal.

- * Why does Aruna feel the place mentioned may become a tourist spot?
- * What are the other facilities to be available in the place to develop it as a tourist spot?
- * What are the steps to be taken to preserve the sanctity of the place from human interference?

Desired competency- Understanding the problems related to the development of tourism industry and the solutions thereof. Causes of development, problems and solutions of tourism industry in West Bengal

Rubric for Evaluation.

1. Problem and realisation of given topic-2
2. Finding probable solution-2
3. Identifying the best solution-2
4. Correlating textual objective with acquired competence-4

(D) Creative Writing

1. Activity - Imaginary conversation on setting up a new factory at Sudipta's house.

Time- 40 mins. [Group discussion- 5/10 mins, writing dialogue individually/group-20/25 mins, exchange of opinion 5/10 mins.]

Teacher's role: Directing students to write a dialogue on a specific subject.

Topic may be read out/ written on black board.

Student's work- After the group discussion, imaginary dialogue would be written.

Topic - Major economic activities of West Bengal

Sub-topic- Importance of small scale industry in West Bengal

Various juicy fruits are cultivated in and around Sudipta's place. Many people in the locality have small units for manufacturing jam, jelly from fruit juice, pickles etc. Sudipta's parents want to set up a similar small factory in the unused rooms of their ground floor. Now write an imaginary dialogue between you and Sudipta on the measures to be taken to accomplish their

dream (within 80 words).

Desired competency- Understanding self- sufficiency through small scale industry.

Rubric for Evaluation.

1. Ability of expression-2
2. Originality of expression-22
3. Logicality -2
4. Correlating textual objective with acquired competence-4

(E) Model Making

1. Activity - Prepare a chart on fold mountain formation

Time- (40 + 40) = 80 mins. (Two periods) [group discussion and planning - 10/15 mins., work to be done through mutual cooperation- 65/70mins).

Teacher's role: Students are to be divided into groups. They are helped to collect subject related materials. They should be told to prepare model/chart on the subject.

Students' activity- Prepare a model/ chart with the help of necessary material.

Topic- Landform processes and different types of landforms

Sub-topic-Origin of Fold Mountains

* Draw a chart of the stages of fold mountain formation on the basis of plate tectonic theory.

Desired competency - Understanding the role of plate movement for the formation of Fold Mountain.

2) Activity - Make a chart on the physiographic division of West Bengal.

Time : (40+40)=80 mins. (2 periods)

[Group discussion and planning- 10/15 mins., the work to be done through mutual co-operation 65/70 mins.]

Teacher's role - Divide students into groups. Cooperate with them to collect materials.

Students' activity- Prepare a chart/ model with the help of required materials. (one from each group)

Topic- Physical Environment of West Bengal

Sub-topic - Relief of West Bengal

- * Prepare a three dimensional physiographic map of West Bengal on a chart paper. Students may use papers, colour, adhesive etc.

Desired competency: Understanding the regional physiographic variation in West Bengal.

Rubric for Evaluation.

1. Conversion of abstract thought to concrete-2
2. Eagerness for creative and experimental work-2
3. Explanation and presentation-2
4. Correlating textual objective with acquired competence-4

(F) Open Text Book Evaluation

1. Activity- Positive and Negative aspects of natural hazards and disaster

Time- 40mins. [group discussion- 5/10 mins, complete the work individually/ in group-20/25 mins., exchange of opinion- 5/10mts]

Teacher's role: to supply study material to each group.

Student's activity- Answer the given questions (within 80 words) on the basis of study material.

Topic - Hazards and disaster.

Sub-topic- River bank erosion

Flood brings destruction of embankments. People settled on the banks are not scared of flood. They know that after the water recedes new silt would give large production. But destruction of embankments is very dangerous. It takes away lands, houses, markets, schools, mosques and temples. 174 km course of the river Ganges, from Bhutnidiyara to Shikarpur (Murshidabad-Nadia border) through Farakka, is under great threat from the river bank erosion. In the last few decades approximately 200 sq.km area covering three blocks in Malda district were eroded. Sand bars amounting to equal area have risen on the opposite bank (near Jharkhand border) of the river. Extensive areas of Dhalkuliyar, Suti, Lalgola, Bhagobangola, Raninagar and Jalangi in Murshidabad are under the threat. The number of land losers is increasing every year. Socio-economic structure is breaking down alarmingly [Source- 'Banglar Nadikatha- Kalyan Rudra page- 98, 2nd paragraph]

- * Cite examples of another normal physical phenomena which causes threat to human society.
- * The normal physical phenomena sometimes affect negatively on human lives. State the positive impact of these physical phenomena.

Desired competency Understanding the positive and negative aspect of physical phenomena.

Rubric for Evaluation:

1. Identification of data and analysis-2
2. Understanding of data-2
3. Use of data -2
4. Correlating textual objective with acquired competence-4

Note: Samples of evaluation for formative assessment and its methodologies for class IX are given above. The teachers may change the subject or topic according to the cognitive level of his/her students.

Geography and Environment

Class - IX

Syllabus

- Theme :**
1. Earth as a planet
 2. Movements of the Earth
 3. Determination of location of a place on the Earth's surface
 4. Geomorphic Processes and Landforms of the Earth
 5. Weathering
 6. Hazards and Disasters
 7. Resources of India
 8. West Bengal
 9. Maps and Scale
- Map (Resources of India and West Bengal)

First Summative Evaluation : 40 marks

Internal Formative Evaluation : 10 marks

- Theme :**
1. Earth as a planet
 2. Movements of the Earth
 7. Resources of India
- Map (Resources of India)

Second Summative Evaluation : 40 marks

Internal Formative Evaluation : 10 marks

- Theme :**
3. Determination of location of a place on the Earth's surface
 4. Geomorphic Processes and Landforms of the Earth
 5. Weathering
 8. West Bengal (Location, Administrative Divisions, Physical Environment)

Third Summative Evaluation : 90 marks

Internal Formative Evaluation : 10 marks

- Theme :**
6. Hazards and Disasters
 8. West Bengal (Major Economic Activities)
 9. Maps and Scale
- Map (West Bengal)

N.B. : Themes chosen for the first and second summative evaluations are also to be included in the third summative evaluation (except map work of first summative evaluation).

Geography and Environment
Question pattern and distribution of marks for Summative Evaluation – Class IX

First Summative Evaluation **Full marks-40**

Theme	Group - A	Group - B	Group - C	Group - D	Group - E	Group - F	Total
	MCQ type 1 mark	Very short answer type question 1 mark	Short answer type question 2 marks	Short explanatory answer type question 3 marks	Long answer type question 5 marks	Map 1 mark	
Physical Geography 1. Earth as a Planet 2. Movements of the Earth	$1 \times 2 = 2$	$1 \times 2 = 2$	$2 \times 1 = 2$	$3 \times 1 = 3$			$\begin{array}{r} \overline{09} \\ 10 \\ \hline + 5 \\ \hline 11 \end{array}$
	$1 \times 2 = 2$	$1 \times 3 = 3$	$2 \times 1 = 2$	$3 \times 1 = 3$			
Regional Geography 7. Resources of India	$1 \times 3 = 3$	$1 \times 3 = 3$	$2 \times 1 = 2$	$3 \times 1 = 3$	$5 \times 1 = 5^*$		
● Map (Resources of India)	—	—	—	—	—	$1 \times 5 = 5$	05
	07	08	06	09	05	05	40

N. B. :

Group-A : MCQ type – Information based and concept oriented questions to be set (four options to be provided).

Group-B : Very short answer type question – should consist of • fill in the blanks • true/ false • column matching • one or two word answer.

Group-C : Short answer type question – Consists of ‘what’/ ‘where’ type questions.

Group-D : Short explanatory answer type question – Compare/contrast/reasoning type of questions to be set (three points to be asked).

Group-E : Long answer type question – Preferably diagram-based questions from physical geography, ‘how’/ ‘why’ questions from Regional Geography.

Group-F : Outline map of India to be provided and questions to be set to locate and label geographical features. Five alternative questions should be provided for sightless candidates in lieu of map work. Each question carries 1 mark.

* Total 2 questions to be given, 1 each from Physical and Regional Geography. Any 1 to be answered.

Geography and Environment
Question pattern and distribution of marks for Summative Evaluation – Class IX
Second Summative Evaluation

Full marks-40

Theme	Group - A	Group - B	Group - C	Group - D	Group - E	Total
	MCQ type 1 mark	Very short answer type question 1 mark	Short answer type question 2 marks	Short explanatory answer type question 3 marks	Long answer type question 5 marks	
Physical Geography 3. Determination of location of a place on the Earth's surface 4. Geomorphic Processes and Landforms of the Earth 5. Weathering	1 × 2 = 2	1 × 2 = 2	2 × 1 = 2	3 × 1 = 3		09
	1 × 2 = 2	1 × 2 = 2	2 × 1 = 2	3 × 1 = 3		09
	1 × 1 = 1	1 × 2 = 2	2 × 1 = 2	3 × 1 = 3	5 × 1 = 5*	08 + 5
Regional Geography 8. West Bengal (Location, Administrative Divisions, Physical Environment)	1 × 2 = 2	1 × 2 = 2	2 × 1 = 2	3 × 1 = 3		09
	07	08	08	12	05	40

N. B. :

Group-A : MCQ type – Information based and concept oriented questions to be set (four options to be provided).

Group-B : Very short answer type question – should consist of • fill in the blanks • true/false • column matching • one or two word answer.

Group-C : Short answer type question – Consists of ‘what’/ ‘where’ type questions.

Group-D : Short explanatory answer type question – Compare/contrast/reasoning type of questions to be set (three points to be asked).

Group-E : Long answer type question – Preferably diagram-based questions from Physical Geography, ‘how’/ ‘why’ questions from Regional Geography.

* Total 3 questions to be given, at least 1 each from Physical and Regional Geography. Any 1 to be answered.

Geography and Environment
Question pattern and distribution of marks for Summative Evaluation – Class IX
Third Summative Evaluation
Full marks-90

Theme	Group - A	Group - B	Group - C	Group - D	Group - E	Group - F	Total
	MCQ type 1 mark	Very short answer type question 1 mark	Short answer type question 2 marks	Short explanatory answer type question 3 marks	Long answer type question 5 marks	Map 1 mark	
Physical Geography 1. Earth as a Planet 2. Movements of the Earth 3. Determination of location of a place on the Earth's surface 4. Geomorphic Processes and Landforms of the Earth 5. Weathering	1×8 = 8	1 × 11 = 11	2×3 = 6	3 × 2 = 6	5×2 = 10	—	41
Man and Environment 6. Hazards and Disasters	1×1 = 1	1×1 = 1	2×1 = 2	3 × 1 = 3	—	—	07
Regional Geography (Including Maps and Scale) 7. Resources of India 8. West Bengal 9. Maps and Scale	1 × 5 = 5	1 × 10 = 10	2 × 2 = 4	3 × 1 = 3	5 × 2 = 10	—	32
● Map (West Bengal)	—	—	—	—	—	1×10 = 10	10
	14	22	12	12	20	10	90

N. B. : Group - A : Total 14 questions to be given. [Total 8 questions to be given including at least 1 from each theme of Physical Geography. Total 5 questions to be given including at least 1 from each theme of Regional Geography.] There will be no alternative in this group.
Group - B : Total 25 questions to be set, out of which 22 to be answered. [At least 2 questions and 3 questions from each theme of Physical Geography and Regional Geography respectively to be given.]
Group - C : Total 6 questions to be given including at least 1 each from 5 themes of Physical Geography. Any 3 to be answered. 1 out of 2 alternatives from Hazards and Disasters to be answered. Total 4 questions to be given including at least 1 from each theme of Regional Geography. Any 2 to be answered.
Group - D : Total 4 questions to be given including 1 each from any 4 selected themes of Physical Geography. Any 2 to be answered. 1 out of 2 alternatives from Hazards and Disasters to be answered. Total 3 questions to be given including 1 from each theme of Regional Geography. Any 1 to be answered.
Group - E : Total 4 questions to be given including 1 each from any 4 selected themes of Physical Geography. Any 2 to be answered. Total 4 questions to be given including at least 1 from each theme of Regional Geography. Any 2 to be answered.

Some discussions on types of questions

Necessary things to be noted for framing different types of questions

- **Multiple Choice Question (MCQ)**

There are mainly two parts in an MCQ: the stem and the options. Only one of the options should be absolutely correct while the rest of the options should be incorrect. There should be at least four options. Certain features has to be borne in mind to frame the stem-part of the question:

- (i) The major part of the information has to be included in the stem so that the options are stated with minimum words. It is necessary to state the main theme of the question in the stem portion.
- (ii) The language of the stem should be simple and unambiguous so that the learners have no difficulty in understanding the instruction.
- (iii) Care should be taken in the use of words in the stem. The words used in the stem should be from the known vocabulary of the learners.
- (iv) It is better not to use negative words in the stem.

- ◆ **Things to be noted for framing options:**

- (i) In every MCQ there should be four options. Apart from the correct option, the other three options are called 'Distractors'.
- (ii) There should be only one correct option among the four options.
- (iii) Each of the options should be independent. There should not be any overlapping in the options.
- (iv) The four options i.e. one correct option and three distractors should have similarity in respect of length, complexity and use of language.
- (v) 'All the options given above are correct' or 'None of the above options are correct'— such sentences should not be used as an option.
- (vi) The correct options of various questions should be arranged at random. That is, if in a question (a) is the correct option, then it is desirable that in the subsequent questions the correct option is (b), (c) or (d).

- ◆ **Things to be noted for using distractors:**

- (i) It should be borne in mind that the distractors should be apparently logical.
- (ii) The common errors and misconceptions of the learners may be given as distractors.

- (iii) Sentences that are absolutely wrong should not be given as options.
- (iv) Correct sentence but which is not the correct answer to the question — it is desirable to use such distractors.

- **Very Short Answer type questions (VSA)**

- ◆ **One word answer or answer in a sentence**

Certain things are to be kept in mind for framing these type of questions:

- (i) The use of language in a sentence ought to be as simple and unambiguous as possible so that the learners do not have any difficulty in understanding the question.
- (ii) The questions should be such that the answers would be short and precise.

- ◆ **Fill in the blanks**

Certain things are to be kept in mind for framing these type of questions:

- (i) The use of language in a sentence ought to be as simple and unambiguous as possible so that the learners do not have any difficulty in understanding the question.
- (ii) It should be noted that only one word should fill up each blank.

- ◆ **Identifying correct or incorrect sentence:**

Certain things are to be kept in mind for framing these type of questions:

- (i) The use of language in a sentence ought to be as simple and unambiguous as possible so that the learners do not have any difficulty in understanding the question.
- (ii) Extremely complicated and long sentences should be avoided.
- (iii) It is better not to present more than one idea in a sentence.

- ◆ **Match the columns**

Certain things are to be kept in mind for framing these type of questions:

- (i) An award of 1 mark should be provided for every correct relationship.
- (ii) The number of items included in column B should be at least one in excess of the items in column A.
- (iii) The items included in column A and B should be as brief as possible.
- (iv) Two columns should be in one page.

- **Short Answer type questions (SA)**

Certain things are to be kept in mind for framing these type of questions:

- (i) The use of language in a sentence ought to be as simple and unambiguous as possible so that the learners do not have any difficulty in understanding the question.
- (ii) Questions should be such that the answers should be in two or three sentences.

- **Long Answer type questions (LA)**

Certain thing is to be kept in mind for framing this type of question:

- (i) The use of language in a sentence ought to be as simple and unambiguous as possible so that the learners do not have any difficulty in understanding the question.

- * **N.B :** The answer of 2 marks question should be in two/three sentences. The answer of 3 marks question should be in three/five sentences. The answer of 5 marks question should be in seven/ten sentences.

Variety of questions based on the proposed blueprint

- **MCQ and Very Short Answer type questions**

Questions can be set on the following items:

- (i) Factors
- (ii) Characteristics
- (iii) Process/method, mention of different landforms
- (iv) Occurrence
- (v) Functions
- (vi) Significance
- (vii) Use of terminologies related to Geography
- (viii) Identifying the dissimilar
- (ix) Identifying the correct pair
- (x) Writing the correct logical sequence
- (xi) Various applications of Geography
- (xii) Establishing interrelationship (e.g. between different elements of physical environment, between landform process and landforms etc.)
- (xiii) Example

- **Short Answer type questions and Long Answer type questions**

Questions can be set on the following topics:

- (i) Characteristics
- (ii) Occurrence
- (iii) Function
- (iv) Role
- (v) Significance
- (vi) Difference/comparison
- (vii) Cause-effect relationship
- (viii) Explanation
- (ix) Example
- (x) Analytical question
- (xi) Drawing diagrams
- (xii) Questions related to diagrams
- (xiii) Identification
- (xiv) Making line diagram and asking questions on it

REVISED Bloom's Taxonomy Action Verbs

Definitions	I. Remembering	II. Understanding	III. Applying	IV. Analyzing	V. Evaluating	VI. Creating
Bloom's Definition	Exhibit memory of previously learned material by recalling facts, terms, basic concepts and answers.	Demonstrate understanding of facts and ideas by organizing, comparing, translating, interpreting, giving descriptions and stating main ideas.	Solve problems to new situations by applying acquired knowledge, facts, techniques and rules in a different way.	Examine and break information into parts by identifying motives or causes. Make inferences and find evidence to support generalizations.	Present and defend opinions by making judgments about information, validity of ideas, or equality of work based on a set of criteria.	Compile information together in a different way by combining elements in a new pattern or proposing alternative solutions.
Verbs	<ul style="list-style-type: none"> • Choose • Define • Find • How • Label • List • Match • Name • Omit • Recall • Relate • Select • Show • Spell • Tell • What • When • Where • Which • Who • Why 	<ul style="list-style-type: none"> • Classify • Compare • Contrast • Demonstrate • Explain • Extend • Illustrate • Infer • Interpret • Outline • Relate • Rephrase • Show • Summarize • Translate 	<ul style="list-style-type: none"> • Apply • Build • Choose • Construct • Develop • Experiment with • Identify • Interview • Make use of • Model • Organize • Plan • Select • Solve • Utilize 	<ul style="list-style-type: none"> • Analyze • Assume • Categorize • Classify • Compare • Conclusion • Contrast • Discover • Dissect • Distinguish • Divide • Examine • Function • Inference • Inspect • List • Motive • Relationships • Simplify • Survey • Take part in • Test for • Theme 	<ul style="list-style-type: none"> • Agree • Appraise • Assess • Award • Choose • Compare • Conclude • Criteria • Criticize • Decide • Deduct • Defend • Determine • Disprove • Estimate • Evaluate • Explain • Importance • Influence • Interpret • Judge • Justify • Mark • Measure • Opinion • Perceive • Prioritize • Prove • Rate • Recommend • Rule on • Select • Support • Value 	<ul style="list-style-type: none"> • Adapt • Build • Change • Choose • Combine • Compile • Compose • Construct • Create • Delete • Design • Develop • Discuss • Elaborate • Estimate • Formulate • Happen • Imagine • Improve • Invent • Make up • Maximize • Minimize • Modify • Original • Originate • Plan • Predict • Propose • Solution • Solve • Suppose • Test • Theory

Learning outcome and types of questions

Sl. No.	Cognitive areas	Learning competency	Curricular areas	Types of questions	Sample questions
1.	Remembering	Identify	The earth as a planet	MCQ	Which of the following planets is the largest? (a) Earth (b) Mercury (c) Jupiter (d) Venus
2.	Remembering	Select	Resources of India	MCQ	Which of the following is an example of non-conventional source of energy? (a) coal (b) mineral (c) natural gas (d) geothermal
3.	Remembering	Show	West Bengal	Very short answer type questions	Show the location of an iron-steel industry in the outline map of India.
4.	Remembering	Which	Motions of the earth	Very short answer type questions	The direction of any free flowing objects on earth changes due to _____ motion.
5.	Remembering	Name	Hazards and disaster	Very short answer type questions	What instrument measures the frequency of the earthquake?
6.	Remembering	What	West Bengal	Short answer type questions	What do you mean by hinterland?
7.	Remembering	Where	West Bengal	Short answer type questions	Which is the wettest place in West Bengal?

Sl. No.	Cognitive areas	Learning competency	Curricular areas	Types of questions	Sample questions
8.	Remembering	Define	Maps and scale	Short answer type questions	What is a map?
9.	Understanding	Infer	Weathering		Mention two conditions of mechanical weathering.
10.	Understanding	Classify	Resources of India	Short analytical answer type questions	State the factors for developing resources and classify resources on the basis of longevity?
11.	Understanding	Relate	Weathering	Short answer type questions	What is the relation between weathering and erosion?
12.	Understanding	Contrast	Land formation process and various land forms of the world	Short analytical answer type questions	Mention three differences between depositional mountains and relict mountains
13.	Creating	Happen	Motions of the earth	Short analytical answer type questions	What will happen if the rotation of the earth stops?
14.	Evaluating	Justify	The earth as a planet	Short analytical answer type questions	The earth is the only planet in the solar system for habitation.' Justify the remark.
15.	Analyzing	Relationships	West Bengal	Short analytical answer type questions	Show how the nature of natural vegetation in the mountainous regions is influenced by the climate of West Bengal. Give suitable examples.

Geography
First Summative Evaluation
Class IX
Model Question Papers

Full Marks : 40

Time : 1 hr 30 min

Group-A

1. Choose the correct answer from the given alternatives:

[1×7=7]

1.1 At what degree do we find the pole star in the northern hemisphere?

- a) 23° b) 90°
c) 0° d) 66°

1.2 Which of the following is an instance of outer planet?

- a) Jupiter b) Mars
c) Mercury d) Venus

1.3 Which of the following pair is correct?

- a) 22nd December to 21st June – Northern journey of the sun (Uttarayan)
b) Summer solstice – days and nights are equal in both hemispheres
c) 22nd December to 21st June – southern journey of the sun (Dakshinayan)
d) Aphelion position – 14 crore 70 lakh km

1.4 Which of the following is the effect of the rotation of the earth?

- a) Apparent annual movement of the sun b) seasonal change
c) Occurrence of day and night d) changes in length of day and night

1.5 Which of the following is an example of human resource?

- a) sunray b) labour
c) water d) soil

1.6 Which of the following type of coal does emit less smoke?

- a) Bituminous b) Lignite
c) Pit d) Anthracite

1.7 Mineral oil is mostly found in

- a) Igneous rock b) Sedimentary rock
- c) red soil d) Podsol soil

Group B

2.1 Write 'correct' beside correct statements and 'incorrect' beside incorrect statements: **[1×2=2]**

2.1.1 Earth's shape is like geoid.

2.1.2 The first sunrise occurs in the western hemisphere.

2.2 Fill in the blanks with appropriate words: **[1×2= 2]**

2.2.1 The earth's difference between equatorial diameter and polar diameter is _____.

2.2.2 The light and dark portion of the earth demarcated by the circular line is known as _____.

2.3 Match the columns: **[1×3=3]**

Column A

Column B

2.3.1 Magnetite

a) utility

2.3.2 Resources

b) solar energy

2.3.3 Flow resource

c) iron ore

2.4 Answer in a few words: **[1×1=1]**

2.4.1 How many days are in a leap year?

Group C

3. Answer the following questions briefly: **[2×3=6]**

3.1 Give a proof of earth's spherical shape?

or

Mention two uses of G.P.S.

3.2 Where does the sunray fall vertically on 23rd September and 22 December?

or

What is apparent movement of the sun?

3.3 Mention two conditions for a neutral substance to be a resource?

or

What is resource?

Group D

4. Explain the following questions briefly: [3×3=9]

4.1 The earth is only planet in the solar system that is habitable for living beings – Mention three points in favour of your argument.

or

Describe the natural environment of Venus and Mars.

4.2 Differentiate between rotation and revolution on the basis of three factors.

or

Explain how aphelion and perihelion occur with diagram.

4.3 Show three differences between the sources of conventional and non-conventional energy.

or

Mention the distribution of mineral oil in the Western Region of India.

Group E

5. Answer any one question: [5×1=5]

5.1 The cycle of four seasons are generally observed on the earth's surface. Explain the cycle of seasons with a diagram.

or

The scientific use of resources is indispensable to cater to the demands of the future generation. What methods need to be adopted to make conservation of resources possible?

Group F

6. Identify the following with suitable names and symbols in the outline map of India: [1×5=5]

6.1 An oil producing centre of North East India.

6.2 An oil refinery in the Western Region.

- 6.3 A thermal power plant in South India
- 6.4 The largest lignite mine of India
- 6.5 An iron ore producing centre of East India

or

[Only for visual impaired students]

6. Answer the following questions (any five): **[1×5=5]**

- 6.1 What is the resource known as which gets exhausted with continuous uses?
- 6.2 Name a iron producing centre in Eastern India?
- 6.3 What type of coal is of best quality?
- 6.4 Where does O.N.G.C's main centre is situated?
- 6.5 Name a hydal power station is South India?
- 6.6 Name one solar power centre of India.
- 6.7 Mention a usage of petroleum.

Geography
Second Summative Evaluation
Class IX
Model Question Papers

Full Marks : 40

Time : 1 hr 30 min

Group-A

1. Choose the correct answer from the given alternatives: [1×7=7]

1.1 The 0° imaginary line that runs East West along the middle of the earth is called

- a) Prime Meridian b) Tropic of Cancer
c) Tropic of Capricorn d) Equator

1.2 It is 2.56 at noon by the clock. How will you express it?

- a) 2.56 b) 56 mins past 2
c) 2.56 am d) 2.56 pm

1.3 Which of the following pair is correlated?

- a) volcanism – internal process b) Block mountain – Folding
c) Rift valley – orogenic movement d) Fold mountain – aperiogenic movement

1.4 Mt. Fujiyama is an example of which of the following type of mountain?

- a) Volcanic mountain b) Fold mountain
c) Block mountain d) Relict mountain

1.5 What do we call to the covering of the main rock formed from the weathering of rocks?

- a) Parent material b) regolith
c) soil d) scree

1.6 Which of the following river belongs to North Bengal?

- a) Kanshai b) Ichamati
c) Damodar d) Teesta

3.4 Mention the names of the wettest and the driest place of West Bengal.

or

Mention two characteristics of climate of West Bengal.

Group D

4. Explain the following questions briefly: [3×4=12]

4.1 Differentiate between parallels of latitude and the meridians of longitude on the basis of three factors.

or

Define local time and standard time.

4.2 'Most people adopt plains for settlement'. Mention three points in favour of your argument.

or

Mention three characteristics of fold mountain.

4.3 Compare between weathering and erosion on the basis of three factors.

or

Explain the process of exfoliation with diagram.

4.4 Mention three characteristics of rivers of Sunderban region.

or

Mention three problems of information technology industry in West Bengal.

Group E

5. Answer any one question [Drawing diagram is not compulsory for visually impaired students]: [5×1=5]

5.1 A e-mail has been sent from Tokyo (139°45'E) to Kolkata (88°24'E) on Tuesday, 1st March 2016 at 3 a.m. on which day, date and time it reached Kolkata?

Place	Longitude	Latitude	Time
A	23° 42' N	87° 01' E	6 pm

or

'The climate of West Bengal is tropical monsoon type' – Justify the comment.

Geography
Thirst Summative Evaluation
Class IX
Model Question Papers

Full Marks : 90

Time : 3 hr 15 min
[15 minutes are allotted to read the question paper]

Group-A

1. Choose the correct answer from the given alternatives: [1×14=14]

1.1 The horizon from a high altitude looks like –

- | | |
|----------------|-----------|
| a) circular | b) linear |
| c) rectangular | d) square |

1.2 The speed of rotation of the earth at two poles is

- | | |
|-------------------|---------------|
| a) 1600 km/hr | b) 1100 km/hr |
| c) almost 0 km/hr | d) 1200km/hr |

1.3 The day shadow circle divide the latitude equally is –

- | | |
|------------------------------|----------------------------|
| a) 21 st March | b) 21 st June |
| c) 22 nd December | d) 3 rd January |

1.4 The meridian of longitude which determines the indian standard time runs through the city of –

- | | |
|--------------|-------------|
| a) Allahabad | b) Jaipur |
| c) Chennai | d) Guwahati |

1.5 Mainly fault is responsible for the development of –

- | | |
|--------------------------|--------------------|
| a) fold mountain | b) block mountain |
| c) depositional mountain | d) relict mountain |

1.6 An example of dissected plateau is –

- | | |
|------------------------|----------------------|
| a) Deccan plateau | b) Meghalaya plateau |
| c) Chotanagpur plateau | d) Ladakh plateau |

- 1.7 A result of biological weathering is –
- a) cracks due to expansion and contraction of rocks
 - b) holes created in limestone region
 - c) cracks caused by roots
 - d) rust in iron content rock
- 1.8 The chemical weathering which is responsible for the development of holes in limestone region is –
- a) oxidation
 - b) carbonation
 - c) hydration
 - d) hydrolysis
- 1.9 In India a cyclone may form disaster in –
- a) highly populated coastal areas
 - b) desert region
 - c) Deccan plateau
 - d) eastern highlands
- 1.10 An example of nonconventional form of energy is –
- a) Hydroelectric power
 - b) geothermal power
 - c) atomic power
 - d) thermal power
- 1.11 One coal mine region is –
- a) Jharia
 - b) Kalpakkam
 - c) Farakka
 - d) Jalgaon
- 1.12 The district which falls under the western plateau region is –
- a) South 24 parganas
 - b) Malda
 - c) Darjeeling
 - d) Purulia
- 1.13 The main pillar of economy in North Bengal is—
- a) iron and steel industry
 - b) cotton industry
 - c) tea industry
 - d) IT industry
- 1.14 A large scale map is –
- a) 1:50,000
 - b) 1:500,000
 - c) 1:10,000
 - d) 1:100

Group- B

2.1 Write ‘correct’ beside correct statements and ‘incorrect’ beside incorrect statements: **[1×6=6]**

- 2.1.1 The shape of the earth is like geoid.
- 2.1.2 The speed of rotation of the earth is same at both equator and poles.
- 2.1.3 The Prime Meridian is a great circle.
- 2.1.4 Epeirogenic movement acts horizontally on the earth’s surface.
- 2.1.5 Mineral resource is an example of flow resource.
- 2.1.6 Loamy soil is required for tea plantation.
- 2.1.6 Gorumara is a reserve forest in West Bengal.

2.2 Fill in the blanks with appropriate words: **[1×6= 6]**

- 2.2.1 During lunar eclipse the shadow of the _____ falls on the moon.
- 2.2.2 _____ is known as land of the midnight sun.
- 2.2.3 The difference of time of a place and its antipode is _____.
- 2.2.4 Tibet is an example of _____ plateau.
- 2.2.5 Shivasundaram of South India is an example of _____ center.
- 2.2.6 The landform of eastern Malda is known as _____.
- 2.2.7 The R.F. of topographical map is _____.

2.3 Match the columns: **[1×7=7]**

Column A	Column B
2.3.1 Landforms	1) Earthquake
2.3.2 Tsunami	2) Contour
2.3.3 Oxidation	3) Problems in mountaineering
2.3.4 Blizzard	4) Rust in Iron

2.4 Answer in a few words (note the alternatives):

[1×3=3]

- 2.4.1 What will be the value of the antipode of the meridian of longitude $85^{\circ} 30'$
- 2.4.2 Write the name of a deltaic plain.
- 2.4.3 What do we call weathering and denudation togetherly?
- 2.4.4 What type of weathering occurs in granite rock infested region?
- 2.4.5 In which category of resources art can be classified?
- 2.4.6 Name a thermal power station of Eastern India.
- 2.4.7 What type of map shows the population density?
- 2.4.8 What is the name of the organisation that produces topographical map?

Group- C

3. Answer the following questions briefly (note the alternatives): [2×6=12]

3.1 What is GPS?

or

What is the significance of International Date Line?

3.2 What is shadow circle?

or

What is apparent diurnal movement of the sun?

3.3 Why is chemical weathering predominant in the equatorial region?

or

Mention two characteristics of relict mountain.

3.4 Name two landslide prone region of India?

or

Name two disasters associated with rainy season.

3.5 What are the two conditions by which a neutral substance can be called a resource?

or

Name two neighbouring states that is on the northern border of West Bengal.

3.6 Give an idea of statement scale with example.

or

Mention two problems of tourism industry of West Bengal.

Group D

4. Explain the following questions briefly (note the alternatives):

[3×4=12]

- 4.1 'The earth is only planet for habitation in the solar system.' Justify the comment logically.

Or

Explain the reason for not feeling the rotation of the earth.

- 4.2 Differentiate between mountain and plain.

Or

Write three differences between chemical and mechanical weathering.

- 4.3 Give three reasons for the cause of flood.

Or

What are the conditions that can change a natural hazard into a disaster?

- 4.4 Why is the production of nonconventional source of energy more important?

Or

Compare the drainage of western and eastern side of West Bengal.

Or

Mention three characteristics of topographical maps.

Group E

5. Answer any two questions:

[Drawing diagram is not compulsory for visually impaired students]: [5×2=10]

- 5.1 Discuss with diagrams about the position of the earth on 21st March and 21st June and its effect.
- 5.2 A cricket match played in Kolkata (88° 22' East) was live telecasted from 9.00 a.m. When this match was seen in Sydney (151° 12' E), Australia?
- 5.3 Explain the role of plate in the formation of Fold Mountains with suitable examples and diagram.
- 5.4 Explain the role of temperature in mechanical weathering through two processes by using diagram.

5.2 Answer any two questions:

[5×2=10]

- 5.2.1 Analyze the practical importance of iron ore and petroleum.
- 5.2.2 'The climate of West Bengal is tropical monsoon type' Justify the comment.
- 5.2.3 Describe how the physical and non-physical environment influence the paddy cultivation in West Bengal.
- 5.2.4 Find the importance of maps in various work.

Or

- 5.1.3 'The climate of West Bengal is tropical monsoon type'. Justify the comment.

Group F

- 6. Locate the following on the outline map of India with suitable name and symbols:** **[1×10=10]**

- 6.1 The parallel of latitude running across the middle of West Bengal
- 6.2 Northern mountainous region
- 6.3 River Damodar
- 6.4 A laterite soil region
- 6.5 Natural vegetation of the deltaic region
- 6.6 Tea producing region
- 6.7 One Iron and steel industrial centre
- 6.8 A jute industrial centre
- 6.9 Kolkata port
- 6.10 Balurghat

Or

[Only for visually impaired students]

- 6. Answer the following questions (Any ten) :** **[1×10 = 10]**

- 6.1 How many districts are in West Bengal?
- 6.2 Name a neighbouring country of West Bengal.
- 6.3 Name a river of North Bengal.
- 6.4 What is the name of the land situated in between ganga delta region and western plateau region?

- 6.5 Name one tidal fed river of West Bengal.
- 6.6 Which branch of monsoon effects rain in West Bengal?
- 6.7 Where Podsol soil is found in West Bengal ?
- 6.8 Where mangrove forest is found in West Bengal?
- 6.9 Where Jute Research Centre is located in West Bengal ?
- 6.10 Which industrial region is known as 'Rurh' of West Bengal?
- 6.11 Name one tourism centre of West Bengal?
- 6.12 Name a petrochemical industrial centre of West Bengal.
- 6.13 Write the name of a mining city of West Bengal?
- 6.14 Name a tourism centre located in the plateau region of West Bengal.

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