Reference Section

I. Bibliography:

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I. Bibliography


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Appendix: A

A Certificate from the Department
Assam University
Silchar

TO WHOM IT MAY CONCERN

This is to certify that Shri Rajat Dey is a Ph.D. scholar of the Department of Educational Sciences, Ashutosh Mukherjee School of Education, Assam University, Silchar. He is currently engaged in a research work entitled “A CRITICAL STUDY OF SCIENCE EDUCATION IN THE SECONDARY SCHOOLS OF TRIPURA” for which your valuable help and co-operations are indispensable. Shri Dey personally meets you for the purpose and to explain the nature and extent of help and co-operation he requires from you in this regard.

We would be obliged if you kindly extend your all possible help and guidance to our scholar for the cause of Education as a whole.

Prof. N. B. Biswas.

Department of Educational Sciences
Ashutosh Mukherjee School of Education
Assam University, Silchar

DEPTT. SEAL
SEAL
(i) **School Information Blank** (For Head of the Institution: Overall views)

### A. Location of the School:

1. School is located in (Rural / Semi rural / Urban / Semi urban) ________ area.
2. School belongs to (West Tripura / North Tripura / South Tripura / Dhalai) ________ district.
3. School belongs to ________ sub-division.
4. Way of communication to the School (Bus / Auto / Rickshaws / Walking): ________

### B. Details of the Institution:

1. Name of the Institution: __________________________________________
2. Year of Establishment: ________
3. Stages of the School (Senior Basic / Secondary / Higher Secondary): ________
4. Complete Postal Address:
   P.O. __________ Block_________ Tehsil/Taluka_____________
   Town/City_________ District_________ State__________ Pin__________
5. Phone (with STD code): ___________ • Fax: ____________
6. E-mail: _______________ • Website Address: ________________
7. Type of Institution (Boys / Girls / Co-education): __________
8. Status of Institution (Minority / Non-minority / Both): ____________
9. Number of Boy’s student: ______ • Number of Girl’s student: ______

### C. Management:

1. School is run by (Govt. / Govt. aided / Private): ________________
2. School is financed by (Govt. / Self-financed / private): ________________

### D. Manpower:

1. Whether sanctioned posts of science teacher have been filled up (Yes / No): ______
2. Number of male teacher: Trained _______ Untrained_______
3. Number of female teacher: Trained _______ Untrained_______
4. Number of science teacher: Trained _______ Untrained_______
5. Laboratory assistant is available in the school (Yes / No): ______
6. Librarian is available in the school (Yes / No): ______
7. Is there any shortage of quality among science teacher (Yes / No): ______

E. School Building / House:
1. Construction of school building / house is completed (Yes / No): ______
2. Total number of rooms (existing): ______
3. Total number of science laboratories (existing): ______
4. Total number of rooms allotted for science laboratory (existing): ______

F. Details of the Course:
1. Syllabus followed by the School (TBSE / ICSE / CBSE): ______
2. Science syllabus is available in the school (Yes / No): ______
3. Medium of instruction (Bengali / English / Hindi / Local language): ______

G. Facilities for Science Education:
1. Arrangement taken for popularizing science education (science fair, seminar, project, field trips, and quiz): ________________
2. Arrangement taken for science teachers to familiarize modern Science Education (training / workshop): ______________
3. Method followed while science teaching (Lecture /Demonstration / Laboratory / Project / Inductive-Deductive): ______________
4. Way of evaluating the science subject (Written test / oral test / practical test / all of them): ___________
5. Number of science classes allotted for each class in a week: ______
6. Number of students at a time can do science practical: ______
7. Time allowed for science practical per day: ______

H. Teaching aids:
1. Whether science related teaching aids are available in the school (Yes / No): ______
2. Whether teachers are using teaching aids (Yes / No): ______
3. Type of teaching aids used in science teaching (model, chart, audio, audio-visual etc): ___
I. Curriculum of Science Subject:

1. Science curriculum is available in the school (Yes / No):______
2. Number of science reference books allotted for secondary classes: ______
3. Publication of the science book (NCERT / SCERT / State local board):______
4. Does Science books are prepared as per curriculum (Yes / No):______
5. Whether teachers are using curriculum strictly (Yes / No):______
6. Language by which science book is written (Bengali/English/Hindi/Local language): ___
7. Objectives of the science curriculum_______
8. Standard of existing science curriculum (national / international level): ____________
9. Whether science syllabus is overburden to the student (Yes / No) ______
10. Whether science syllabus is framed as per the Indian Education Commission Recommendation (Yes / No):______

J. Library:

1. The library has separate reference section and reading room (Yes / No) ______
2. Number of text books in the library: _____
3. Number of reference books in the library: _____
4. Number of science journals / periodicals / magazine being subscribed: _____
5. Number of science encyclopedias available in the library: _____
6. Seating capacity of the library: ______

K. Other information:

1. Socio-economic level of the locality of the School: _______________________
2. Level of attitude of the students towards science education: ______________
3. Type of problems facing in science education: _________________________
4. Level of performance of science subject as compare to other subjects: _______
(ii) **Problem Checklist** (For Science Teachers: Views related to school)

**A. Attitude towards Science Education:**

1• Is there any lack of student attitude towards science learning?  
   Always / sometimes / not at all

2• Whether socio-economic status of the student is sound?  
   Always / sometimes / not at all

3• Is school financially sound to run the science education programme?  
   Always / sometimes / not at all

4• Whether Govt. /management are helping financially towards development of science education?  
   Always / sometimes / not at all

**B. Infrastructure:**

1• Is there any scarcity of materials in science laboratory?  
   Always / sometimes / not at all

2• Is there any scarcity of science teacher in the school?  
   Always / sometimes / not at all

3• Is there any accommodation problem for science education?  
   Always / sometimes / not at all

4• Is there any shortage of science books in the library?  
   Always / sometimes / not at all

5• Is library fully equipped with all facilities?  
   Always / sometimes / not at all

**C. Management:**

1• Is relation between head of the Institution and teacher sound?  
   Always / sometimes / not at all

2• Whether student-teacher relation is good?  
   Always / sometimes / not at all

3• Whether guardian-teacher relation is good?  
   Always / sometimes / not at all

4• Whether sufficient fund is allotted to conduct different types of science activity e.g. science fair, quiz, seminar etc.?  
   Always / sometimes / not at all

5• Is arrangement taken for science teachers regarding familiarization of modern science education?  
   Always / sometimes / not at all
D. Science Curriculum:

1. Whether science curriculum is available in the school? 
   Always / sometimes / not at all

2. Whether science syllabus is overburden to the student? 
   Always / sometimes / not at all

3. Whether standard of science curriculum is up to the national level? 
   Always / sometimes / not at all

4. Is science curriculum prepared as per the recommendation made by the Indian Education Commission? 
   Always / sometimes / not at all

5. Whether science syllabus is activity based or not? 
   Always / sometimes / not at all

6. Whether science Textbooks are available locally? 
   Always / sometimes / not at all

7. Is there any problem in text book language/ printing? 
   Always / sometimes / not at all

E. Teaching Aids:

1. Whether there is an availability of teaching aids in the school? 
   Always / sometimes / not at all

2. Whether teachers are using science based teaching aids while teaching? 
   Always / sometimes / not at all

3. Whether students are motivated in preparing improvised teaching aids? 
   Always / sometimes / not at all

F. Surrounding Problems:

1. Is there any problem regarding medium of instruction? 
   Always / sometimes / not at all

2. Whether there is any language problem in between student-teacher interaction? 
   Always / sometimes / not at all

3. Is student-teacher ratio maintained in the class? 
   Always / sometimes / not at all

4. Is there any lack of communication with the school? 
   Always / sometimes / not at all

5. Whether school building is used other than school activity during school time? 
   Always / sometimes / not at all

6. Whether school teachers are utilized other than school activity during school timings? 
   Always / sometimes / not at all

7. Is there any extremist problem where school is situated? 
   Always / sometimes / not at all

8. Do you think that you have find problem in your profession? 
   Always / sometimes / not at all
(iii) **Questionnaire** (For Science Teachers: Views related to teacher & science teaching)

**Information about Teacher**

1. Name of the School: _________________________
2. Name of the Teacher: _________________________
3. Address: _________________________________
4. Date of Birth: ______________
5. Sex (M/F): _____
6. Date of Appointment in the School: __________
7. Nature of Appointment (Temporary/Probationary/Confirmed): ______
8. Educational Qualification: _______________________
9. Designation (PGT/TGT/PRT): ________________
10. Professional Qualification: ____________________
11. Trained (In-service/Before service) or Untrained: _____________
12. Date of Superannuation / Retirement: ________________
13. Teaching Experience (in years): ________________

**Information Regarding Science Teaching**

**A. Text Book**

1. In which language science book is written?
   a) Bengali ☐
   b) English ☐
   c) Hindi ☐

2. Who is selecting the science book?
   a) Head of the institution ☐
   b) Science teacher ☐
   c) Both ☐

3. Science book is prepared as per
   a) Curriculum framed up by Indian Education Commission ☐
   b) Curriculum framed up by State Education Commission ☐
   c) Both ☐
4. Problems related to science book
   a) Language
   b) Printing
   c) None

B. Materials
1. What type of technology based teaching aids is used by science teachers?
   a) Use ware
   b) Software
   c) Hardware

2. What type of teaching aids is used by science teachers?
   a) Model-chart
   b) Audio-visual
   c) Audio or visual

3. What type of science magazine is kept in library?
   a) Locally published
   b) National level
   c) International level

4. What type of educational programmed are arrange for science student?
   a) ETV
   b) ITV
   c) Science excursion

5. What type of problem is there in the library?
   a) Shortage of book
   b) Lack of physical facilities
   c) Nothing

C. Laboratory
1. What is the shape of the science laboratory?
   a) Square
   b) Rectangle
   c) Triangular

2. How many laboratories are there in the school?
   a) 1
   b) 2
   c) 3
3. What type of problem is there in the laboratory?
   a) Financial scarcity
   b) Infrastructural problem
   c) Nothing

D. Method of Teaching
1. What is the medium of instruction in the school?
   a) Bengali
   b) English
   c) Hindi

2. Which teaching method is followed by teacher during science teaching?
   a) Lecture
   b) Experimental
   c) Investigatory

3. What technique is used to motivate students towards science learning?
   a) Teaching as per existing situation
   b) Engage the students in science related co-curricular activities
   c) By showing them improvised model while teaching

4. What type of technique is used to develop scientific temper among the students?
   a) Following high class teaching method
   b) Following appropriate curriculum
   c) Fulfillment of students’ demands

E. Curriculum
1. Which type of syllabus is following in the school?
   a) TBSE
   b) ICSE
   c) CBSE

2. Whose publication science book is followed by school?
   a) NCERT
   b) SCERT
   c) State local board

3. At what extent school science curriculum is related to practical life?
   a) Job
   b) Life centric
   c) Development of human civilization
4. What is the standard of existing school science curriculum?
   a) State level  
   b) National level  
   c) International level  

5. Science curriculum is framed up as per recommendation made by
   a) Indian Education Commission  
   b) State Education Commission  
   c) Both  

**F. Facilities**

1. What type of seating arrangement is made in the class?
   a) On the floor  
   b) On the benches  
   c) Galleries  

2. What type of writing facilities is available in the class?
   a) Black board & chalk  
   b) White board & chalk  
   c) Nothing  

3. In which type of science competitive examination students are allow to sit?
   a) NTSE  
   b) JBNST  
   c) Science Olympiad  

4. What arrangement is made for popularizing science education?
   a) Awareness about superstition and pollution  
   b) Using first-aid  
   c) Neat and cleanliness  

5. What arrangement is made to familiarize modern science education?
   a) Summer school  
   b) Seminar  
   c) Workshop  

6. What type of field trips is arranged for students to acquire modern science education?
   a) To visit science city and science museum  
   b) To visit scientific research centre  
   c) To visit Radio, T.V., telephone station  

7. What type of co-curricular activities is arranged for students in the school related to science education?
   a) Science fair
   b) Science club and science museum
   c) Birth day celebration of great scientist

**G. Evaluation**

1. In which way science subject is evaluating in secondary level?
   a) Written test
   b) Oral test
   c) Practical test

2. How many terminal examinations are taken in a year?
   a) 1
   b) 2
   c) 3

3. What type of question paper is prepared for evaluating science subject in secondary level?
   a) Teacher made
   b) Standardized
   c) General

4. What is the way of searching talented students?
   a) Through class teaching
   b) Through science based activity
   c) Guide them out side the class

5. What arrangement is made for talented science students?
   a) Taking extra class
   b) Providing reference books and notes
   c) Guide them out side the class

6. What is the level of performance of science subject as compare to other subjects?
   a) Poor
   b) Average
   c) High

**H. Other Information**

1. What is the socio-economic level of the locality of the school?
   a) High income
   b) Middle income
   c) Low income
2. What is the level of attitude of the students towards science learning?
   a) Low
   b) Average
   c) High

3. What type of problems that school is facing towards science education?
   a) Lack of teaching staff
   b) Financial scarcity
   c) Extremism

4. What are the objectives of science education in secondary level?
   a) Correlation with industry
   b) Correlation with agriculture
   c) Both

5. What type of value education that science education avail?
   a) Utilitarian
   b) Disciplinary
   c) Cultural
(iv) **Interview Schedule**

**Expert opinionative relating to Science Education followed at Secondary Level in the state of Tripura**

1. Please provide the main objectives of science education when science was taken as a compulsory subject during the first ten years of schooling.

2. Please provide the year when science education was introduced in the state Tripura.

3. Sir, please inform me how many times science syllabus have been revised in the secondary level in our state.

4. How far modern science education is effective for the development of new growing citizen of India------ please extend your views Sir.

5. Please share your opinion whether standard of syllabus of science education of Tripura is up to the mark of national level.

6. What are the main constraints for the development of science education in Tripura------- your comments Sir?

7. Please extend your kind opinion whether standard of science education in Tripura is in tune with CBSE and ICSE standard.
8. Please share your assessment regarding the present practice of science education serve the basic need to build morality, humanity and nationality in students at secondary level.

9. Sir, please opine regarding basic fundamental directions that should be in the syllabus of science education at secondary level.

10. Please provide your views regarding the practical implementation of science education for the development of the modern society.

11. Whether the text books, reference books are written in accordance with the recommendation made by Indian Education commission (1964-66) ------- your comment please.

12. Please provide your views regarding the need of introduction of new branch of science education at secondary level.

13. Whether science education in Tripura strengthened so as to develop in the child well defined abilities and values such as the spirit of enquiry, creativity, objectivity, the courage to question and an aesthetic sensibility ------- your comment please Sir.

14. Whether the present practice of science education in Tripura is in tune with the objectives of secondary level education of the country as recommended in the NPE- 1986.

15. For the up gradation of modern science education, please provide us the necessary mechanism for the preparation of science curriculum.
III. Glossary

ACADEMIC GROWTH OF THE SCHOOL

Enhancement in the teaching, learning, research and extension activities of the school in quality as well as quantity.

ACCOMMODATION

Accommodation is the act of providing something (lodging or seat or food) to meet a need.

ADVANCE LEARNERS

Those who have already learnt the basics or students who have performed at higher level.

AGARTALA MUNICIPAL COUNCIL (AMC)

The Agartala Municipal Council is the municipal body which governs and maintains the city of Agartala.

History: The Capital Agartala (new) was founded in 1838 AD by Maharaja Krishna Kishore Manikya (1830-49 AD).

The Agartala Municipality was instituted in 1871 AD during the reign of Maharaja Chandra Manikya (1862-96 AD). The first British Political Agent appointed for Tipprah in 1871 AD, Mr. A.W.B. Power, was offered the honour of being the Chairman of the Agartala Municipality. The municipality is located at the crossing of Latitude N 23°50’ and Longitude E 91-17°, covering 3 km² during that period.

Present: The Municipal Council consists of councillors elected by the residents of the city. The city is divided into municipal wards and each ward elects a councillor to the Council. The municipal area was 16.012 km² with a population of 1,89,998 with literacy rate 92.20% as of the 2001 census. The Urban Development Department Notification No.F.2(2)–UDD /2003 dated July 2, 2004 the Agartala Municipal Council has further
been extended taking 16 No. of Grams of Dukli R.D.Block, 7 No. of Grams of Mohanpur R.D. Block and 2 No. of Grams of Jirania R.D. Block with an area of 42.83 square kilometers and a population of 178,495.

AGRICULTURE

Agriculture is the production of food and goods through farming and forestry. Agriculture is the key development that led to the rise of human civilization.

The art or science of cultivating the ground, including the harvesting of crops, and the rearing and management of livestock; tillage; husbandry is called agriculture.

Agriculture is the process of producing food, feed, fiber and other goods by the systematic raising of plants and animals.

Agricultural is relating to cultivating land, growing crops and rearing animals.

The sector of an economy that includes crop production, animal husbandry, hunting, fishing, and forestry is called agriculture.

AIR POLLUTION

Air pollution is the introduction of chemicals, particulate matter, or biological materials that cause harm or discomfort to humans or other living organisms, or damages the natural environment into the atmosphere. The atmosphere is a complex dynamic natural gaseous system that is essential to support life on planet Earth. Stratospheric ozone depletion due to air pollution has long been recognized as a threat to human health as well as to the Earth's ecosystems.

AIR POLLUTANT

An air pollutant is known as a substance in the air that can cause harm to humans and the environment. Pollutants can be in the form of solid particles, liquid droplets, or gases. In addition, they may be natural or man-made. Pollutants can be classified as either primary or secondary. Usually, primary pollutants are substances directly emitted from a process, such as ash from a volcanic eruption, the carbon monoxide gas from a motor vehicle exhaust or sulfur dioxide released from factories. Secondary pollutants are not emitted directly. Rather, they form in the air when primary pollutants react or interact. An
important example of a secondary pollutant is ground level ozone — one of the many secondary pollutants that make up photochemical smog. Some pollutants may be both primary and secondary: that is, they are both emitted directly and formed from other primary pollutants.

AMPLIFIER

An amplifier or simply amp is any device that changes, usually increases, the amplitude of a signal. The relationship of the input to the output of an amplifier—usually expressed as a function of the input frequency—is called the transfer function of the amplifier, and the magnitude of the transfer function is termed the gain.

APPLICATION

According to dictionary of education application can be defined as:
(a) The act of concentrating the attention on the material at hand when called on to master printed or written matter.
(b) The type of activity in a directed study procedure in which pupils attempt to apply what they have learned in the study of a subject or topic.
(c) According to Bloom “Application” is given a problem new to the student; he will apply the appropriate abstraction without having to be prompted as to which abstraction is concept or without having to be shown how to use if in that situation.

A demonstration of ‘application’ shows that he will use it correctly given an appropriate situation in which no mode of solution is specified.

AREA

A particular geographical region of indefinite boundary.

ATTITUDE

It is a complex mental state involving beliefs and feelings and values and dispositions to act in certain ways.

AUDIO

Audio is sound within the acoustic range available to humans. An audio frequency (AF) is an electrical alternating current within the 20 to 20,000 hertz (cycles
per second) range that can be used to produce acoustic sound. In computers, audio is the sound system that comes with or can be added to a computer.

**AUDIO-VIDEO (A/V)**

Audio-Video (A/V) refers to equipment and applications that deal with sound and sight. The A/V word includes microphones, tape recorders, audio mixers, still and video cameras, film projectors, slide projectors, VCRs, CD and DVD players/recorders, amplifiers and speakers. The term originally meant "audio-visual."

**AUDIO-VISUAL AIDS**

Audio-visual aids use the senses of both sights (seeing) and sound (hearing) collectively or sometimes individually. These aids include sound films, filmstrips, tapes/slides, broadcast television, closed circuit television, video-recording etc. Recently, microprocessors have also been used in computer assisted learning/training.

**BENCH**

Bench is a long seat for more than one person usually used in school or colleges.

**BLACKBOARD**

A chalkboard or blackboard is a reusable writing surface on which text or drawings are made with sticks of calcium sulphate, known, when used for this purpose, as chalk. Chalkboards were originally made of smooth, thin sheets of black or dark grey slate stone. Modern versions are often green or brown and are thus sometimes called a greenboard or brownboard instead.

**CENTRAL BOARD OF SECONDARY EDUCATION (CBSE)**

A trail of developments marks the significant changes that took place over the years in shaping up the Board to its present status. U P Board of High School and Intermediate Education was the first Board set up in 1921. It has under its jurisdiction Rajputana, Central India and Gwalior. In response to the representation made by the Government of United Provinces, the then Government of India suggested to set up a
joint Board in 1929 for all the areas which was named as the ‘Board of High School and Intermediate Education, Rajputana. This included Ajmer, Merwara, Central India and Gwalior.

The Board witnessed rapid growth and expansion at the level of Secondary education resulting in improved quality and standard of education in institutions. But with the advent of State Universities and State Boards in various parts of the country the jurisdiction of the Board was confined only to Ajmer, Bhopal and Vindhya Pradesh later. As a result of this, in 1952, the constitution of the Board was amended wherein its jurisdiction was extended to part-C and Part-D territories and the Board was given its present name ‘Central Board of Secondary Education’. It was in the year 1962 finally that the Board was reconstituted. The main objectives were those of: serving the educational institutions more effectively, to be responsive to the educational needs of those students whose parents were employed in the Central Government and had frequently transferable jobs.

The Board functions under the overall supervision of the Controlling Authority which is vested with the Secretary Education, Government of India, Ministry of Human Resource Development. The Board has various statutory committees which are advisory in nature. The Governing Body of the Board is constituted as per its rules and regulations. The recommendations of all the committees are placed for approval before the Governing Body of the Board.

CBSE is a self-financing body which meets the recurring and non-recurring expenditure without any grant-in-aid either from the Central Govt. or from any other source. All the financial requirements of the Board are met from the annual examination charges, affiliation fee, and admission fee for PMT. All India Engineering Entrance Examination and sale of Board’s publications.

**CENTRALIZATION & DECENTRALIZATION**

The concepts of centralization and decentralization are important ones to consider as they ultimately affect the effectiveness of schools in educating the children of a nation. Centralization refers to the condition whereby the administrative authority for education is vested, not in the local community, but in a central body. This central body has
complete power over all resources: money, information, people, and technology. It decides the content of curriculum controls the budget, is responsible for employment, the building of educational facilities, discipline policies, etc.

Decentralization, on the other hand, refers to the extent to which authority has been passed down to the individual school. Site-based management is an example of decentralization in which individual schools can make their own decisions related to finances and curriculum. However, the locus of power remains with the central body. Advocates of decentralization believe it will result in higher student performance; more efficient use of resources; increased skills and satisfaction for school administrators and teachers; and greater community and business involvement in and support for schools.

CLEANLINESS

Cleanliness has 2 senses:
(1) The habit of keeping free of superficial imperfections
(2) Diligence in keeping clean

CO-CURRICULAR ACTIVITIES (CCAs)

Co-curricular activities, previously known as Extracurricular Activities (ECAs) are activities that educational organisations in some parts of the world create for school students. They are activities which all school students must attend alongside the standard study curriculum.

The scope of CCAs is wide due to a nearly inexhaustible list of interests. Some of the major groups include Computer Club, Art Club, Dance Club, Swimming, Basketball, and Photography Club.

COMMUNICATION

Communication is a connection allowing access between persons or places. It is a process of transferring information from one entity to another.
COMPUTER

A computer is a programmable machine that receives input, stores and manipulates data, and provides output in a useful format.

COMPUTER-AIDED (ASSISTED) ASSESSMENT (CAA)

An assessment through an examination or test that is constructed and / or administered and / or marked with the aid of a computer.

CONTENT

The subject matter or discipline that teachers are being prepared to teach at the elementary, middle level, and / or secondary level. Content also refers to the professional field of study (e.g. special education, early childhood or school administration)

CORRELATION

When there is a relationship of a quantitative or qualitative nature between two sets of phenomena, the appropriate statistical test for discovering and measuring the relationship and expressing it in a precise way is known as correlation.

COUNCIL FOR THE INDIAN SCHOOL CERTIFICATE EXAMINATIONS (CISCE)

The Council for the Indian School Certificate Examinations is a private, non-governmental board of school education in India. It conducts two examinations in India: the Indian Certificate of Secondary Education (ICSE) and the Indian School Certificate (ISC). The CISCE was set up in 1956 at the meeting of the Inter-State Board for Anglo-Indian Education a proposal was adopted for the setting up of an Indian Council to administer the University of Cambridge Local Examinations Syndicate's Examinations in India. It is an all-India, but not a government sponsored board (unlike the CBSE and NIOS). It is based in New Delhi.

The Indian Certificate of Secondary Education (ICSE) Examination is a K-10 public board examination for students in India who have just completed Class X (equivalent to the first two years of the 4 year High School programme). Seven subjects
are to be taken by the candidates, of which four are compulsory and three have a choice of subjects.

Similarly, the Indian School Certificate (ISC) Examination is a K-12 public board examination for those completing Class XII (equivalent to the end of the 4 year High School programme). Candidates must have English and Environmental Education as two of their subjects, and then may choose three, four or five more subjects to give exams for.

COUNSELING

Exhorting, assisting and guiding students individually or collectively for academic, career, personal and financial decision making.

CREATIVITY

Creativity is the ability to invent and develop new and original ideas, especially in an artistic way (Collin English Language Dictionary).

According to Spearman, creativity is the power of human mind to create new contents by transforming relations and thereby generating new correlates.

CULTURE

The tastes in art and manners that are favored by a social group.

The attitudes and behavior that is characteristic of a particular social group or organization;

CURRICULUM TRANSACTION

Actions carried out in order to implement a curriculum.

DEMONSTRATION METHOD

The dictionary meaning of the word "demonstration" is the outward showing of a feeling etc.; a description and explanation by experiment; so also logically to prove the truth; or a practical display of a piece of equipment to show its display of a piece of equipment to show its capabilities. In short it is a proof provided by logic, argument etc.
To define "it is a physical display of the form, outline or a substance of object or events for the purpose of increasing knowledge of such objects or events.

**DEVELOPMENT EDUCATION**

Development education is an active learning process, founded on values of solidarity, equality, inclusion and co-operation. It enables people to move from basic awareness of international development priorities and sustainable human development, through understanding of the causes and effects of global issues to personal involvement and informed actions.

Development Education is a process which seeks to generate changes in values and attitudes both at the individual and collective level, with an eye to a fairer world in which resources and power are fairly shared in a spirit of respect for human dignity.

Development education is a dynamic, interactive and participatory process, which aims:

(a) To achieve a complete and comprehensive education for each person; to promote awareness and understanding of the causes related to development problems and of the interdependence between local and global issues.
(b) To promote inter-cultural understanding
(c) To promote social transformation/change based on equity, justice and solidarity;
(d) To promote the right and the duty of each individual and people to participate and contribute towards sustainable development.

**DISCIPLINE**

A branch of knowledge.
A system of rules of conduct or method of practice;
Develop (children's) behavior by instruction and practice; especially to teach self-control; "Parents must discipline their children";

Training to improve strength or self-control.

Punish in order to gain control or enforce obedience;
DIVERSITY

Differences among groups of people and individuals based on caste, socioeconomic status, gender, exceptionalities, language, religion and geographical location.

DVD

DVD, also known as Digital Video Disc or Digital Versatile Disc, is an optical disc storage media format, and was invented and developed by Philips, Sony, Toshiba, and Time Warner in 1995. Its main uses are video and data storage. DVDs are of the same dimensions as compact discs (CDs), but are capable of storing more than six times as much data.

EDUCATIONAL TECHNOLOGY (ET)

The development, application and evaluation of systems, techniques and aids to improve the process of learning.

EMOTION

Emotion in the aroused psychological and physical state of an organism, marked by increased bodily activities and strong feelings directed to some definite object.

ENVIRONMENT

It is defined as all the external forces, influences and conditions which affect the life, nature, behaviour and growth, development and maturity of the organism.

EVALUATION

Evaluation is systematic determination of merit, worth, and significance of something or someone using criteria against a set of standards.

EXAMINATION

A set of questions or exercises evaluating skill or knowledge OR A formal test involving answering written or oral questions with no or limited access to text books.
EXCURSION

An excursion is basically a trip or outing somewhere or a visit to some location of interest. Here are some examples:
(1) A short trip or outing to some place, usually for a special purpose and with the intention of a prompt return: a pleasure excursion; a scientific excursion.
(2) A trip on a train, ship, etc., at a reduced rate: weekend excursions to mountain resorts.
(3) The group of persons making such a journey: an excursion of tourists.

EXPERIMENTAL METHOD

The experimental method involves manipulating one variable to determine if changes in one variable cause changes in another variable. This method relies on controlled methods, random assignment and the manipulation of variables to test a hypothesis. OR

The experimental method is a systematic and scientific approach to research in which the researcher manipulates one or more variables, and controls and measures any change in other variables.

EXPERIMENTAL RESEARCH

Experimental research is commonly used in sciences such as sociology and psychology, physics, chemistry, biology and medicine etc.

It is a collection of research designs which use manipulation and controlled testing to understand causal processes. Generally, one or more variables are manipulated to determine their effect on a dependent variable.

Experimental Research is often used where:

(a) There is time priority in a causal relationship (cause precedes effect)
(b) There is consistency in a causal relationship (a cause will always lead to the same effect)
(c) The magnitude of the correlation is great.
The word experimental research has a range of definitions. In the strict sense, experimental research is what we call a true experiment.

**FAMILIARIZATION**

It means the experience of becoming familiar with something.

**FEEDBACK**

The information received by learners immediately after each of their responses during a sequence of programmed instruction which indicates the correctness of the response or communication of response to a teacher by learners, as in a feedback classroom.

**FILM**

Film encompasses individual motion pictures, the field of film as an art form, and the motion picture industry. Films (also referred to as movies or motion pictures) are produced by recording photographic images with cameras, or by creating images using animation techniques or visual effects.

**FLOOR**

The floor is the inside lower horizontal surface of a room.

**GIFTED EDUCATION**

Gifted education (also known as Gifted and Talented Education (GATE), Talented and Gifted (TAG), or G/T) is a broad term for special practices, procedures and theories used in the education of children who have been identified as gifted or talented.

**GIFTEDNESS**

The National Association for Gifted Children in the U.S. defines giftedness as students, children, or youth who give evidence of high achievement capability in areas such as intellectual, creative, artistic, or leadership capacity, or in specific academic fields, and who need services and activities not ordinarily provided by the school in order to fully develop those capabilities.
GIFTED AND TALENTED STUDENT

'Gifted and talented student' means a child or youth who performs at or shows the potential for performing at a remarkably high level of accomplishment when compared to others of the same age, experience, or environment, and who:

(a) exhibits high performance capability in an intellectual, creative, or artistic area;
(b) possesses an unusual capacity for leadership; or
(c) excels in a specific academic field.

– 74th legislature of the State of Texas, Chapter 29, Subchapter D, Section 29.121

GOALS

A result, milestone or checkpoint in the future which will indicate significant progress towards the vision. Achieving a collection of four to six goals would realize the vision. A goal should be:
(a) Measurable;
(b) Critical for success;
(c) Aggressive, benchmarked targets;
(d) Specific

GOVERNMENT

A Government is the body within a community, political entity or organization which has the authority to make and enforce rules, laws and regulations.

GUIDANCE

Guidance is the help given by one person to another in making choices, adjustments and solving problems.

Guidance involves difficult acts of helping boys and girls to plan their own future in the light of all factors that can be mastered about themselves and about the world in which they are to work and live.

Secondary education commission
**HARDWARE**

In information technology, hardware is the physical aspect of computers, telecommunications, and other devices. The term arose as a way to distinguish the "box" and the electronic circuitry and components of a computer from the program you put in it to make it do things. The program came to be known as the software.

Hardware implies permanence and invariability. Software or programming can easily be varied. You can put an entirely new program in the hardware and make it create an entirely new experience for the user. You can, however, change the modular configurations that most computers come with by adding new adapters or cards that extend the computer's capabilities.

**IMPROVISATION**

If we say 'Science is Doing' and teaching of every topic should possibly be supplemented by appropriate activities or practical, then is it essential to have sophisticated labs full of apparatus, equipments and chemicals? In fact, such facility is neither always available and luckily nor do we need it many a times. While teaching, if one gets the required experimental arrangement ready-made, well it is very good. However, sometimes the standard teaching aids may remain out of reach - may be due to any reason. Look around, quite possible one gets something from the surroundings, which may serve as a better teaching aid for the topic. A step further, perhaps he who is innovative, may prepare such an aid from the available materials from here and there, Improvisation is the term, that refers to an off hand construction of a teaching aid with simple available materials costing little or nil.

**INDUSTRY**

The people or companies engaged in a particular kind of commercial enterprise; "each industry has its own trade publications”.

The organized action of making of goods and services for sale;
An industry (from Latin industries, "diligent, and industrious") is the manufacturing of a good or service within a category.

INFORMATION TECHNOLOGY (IT)

Information technology (IT) or information and communication technology (ICT) is a broad subject which deals with technology and other aspects of managing and processing information, especially in large organizations. Particularly, IT deals with the use of electronic computers and computer software to convert, store, protect, process, transmit, and retrieve information. Information technology (IT) is "the study, design, development, implementation, support or management of InfoTech". Information technology is a general term that describes any technology that helps to produce, manipulate, store, communicate, and/or disseminate information. Computer hardware and software; voice, data, network, satellite and other telecommunications technologies; and multimedia and application development tools. These technologies are used for the input, storage, processing and communication of information.

INFRASTRUCTURE

Means physical facilities like buildings, play fields, hostels etc., which help run an institutional programme.

INSTRUCTIONAL MATERIAL

Instructional materials are those which are designed for teacher and learner to use for instructional and learning purpose.

INTELLIGENCE

It is the ability to solve the general run of human problems, to adjust to new situations and in short, the ability to think.

INTERACTION

Interaction is a kind of action that occurs as two or more objects have an effect upon one another. The idea of a two-way effect is essential in the concept of interaction,
as opposed to a one-way causal effect. A closely related term is interconnectivity, which deals with the interactions of interactions within systems: combinations of many simple interactions can lead to surprising emergent phenomena. Interaction has different tailored meanings in various sciences. All systems are related and interdependent. Every action has a consequence.

INTERACTIVE TELEVISION

May also be known as ITV, iTV, i-TV, ETV, Etv. Interactive Television is TV programming with interactive content and/or enhancements. Interactive TV provides a richer and more efficient television experience. It can combine Traditional TV viewing with a back channel (return path), thus offering the interactivity enjoyed by those communicating through a network, such as the Internet. Interactive TV programming can include interactive advertising, electronic storefronts, electronic communication with others, richer graphics and links to Web (or web-like) sites such as walled gardens. With developments including the incorporation of a digital TV infrastructure, increased broadband resources, better video compression, increased use of Digital Video Recorders, Video-on-Demand, Electronic Program Guides, etc., interactive TV will continue to become more commonplace. Interactive TV’s future looks great as research conclusively shows that people want additional information and enhancements pertaining to TV programming. Also telcos need to better compete with cable providers who are now offering bundled telephone, TV and Internet service. Interactive IPTV can offer a great deal of interactivity at little extra cost.

INTEREST

Interest is a feeling or emotion that causes attention to focus on an object or an event or a process. In contemporary psychology of interest the term is used as a general concept that may encompass other more specific psychological terms, such as curiosity and to a much lesser degree surprise.
INTERNATIONAL STANDARDS

International standards are standards developed by international standards organizations. International standards are available for consideration and use, worldwide. The most prominent organization is the International Organization for Standardization.

International standards is one way of overcoming technical barriers in international commerce caused by differences among technical regulations and standards developed independently and separately by each nation, national standards organization, or company. Technical barriers arise when different groups come together, each with a large user base, doing some well established thing that between them is mutually incompatible. Establishing international standards is one way of preventing or overcoming this problem.

JAGADIS BOSE NATIONAL SCIENCE TALENT SEARCH (JBNSTS)

Jagadis Bose National Science Talent Search (JBNSTS), Kolkata, was founded in 1958 by visionaries such as Dr. B.C. Roy, Sir Jehangir Ghandy, Dr. Ramaswamy Mudaliar, Dr. D M Bose, Shri R. P. Bilimoria and many others (Founder Members) to commemorate the birth centenary celebrations of India's first modern scientist Acharya J.C. Bose.

JBNSTS is an institution of non-formal science education for motivating, identifying and nurturing young talented students of basic sciences, medicine and engineering. (Mission)

JBNSTS identifies talented students through specially developed tests and provides meritorious students with scholarships and a range of nurture programs. (JBNST Scholars)

JBNSTS conducts innovative out-of-class programs in science for students from West Bengal, 8 North-Eastern States, Bihar, Orissa, Chattisgarh and Jharkhand. (Activities).
JBNSTS functions from its own building established in 2005 near Eastern Metropolitan Bypass, 1300, Rajdanga Main Road, Kasba, Kolkata 700107.

JOURNAL

A journal has several related meanings:

(a) A daily record of events or business; a private journal is usually referred to as a diary.
(b) A newspaper or other periodical, in the literal sense of one published each day;
(c) Many publications issued at stated intervals, such as magazines, or scholarly pacific journals, academic journals, or the record of the transactions of a society, are often called journals.

Although journal is sometimes used, erroneously as a synonym for "magazine", in academic use, a journal refers to a serious, scholarly publication, most often peer-reviewed. A non-scholarly magazine written for an educated audience about an industry or an area of professional activity is usually called a professional magazine.

Open access journals are scholarly journals that are available to the reader without financial or other barrier other than access to the internet itself. Some are subsidized, and some require payment on behalf of the author. Subsidized journals are financed by an academic institution or a government information center.

KNOWLEDGE

According to dictionary of education knowledge can be defined as :

(i) The accumulated facts, truths, principles and information to which the human mind has access;
(ii) The outcome of specified rigorous inquiry.

According to Bloom knowledge is little more than remembering of the idea or phenomenon in a form very close to that in which it was originally encountered.
LABORATORY ASSISTANT

Incumbents perform assigned, varied, standardized, and nontechnical laboratory procedures in processing or preparing laboratory specimens, materials and supplies, and in operation of specialized mechanical laboratory equipment while receiving on-the-job training.

LEARNING RESOURCES

All the resources which may be used by a learner to facilitate learning i.e. facilities like library, laboratory, computer centre etc. that are essential resources for the learning experience.

LECTURE METHOD

An educational presentation usually delivered by an instructor to a group of students with the use of instructional aids and training devices. OR

A method of instruction in some educational programs and courses which hinges on the teacher orally presenting the material of the course in an organized way to the students, going from theory to examples and back again. Lectures may contain a varying level of student participation, and note-taking is usually appropriate.

LIBRARIAN

A professional person trained in library science and engaged in library services. OR

The keeper, manager of a library; One who cares for the publications, files etc. in a library, whether staff or volunteer; A person who processes and organizes information.

LOCATION

Location is a point or extent in space i.e. a particular place in physical space. In geography, Location is a position or point in physical space that something occupies on the Earth's surface, the Solar System, or mankind.
LOW INCOME

Generally, a household whose income does not exceed 80% of the area median income.

MAGAZINE

Magazines, periodicals, glossies or serials are publications, generally published on a regular schedule, containing a variety of articles, generally financed by advertising, by a purchase price, by pre-paid magazine subscriptions, or all three. Magazines can be distributed through the mail; through sales by newsstands, bookstores or other vendors; or through free distribution at selected pick up locations.

MANAGEMENT

Management in all business areas and human organization activity is the act of getting people together to accomplish desired goals and objectives. Management comprises planning, organizing, staffing, leading or directing, and controlling an organization (a group of one or more people or entities) or effort for the purpose of accomplishing a goal. Resourcing encompasses the deployment and manipulation of human resources, financial resources, technological resources, and natural resources.

Because organizations can be viewed as systems, management can also be defined as human action, including design, to facilitate the production of useful outcomes from a system. This view opens the opportunity to 'manage' oneself, a pre-requisite to attempting to manage others. Management can also refer to the person or people who perform the act(s) of management.

MANPOWER

Work force: the force of workers available.

The total number of all available workers;
MEDIUM OF INSTRUCTION

Medium of instruction is the language that is used in teaching. It may or may not be the official language of the country or territory. Where the first language of students is different than the official language, which may alternatively be the medium of instruction through part or all of schooling. Bilingual or multilingual education may involve the use of more than one language of instruction.

MENTAL HEALTH

A person is said to have a good mental health when he succeeds to maintain harmonious relationship between himself and his environment. According to Hadfield, “Mental health is the full and harmonious functioning of the whole personality”

METHOD

Method is a style of conducting a research work which is determined by the nature of the problem. M. Verma has defined the term method in the following manner:

“Method is only in the abstract as logical entities that we can distinguish between matter and methods, in reality, they form an organic whole and matter determines method analogously as an objective determines the means and content and spirit determine style and form in literature.”

MICROPHONE

A microphone is an acoustic-to-electric transducer or sensor that converts sound into an electrical signal. In 1876, Emile Berliner invented the first microphone used as a telephone voice transmitter. Microphones are used in many applications such as telephones, tape recorders, karaoke systems, hearing aids, motion picture production, live and recorded audio engineering, FRS radios, megaphones, in radio and television broadcasting and in computers for recording voice, speech recognition, VoIP, and for non-acoustic purposes such as ultrasonic checking or knock sensors. Most microphones today use electromagnetic induction (dynamic microphone), capacitance change (condenser microphone), piezoelectric generation, or light modulation to produce an electrical voltage signal from mechanical vibration.
MIDDLE INCOME GROUP

Middle income group is that group of citizen whose gross maximum income per month does not exceed Rs.20, 000/- or Rs.2, 40,000/- per annum.

MINORITY GROUP

A minority is a sociological group that does not constitute a politically dominant voting majority of the total population of a given society. A sociological minority is not necessarily a numerical minority — it may include any group that is subnormal with respect to a dominant group in terms of social status, education, employment, wealth and political power. In socioeconomics, the term "minority" typically refers to a socially subordinate ethnic group (understood in terms of language, nationality, religion and/or culture). Other minority groups include people with disabilities, "economic minorities" (working poor or unemployed), "age minorities" (who are younger or older than a typical working age) and sexual minorities.

MORAL VALUE

It is a matter of experience that mankind reacts to human behaviour sometimes with approval and sometimes with disapproval. Not only the individual but society makes judgments of various kinds of human behaviour. The kind of behaviour approved by the people is called moral behaviour and the kind of behaviour disapproved by the people is called immoral behaviour. An individual can develop moral behaviour only when he understands what is good and what is evil, what is right and what is wrong. The consciousness of right and wrong, good and evil is called moral values. It relates to some standard, code of conduct. So, moral values refer to the behaviour of man towards man in the home, in society, in economic fields and in the life of outside world. Generally, man is not born moral. He possesses certain impulses. Education enables him to control these animal impulses through the development of higher values of life, worthy interest, lofty ideals and noble ideals. The concept of good differs from person to person. But the good considered from moral point of view is regarded as the highest good.

It is education, which can make people to understand the nature of the highest good. Therefore, in the centers of learning attempts should be made to develop moral
consciousness among the pupils. Moral values should be inculcated from very early childhood. At home, physical habits and mental attitudes are formed in the children who lead to the development of moral values. Good manners are important for cultivation of moral values. Good manners help us to refine our behaviour by removing the harshness in our words.

MOTIVATION

The psychological feature that arouses an organism to action toward a desired goal. Motivation is the activation or energization of goal-oriented behavior. It may be intrinsic or extrinsic.

NATIONAL CHILDREN’S SCIENCE CONGRESS

This is an opportunity for brilliant young scientists (between 10 to 17 years of age) to work in teams under a guide on an identified theme; select a problem from the neighborhood, develop a hypothesis and conduct field research, see patterns in data and prepare a report. Meritorious and innovative projects selected for district congress. State congress and national convention, each state also sends two delegates to the annual session of the Indian science congress and Intel science technology discovery fair. The congress has been organized in almost all districts every year with more and more schools, club, joining the activity. Developing an activity book, training Workshops for guide teachers, evaluating the research.

NATIONAL COUNCIL FOR SCIENCE & TECHNOLOGY COMMUNICATION

Department of Science & Technology, Government of India
Schemes for Communication and Popularization of Science & Technology
Rashtriya Vigyan Evam Prodyogiki Sanchar Parishad

The Parishad is an Apex Organization of the Government of India that endeavours to communicate Science and Technology, stimulate Scientific and Technological temper and coordinate and orchestrate such efforts. The goals of the Parishad are to create excitement concerning advances in science & technology, to enable informed decision-
making at the grass roots level and to encourage intelligent debate on developmental issues.

**NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING (NCERT)**

In 1961, the Government of India established the National Council of Educational Research and Training (NCERT) as an autonomous organization to assist and advise the governments at the Centre and in States in the implementation of their policies for education, especially to bring about qualitative changes in school education and teacher preparation. Over the years, Council has evolved into a unique organization, with its increasing range of activities that has influenced school education in India.

The National Council of Educational Research and Training (NCERT) is an apex resource organization set up by the Government of India, with headquarters at New Delhi, to assist and advise the Central and State Governments on academic matters related to school education.

**NATIONAL EDUCATION COMMISSION (NEC)**

National Education Commission was established under the National Education Commission act No. 19. of 1991 to make recommendations to the President, on educational policy in all its aspects, with a view to, ensuring continuity in educational policy and enabling the education system to respond to changing needs in society. Review and analyze such policies and plans in operation and where necessary, to recommend to the President, changes in such Policy Plan or plans.

**NATIONAL TALENT SEARCH EXAMINATION (NTSE)**

The National Talent Search Examination (NTSE) is a national level scholarship program in India to identify and nurture talented students. The scheme is open to students of Indian nationality. Only students studying in Class VIII and Class X standard are eligible to appear for the selection process. As it is organized by an official body (NCERT), it is widely regarded as the most prestigious examination at high school level in the country.
Soon after NCERT was established in 1961, a programme to identify and nurture the talented students took up the shape of a scheme called National Science Talent Search Scheme (NSTSS) in the year 1963. The objective of this scheme was to identify talented students and awarding them with scholarships. During the first year of the implementation of the scheme, it was confined to the Union Territory of Delhi wherein only 10 scholarships were awarded to the Class XI students.

NON-GOVERNMENTAL ORGANIZATION (NGO)

A non-governmental organization is a legally constituted, non-governmental organization created by natural or legal persons with no participation or representation of any government. In the cases in which NGOs are funded totally or partially by governments, the NGO maintains its non-governmental status by excluding government representatives from membership in the organization. Unlike the term "intergovernmental organization", "non-governmental organization" is a term in general use but is not a legal definition. In many jurisdictions, these types of organization are defined as "civil society organizations" or referred to by other names.

NORMATIVE SURVEY METHOD

The normative-survey method of educational research is very common. It is that method of investigation which attempts to describe and interpret what exists at present in the form of conditions, practices, processes, trends, effects, attitudes, beliefs etc. It is concerned with the phenomena that are typical of the normal conditions. It investigates into the conditions or relationships that exist, practices that prevail, beliefs, points of view or attitudes that are held, processes that are going on, influences that are being felt and trends that are developing. It is an organized attempt to analyze, interpret, and report the present status of a social institution, group or area. It deals with a cross-section of the present, of duration sufficient for examination ---- that is, present time, not the present moment. It seeks to answer the question, “What are the real facts with regard to the existing conditions”.

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ORAL EXAMINATION

This is an examination conducted by spoken communication. A student answers questions by speaking rather than by writing. This is also known as the viva voce, this refers to the oral examination in which a student defends his/her thesis in front of a Committee of Examiners.

OVERHEAD PROJECTOR

An overhead projector is a variant of slide projector that is used to display images to an audience. An overhead projector typically consists of a large box containing a very bright lamp and a fan to cool it. On top of the box is a large fresnel lens that collimates the light. Above the box, typically on a long arm, is a mirror and lens that focuses and redirects the light forward instead of up. Transparencies are placed on top of the lens for display. The light from the lamp travels through the transparency and into the mirror where it is shone forward onto a screen for display. The mirror allows both the presenter and the audience to see the image at the same time, the presenter looking down at the transparency as if writing, the audience looking forward at the screen. The height of the mirror can be adjusted, to both focus the image and to make the image larger or smaller depending on how close the projector is to the screen.

PERFORMANCE

The degree to which a development intervention or a development partner operates according to specific criteria/standard/guidelines or achieves results in accordance with stated goals and plans.

PERIODICAL

A periodical publication, or just periodical, is a published work that appears in a new edition on a regular schedule. The most familiar examples are the newspaper, often published daily, or weekly; or the magazine, typically published weekly, monthly or as a quarterly. Other examples would be a newsletter, a literary journal or learned journal, or a yearbook. OR
Periodicals are publications which are issued at regular intervals, such as journals, magazines, and newspapers. They are also often referred to as serials. Periodicals usually consist of a collection of articles, which may range from a single page story in a magazine to a 40 page study in a scholarly journal.

**POLLUTION**

Pollution is the introduction of contaminants into an environment that causes instability, disorder, harm or discomfort to the ecosystem i.e. physical systems or living organisms. Pollution can take the form of chemical substances or energy, such as noise, heat, or light. Pollutants, the elements of pollution, can be foreign substances or energies, or naturally occurring; when naturally occurring, they are considered contaminants when they exceed natural levels. Pollution is often classed as point source or nonpoint source pollution.

**POLLUTION PREVENTION**

Pollution prevention is reducing or eliminating waste at the source by modifying production processes, promoting the use of non-toxic or less-toxic substances, implementing conservation techniques, and re-using materials rather than putting them into the waste stream.

Pollution prevention means "source reduction," as defined under the Pollution Prevention Act, and other practices that reduce or eliminate the creation of pollutants through:

(a) Increased efficiency in the use of raw materials, energy, water, or other resources, or
(b) Protection of natural resources by conservation.

**POVERTY**

Poverty refers to the condition of not having the means to afford basic human needs such as clean water, nutrition, health care, clothing and housing.
PRIVATE SCHOOLS

Private schools, also known as independent schools, are not administered by local, state or national governments; thus, they retain the right to select their students and are funded in whole or in part by charging their students tuition, rather than relying on public (government) funding, students can get a scholarship into a private school which makes the cost cheaper depending on a talent the student may have e.g. sport scholarship, art scholarship, academic scholarship etc.

PROFESSIONAL DEGREE

A professional degree is generally a college degree that allows us to work in a certain profession. There are some types of employment that are not open to people without a professional degree. For instance we can’t be a teacher, doctor, a nurse, a physician’s assistant or nurse practitioner without obtaining the appropriate degrees first.

A professional degree is a degree, the course curriculum of which is concentrated on a particular industry. For example - Engineering in computer science constitutes of subjects related to computers. Mechanical engineering contains subjects related to in and out of machinery types and their working.

PROFESSIONAL DEVELOPMENT

Opportunities for teacher to develop new knowledge and skills through in-service education, conference attendance, summer leave, intra and inter-institutional visitations, fellowships and work in schools etc.

QUIZ

A quiz is a form of game or mind sport in which the players (as individuals or in teams) attempt to answer questions correctly.

RADIO STATION

Radio station is the station for the production and transmission of AM or FM radio broadcasts. Radio broadcasting is an audio (sound) broadcasting service, broadcast
through the air as radio waves (a form of electromagnetic radiation) from a transmitter to a receiving antenna.

**READING ROOM**

The Reading Room is a comprehensive, free resource of articles relating to science and skepticism. The Library contains an ever-growing index of articles, reviews and opinion editorials called from our extensive archives, offering an in depth look into the myriad of subjects the Skeptics Society has explored over the years.

**REFERENCE BOOK**

A reference book or reference-only book in a library is one that may only be used in the library and not borrowed from the library. Many such books are reference works (in the first sense) which are usually used only briefly or photocopied from, and therefore do not need to be borrowed. Keeping them in the library assures that they will always be available for use on demand. Other reference-only books are ones that are too valuable to permit borrowers to take them out. Reference-only items may be shelved in a reference collection located separately from circulating items or individual reference-only items may be shelved among items available for borrowing.

**REFERENCE SECTION**

The Reference Section in the library has various books that are sources of information about different subjects. They include dictionaries, encyclopedias, manual, and other informational books. Most books in the Reference Section may not be taken out so that they are always available to those who need them.

**RELATION**

An abstraction belonging to or characteristic of two entities or parts together.

**REMEDIAL COURSES / PROGRAMMES**

Courses / programmes offered to academically disadvantaged students in order to help them cope with academic requirements.
REMEDIAL INSTRUCTION

A specific unit (or system of units) of instruction based on comprehensive diagnostic finding and intended to overcome a particular learning deficiency or set of learning deficiencies in a student.

RESEARCH

Probes into what is known to reach the unknown; it is often the rigour of inquiry which is accomplished by objective pursuit of knowledge that is valued in research.

Research is an inquiry process that has clearly defined parameters and has as its aim the discovery or creation of knowledge, or theory building, testing, confirmation, revision, refutation of knowledge and theory; and / or investigation of a problem for local decision-making.  

----------- C.R.Mcclure and P.Hersson

RESEARCH IN SCIENCE EDUCATION

The practice of science education has been increasingly informed by research into science teaching and learning. Research in science education relies on a wide variety of methodologies, borrowed from many branches of science such as cognitive psychology and anthropology. Science education research aims to define or characterize what constitutes learning in science and how it is brought about.

RURAL AREA

Rural areas are large and isolated areas of an open country (in reference to open fields and not forests, etc.), often with low population density. The terms "countryside" and "rural areas" are not synonyms:” countryside" refers to rural areas that are open. A forest, wetlands, etc. with a low population density is not a countryside.

Rural areas (also referred to as “the country”, countryside) are sparsely settled places away from the influence of large cities. Such areas are distinct from more intensively settled urban and suburban areas. Inhabitants live in villages, hamlets, on farms and in other isolated houses.
In modern usage, rural areas can have an agricultural character, though many rural areas are characterized by an economy based on logging, mining, petroleum and natural gas exploration, or tourism.

**SLIDE PROJECTOR**

A slide projector is an opto-mechanical device to view photographic slides. It has four main elements:

(a) Electric incandescent light bulb or other light source (usually fan-cooled)
(b) Reflector and "condensing" lens to direct the light to the slide,
(c) Holder for the slide and
(d) Focusing lens.

**STATE COUNCIL EDUCATIONAL RESEARCH AND TRAINING**

The State Council Educational Research and Training (SCERT), Tripura is an autonomous body entrusted with planning, implementation and evaluation of all academic programmes from pre-school to higher secondary levels. The State Institute of Education (SIE), which functioned as part of the Department of General Education, was converted to form the SCERT, to give a new thrust and direction to school education in the State with the Hon. Minister for Education as the Chairman and Secretary, General Education Department as Vice Chairman of the governing Body of SCERT. Director, SCERT is the Convener of the governing body.

**SCHOOL**

A school is an institution designed to allow and encourage students (or "pupils") to learn, under the supervision of teachers.

A building where young people receive education.

**SCHOOLS IN INDIA**

A uniform structure of school education, the 10+2 system has been adopted by all the States and Union Territories of India. However, within the States and the UTs, there
remains variations in the number of classes constituting the Primary, Upper Primary, High and Higher Secondary school stages, age for admission to class I, medium of instruction, public examinations, teaching of Hindi and English, number of working days in a year, academic session, vacation periods, fee structure, compulsory education etc.

The Secondary Education starts with classes 9-10 leading to higher secondary classes 11 and 12. The Secondary Education which serves as a bridge between primary and higher education is expected to prepare young persons between the age group 14-18 in the world of work and entry into higher education.

SCIENCE CLUB

The purpose of a science club is to develop student interest in science, to introduce them to a variety of scientific disciplines and to develop skills in fieldwork, research and project presentations.

SCIENCE CITY

"Science city", is a formal term for towns with high concentration of research and development facilities. The city is constructed to help the advancement of creative arts, sciences, and research, as well as to spur the creation of new industries and cultures etc. etc.etc.seems to be an intensively "planned" city around technology and creativity.

SCIENCE FAIR

A science fair is (generally) a competition where contestants create a personal project related to science or some scientific phenomena.

Science fairs usually are involved with children and schooling, however, the term can be used to describe science fairs independent of the age of the contestants involved. They are often also combined with competition in mathematics or history.

A competition in which contestants, usually children, create science-related projects or demonstrations.
SCIENCE MUSEUM

Science museum is a museum that collects and displays objects having scientific interest. It contains collections relating to the history of science, technology, and industry. Museum is a depository for collecting and displaying objects having scientific or historical or artistic value

SCIENCE OLYMPIAD

The Science Olympiad is a national, non-profit, tax exempt organization, devoted to improving the quality of science education, increasing student interest in science, and providing recognition of outstanding achievement in science education by both students and teachers. These goals are achieved by participation in Science Olympiad tournaments, incorporating Science Olympiad into classroom curriculum and attending teacher training institutes. The Science Olympiad is a national, non-profit, tax exempt organization, devoted to improving the quality of science education, increasing student interest in science, and providing recognition of outstanding achievement in science education by both students and teachers. These goals are achieved by participation in Science Olympiad tournaments, incorporating Science Olympiad into classroom curriculum and attending teacher training institutes.

Science Olympiad competitions follow the format of classroom lab tests, popular board games, TV shows, and athletic games. Everyone can find a niche for his or her particular skill in Science Olympiad as each event is designed to take advantage of the wide variety of students' talents. Events are well balanced between the various science disciplines of biology, earth science, chemistry, physics, computers and technology. There is also a balance between events requiring knowledge of science facts, concepts, processes, skills and science applications.

SCIENCE POPULARIZATION

Science popularization is one historical and dynamic concept. Based on the research of the science popularization development course in developed countries, we think science popularization has developed by phases. According to the public’s
participation in science popularization, the contents and forms of science popularization, we think that it has 3 phases with obvious characteristics: Public Acceptance of Science, Public Understanding of Science, and Public Participation of Science.

**SCIENCE TEACHER**

Science teacher is someone who teaches science.

**SCIENCE TEACHING**

Teaching of science is not mere transaction of science-based knowledge so as to load students' mind with facts and figures. Teaching of science is a process in which the three essential components are - to acquire Knowledge, to understand the concepts or principles and to apply those in a novel situation in order to solve a problem. At school level, science is taught through theory as well as practical. Although, at higher education a part of the science tends towards more abstract and theoretical, but at lower stage, experimentation and demonstrations are essential components for explaining many of the concepts.

**SCIENTIFIC RESEARCH**

Scientific research is systematic controlled empirical and critical investigation of hypothetical propositions about the presumed relations among natural phenomena.  

--------- Kerlinger

**SEMINOR**

Seminar is, generally, a form of academic instruction, either at an academic institution or offered by a commercial or professional organization. It has the function of bringing together small groups for recurring meetings, focusing each time on some particular subject, in which everyone present is requested to actively participate. This is often accomplished through an ongoing Socratic dialogue with a seminar leader or instructor, or through a more formal presentation of research. Normally, participants must not be beginners in the field under discussion. The idea behind the seminar system is to familiarize students more extensively with the methodology of their chosen subject and also to allow them to interact with examples of the practical problems that always occur
during research work. It is essentially a place where assigned readings are discussed, questions can be raised and debates can be conducted. It is relatively informal, at least compared to the lecture system of academic instruction.

SEMINORS, CONFERENCES, WORKSHOPS ETC

It is a group discussion session followed by the presentation of a peer or a lead lecture or a short course with a high degree of participation and discussion between experts and participants.

SERVICE

Teacher contributions to schools, communities and professional associations in ways that is consistent with the institutions mission.

SKILLS

The ability to use content, professional and pedagogical knowledge effectively and readily in diverse teaching settings in a manner that ensures that all students are learning.

The dictionary meaning of skill is the ability to promote learning, developed through appropriate preparation and experience and facilitated by natural aptitude.

Skill in education has got different meaning. It facilities in working mechanically. It demands less mental energy. To do a work skillfully, requires sustained practice. So acquisition of knowledge should be followed by much practice which gives rise to skill.

SOCIAL BEHAVIOUR

Social behaviour is likewise responsive to the demands and sanctions of the social groups in which the individual participates.

SOCIAL DEVELOPMENT

The increasing ability to get along with oneself and others.

SOCIETY

A number of like minded individuals, who know and enjoy their like-mindness and are therefore, able to work together for common ends.
SOFTWARE

A general term for material which is used in conjunction with hardware. Most of the times, its use is restricted to describe the programs that control computers.

STAGES OF THE SCHOOL

(1) The Primary Stage:

The Primary Stage consists of Classes I-V, i.e., of five years duration, in 20 States/UTs namely Andhra Pradesh, Arunachal Pradesh, Bihar, Haryana, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Manipur, Orissa, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal, Andaman & Nicobar Islands, Chandigarh, Delhi and Karaikal and Yanam regions of Pondicherry. The primary stage consists of classes I-IV in Assam, Goa, Gujarat, Karnataka, Kerala, Maharashtra, Meghalaya, Mizoram, Nagaland, Dadra & Nagar Haveli, Daman & Diu, Lakshadweep and Mahe region of Pondicherry.

(2) The Middle Stage:

The Middle Stage of education comprises Classes VI-VIII in as many as 18 States. Uts viz., Arunachal Pradesh, Bihar, Haryana, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Manipur, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal, Andaman & Nicobar Islands, Chandigarh, Delhi and Karaikal region of Pondicherry; Classes V-VII in Assam, Goa, Gujarat, Karnataka, Kerala, Maharashtra, Meghalaya, Mizoram, Dadra & Nagar Haveli, Daman & Diu, Lakshadweep and Mahe region of Pondicherry and Classes VI-VII in Andhra Pradesh, Orissa and Yanam region of Pondicherry. In Nagaland Classes V-VIII constitute the upper primary stage.

(3) The Secondary Stage:

The Secondary Stage consists of Classes IX-X in 19 States/UTs. Viz., Arunachal Pradesh, Bihar, Haryana, Himachal Pradesh, Jammu & Kashmir,
Madhya Pradesh, Manipur, Nagaland, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, West Bengal, Andaman & Nicobar Islands, Chandigarh, Delhi and Karaikal region of Pondicherry. The High School stage comprises classes VIII to X in 13 States/UTs viz., Andhra Pradesh, Assam, Goa, Gujarat, Karnataka, Kerala, Maharashtra, Meghalaya, Mizoram, Orissa, Dadra & Nagar Haveli, Daman & Diu, Lakshadweep and Mahe & Yanam regions of Pondicherry. However, the Higher Secondary / Senior Secondary stage of school comprising classes XI-XII (10+2 pattern) is available in all the States/UTs though in some States/UTs these classes are attached to Universities/Colleges.

STANDARDIZATION

A consistent set of procedures for designing, administering, and scoring an assessment. The purpose of standardization is to assure that all students are assessed under the same conditions so that their scores have the same meaning and are not influenced by differing conditions.

STATUS

The relative position or standing of things or especially persons in a society. A person's status is a set of social conditions or relationships created and vested in an individual by an act of law.

STRATEGY

A specific, medium or long-term plan for making progress towards a goal. A strategy should have the same attributes as a goal but should be more specific and action-oriented. Together a set of strategies, if successfully pursued, will impact the goal measure and eventually achieve the goal.

SURVEY

The word survey has been derived from the words ‘sur’ or ‘sor’ and ‘veeir’ or ‘veior’ which means ‘over’ and ‘see’ respectively. Normative survey deals with ‘what is’? Its scope is very vast. It describes and interprets what exists at present. In a normative
survey we are concerned with conditions or relationships that exist; practices that prevail; beliefs, points of view or attitudes that are held; processes that are going on; influences that are being felt and trends that are developing.

The methodology of survey research emphasizes using rigorous sampling methods and sampling designs, design of the study including specification of objectives, hypotheses and plan of collecting information. The methodology of this type of research uses various kinds of tools such as questionnaires, interviews, personal visits; inspection of records, use of standardized psychological tests. The methodology very specifically stresses the preparation of some sort of flow chart which tells the researcher (i) what are objectives, (ii) to achieve them what kind of information is needed to be collected, (iii) from whom or where this information has to be collected, (iv) how this information or data has to be tabulated and analyzed.

SURVEY RESEARCH

The purpose of survey type research, according to Kerlinger (p.410) is to discover the relative incidence, distribution and inter-relations of sociological and psychological variables. Survey type studies, by and large, describe the current status of a phenomenon, some group of people, an institution, some existing practice, policy or event. Sometimes, they compare the status with some available standards and make suggestions for improving the status. Survey research as being used in social sciences is, however, different from the status survey and is considered enough scientific if looked from methodology point of view.

In most researches of survey type small samples are studied and on the basis of that, inferences are drawn about the whole or at least larger populations. They emphasize that if this is the purpose, the sample should be drawn randomly. These are, generally, called sample surveys.

SYSTEM

The structure or organization of an orderly whole, clearly showing the interrelationship between the different parts (sub-systems) and between the parts and the whole.
TAPE RECORDER

A tape recorder, tape deck, reel-to-reel tape deck, cassette deck or tape machine is an audio storage device that records and plays back sound, usually using magnetic tape, either wound on a reel or in a cassette, for storage. It records a fluctuating signal by moving the tape across a tape head that polarizes the magnetic domains in the tape in proportion to the audio signal.

TEACHER LEARNING MATERIAL (TLM)

The teacher in order to augment learning to take place amongst the pupils uses teaching learning materials. These include books, notebooks, charts, AV aids, chalks, black boards, slide projector, over head projector, computer, internet, education kits, science kits, mathematic kits etc.

TEACHER LEARNING METHODS (TLMs)

Teaching learning methods are process in the education of a student that facilitates learning. Teaching learning methods are undergoing changes over time especially after the introduction of computers and the emergence of multimedia application.

TEACHER QUALIFICATION

A teaching qualification or teacher qualification is one of a number of academic and professional degrees that enables a person to become a registered teacher in primary or secondary school. Such qualifications include, but are not limited to, the Postgraduate Certificate in Education (PGCE), the Professional Graduate Diploma in Education (PGDE) and the Bachelor of Education.

TEACHING

Teachings - The particular message or curriculum that is taught.

In education, a teacher is a person who educates others. A teacher who educates an individual student may also be described as a personal tutor. The role of teacher is often formal and ongoing, carried out by way of occupation or profession at a school or other place of formal education.
TEACHING MODEL

Teaching models prescribe tested steps and procedures to effectively generate desired outcomes. In general, models can be classified along a continuum from instructor-directed, to student-instructor negotiated, to student-directed.

TECHNIQUE

The manner and skill with which artists employ their tools and materials to achieve a predetermined expressive effect. The ways of using media can have an effect on the aesthetic quality of an artist's total concept.

TELEPHONE EXCHANGE

In the field of telecommunications, a telephone exchange or telephone switch is a system of electronic components that connects telephone calls.

A workplace that serves as a telecommunications facility where lines from telephones can be connected together to permit communication.

TELEVISION STATION

A television station is a type of broadcast station that broadcasts video and usually audio to television receivers in a particular area. Traditionally, TV stations made their broadcasts by sending specially-encoded radio signals over the air, called terrestrial television. Individual television stations are usually granted licenses by a government agency to use a particular section of the radio spectrum (a channel) through which they send their signals. Some stations use LPTV broadcast translators to retransmit or rebroadcast to further areas. Television stations are a form of television channel, but not all television channels are necessarily stations.

Many television stations are now in the process of converting from analogue (NTSC, PAL, or SECAM) to digital (ATSC, DVB, or ISDB).
TOTAL QUALITY MANAGEMENT (TQM)

It is a comprehensive approach for improving competitiveness, effectiveness and flexibility through planning, organizing and understanding each activity and involving each individual at each level.

TRIPURA BOARD OF SECONDARY EDUCATION (TBSE)

Tripura Board of Secondary Education started its functioning in the year 1973, is a statutory body of the Government, which conducts the school Examinations in the state. The School examinations conducted by the board, every year are:

(i) Higher Secondary (HS: +2) Examination - for XII Class
(ii) Madhyamik Pariksha (10 class examination) - for X Class

URBAN AREA

An urban area is characterized by higher population density and vast human features in comparison to areas surrounding it. Urban areas may be cities, towns or conurbations, but the term is not commonly extended to rural settlements such as villages and hamlets.

An Urban area, according to 1971 census included all municipal towns, cantonments and any other areas being administered by local bodies such as town committees, union committees etc. and any other place, which satisfied the following empirical criteria viz.

(i) A population of not less than 5000 persons
(ii) A density of at least 1000 persons per square mile
(iii) Three fourth of the occupation of the working population should be outside of agriculture and
(iv) The place should have a few pronounced urban characteristics and amenities like location of educational, medical or public institution, offices or trading contras in it.

By plain definition an urban area is a area with a population of at least 1,000 and no fewer than 400 persons per square kilometer. By detailed definition an urban area has
a minimum population concentration of 1000 persons and a population density of at least 400 persons per square kilometer, based on the current census population count. Urban population includes all population living in the urban cores, secondary urban cores and urban fringes of census metropolitan areas (CMAs) and census agglomerations (CAs), as well as the population living in urban areas outside CMAs and CAs.

USEWARE
The generic term Useware was introduced in 1998 and denotes all hardware and software components of a technical system which serve its interactive use.

UTILITARIAN
Utilitarianism is the idea that the moral worth of an action is determined solely by its contribution to overall utility: that is, its contribution to happiness or pleasure as summed among all people.

VALUE
Man acts to satisfy his needs. Anything which satisfies a human need becomes thereby a thing of value. It is an element of desirability and satisfaction that is common to all values, material or nonmaterial. In psychology the term value is generally employed to designate a dominant interest, motive or broad evaluative attitude. Values have been defined variously by different educationists, but on the whole it is interpreted to be either a set of feeling or an action.

Values are unique verbal concepts that relate to the worth given to specific kinds of objects, acts and conditions by individuals and groups.

VEDIO
(1) Refers to recording, manipulating, and displaying moving images, especially in a format that can be presented on a television.

(2) Refers to displaying images and text on a computer monitor. The video adapter, for example, is responsible for sending signals to the display device.

A recording produced with a video recorder (camcorder) or some other device that captures full motion.
IV. 

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