

SHREE H.N.SHUKLA GROUP OF B.ED. COLLEGES

(Affiliated To Saurashtra University & NCTE) (Vaishali Nagar 2
& 3, Near Amrapali Under Bridge, Rajkot)

Science Method Sem-2

unit.1:lesson of planning development

- 1.1 Tas Planning(concept, stairs)
- 1.2 Tas of planning structure
- 1.3 unit Planning
- 1.4 of the blueprint Based on unit of the test structure

unit.2:Science of education methods

- 2.1 methods: (concept, effective measures and benefits)
 - 2.1.1 lecture method
 - 2.1.2 Swadhyaya method
 - 2.1.3 Demonstration method
 - 2.1.4 experiment method
 - 2.1.5 Project method

unit.3:evaluation And functional Research

- 3.1 question type:concept, structure and example
 - 3.1.1 Dissertation oriented
 - 3.1.2 short answer
 - 3.1.3 Object oriented(Empty, conjunctions, multiple choice, relational reduction, classification)
- 3.2 Blue of print structure
- 3.3 Ideal of the question paper symptoms
- 3.4 functional Research:concept, Importance of Sopa

unit.4:Science in education tools

- 4.1 Science laboratory:importance, planning, maintenance
- 4.2 activities:Science congregation, science fair, field trips, sky viewing
- 4.3 References:experiment From the notes, Science Journals

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unit:1

Science in education lesson of planning development

1.1 Introduction:

no one playback Singer, a cricketer, a cinema actor or actress, a wrestler, a comedian, a singer, a tabla player, a sharnai player, a dancer or a dancer, a painter, a sportsman or an athlete become famous in the country or around the world. Not all individuals can achieve such achievements. There are two main reasons for their distinctive achievements. One is the thorough training he has received in his field and the sadhana he has done in it and the other is he has based his work on the foundation of good planning. If they don't plan well, they can't work by being absorbed in their field and therefore can't get the expected success. Thus planning is very important. Even some school teachers are unable to integrate their class teaching thoroughly due to lack of lesson planning. So training alone is not enough for good teaching. Good planning is also essential. That is why it is said that, "First plan out your work and then work-out your plan, that is the way to attain a sure success."

training Pamela of school Professor If own function Plannedly do So that Of course Success Professor became can. thus good And Effective pedagogy good Planning on intimate way Dependent is. good lesson Planning a in teaching Success to get Gravity is.

1.2 Concept of Planning in Science Education:

Govt of the country K of the state Progress for long K Short of period Planning do is. on a journey the goer the person of travel Planning do is. engineer Building tying Before His Planning (Blue Print) ready do is. Planning doing times nation K the person himself where is And He where to reach is ? (goals), how to reach there? Who needs help to reach the goals? What obstacles can there be in it? What should be done to remove the obstacles? etc. things have to be mentally thought, contemplated, considered. This mental thought - thinking - thinking is planning. Lesson planning in science is actually teaching planning. Before entering the teaching classroom he ponders many things. Pre-planning of teaching-teaching means planning of teaching, which points the teacher has to teach? (Subject matter) What does the teacher want to achieve by teaching those topics? (Objectives) How to teach those issues? (Methods, Procedures, Techniques, Approaches) Where and where to use educational tools and reference materials before and during teaching? What is the rank of class teachers? What educational experiences are to be respected for the achievement of objectives? What will be the expectations of the teachers towards the professor? What are the expectations of professors? How to satisfy those expectations? How to make the classroom lively? How to measure achievement of objectives?

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Ka. Pa. What work, how much and how to do it? What should be done for the teacher to go home and revise the studies done at school? If a written note is prepared after considering many such things, it is said that the teacher has planned his teaching work or the lesson to be given by himself. In short, lesson planning is a detailed consideration of the entire teaching-learning process. However, a teacher does not only have to plan lessons. Apart from lesson planning he also has to do unit planning, monthly planning and yearly planning.

1.3 Lesson Planning in Science Education:

lesson of planning Meaning:

"Lesson planning in terms of a science teacher is the teacher's planning of instruction in the classroom."

"Lesson planning is a detailed picture of the content, teaching methods and class notes to be taught in class teaching."

But Above meanings incomplete is.

Bossing of planning Meaning below According to give is:

"A lesson plan is the title given to a statement of achievements, to be realized and specific means by which these are to be attained, as a result of activities engaged in, during the period that the class spends with the teacher."

of the professor In presence fixed in time Happening activities, a detailed list of educational tools used, content and objectives served by them can be called lesson planning. Motion has no meaning without a sense of direction.

V.K.Kohli lesson of planning Meaning below According to give is:

"Careful lesson planning is the key to successful teaching. Lack of planning encourages fumbling and indecision with accompanying disciplinary problems."

"Cautious lesson Planning a Success of teaching the key is.

of planning in lack Professor where And there the gap I want is And decision take can not.with-with how much Disciplinary problems arises is."

Lester B.Stand lesson of planning Meaning below According to explain is:

"A lesson plan is actually a plan of action. It therefore, includes the working philosophy of the teacher, his knowledge of philosophy, his information about an understanding to his pupils, his

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comprehension of the objectives of education, his knowledge of the material to be taught and his ability to utilize effective methods."

"Lesson Planning a of the professor action plan is, which includes the teacher's philosophy of practice, his theoretical knowledge, his understanding of subject-information, his understanding of educational objectives, his knowledge of the material of what he is to teach, his ability to use methods effectively, etc."

of the classroom of educational experiences The foundation Above J unit Planning And annually-Monthly of planning building Chanay is a to forget No should. loose Education of texts Planning, unit planning and monthly-yearly planning are three interrelated. Annual-monthly planning provides a design, from which unit maps (blue prints) are formed. From such maps of the units, the daily action plan is made, planning the daily teaching lesson. Thus monthly planning, event planning and lesson planning originate from the background role of annual planning. Unit planning is spread over five, seven or more hours, but the teacher has to stick to the schedule. One or two hours of a subject is allotted in a day on the time table. Hence the implementation of the unit plan extends for one to two weeks as per requirement. Under these circumstances, it becomes essential for the teacher to plan the day-to-day work carefully.

Lesson Planning a Impressive of education focal point is. In it too much J hard work, has to be done, but it definitely gives strong fruit. In the absence of lesson planning, the teacher becomes exhausted in trying to maintain discipline in the classroom and becomes discouraged by his own failures in the classroom. Although a teacher who has a good lesson plan gets tired, his tiredness is filled with the joy of satisfaction. A teacher who goes to class with planning never has to face difficulties. It can confidently function throughout the day. Due to planning it can provide effective education and achieve the set objectives. Thus, due to the teacher's lesson planning, the internal strength of the teachers is not only developed, but also their universal development or global development. To make all this possible lesson planning should be prepared in written form.

* Advantages of lesson planning:

Lesson From planning pedagogy Well planned, is regular and methodical.

Lesson Planning by In professor Confidence, self-confidence and self-awareness are generated.

Lesson Planning of the professor to teaching Simple made In it Helpful happen is.

Lesson Planning Among professors Interest And aptitude awake do is.

Lesson to planning Due to of time savings happen is the reason K Among professors Absolutely in time good Sense And a lot everything knowledge grow up is, as well as developing certain expected behaviors and attitudes. Without planning, all of this can take longer than is accomplished.

Lesson to planning due to in teaching harmony be preserved is.

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lesson Planning by Professor in class in attendance happening of questions solution Various From examples do is.

lesson Planning to the professor Enough Independence give is.

lesson From planning In professor self esteem awake happen is.

lesson From planning Teaching Effective become is And that of teachers comprehensive development done Helpful happen is.

lesson to planning Due to Professor Definitely in class go skillful And success of a person As Barti can is.

"The teacher who has properly planned his lesson enters the classroom with confidence, without any anxiety, ready to attack any problem and prepared to carry it out like a skilled worker."

lesson Planning different different Study of lessons of array one the link become is, so that continuity is maintained in teaching.

lesson to planning Consequently Professor in class enter that Earlier that of teaching issues about required knowledge, get information and facts. For this he can prepare with the help of reference texts, thus, lesson planning gives him an opportunity for advance preparation.

in the classroom vertical to be Some Accidental difficulties And of problems Professor in advance idea Curry Le is And their solve Also in advance J thinking take out is, so that 9- teaching can be done without interruption.

lesson From planning ready(Well prepared) the teacher is so influential in the class that class arrangement issues do not arise. However, if an adverse situation arises, the teacher can successfully deal with it.

pedagogy at the time Professor where where, he also thinks in advance about how he will use which educational materials.

lesson Planning a Teaching of the process Radar is.in class how transactions in attendance will happen its prediction And Warning of them found stay is.when where questions to ask, which in the situation which method K technique to adopt, what approach to take, how to awaken the curiosity of the teachers, how to motivate and encourage the teachers and make them ready for new knowledge, how to start teaching, how much time to give to whom among reinforcement, presentation, revision, evaluation etc. becomes quite clear.

lesson Planning to study Solid make is.of foreknowledge foundations on Teaching start Curry contents A.V way development monks K so that a knowledge the future Teaching - Become the foundation of learning.

lesson From planning connection Sadhava about consideration Also done can is.

lesson Planning In professor Study the habit develop is.daily new lesson, a teacher has to go through new considerations, new experiments and ever new situations. In short, a teacher can be constantly innovative.

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lesson From planning of the professor Time, energy and labor are saved, as a result he is not stuck in useless learning. It also avoids digressions and thus avoids the false haste to complete the course later by saving time.

Lesson planning allows the teacher to have a constant idea of the expectations of the students and can also consider in advance the learning experiences to be given to the students.

In short lesson of planning study – Teaching becomes easy, rich, nice, successful, efficient and effective.

lesson of planning limitations:

loose Tas From planning of education remote purposes Accomplished done can not, as it is planned for a duration of 35 to 40 minutes only. In such a short period of time, although the objectives like developing scientific outlook, developing attitudes, developing interest-aptitude and developing some high-level skills etc. are important, lesson planning cannot be achieved.

loose of the hour Planning in education All of subjects as well All J Kind of Lessons for convenient not. Specially by doing skill, it is not suitable for lessons related to activity etc.

lesson From planning Education Minister of Information became go is. professors mostly Partly inactive stay is. them Interest falls Like that of activities Use done can not.

of the subject loose pieces fell go is, as a result the integrity of knowledge is not maintained.

lesson to planning Due to pedagogy only of ritual As Above the last stiff, becomes tight and mechanical. Not every lesson may require prior knowledge testing. Also evaluation is a continuous process. Therefore formal assessment may not be mandatory in every lesson.

lesson From planning approach Subjective became go is And that Academic Center Lived not.

lesson Planning Plan Practical becoming not

loose of lessons In planning of attachment possibility Relatively a lot less stay is.

lesson Planning Written why for to be should ?

to many Naturally way J like this feel K everyone of lessons to planning Written way ready done of time A lot a waste happen is. This thing Totally true Also is. trainees for In the beginning Written Note ready to do function of the head the pain even Boring done falls is. As However of the beginning stage to the trainee Inverted lesson Planning Note indispensable is, But From Mahavara in teaching Lean became gone then to him lesson Planning Of note need Lived not. In the beginning lesson Planning Note Written way ready to do importance below According to is:

anyone Plan When paper Above come down then J its everyone of aspect in detail idea Curry can be is.

from that in contemplation Certainty And Regularity come is.

Professor of mistakes the victim becoming not.

In professor idea Clarity And Confidence come is.

in class take to go All material forgot Except Professor in class take go can is And came By mistake created Ridiculous from the situation that rose up go is.

in teaching sequentiality, Continuity And coordination maintained stay is.

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contents Gradually development which way monks His suggestion lesson From planning found stay is.

Determined purposes how many somewhat Success happened that to know Written lesson Planning Useful is. Also from that purpose of achievement measurement to do for of evaluation manner Clearly And Various way thinking can be is.

Written lesson Planning to the professor class action for of contemplation chance give is. study – Teaching Shi way Rich become its consideration Also Professor Curry can is.

Written lesson From planning ready done Teacher in himself lit up to self-confidence due to easily of the class of atmosphere control Curry can is.

Trainee when of school Teacher become is then to him every day Six K Seven Tas to take have is. Besides of experiments Preparatory, of the laboratory arrangement, of the experiment Verification, of teachers The workaholics (Workbooks) as well their of the notebook Verification to do have is. at home Also Next of the day of subject matter Planning to do have is. therefore everyone of the hour Planning to do possibility J not, that only of school In the logbook too much J In short All of the hour Planning will write. Also This mini plan to him Specially Nothing Useful became will be able to no therefore to him for medium way is unit Planning. main units K J Five Six in hours complete happen of his Five Six different different lesson Plans to do instead of of note in the form of one J Planning done come is to him unit Planning say is. to the trainee unit of planning Mahavaro by giving Tas of planning writing-hard work survive is And idea In the process harmony come is.

Meaning:

"alike Specifications Having of course to the issues Gradually to teach for Consistent to planning unit Planning said come is."

So then This unit a what is ? Carter defines a unit as follows:

"An organization of various activities, experiences or types of learning around a certain theme, problem or purpose developed co-operatively by a group of pupils under teacher's leadership involves planning, execution of plans and evaluation of results."

"of the unit thing Organized have, are educative, self-contained, and coordinate educational activities, experiences, and learning styles around a central theme, problem, or purpose. The term unit also includes planning, implementation of planning and evaluation etc."

above lecture looking at seems is K, a cluster of learning experiences, activities, and learning styles around a central theme, problem, or objective. Although pedagogues do not agree on the definition of a unit, its main features are unity of content, educational content and the objectives it achieves.

of the unit Second one definition Prof.K.K.Shukal by below According to done came is:

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"A unit is considered to be a block of subject matter, but the present concept of a unit includes the procedure of presentation of subject matter also ie it is both - a block content as well as method" Shukla

knowledge And of business different different in fields Now The term 'unit' is widely used. "A unit is a subdivision of content and a method for it."

of science of the curriculum a lot affairs each other with relationship have is.came matters appropriate in order Integrated done come So Pedagogy in education lesson of planning development

one unit to form is.come on everyone unit Science of education one self complete Ingredient became go is.come on Ingredient enough educational experiences complete to put And Among professors permanent count can be Such desired changes to bring strength have is.in the unit of subject matter Unity too much J Important is.unit Planning a indeed So Trainee teachers for not,But professional teachers for Planning is.in the unit totality,Unity And perfection to have required is.of totality in sight complete is Such Education unit called.its different different Sub issues of totality K of integrity in sight Mutually relationship Having have is.Such of issues community That is unit.

*unit Planning why for ?

common way we35K40of minutes To the hour into consideration keeping lesson Planning let's do are.In this indeed So we of subject matter small pieces let's teach are.But As By doing Science of education Continuity at risk is.Among professors behavior changes brought in Such retail lesson Plans deep come down is And therefore of education Effectiveness decrease is.unit Planning done come So that of teachers on the side Purposeful for Beneficial And Beneficial by choice is.from that below Wise benefit got can be is:

of science in teaching unit of planning Consequently Continuity come is And professors Huge role on idea doing happen is.In it of knowledge Continuity And of integrity Psychological of concept Inclusion done is.

unit From planning of subject matter in a row study done can is.unit Planning According to Educational By doing of subject matter All J to the issues perfect justice gave can be is.

of science Professor of science of subject matter of the unit Exclusive purposes on attention concentrated Curry can is,the reason K common purposes all over unit for one J Time In the beginning to write have is.

unit to planning Due to of science of the professor of power Rescue happen is.Besides its labour And of time Also Rescue happen is.

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unit In planning of science of teaching Teaching experiences thoughtfully Given coming Since His Repetition to do need Lived not.of science Professor own to experiences Based on situation According to of science unit In planning appropriate Change Also can do is.

unit From planning To the professors of science of teaching Rich,honest And organized experiences gave can be is.

of the year from the beginning J of units In context of science Professor instrument material And References Received to do attempt do is.that himself units Regarding Clear done go is as well to him own of limitations Also concept come is.

unit to planning Due to of science of teaching evaluation methods,procedures as well Swadhyayan in advance idea done can is.

unit Planning By doing appropriate way Repetition And Confirmation done can is.

of subject matter in detail study done can is,J chilachalu loose in lessons possible happening not.D.T.Carbon And organic of compounds lesson one J loose in hours to give going In it of carbon Constitution,Carbon found to come Places,of carbon Diversity,Carbon dioxide And other organic Compounds,frequency in the table His location etc Sub to the issues perfect justice gave could not.unit Planning According to pedagogy By doing This All to the issues in detail justice gave can be is.

unit of planning Five Six Tas among everyone in hours Introduction to do J falls like that Compulsory not.therefore unit In planning Tas of planning from artifice survive can be is.

unit Planning flexible(flexible)is.everyone in hours Planning According to J exactly Crisis function happen,No happen,less let's go,more let's go a of the matter worry to do no one need not.no one one in hours less K more As much as Also let's go From there that Next in hours Next increased can be is And a in hours K that then previous subject matter offset Curry can be is.

of science one Than More teachers with Together unit Planning Curry can is.thus of co-workers think And of experience benefit got can be is.thus unit to planning Sadiya Meaning gashavi Dia . It is co-operative task.

anyone one unit for Once unit Planning done come that then that years until in use take can be is.bj year And that Next over the years only of the name Change((Marginal Changes)) to do falls.Such insignificant changes like K This in hours Now then where instrument K chart to use,its mentioned unit Planning Of note Marginalized Also Curry can be And the whole Planning again No to do falls. in the classroom study experiences,study activities Besides interview,journey-Tourism etc Four of walls the outsider to experiences Also unit In planning include can be.

unit In planning different different Tas for team-Teaching Also Curry can be.Some issue K its Part No Fawato have So own Co-worker to the professor that to teach for handed over can be.

loose in lessons of attachment Possibilities Relatively less have is,When unit In planning other issues And other subjects with of attachment Huge opportunities existing have is.

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unit:2

Science of education methods

2.1 Introductory :

"Teaching is not everybody's cup of tea."

"Teaching is not everyone's cup of tea."

one legendary saying is K,

"The scholars are probably not good teachers."

"A scholar may not be a good teacher."

2.2 What is teaching method?

of science to education Consequently In the audience how Change to bring is that to us purposes by notified happen is. therefore "Methods adopted for the purpose of making learners go through the process of learning to achieve the specified objectives are called teaching methods."

Second way should So,

"A set of systematic and sequentially arranged activities is called a teaching method. It consists of sequentially arranged activities for both the teacher and the learner."

Third From a point of view should So,

"The system by which learners acquire experiences in a systematic and orderly manner is called a teaching method."

2.3 Types of Teaching Methods:

Teaching of methods Three type is:

Faculty Centre methods:came Two methods known is.one discourse method And Second Philosophical K Demonstration method.In this of the professor function J importance have is.

Professor-Academic Center methods:J in the method Professor And Professor Both Participant becoming have Like that methods Professor-Academic Center methods counts is.Discussion method a came method is.

Academic Center methods:J In methods of the professor J function And activities main have And Professor only mentor as role playing have Like that methods a Academic Center methods is.came Some of methods list below gave is.

experiment method

group-discussion method

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project method
Swadhyaya method
Supervised Study method
performance method
interview method
seminar method

Of these Some of methods discussion presented in the unit done is.

2.4 Importance of Teaching Methods:

Education of methods knowledge to get Professor for importance As follows is:

Teaching of the method From knowledge In professor of teaching skill come is.
Some to wonder teachers class in teaching confusion experience is.If they Various Teaching from
methods completely knowledgable done go So their This confusion away happen is.

Teaching of methods knowledge In professor Confidence Prere is.

Teaching of methods accurate knowledge possessor Professor Various trick - Can make his
teaching interesting and interesting with technology.

Various Teaching of methods Use the doer The teacher often Educational of equipment Use
Compulsorily to do falls is, thereby creating interest and aptitude in teaching in the teachers. E.g.
A teacher using the philosophical method must use experiments and other written materials.

Various Teaching of methods knowledgable Professor If no one one of the method from use to him
Success No found So its in substitution other of methods Use by doing Success got can is.

Various of methods from use Among professors compare to do, acquisition of knowledge,
generalization, development of various skills etc. are developed as each method helps in
developing some essential quality.

of science Various methods by Various objectives Accomplished done can is.

Now we Science of education Various methods about in detail Study will do.

2.5 Lecture Method:

Concept :

This to the method discourse method Also said come is.common way high in education lecturers
This method adopt is.Secondary at the level Also teachers This of the method Use do is.mostly
where big community Study doing have there This method more convenient happen is.

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This in the method Professor professors before Statement do is And its by of education of subject matter presentation do is. In it professors shut up listeners become is. they This in the method anyone Kind of Active Part taking not. To the professors of the professor From the statement only ready details I found is. professors only listen is And in a few minutes they tired go is therefore the whole Tas Meanwhile His attention concentrated Lived not And they inattentive become is. come at the time they of the professor some Statement to listen miss out go is. And That is somewhat their In Enlightenment the raw remained go is. This in the method of teachers on the side only of knowledge purpose Accomplished happen is And that Also Partially complete no. Besides from that of education other purposes Accomplished happening not. Also Among professors Some Powers like K Reasoning, observation etc. are also not developed.

Effective to make remedies:

discourse method a Faculty Centre method is, in which the role of professor is important and the role of professors is secondary. This method was widely used in ancient times. While using this method the science teacher should ask questions in between. Also, the use of models, samples, charts etc. should be mentioned. By doing this, the teachers will be saved from listening to monotonous lectures and they will not get bored. Also, the science teacher should try to make the lecture lighter than the lecture and should use such techniques. Lectures should be delivered in such a way as to attract the attention of the lecturers and interest them.

lecture come on discourse method over the years walk coming of education old(out of date) method can be said to be. But it is not right to develop a sense of this method. Each method is sometimes very necessary. Also, each method has its own unique features and limitations.

in science Some Information Pradhan units like K adaptation And Biological Evolution, Organisms and Habitats, Micro-ecosystems, Planning of Ecosystems, Useful Plants and Animals, Cells and Cell Division, Conservation of Natural Resources, Balanced Diet, Transgenic Diseases, Agriculture and Animal Husbandry, Agricultural Practices and Implements, Biological Actions, Human Evolution, Natural Resources, Bio-Environment etc. The use of lecture method becomes necessary for teaching.

lecture of the method benefit:

Professor for discourse ready to do Simple falls is.

good And Effective discourse bright To the professors in the study Inspirational become is. Various Narrative style And style by Professor to teach to the point interesting made can is. upper in classes professors of the professor of the lecture with with I quickly Note to do skill developed can is.

This in the method Professor Active would have not, there are no projects or demonstrations so there is no time wastage, lectures are smooth and learning is fast.

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Professor good speaker to be training Gradually got can is. curriculum long have So Determined in time that complete can happen is.
of science of course balance Diet And second Some
issues Such Minister of Information have is K in which lecture method Ati necessary become is.
To the professors Hearing – Experience can be properly trained.
Professor himself mental way Extremely Active remained can is.

The teacher yourself J All J activities to do Since of the class of cooperation K convenient-
Inappropriate of retaliation lesson on effect Happening not, so if there is dominant discourse, the class system is maintained.

one J in hours many Information gave can be is.

Professor to the subject matter too much J Briefly And Gradually presented Curry can is.

Professor In discourse Continuity maintain can is.

Professor himself acquired done skills Based on To the professors Aggressive can is.

Homework Given Simplicity stay is.

Among professors of patience of virtues development happen is And in them of tolerance marks Cultivated is.

Some innovative And hard units sharp from discourse Do well to learn can be is And In it Clarity bring can be is.

in science experimental of work Information to give for, the lecture method is useful for giving practical instruction as well as clarifying some theoretical points.

of texts Repetition to do for, the lecture method has proven successful for building unit roles as well as for presenting biographies of scientists.

to the lecture In the end Professor To the professors questions by asking them No understanding affairs again Explained can is.

lecture to give a one Kind of art is, which is very difficult to acquire. The success of this method depends on the teacher. Its eloquence, presentation of content, pronunciation, teacher's dominance over academic issues, fluent presentation of ideas, clarity of the teacher's own content, style of presentation etc. can make the teacher's lecture impressive, effective and highly successful.

***Limitations of lecture method:**

This in the method only Professor J Active have is, so the learning process becomes one-way. Science of education only of knowledge purpose And that Also Partly Accomplished done can is And other high Kind of purposes Accomplished done can not. Adhyas become passive listeners, hence they become inattentive and inactive.

of the professor discourse other than other Powers Rundhaya is And therefore a of powers waste happen is.

To the professors own think expressed to do Space Lived not.

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often of teachers Comprehension outside discourse have So that them for Boring become is.

Professor the whole Time spoke do is therefore that labored done go is.

long discourse Also Among professors get bored produce do is.

To the professors activity No meeting they depressed And discouraged done go is.

This of the method Excess to education get worse is And therefore of education Quality lower come down is.

This in the method Memory on more load placed come is. therefore their Observability And other of powers development happening not.

of teachers Independent way idea to do of power Also development happening not.

of teachers Oral to expression stimulation Given coming not.

To the professors ready Goods(subject matter) Served was coming Since them Exclusive experiences meeting not.

Professor speak keep is Also professors understood is K not its the need that doing not, therefore of teachers Sense-of power development happening not.

This in the method Professor And Professor in between coordination Happening not, Correlation bound not.

professors If from the lecture too much J get bored So they voice do is And therefore in class indiscipline produce happen is.

lecture in the method Scientist method And Scientist of attitude experiences To the professors meeting not.

If Professor only textbook from J discourse ready do And context –of literature Use No do So To the professors Specially nothing New to know meet not.

lower in standards If of the professor lecture of teachers level outside have So This method fail go is.

This in the method 'Action by Education' Learning by doing'to location not.

This method According to Education by giving Among professors to the subject matter gokhi to put tendency dominant become is.

thus, This of the method Many Benefit being However that one required method is. therefore its Ignore to do should no. Also other Educational In methods Also discourse So have is. J, therefore This of the method we give up Curry can As not, therefore This method more Success happen that for The teacher attempt to do should.

2.6 self study method (Assignment method) :

*concept:

culture the sheep fly away Ch, "Gurunam Master: Swadhyaya:". self study a of Guru Also Guru is. Swadhyaya That is self chapter –yourself done Study. therefore Swadhyaya a

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the best Guru is as a professor horseman Presiding to the horse Knowledgeable From Bhagirathi on the shore deliver, But that Thirsty No have So that knowledge of the Ganges Turn P will be able to no. thus Gone until of education experiences of the priest own No become there until to him knowledge No found. of science subject matter: what like that have K In it of the professor, its of guidance And of experiments Of course need falls J. therefore In it of self-study Space other subjects Than less is, As However in science Also Many Information Pradhan Such units is K J Swadhyaya method by more easily learned can be. This to the method trial 7 method as Also to recognize come is. Swadhyaya method a one Kind of group Study method is.

Swadhyayani Some Definitions below According to is:

"Swadhyaya a To the professors in class K class out Given coming function is."

"Assignment is the work that is assigned to the students either in the class or out of the class-study."

"J unit Professors to study is, of his Rebuttal And Admittedly J Educational activity done come And from which a of the unit Study Capably done can Like that activity That is Swadhyaya." Bossing Alcon, Kinder And Shnert own 'Better teaching in school' of the name in the book good Swadhyayani definition below According to give is:

"An effective assignment is one that is designed to achieve at least two objectives: to contribute to the achievement of specific objectives of the lesson plan and to motivate the students to learn with a minimum of correction."

"Effective Swadhyaya a way done to be should K from that In less than Less Two purposes Accomplished happen: (1) lesson of planning Exclusive purposes Accomplished to do for himself Contribution give And (ii) In less than less errors with To the professors motivation found Grants, Care And Freech of the name The authors own 'Modern methods in secondary schools' Namana Pust good Swadhyayani Sense below According to give is:

"Out of class-work that will indicate how successfully students are perfecting study skills and to what extent they are able to make relationships, locate and utilize materials and the work without supervision will allow maximum personal development."

"of classwork out by going done coming function i.e Swadhyaya how way professors Study skills successfully complete do is, its directed do is And Some somewhat they relationships to tie for, to the subject matter Find out extract And in use to take for And Supervision without function max personal development to do for how way them Stimulate is And powerful make is its Also directed do is."

Above Definitions Swadhyaya of the method concept below According to clarify is:

Swadhyaya a self-of study one activity is.

Swadhyaya by curriculum competent become is.

Swadhyaya a Homework not. Homework a So only at home ie of the class out to do have is, When Swadhyaya So in the classroom, of school other in continents Or school out Also done can is therefore to homework of self one organ said can be.

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of Swadhyayana Various forms have is.D.T.Reading Swadhyaya,writing Swadhyaya,observation Swadhyaya,knowledge of editing Swadhyaya etc.

Swadhyaya long as well short of term to be can is.

in self Assigned function activity for Absolutely process is.

in self of the professor Guidance rather than have is.

Swadhyaya questions K of activities composition skillfully done came to have should.

Swadhyaya personal Also gave can be And in the group Also gave can be.

Swadhyaya by lesson of planning common purposes as well Exclusive purposes Accomplished done can is.

good Swadhyaya In less than less errors by doing To the professors to learn for encouraged And motivated do is.

Swadhyaya by professors Study skills developed can is,relationships established Curry can is,Supervision without function by doing max personal development Simple can is And of study subject matter Find out by removing to him in use to take Power develop is.

good Swadhyaya Study Under of details Companionship set up is.

good Swadhyaya To the professors context of literature max Use make it like that have is.

in self existing questions knowledge,Sense,of knowledge usage And skill oriented from purposes motivated have is.

good Swadhyaya To the professors mental of powers development do like that have is.

good in self notified questions And activities Simple, medium and hard are of three types.

good Swadhyaya of teachers age group, related to needs, interests, interests and subject matter.

Effective to make remedies:

professors Swadhyaya of questions Answers from where got will be able to His finish Guidance In it to be should.

If Swadhyaya Methodically professors learn Such of the professor insistence have So He to him for okay okay Preparation to do falls is.He to him for CV ready to do falls is.

only textbook J no, but must also contain questions that require reference books, charts, filmstrips, or other tools to generate.

Swadhyaya In the questions Variety to be required is.Answers possible so much Short come Such questions in self being should And that for of questions the number in self Special to have required is.In it Essay questions, should be short questions and informal questions.

Swadhyaya of questions Answers always Written in the form of No Also have.sometimes picture K sketch to draw, drawing a diagram, observing in a microscope, recording the results of weight, temperature, length, size or mini-experiment, calculating using formulas, etc.

Professor alone no, but in discussing the answer, it should be allowed for one student's answer to benefit another.

directly Literally to the north instead of Understanding verify Such Answers And no one of principle of use Answers to give falls Such questions In it being should.

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of family of members using, the variety of questions that can be answered by observing and questioning the home or immediate environment should be inherent. Such Swadhyaya can only be Grihas Swadhyaya.

Swadhyaya no one one main unit K Sub to the unit covered Le like that Consistent to be should.As However Facilities fertilizer Taswar Leaflet Also In it gave can be.

of Swadhyayana Answers to check, the method of improvement and evaluation should be as simple as possible. If these three processes cannot be done, then Swadhyaya becomes a file paper or a joke for self-professors.

This method of teachers Personal to the differences into consideration take their Personal to development afford is.

good of Swadhyayana questions professors of course J issues study gone have its with related to being should.

Swadhyaya of the method benefit:

Professor Self-effort fixed of the unit Information Received do is.

Professor Various instrument-material And of reference literature Use by of information deduction And Note Than learn is.

of course extended to the issues Swadhyaya by together covered take can be is.

To the professors leisure of time appropriate Use to do the habit falls is.

Swadhyaya to the method Due to Among professors Absolutely Kind of behavior changes bring can be is.

Various equipment as well of references Use to do skill This in the method developed can be is. group Swadhyaya by Among professors in a group staying function to do Democracy style developed can be is.

from that Reading, various skills like comprehension, creation, note taking etc. can be developed.

This in the method Mutually of subjects coordination Curry included Education possible made can be is.

In it Professor yourself J to read, motivated to think, act and experiment.

group in self professors of others With cooperation good Education got can be is.

Among professors Confidence, develop habits of adventure, exploration and self-reliance. of discipline questions arising not.

This method Based on the principle of 'learning by doing'.

professors one J at the time different-different Swadhyaya doing Since at school experiment relative less Equipment have So Also walk can is.

If Professor of teachers Progress chart(Progress Chart) by just looking at it, one gets an idea of which teachers are bright and which are weak in the class. Therefore, the teacher can speed up the progress of the weaker students by guiding them in increasing their study pace and guiding the bright students in additional reading and additional experiment work

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Swadhyaya of the method limitations

lower in standards This of the method of success Possibilities less Ch .

where group Swadhyaya adopted come is there of knowledge pieces falls is.one group J Swadhyaya do is that other group doing not.

J at school Rich library not used to be there This method Success becoming not.

Swadhyaya method Professor And Professor of both on the side Plenty Preparation asked for Le is. group in self Some members Active have is when Some members inactive have is. common way Swadhyayo bookworm became go is.

often of the priest in homework Help do Like that Equipment, it doesn't have a reading or family atmosphere.

often at school Rich workshop K Laboratory Also having not.

of Swadhyayana Planning, the teacher is either not prepared or has no time for guidance and assessment.

Swadhyaya by experiment to make too much J difficult is.therefore This Methodically experimental skills to cultivate a Approximately impossible is.

professors yourself function No do Also from others Copy do like that This in the method finished possibly is.Copy the doer to the priest no one J benefit happening not.

Courses long Since And This in the method Time more going away Since Curriculum fixed in time complete done can not

2.7 Demonstration Method:

concept:

This to the method Demonstration method, also known as experimental demonstration method or empirical method. It is a teacher-centered method. It is a very important method for science education. Science is a subject of learning through experimentation. The ideal situation is for every student to have the opportunity to experiment and thus learn. But providing such facilities is a very difficult task due to insufficient equipment in our schools. Often, schools have enough equipment, but teachers do not have the skills to conduct experiments, some experiments cannot be assigned to young teachers, some experiments require the special understanding of the teacher to get the results, in these cases, the teacher himself performs the experiments instead of giving them to the teachers. Yes, he also notes the results of the experiment with the help of the teachers, after discussing the results he also takes a decision with the help of the teachers. Explain the experiment instruments and their arrangement with the help of diagrams, explain the experiment instruments and their arrangement with the help of diagrams, show the parts of the experiment instruments in larger size in the diagram if they are small and explain

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their simple diagrams if they are complex. When a teacher teaches science in the classroom in this way, he is said to have used a philosophical method. Thus, this method is a teacher-centric method, but the teachers also participate to a fair extent. In this method, a situation is created in which the teachers develop well. In it, the teacher himself experiments with the cooperation of the students, in between puts some questions before the class and the students give their answers. Besides this, in the philosophical method the professors have to observe carefully. He has to describe each step of the experiment. Conclusions are to be drawn from the results of the experiment. This involves using the powers of observation, reasoning and thinking of the teachers. In this method, the teacher should make a proper plan for the experiment. Also the purpose of the experiment should be clear in his mind.

importance:

Prof Knox states the importance of philosophical method as follows:

"For the purpose of providing knowledge for both immediate and permanent retention and for the purpose of providing technique of handling new problems, the lecture demonstration method is much to be preferred in the case of average and superior pupils."

When of teachers Age tools yourself used to be able As much as mature No have then This method Useful is.

at school All J To the professors personal way K in the group experiment to do gave can be so much tools No have then This method a the best option is.

experiment Dangerous have And therefore To the professors that gave can be As No have then method Useful become is.

principles to explain for This method convenient is. professors From the book principles read will go So they understand will be able to no And gokhi will put. like this No happen that for This method to use appropriate is, because by seeing the experiment done by the teacher, the purpose of the experiment, equipment, method of experiment, diagram, note of observations, conclusions etc. will be understood so that he will remember it and will not need to memorize it.

experimental in works included Exclusive of skills concept This method by good way gave can be is. New of the unit beginning tiny Philosophical experiments by Curry can be is.

different different affairs between distinction Philosophical representations by more good way Explained can be is. D.T. heat conduction, heating and cooling.

To the professors different different experiments by showing To the professors in the study Interest falls is And in education Diversity bring can be is.

experiments by Among professors located wrong to concepts Professor away by doing them true Sense gave can is.

Professor himself experiment Curry that Regarding questions asked of teachers evaluation Curry can is.

discourse in the method happening of teachers distraction This in the method Avoidance can be is.

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India like growing up in the country where in schools experiments about Tanchi Equipment is there Science Education for This one only Excellent method is.

here one thing Clear Curry to take should K only experiments a J Philosophical method not, but also representation through other graphical materials like pictures, charts, maps, graphs, posters etc., projected materials like episcope, epidioscope, overhead projector, film strip projector, slide projector, movie etc. and also philosophical representations of samples, models display etc. can be included in the philosophical method.

* Measures to make Demonstration / Philosophical Method Effective: Following points should be kept in mind for successful use of Demonstration Method.

Professor Philosophical experiment presented do then He into consideration keep should K All J professors experiment saw can is K no.If As No have So below According to arrangement to do. Philosophical table on appropriate corner big the mirror arrange K so that professors of experiment in fine wee observation in the mirror falling reflection from Curry can.

If class of number in sight small have So Professor Philosophical table on experiment do then professors Philosophical of the table around gourd around stand up staying of experiment observation do Like that them notification to give.

big in class professors stool Above, can observe the experiment sitting on the tray or on the window grill.

of teachers to the age group into consideration keeping The teacher experiment And other Philosophical representations to do.small of age professors for plain experiments And big of age professors for stuck from tools happening experiments demonstrated can be.

Philosophical table possible so much big And All professors experiment saw can so much tall to be should.

Philosophical of the table exactly behind black plank to be should.

The teacher of experiment purposes professors before Clear to do should.

Philosophical of the table in front of of teachers Seating arrangements arrangement A.V to have should K so that Next sitting down professors them Nade no that way All professors experiment saw can.

Philosophical table Above perfect the light stay Like that arrangement to do.Also of experiment appropriate role by tying then J experiment start to do.Demonstration for tools enough big having should K so that All professors easily His observation Curry can.

D.T.of forces parallel of quadrilaterals rule proven to do for instrument, a model showing the structure of the eye etc. should be large enough.

model Four from the side saw can be that for Philosophical of the table Underlying Or separately small moving around Philosophical of the table arrangement to do.If so different table No have So Sample, models and other experimental equipment should be rotated from all sides so that the teacher can see them from all sides.

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Philosophical presentation for All of them J tools in advance ready to keep should And Philosophical table on His As Fave As the rocks No Than appropriate in order organized way to put should, so that when needed, any means is immediately available without wasting time. Place the tools to be used on the left side of the table and arrange them in visible order. After the philosophic presentation of the instruments is done, they are placed on the philosophic table on the right side. When many things are to be shown, do not put them all together on the table, but arrange them in the boxes under the table and show them one by one as needed. General order and neatness are especially essential to philosophical work. Do not keep unnecessary books or tools on the philosophical table.

experiment Success happen its The teacher Enough Care to take should And that for Enough Preparation to do should.in advance experiment by doing Enough Verification Curry to take should.experiment doing at the time time limit Also in the target to take.experiment doing at the time no one instrument broke down go So in advance In addition of equipment arrangement to keep Or So of experiment the second extra Set By arranging in advance ready to keep.Sometimes experiment fail go So The teacher scared to go no, but to find out the causes of failure and rectify them and demonstrate anew.

experiment During The teacher no one the magic to do not.Hence of experiment purposes, equipment, method etc. to inform the teachers about all matters. This does not mean that they even know the decision. If they are told the decision in advance, then logic, speculation, thinking, scientific method etc. cannot flourish in them.

The teacher Ideal experiment to show Since experiment about in fine Fine of affairs He Care to take should.D.T.tools organized to preserve, arranging, using pliers to remove weights from weighing box etc.

In the experiment coming of importance issues Or of observation Absolutely moment towards of the professor attention in advance to draw should.of inspection hour past gone then you saw ? It would be meaningless to say so. E.g. In a neutralization experiment, if a single drop is added, the color of the acid or base solution changes. Observing this point carefully, similarly in the melting point experiment the observation of the thermometer should be recorded at the moment when the solid becomes a liquid, otherwise the observations in both the above experiments will be incorrect.

The teacher of experiment with in between in between need feel there discussion to do should And Explanation to give should.experiment finished done gone then Aki with discussion to do K Explanation to give that appropriate not.

New of experiment with J other required tools like K printed Mrs Roll Up board on drawn Fig,Pictures,Colored Chalk etc take to go.

experiment Meanwhile K other Philosophical representations at the time in between by questioning of teachers attention pulled out keep.need falls So them near Called observation to do for to say.As

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K temperature Thermometer on to read, in the microscope observation to do etc. In short Professor And Professor Both of them Active stay.

of experiment K other Philosophical of representations with with J The teacher Ka.Pa.function doing stay.D.T.Fig Ka.Pa.on to draw.organized results in the barn to note,discussion by Predictions And decisions to derive etc. professors the whole of experiment report yourself J methodically in the laboratory write like that The teacher insistence to keep.

of teachers of the mouth price from them no one confusion have So that discerning The teacher their difficulties away to do for effort to do.

Some written of material presentation Ka.Pa.of Both side on kept came Bulletin board on Also Curry can be.

The teacher In the experiment Unnecessary Speed No Than Enough Time to give should And discussion by professors completely Sense Cultivate its concept to keep should.of this Meaning like this not K too much Time Wasted put.In less than less However Educational purposes Accomplished to do for Enough Time allocate.

The teacher Also himself done of experiment evaluation to do should.of experiment purposes how many somewhat Accomplished happened ?To the professors how much benefit happened ?to the professor himself which which difficulties river etc of affairs evaluation to do should.

experiment During no one an accident No created its Vigilance to keep.D.T.to the priest Chlorine air Directly No to smell,But to him in the water by dissolving then its residence to take to say.thus not happen So Chlorine air toxic Since Professor unconscious done go And its on no one deadly effect Also happen like that become.

stubborn composition having tools,model Sample etc by opening their Internal composition To the professors to show should.

In the experiment used substances in measure to take And to use.of chemicals haphazardly Use No to do.

figures The teacher yourself J black plank on to draw.If to him figures to draw Utterly gap No have So J by drawing take to go.If electrical circuits And other In the figures symbols And of nouns Use was coming have So next to that about Clarity to give.

experiments to the season Correspondingly choose to do.D.T.Friction of electricity experiments in monsoon No to do,the reason K Havana to moisture due to Electrocution from being Such experiments in monsoon fail go is.that J way of snow experiments for hot the season And of phosphorus experiments for cold the season more convenient is.

inadequate And Defective of equipment complaint The teacher of course No to do,But In it existing defect corrected own of skill competence first time to do.

of the class All J of teachers Empirical demonstration towards attention concentrated stay that too much J required Since The teacher problems by putting in them Curiosity produce to do,so that All J professors too much J Eagerly of experiment to the results longing for

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*Demonstration/Philosophical of the method benefit:

Methane, Ethane of air fabrication like scary from experiments To the professors saved can be is.
This Methodically of time Rescue Curry can be is.

This method experiment of the method In comparison Thrifty is.

This in the method professors direct knowledge get is. they study-Teaching In the process Active Part Le is, therefore in them of science subject towards Interest awake happen is.

Value of equipment of use In the experiment professors Than This in the method Professor himself Care kept can is, so that to the instrument loss happening prevented can be is.

experiment Meanwhile professors enough attention give is, they observation do is, of experiment Note do is, The teacher asked of questions Answers gave can is, Fig draw is, Given In the figure nomination do is, experiment done Cooperation give is And of experiment everyone in activity Part take Active stay is.

This Methodically To the professors Also good benefit happen is. they each other Cooperation give is. of each other using of intelligence, of skills And Some mental of powers development do is.

This in the method To the professors direct of things And alive of samples Also Demonstration in doing come is. therefore said can be K that Psychological method is.

at school when All J To the professors personal K in the group experiments to give possible No have then Professor the whole class before of experiment presentation do is.

experiment From vision To the professors J-that affairs in between stayed of causality relationship Explained can be is, as well of subject matter Overview done can be is. D.T. electrical of production experiment doing at the time Professor on purpose no one mistake do And To the professors question ask K electrical production why for No happened ? This for detailed discussion done come So therefore To the professors of causality Clear concept came can.

#Demonstration/Philosophical of the method limitations:

'function by Education' – 'Learning by doing' a of theory here Execution happening not.

This in the method Professor Continuous Active stay is, But its Relatively professors inactive became go is.

This in the method of teachers personal to the differences into consideration taken coming not, therefore bright To the professors benefit happen is, When weak To the professors loss go is.

This in the method Among professors experimental skills developed can not.

This Methodically Among professors Scientist trends Cultivated could not, as well experimental of works training found not.

This in the method professors yourself experiment doing No Since in them Interest produce happening not.

This in the method of the professor In comparison professors inactive living Since And If Professor Interesting way experiment Demonstration No Curry can So professors bored go is.

too much J big in class All professors experiment exactly saw can not.

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To the professors This in the method direct experiences meeting not. This method Science of education good Among the methods one being However In it of teachers complaint have is K them Plenty work to do falls is.of experiment Preparation,tools together to do,tools arrange,other Demonstration literature collected to do And presented to do,of experiment Note ready to do,figures to draw etc a lot performance of the professor Partly come is.of this solution is.To the professors different different in squads Philosophical table have Called experiment And other In demonstrations His Cooperation to take.Above indicated of the professor function among many professors have done can be.thus By doing Two benefit will happen.one So of the professor function less will happen And Second To the professors Active made can be.Also This in the method 'Learning by doing'about J defect is that Avoidance can be.therefore class in teaching The teacher This of the method frequently Invariably Use to do should.

2.8 experiment method (Experimental Method):

concept:

This one Academic Center method is.common in sense professors in the laboratory yourself J experiments by doing knowledge get is to him experiment method said come is.But indeed So experimental tasks Two Kind of have is: (i)in the laboratory to do experimental tasks And(ii)of the laboratory out to do experimental tasks.of the laboratory inside to do experimental tasks for experiment tools,chemicals,other required things etc of the laboratory inside J kept come is,When to Botany pertaining to experiments as well Farming,gardening And to him pertaining to the questions experiment by Or Inspection by Study to do for of the laboratory out to go falls is.to Botany pertaining to experiments of school on campus developed in the schoolyard done can is.Secondary in schools of science in the curriculum Professors to do of experiments list determined done have is,J them Compulsory to be done have is.at school that for facilities to give Also Compulsory is.

This in the method experiment tools choose to do, Arranging the equipment, performing the experiment properly, recording the results of the experiment systematically in the laboratory, observing, making decisions etc. all the tasks have to be done by the teacher himself. A teacher acts only as a guide. Here the student gets an opportunity to use the experimental equipment and experiment himself. He also gets an understanding of how to set up experimental equipment and why to conduct an experiment. In many schools special cards for the experiment are prepared and given to the teachers. In which the purpose of the experiment, laboratory equipment, materials and chemicals to be used in the experiment, diagram of the experiment, method of the experiment, notebooks for recording observations etc. are given in advance. The teachers read such notes and prepare for the experiment and think about it and do the experiment and also take the necessary notes. Some of these experiments have been philosophically demonstrated to them by the teacher earlier. So they also know what the results of these experiments should be. However, the teachers are not particularly benefited by this

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experiment. The following points should be considered for teachers to get the most out of the experiment.

professors yourself J experiment do its, an experiment shown to him from a distance, has a profound effect on his psyche. They get hands-on experience with this method because in this method they do all the work themselves, from selecting the experimental equipment to drawing the conclusions of the experiment. First of all, in the form of background, the teacher experiment method gives the teachers an understanding of the principles and theoretical matters in the classroom. Then he takes the professors to the laboratory. Which divides all the teachers of the class into groups as many as there are sets in the laboratory related to that experiment. If there are six sets in the laboratory it makes six groups of the whole class and if there are eight sets it makes eight groups. Then give each group a set of experiments and instruct the group teachers to do the experiment themselves. The experimental method can be divided into two sections:

controlled experiment method:

* When experiments are performed to test theories. Then it is called controlled experimental method. In it, the teachers are given the purpose of the experiment, equipment, materials, figure of the experiment, method of the experiment, observations and decisions. Adhyetas only have to do mental work to confirm the theory. However in this method the teachers get an idea of introduction of tools, option of observation power, way of note taking etc. So the value of this method should not be underestimated. This method is very useful at secondary level. The teacher should give verbal instructions at the beginning or give clear written instructions through cards or labs. If necessary, the teacher should demonstrate the experiment before giving the experiment to the teachers using the experimental method.

uncontrolled K free experiment method:

In this method all the things about the experiment like purpose of the experiment, equipment, materials, diagram, method of experiment etc. are given except the note of the results and conclusion, but in it the note of the results and the conclusion are decided by the group. Even a science professor or a lab assistant cannot tell what the result will be in the experiment. E.g. Plants of the same type of soil are planted together in identical pots to find out which fertilizers affect plant growth. Each plant is watered in the same amount at the same time. Different types of fertilizers are applied in different pots and the effect is directly observed and the group discusses and draws conclusions. Similarly, experiments on water absorption in different types of soil, effect of kanji on different leaves, determination of heart rate of different human body etc. can be given in this method. Experiments with the following characteristics can be given in this. J of experiments Qualitative K Numerical Information Professor have K no one in the book ready No have.

no one of principle For example pertaining to small of the question small Answer to find have.

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This in the method of experiment the whole Preparation of teachers group by J done come is.need seems So J And where need have there Professor Guidance finish give is Or So professors From the book Guidance got Le is.

This in the method professors yourself J Laboratory equipment together doing, sets up experimental equipment, observes, records results and draws conclusions. Professors sometimes build hypotheses from the results obtained and conduct novel experiments to test the hypotheses.

This J for reasons This Kind of to experiments free experiments Or uncontrolled experiments Or Unsuccessful experiments said come is.of science professors for Above controlled And uncontrolled Both Kind of experiments required is.In the beginning professors controlled experiments do that necessary is, because it develops certain essentials in them. After that, it is necessary that they do unrestricted or free experiments, so that they develop the sense for experiments, thinking power, management power, reasoning power, power of prediction e

* Measures to make the experiment method effective:

professors experiment to do from purposes alert being should.

of the laboratory Planning A.V way to do should K so that professors idea doing happen.they think K experiment to do for where where tools would like, how the experiment should be set up, how the experiment can be recorded etc.

The teacher should inform them in advance that the students should take the experiment seriously, because the experiment is meant to deepen the understanding of science principles. experiment by Among professors of experiment purpose, to develop an understanding of experimental equipment and materials, experimental design, method of experiment, observation rooms, drawing conclusions, recording experiments, formulating hypotheses etc. The thing to be specially remembered here is that through experiment the professors are to give a small piece of research and the example of a small scientist is to be revealed in it.

To the professors experiment giving Before The teacher of experiment Miniatures to do.required Instructions to give, specifying the care and precautions to be taken in the experiment, writing mention of the above on cartons, cards etc.

To the professors Primary of treatment tools Regarding knowledge to give.The teacher All J professors In the experiment Active stay that to see And Who, giving guidance when and where needed.

professors Original experiments do that for Talented And bright To the professors motivation And Encouragement to give as well that for required facilities finish to give.

Professors in the laboratory to keep Care And

Disciplined of behavior The teacher them concept to give.

professors of experiment Note of experiment with with there J do like that insistence The teacher to keep.

experiment finished happen then of experiment tools professors clean up do And their appropriate And original in place back Systematically put A.V Clear Instructions to give

SHREE H.N.SHUKLA GROUP OF B.ED. COLLEGES

(Affiliated To Saurashtra University & NCTE) (Vaishali Nagar 2 & 3, Near Amrapali Under Bridge, Rajkot)

Among professors some expected changes like K instrument Use skill, the ability to record experiments, the development of qualities like management, patience and perseverance, observation, design skills, decision making, drawing skills, etc., the teacher should constantly observe and strive for it.

became can there until The teacher To the professors personal experiments to give should.As possible No have So Two, form groups of three or at most four teachers to give group experiments. Here the teacher should take care by observation that if more than four teachers have to be formed in a group, all of them work. It should not happen that one or two people act and others take over from them.

group experiments During professors inside-inside talk Curry the noise by doing to others Disturbance No deliver that to see.If thing to do indispensable become So too much J slowly to others Disturbance No reach As thing to do them The teacher Clear notification to give.

Education account from determined done came experiments Besides Additional experiments Also Professor idea And Planning by doing To the professors gave can.professors Sometimes in class questions stand up do, problems can be taken from them and experiments to solve them can be given to the teachers.

professors Carefully them Given came experiments do And become as much accuracy keep its The teacher Continuous insistence to keep.Inspection by that Regarding frequently them escape And required Instructions Also to give.

professors of experiments results on effect doing Various matters understand And of experiments In the results This to the effects Due to occasionally coming of differences reasons understand. professors idea, the methodology should be designed to encourage thinking and reasoning. experiment done After Also The teacher professors with Deliberation And discussion to do should.As By doing them many Clarifications will happen And in science they More More Interest taking will happen.Also This By discussion to the professor experiments to give In planning what Amendment to do K so that This of the method max benefit got can be its Also concept will come.

experiment pristine in order was coming to be should, such as conducting friction electricity experiments in the dry season of winter.

To the professors In the experiment Interest will have So they Science in congregation Also Interest taking will happen.If thus happen So at school them for of the workshop arrangement vertical to do should.

of science in the curriculum No have Such of science in periodicals coming Avanwa experiments, creation of new types of equipment etc. also to give motivation to the teachers to do the same in practical work.

Above among Some experiments school released then Also professors in the laboratory by going Curry can A.V facility at school them finish to give.

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one of the group to the results second of the group results with to compare. If In the results more difference have So that about Scientist discussion Also Teachers their with arrange. This difference for causal A.V experiment of equipment defect or experiment of the doers mistake where is its directed The teacher Clear way to do.

of the laboratory out And at home done can Such experiments Also The teacher To the professors Swadhyaya as to give. D.T. in the air I of parts oxygen is a experiment Household from tools at home done can is. that J way Second generation experiment Also at home done can. Also Everyday from food found the heat And of power calculation to do professors by their Everyday in food to be taken different different of things of quantity they list ready do And that from ready from the warehouses them calculation Than to teach.

*** Advantages of experimental method:**

experiment of the method appropriate from use Among professors problematic question to find Power, problem solving skills develop based on problem analysis and prior knowledge. professors experimental role on to problems Hull to do thinking can is. professors to the result Based on proposal K imagination determined Curry can is, learns to find flaws in ideas or propositions and can test them experimentally.

Among professors experiment of equipment Use to do, develop skills in selecting experiment equipment, setting up experiment equipment, modifying experiment equipment and making necessary experiment equipment.

experiment of equipment using Precisely measure to take skill This Methodically Among professors grow up is, as well as taking measurements

Among professors of responsibility spirit produce happen is.

This Methodically Among professors Scientist way to think of power development happen is. yourself experiments by doing Success from meeting Among professors Confidence And of self-reliance of spirit development happen is.

*** Limitation of Experimental Method:**

experiment for of equipment at school lack of have Or less tools have then To the professors Independent way work to do chance Lived not.

experiment for of furniture Facilities No have then Also To the professors too much J difficulty falls is.

Professor Active No have So in class the noise happen is And class arrangement on no one J control Lived not.

Professor in class experiment Meanwhile K experiment husband gone then no one J discussion-consideration No do So of teachers in understanding the raw remained go is.

If professors appropriate way of experiment of equipment Use No do So tools experiment During big Relatively broken explode is Or get worse is And a way to school big economic loss go is.

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experiment method Philosophical method Than more Time asked for Le is, so this method consumes a lot of time.

Precious as well Dangerous tools school, does not give professors to conduct experiments. So in such experiments no experimental work is done and yet the experiments are written. This does not benefit the teachers at all, rather harms them.

free experiments for Time more to give Falling Since of science teachers that for ready happening not. Also of work to load Due to To the professors Guidance to give for Enough Time Also their have would have not.

professors own yourself Curry can And thinking can Such experiments in the curriculum were not. J in schools experiment happened without J in the laboratory written going have is there professors of experiment from tools Acquaintance happening not And experimental skills Also Cultivated can not.

to the experiment In the end of experiment tools clean up by doing status quo to put have is. scary chemicals Also they Carefully by saving carefully put Like that them notification to give have is. This Instructions to give Professor miss out go So unsanitary to the equipment Due to when Second times experiment to do have then its of failure Probabilities increased go is. Also scary chemicals like As be placed So from that an accident to happen Also probability stay is.

gifted And bright professors good way, is understandably keen to conduct many additional experiments. They have great curiosity but schools do not provide them with special facilities so their curiosity is not satisfied and they remain dissatisfied.

project method/Project method(Project Method) :

This to the method Project K Plan method as Also to identify come is. Plan Methodically function to do idea Agriculture Regarding from education arose is. of agriculture J of subjects like when second subjects Plan Methodically taught coming were then professors Interest And Excitedly function doing were. This of the method All J Among the subjects Use happen is But Plan of the method in science Exclusive location is, because science is not only an experimental subject, but an ever-evolving subject

* Founder:

This of the method pioneer John Dewey is. John Due of utilitarianism principle from This of the method composition Curry was. This to the method Dr. J. a. to Stevens perfect made was. Then then Dr. William Kilpatrick, Parker, Kevey, Marion, Ballard and Burton etc. played a major role in its development.

* Concept of project methodology:

different different Academicians of the project J Definitions gave is of them J of the project concept Clear done will go.

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"Project has been defined as that form of co-ordinated activity that is directed towards the learning of a significant skill or process."

"project a one A.V coordinated activity is K J Important skill K of the process study Towards Thread go is."

"A project can be classified as exploration, construction, communication, play and skills."

Collings

"to the project Search, can be categorized into creation, exchange of ideas, games and skills."

"A project is a problematic act carried to completion in its natural setting."

"When to the priest no one problem so much Important And required feel K that Accomplished to do, a problem becomes a project when one works independently to solve a problem in a free and natural environment." Burton

A All Definitions Meaningful is.anyone activity like K Dramatization, Ramleela, making models, drawing maps and charts, collecting pictures, preparing scrap books, going on field trips are included in the survey project.

This in the method no one Useful function professors in the group of each other With cooperation do is.Professor J This in the method unit determined by doing work to do have is.indeed So its requirement vertical happen And that to need to satisfy project in hand taken that J In it work to do correct way is.That is K curriculum, content and teaching techniques as well as activities Teban Ahyetale Bhate 4 Viyari Adhwani Hoy Chhe. 'Learning by doing' and 'Learning by living' are two important principles of this method.

In short of the project something purpose have is, to achieve this purpose something has to be planned, which is done in the social, real and natural situation created in the school.

good of the project symptoms Or to the project Effective to make remedies:

good project Purposeful to be should.its objectively Professor perfect informed to be should And He To the professors Also from that aware to do should.

good project of teachers everyday in life Useful And Practical to be should.

project by To the professors found experiences Prolific being should.In it hand conducted came activities by Knowledge of them So to meet J should-so much J no Also This activities them More knowledge to get behind Active doing to have should.

project by in them each other Helpful to happen And of cooperation spirit Cultivate should.in them Democracy Ritual Also from that produce to happen should.

good In the project To the professors of activities with with Responsibility Also to meet should.professors himself think, independent planning, giving their opinion, making their decisions and working to the best of their ability should be seen by the teacher.

good In the project professors physical And mental Both way Active to happen should.

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good In the project To the professors work to do for perfect Independence to give should.project ever The teacher professors on impose No should, but useful projects arising out of their daily life and needs should be chosen by the students themselves by heart.

good In the project Survey activities And tasks professors yourself J do.Professor need falls there Guidance give.

good project Thrifty to be should, meaning that it consumes the least amount of time and money and yet achieves its objectives. Also, some compensation should be given in the form of income generation from the by-products.

good project time oriented to be should, i.e. it should be chosen according to the seasons of the year. For example, a project related to the study of vegetation should be undertaken in monsoons.

Professor J Nothing activity do is that Purposeful to have should.Besides that Important And Ruchikar Also to have should.If Professor on purpose known And Conscious have So that interestingly function to do motivated is And hand Domestic function on time finish do is.thus study process Wagley to make for Professor J Nothing do is that why for do is its Clear concept to him to be should.

here professors self Actionable by becoming Enlightenment do Like that Expectation is.Hence them In addition More Actions to do opportunities to meet should.Also This Actions their level Correspondingly to have should K so that their Reasoning grow up, their professional development as well as their overall development. Thus, Adhyeta himself is active by nature. He likes the activity. So the teacher should plan the teaching-learning in such a way that it gets maximum activity. The scheme method requires the students to think and plan independently and complete the project with the mutual cooperation of the students. Rather than doing activities in which teachers are interested, they receive learning from projects in which they accept responsibility. A feature of the project method is that whatever the student learns, he learns through the activity and uses his intelligence, thinking power, reasoning power in that activity. to the priest In the project J function Given come that real to be should And real in the situation that function complete to happen should.This in the method artificiality location not.life himself Also one Huge project is.to the priest real of life in the world to stay is.Education a If life to live Preparation for have So Professor that Excellent way to live should And From that experiences Received to do should.project method at school real of life of situations construction do is.real in the situation J professors own work do A.V them opportunities Given come is.Hence Education real as well interest And requirement with relationship containing become is.

J activity to the priest Useful seemed have its own to needs nourishing have And its Everyday life with appropriate connection containing have that done to him motivation found is, gets interested and arouses enthusiasm in him. Also, the knowledge that the student acquires should be practical. Formal and literal knowledge is of no importance. The knowledge gained through the project method gives practical utility. Results can be obtained with little age. In which different beetles are made with all the above factors in mind and rotated on the same surface each time

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with the same force, their rotation time is measured, different conclusions can be obtained for each factor. This is an example of a research project. Similarly, why does a rubber ball bounce more? By taking a research project like the swelling action of bread, strength of hair etc., thinking about the factors affecting it, experiments can be obtained about them and conclusions can be obtained. It is only a question of developing contemplative thinking.

* Types of Project (Types of Project):

Nirmash protest (Construction Project) :

In this Two Kind of project hand axis can be:

(i) Instrument Making Projects : In which projects can be undertaken to make instruments for aquarium, vivarium, terrarium, museum, herbarium, gravity toys, electric bell, periscope, kaleidoscope, factory or refinery model etc.

(ii) Manufacturing Projects : In which projects of manufacturing ink, face powder, wax, vaseline, balm, toothpaste, soap, mirror, phenyl, detergent etc. can be undertaken.

skill to flourish project:

Primus, repairing bicycles, radios etc., welding, fuse making, electric testers, mic amplifiers, film and filmstrips. Projects can be undertaken to develop skills in using projectors, overhead projectors and other educational equipment. Apart from this, projects such as doing simple electric wiring, making albums, taking care of aquariums, vivariums etc. can also be undertaken.

Collections ready to do project:

Various Butterflies, projects can be taken up to prepare collections of birds, roots, leaves, fruits, seeds, photos of scientists, pictures of scientific instruments, scientific articles, feathers of birds, fertilizers, rocks etc.

Study project:

of paper the narrative, History of electricity, history of petroleum, story of rockets, biographies of scientists, cloth from cotton, study of various diseases, development of time measurement methods, history of atomic research in India, creation of computer and its history, if projects are undertaken at our national laboratories etc. can be called a project.

Inspection project:

where on the spot, such as birds, insects, worms etc. are found

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Advantages of project method:

This in the method of the professor study Rich become is. This of the method foundation J study is. therefore readiness, benefits from learning rules such as repetition and impact.

project method Excellent result giver method is. Also often of them found of by-products sale By doing economic benefit Also happen is.

This in the method of labour Pride preserved is. the reason K professors yourself J In it All of them J tasks do is. Consequently Self reliance And of responsibility Consciousness like qualities in them bloom is. of labour Of the results joy This in the method of labour Pride more is.

This in the method idea And of conduct coordination happen is. to school real life with associated with can be is. In the project professors self think is, defines the problem, plans it first conceptually and later in written form on paper and finally implements it and embodies it. Thus we find a beautiful combination of thought and conduct in the project method.

In this method the individual differences of the teachers are catered for, as each teacher gets work according to his own interests and strengths.

project a of teachers self-of interest activity Since In it self-reliance vertical happen is. In it professors at work Such neck stay is K of indiscipline question J stand up happening not.

project in the method To the professors of life real Experience found is. to the priest project Methodically of life real knowledge Received happen is. Phone to do, filling money order form, making a wire, meeting an official, drawing pictures,

of society questions to know etc tasks to him real of life Experience make it is.

This in the method Action by Education, the benefits of learning through activity and learning through play. The teachers participate in the project voluntarily. They become active participants in the activity and therefore do not feel burdened with knowledge. Being a function of freedom and self-choice, it happens at a much faster pace than expected.

This in the method Professor Active partner not But of teachers a friend, acts as a mentor and philosopher. In it, the teacher-student relationship becomes better. This is where the true talent of a teacher lies.

This in the method of teachers mental of powers development happen is. rational consideration, Successive presentation, decision making power, clear expression, correct interpretation, reasoning etc. are developed in Adhyatya.

project in the method of teachers Character construction happen is. in them Project method by Patience, qualities like self-confidence, tolerance, enthusiasm, cooperative spirit etc. flourish. Adhyeta himself creates something and enjoys the creation. His instinct of self-importance is satisfied, faith in himself is born. Adhyeta develops faith in his own powers, his independent thinking flourishes. His own personality develops and as a result his character is formed.

Project in the method Professor From self study, acquires knowledge by himself. He gains knowledge through experience. As a result the knowledge he acquires is natural and eternal, so the devotee is freed from Gokhanapatti.

This in the method function to do Consequently to the priest of self-assessment the habit falls is.

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project of the method limitations:

This in the method of confirmation take a chance meets not, because it is not possible to devote so much time.

If project long have So In it of time a waste Plenty happen is And Such long In the project of time of waste in front of meeting of knowledge dose less have is.

This method Expensive is the reason K In it Rich library, requires a rich laboratory and a rich workshop. Also some projects are very expensive. Besides, the lecturers also have to spend on travel, excursions and visits.

This to the method too much J big Numbered in classes Success found not, because the teacher, being constantly active, cannot meet his task of a large class. So the professors try to satisfy the professor by preparing such report just by hearing from here and there or reading about it from one or two books.

→ The problems presented in the project method are often beyond the scope of younger teachers.

This in the method meeting in knowledge burn Sutrata would have not.himself of the project J in the section function did have that section Regarding To the professors Sangopang knowledge found is, but in other sections knowledge is gained through whatever is heard during discussion, which is incomplete.

J in works To the professors Interest have Like that tasks they pick up is, but they feel that they are overwhelmed by tasks that are not of interest to them and therefore they do not do much work in them.

If project too much J long have So professors get bored is And often from the middle J Such project left debt falls is.

If In professor Huge Reading, without deep knowledge, diverse skills and abilities and tact to take work from faculty, they will not be able to provide proper guidance and hence faculty will feel confused due to lagging in the project.

This in the method to the professor Partly Plenty work come is, so often the teacher himself gets bored.

In the audience In the project the night done go is, therefore spend more time on it and become careless in other subjects. Thus project work takes place at the expense of other subjects. project method for the most big resistance a Curriculum is.at school everyone in the subject Some J curriculum Some J in time complete to do have is.project in the method This possible not.Also, not all topics in the syllabus can be taught through project method. This method is suitable only for certain limited cases.

presented In the chapter we Science of education Some methods And Techniques saw.This of methods Discreetly And appropriate way Use done come So of science Education Absolutely Success become is

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unit:3

Science in education evaluation

3.1 Introduction:

study-of teaching of the process main objective Among professors expected behavior-changes to bring is.to him for of the priest Maturity, teachers plan learning experiences with readiness and prior knowledge in mind. The final step in the teaching-learning process is to assess the performance of teachers to determine whether the learning experiences provided by the teacher have resulted in expected behavioral changes in the students. The process we use to make this determination is the process of evaluation. So the four things involved in such a process are – testing, testing, measuring and evaluating. The process of gathering evidence of achievement with respect to a particular field is called a test, while the means or method of determining the direction of a search for an answer with respect to a question is a test. Also, the comparison of a quality, attribute or subject matter with a corresponding measure is a measurement and if we add judgment to the measurement and evaluate various behavior patterns of the teacher, then it is an evaluation, such as the achievement of the teachers of his class after teaching the topic 'Current and Impedance' in the ninth standard. A test is the tool used to find out what the level is. Through the test it gathers evidence of the achievement of the students in the specific field (electricity and impedance) mentioned above, this happened test. At the end of the test, the score is given for each of the attributes, such as knowledge, skill, understanding, etc., determined by the teacher, independently or in the form of a total sum. E.g. 83, so this 83 score is comparable to a measure consistent with the subject achievement level, so this measurement is done. Now if the teacher adds his own value judgment to this then it is considered to be evaluated, like if the teacher determines three achievement levels of excellent, moderate and poor for the subject achievement of the student, then this number '83' shows the excellent achievement level. And if the teacher also tells the reason behind considering it excellent, it is considered to be evaluated.

3.2 Modern Concept of Evaluation:

Education In the process purpose determination a starting point is.of purposes In context professors Quality Received do is.

purposes of the priest on the side which at the level Accomplished happened His Ankan the test by done After This of marking Meaningful way methodically description done come to him Educational evaluation called.thus of teachers of quality Methodical description That is evaluation.Now we evaluation about Some Definitions should, which will make the meaning of the evaluation more clear.

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thus, assessment is a measurement i.e. testing a single area of subject-related achievement, skill or ability, but also covers testing of complex things like thinking patterns, ideals, study habits, interests, attitudes. Also, evaluation is qualitative in terms of standards. therefore
evaluation=measurement+Valuation

3.3 Types of Evaluation:

our in schools we tests by only test let's do are. Written test a It is not a 'process of testing teachers from all sides', as it only measures the memory of the teachers, but in science teachers also acquire some practical skills through experiments, which are not measured in the written test. It also requires practical testing. Written and practical tests are conducted periodically. It cannot measure the daily activity, progress, interest, scientific attitude etc. of the professors. For this, their records, experiments should be looked at and their works and activities should be continuously observed. Thus the evaluation needs to be done in three ways.

Written evaluation

Oral evaluation

functional evaluation

3.4 Evaluation Tools and Techniques:

Essay Type Questions:

Essay of questions Answers professors free way gave can is, and can express ideas according to their own point of view. These types of questions are most popular in India since long time.. Essay questions help the student to see the problem from which point of view, how to use his knowledge, how to integrate the knowledge and how to connect the knowledge of one branch with the knowledge of another branch. All those things are tested. Essay questions measure the student's written expression.

"A type of question in which the examinees are asked to discuss, enumerate, state, evaluate, analyze, summarize and criticize is called an essay type question."

"Questions in which the examinee is asked to discuss, enumerate, demonstrate, evaluate, analyze, summarize and critique are called essay type questions." Essay-type questions also suggest a specific answer length and suggest doing the above (discuss, enumerate, demonstrate, etc.). Essay type questions can be divided into two sections based on their answers.

In this J of issues of detail Professor discussion to do have is, it has to be planned and answered. For him there is no binding in question. The teacher gets some leeway in presenting the answer. So he can best express his skills and power of presentation. The student is free to choose the topics for answers, express the content in a systematic way. E.g. Describe the

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different effects of electric current. – Write a note on electric motor. Restricted Response Type: Depending on the nature of the question, in this type of question a limit or constraint is placed on the answerer. The specific boundaries for the topics to be answered are laid down in the question itself. E.g. *

- (i) Give an understanding of the structure and functioning of the heart.
- (ii) Explain the principle, structure and working of dynamo.
- (iii) Write a detailed note on evolution.

This Kind of Essay questions by subject matter related to of information deep knowledge, objectives of application, skill and understanding may be assessed. Limited answer type essay questions are expected at secondary and higher secondary school level and extended answer type questions at higher level.

Wildman below Wise 11 types of essay questions are mentioned. (1) Questions beginning with what, where, when, who and which.

(ii) Outline. (iii) Give the difference. (iv) Explain. (v) Describe in detail. (vi) Value. (vii) List. (viii) Describe. (ix) Compare. (x) Contrast. (xi) Summarize.

Dissertation of questions advantages:

Questionable for formed Simple is.

To the professors Answer giving Before of issues of arrangement, adequate opportunity for thinking and effective presentation.

from each other take off to do K stealing to do Possibilities less stay is.

Essay Kind of of question in response expressed happening of the priest reaction, emotions, attitudes and thought processes can better understand adhyats.

Gradually good And correct Answer to give in power Increase to do for Professor Continuous Striving stay is.

of the textbook from one More of issues one J in question Inclusion Curry can be is.

of examination paper a lot long happening not, but becomes relatively short.

of examination paper in print And its distribution done Simplicity stay is.

Essay questions by Important of purposes measurement Curry can be is.

good Study of methods Use to do for And Study habits to develop for Essay questions to the priest Prere is.

study – New teaching methods of teaching like self-study method, discussion method, seminar method etc. can be used.

To the professors Answers to write for of words bond moving not.

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Essay of questions limitations:

below indicated Some to limitations Due to Essay questions too much J passed away is. simply complex Kind of Many purposes Determined Curry Such questions to use Expectation is But In practice like that to see found is K mostly Partly only of knowledge purpose Accomplished done can Such questions to form is And other purposes towards neglect served come is.

question in the form of Also In practice defects to see found is. of question sentence in composition of clarity lack of have is. different different professors His different different Interpretation Curry in response Also different different J write is.

the most more objectionable Essay of questions evaluation happened is. the reason K evaluation Self oriented become is. Professor – There is no comparability of results between Advaita. Evaluation balance is not maintained between examinee – examinee and physical – mental health of the examinee also affects the evaluation.

Essay of questions reality (Validity) is low.

Essay of questions Credibility (Reliability) is also low.

Hundred of virtue In the question paper placed Tens Essay In the questions the whole curriculum rarely J covered can be is.

(b) Short Answer Questions or Short Answer Questions :

J of questions Answers In short gave can be them Short answer K short answer questions said come is. common way short answer of questions Answers one from the sentence start by doing four five in sentences gave could have is. This Kind of questions to the question affiliate subject matter And Answer a Both in sight attachment Having have is. therefore of question of the north length, the time taken by the examinee for the answer and the marks for multiplication make such questions de facto short-answer questions from all three points of view. Their form is as follows.

classification do, give reason, identify, show, list etc. words with clear suggestion add to the question.

This Kind of of questions composition for the following affairs into consideration to keep.

of question Language accurate And Totally Clear to have should. in question J His imposition Visible to happen should.

of subject matter From knowledge ideological selection Curry of the question North to give falls And North directly directly memory based on have Like that Questionnaire expected is.

In it Descriptive North like in response liberation No to have should, but rather should have a short, to-the-point answer.

to the subject matter affiliate no one matter towards decision, the causal relationship, may be a better question covering the review.

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question J study of origin measurement for ready done located have to him related to short, clear and complete information should be included in the question.

of sample questions:

- (1) State two points of difference between diamond and graphite.
- (2) Give a scientific reason : 'Iron windows and doors are painted.'
- (3) Write four physical properties of metallic elements.

This Kind of to the questions Purposeful questions Or Apathetic of questions in the name Also to identify come is. Such questions Extremely Short answer, a word, number or word group whose answer is found. American Dr. J. like this. Rice was the first to introduce objective questions. Dr. Benjamin Bloom gave a detailed understanding of such questions in India. These types of questions can be classified as follows In these types of questions you have to choose the correct answer from the answers given below the question. Such tests are also called recognition type tests. It has four types as follows.

(i) True False Test: Two options are given against the given statement, true or false. Circle 'True' if the statement is true and 'False' if false. A square is provided in front of this and it can be marked () if the statement is true and (X) if it is false. E.g. Deficiency of vitamin D causes a disease called beriberi.

our in the galaxy There are 1011 stars.

Borax of powder atomic formula is $\text{Na}_2\text{B}_4\text{O}_7$.

Such of questions composition Classical way happen that for the following affairs into consideration to keep:

Statements plain, should be simple, clear and short.

Statements Totally true K Totally wrong having should.

Statements Text From the book directly choose No Than In it Literally changes by doing The teacher own in language to form.

in statements Answers for no one Exclusive Indicators No having should.

one in statement only one J idea presented to happen should.

of speculation Proportion to reduce ways thinking By way of instruction put can be.

true And wrong of statements length And the number the same to have should.

Negative Statements to form No should.

(ii) (Matching Test): A and B sections are given in these tests. section

The detail matching each detail given in A has to be selected from section B. Section A is considered as 'Stimulus B' and section A as 'Stimulus'. The forms of conjunctions may be as follows. In section A opposite to scientific phenomenon in section B date, opposite to habitat of plants or animals their names, opposite to names of ingredients in food their percentages,

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opposite to example its principle, opposite to scientific instruments their functions, purposes or uses, opposite to inventor its discovery, names of elements opposite to properties of chemical elements or formulas etc.

joints of the test in composition the following affairs into consideration to keep.

excitement of the department each one detail with Retaliation of the department Also only one J detail off sitting to come should.

Both of departments of details subject matter identical to be should,

Both in sections what given is And Answer which way to give is its Clear Sense of question In the beginning Simple in language By way of instruction to give should.

excitement in the section As much as details have its Than Retaliation in the section More details to have should.

details long long No giving Both in sections In it abbreviated to be should.

(iii) (Multiple choice type test):

This Kind of in the test Also Two section have is one to the department Branch (Stem) which is an introductory statement. If more than two alternatives are given below this statement, the second part, only one of the given alternatives is correct. The rest are called destructors. The more the researchers can confuse the subjects, the more effective the test. A branch contains either an incomplete statement or a question and an option section either completes the statement or answers the question. It provides more than two options even below the empty space. There are also seven types of multiple choice test as follows:

Multiple choice of the test officially composition for the following suggestions into consideration to take.

Branch Meaningful to have should And no one Absolutely Form Clear happen As Written to have should. thus By doing repellents Powerful will happen And Branch Rich will happen. in the branch Irrelevant affairs No keep.

possible have there until Negative Statements to put not.

only one And expected correct North found Such J options to put.

Branch below options organized thinking J put. repellents Powerful become that Towards Special attention give.

of teachers of rank concept kept that wise Branch form. to the branch for of options presentation for Absolutely order, specify a logical sequence or other scheme.

of developers possible so much All J matters in the branch include.

of the branch detail And appropriate of option by association becoming perfect in statement of grammar defect stay should not. came defect

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often correct of the answer suggestion do is. only of knowledge memory for J questions Besides Sense, questions related to skill, application etc. should also be formulated.

examples:

- (1) Normal human body temperature (98.6°C , 98.6°R , 98.4°F , 97.4°F , 96.4°F)
- (2) How is the air heated by the sun? (heating, radiation, conduction, heat exchange)
- (3) Which of the following is an insulator of heat? (mercury, glass, iron, silver, copper)

This Kind of in tests the facts K made order to show have is. In this order which way to give is its notification to give should. Various of affairs correct to sequence Based on no one Absolutely detail K subject matter Clear to be should. In it Given of events order Fixed to be should And Controversial No to be should. came in tests no one of experiment steps Horizontally demonstrated of experiment At the beginning First order gave then them climbing order to give said can be.

examples: the following matters correct in order write down.

- (1) Butterfly, caterpillar, egg, cochleate.
- (2) cell, body, organ, tissue, organ, muscle.

came to the tests of memory tests (Also called recall type test). They can also be called tests of knowledge reproduction. It is of three types as mentioned below.

(i) Fill-in-the-Blank Type Question : In this only blank spaces are given but no answers or alternatives are given below them. The student has to write the answer by recalling it from his memory.

Mutually related to A.V J Two details Given have is, a clear relationship between them is expected to be drawn by the teacher or to be drawn according to his level. The composer should realize the test that only the same relationship is expressed in the other two details.

examples:

to eat Soda: Wash Soda: Na_2CO_3

acceleration: Velocity: $\text{m}/\text{Sec}^?$:

vitamins B: : vitamins a: sleepiness

Above described Written examinations Besides of evaluation other tools below According to is:

3.5 Characteristics of an Ideal Question Paper:

Secondary Education Punch (1952–53) and following suggestions for examination reform by the University Education Commission (1948–49) the examination-reform program was initiated in India. In this examination-revision program of India, Dr. of the University of Chicago. The services of Benjamin Bloom became available. The evaluation department of NCERT expanded

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the examination-revision program through various work camps. As a result of these efforts, the format of our question papers has changed. As a result of exam-revision we have got an idea of the characteristics of a good question paper.

Ideal of the question paper Important symptoms below According to Counted can be:
of the question paper notified of course All J of units Proportionate Appreciation established have.
Question paper standard have – i.e. the questions are only for the purpose for which the examination is conducted. E.g. Purpose of diagnosis, purpose of achievement.

Question paper reliable have That is K its of questions Answers Absolutely have. everyone Students examiner its Such North for Unanimity have, i.e. the student-examiner or changing answers remain the same.

Education-of evaluation All J of purposes Verification questions from have.
examinee for time limit Proportionate as well Sorry have. Question paper a lot long K short No have.
In the question paper of questions Hardness value maintained have. Ati
Simple questions as well Ati hard questions No have that into consideration keep necessary is.
In the question paper of questions deduction value appropriate have That is K of children Personal differences According to different give Such questions have.
of the question paper questions organized have, have required sections, have appropriate questions according to question patterns, and arranged the questions in order of difficulty value.
In testing administrative Flexibility give Such questions have, there are issues of saving in administrative costs.
of question Language, presentation, printing etc. has been given attention.
of the question paper with multiplication Plan have.
of the question paper composition Based on Blue-print.
Question paper reliable And standard have.
of the question paper Language Simple, clear and specific instructions are clearly stated.
thus, In short, in the terminology of education, a question paper can be called an ideal question paper only if it is of an ideal form that is liked by the examinee, the examiner and the invigilator.

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unit:5

5.1 Preamble:

Science only from books by reading learned could not do for Professor your self experiments to do falls is, observation, has to be observed. Apart from that, the professors will not be able to understand the subject of science in the true sense. Until the early twentieth century, even in colleges, science was taught mostly through lectures. In some colleges enthusiastic professors would only demonstrate the experiments. Gradually, as the importance of science increased at the secondary level, schools began to install science equipment in a cupboard and science teachers taught science by doing experiments that they could. This was the situation in 1940. Some progressive schools then began to have a separate room, known as a laboratory, in which teachers could conduct group experiments.

Given coming. Then then slowly slowly like this accepted came K 5 of science to education Interesting And experimental making have So of the priest around of science atmosphere to be should And therefore of science Someone Tas in the laboratory to take should like this accepted came. The panel of 'Science Her cation Report' also noted the same thing as follows.

"It is also now an accepted fact that the practice and the theory work in science subjects should not be treated separately."

5.2 Meaning and Concept of Laboratory:

"common way experiment tools Having And Professor as well professors experiments Curry can A.V facility Having to the continent laboratory said.can be."

In the beginning when in science Physics And Chemistry like this Two J branches taught coming But common of science concept implement leaving Botany, Zoology, Geology, Astronomy etc. have to carry out experiments on botany and astronomy respectively in the botanical garden of the school or outside under the open sky. Hence the concept of laboratory becomes very large. Hence the above definition explaining the meaning of laboratory is not fulfilled. Hence, if we want to make a statement that includes the larger concept of laboratory, it can be said that wherever there is an experiment, there is a laboratory. Thus the above meaning is more suitable for the laboratory. However, laboratories corresponding to the larger concept of laboratory are not found in the schools of our country at present. Here we will only take the narrow meaning of laboratory as a room with facilities for conducting experiments for the same reason. Also! We shall also call a laboratory a room with double facilities in which both the work of experiments and the work of general education of science in special circumstances can be done in the same room.

5.3 Importance of Laboratory:

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our in the country Education Correction for one then one Punches At the end gone. everyone Punch of science Education on load gave And its of education Important Accepted. of science Education experimental function Except incomplete counts that Also Accepted. However Also today our too much J counting in schools professors experiments with Science learn is. indeed So experiments Except Science to teach a Totally Inappropriate is. Kothari Commission Also noted is K, "To learn science is to do science. There is no other way of learning science."

yourself experiments to do J effect of teachers the mind on falls is, such an effect cannot arise otherwise. Only by working with concrete objects can better develop abstract concepts.

of the laboratory importance showing issues below According to is:

Among professors self-awareness And Creativity like high of qualities development in the laboratory J possible is.

Among professors enthusiasm, qualities like patience, perseverance, agility, accuracy can be developed well only through experiments done in the laboratory.

in the laboratory done experimental function with J of teachers deep observation to do Power, practical skills and thereby develop reasoning and decision-making skills.

in the laboratory experiments Than Than J Among professors of experiment tools choose to do, skills in using instruments, arranging instruments and selecting alternative instruments are developed and thereby develop a sound understanding of scientific principles.

in the laboratory done experiments by J professors Constructive Power And Scientist trends Cultivated can is.

in the laboratory in the group experiments by doing professors of cooperation spirit And Union spirit Cultivate is.

- Through experimentation, students gain self-esteem and develop self-confidence.

experiment Than J professors patient And fatigue become is.

of the laboratory function with J professors create K of events meticulous Inspection by doing its from J that event K event Regarding guess to do Power develop is.

in the laboratory experiments by doing professors himself Understood of knowledge in life other in the field good way Use Curry can is.

To the professors Secondary at the level possible so much more experiments in the laboratory to do by giving the country Technical in the field good development Simple will be able to as well the country modernization for self-sufficient will happen.

To the professors in the laboratory max experiments doing By doing in the future of them J to the country good scientists found will be. Moreover to the country machine-System of learning import to do will have no.

To the professors Experimental by making others Rich And developed of nations As we Also of Samadvina the stairs one then one sir Curry we can.

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Rich of laboratories facilities vertical by doing we To the professors Experimental And capable of made we can K so that them our in the country J Excellent Career to formulate opportunities Received will happen And them Abroad Towards Glance not to put falls. at school If of the laboratory continent different have So to science pertaining to all Equipment In it one J in place kept come is, so it does not have to be looked for everywhere, it is immediately at hand when needed and thus saves time. of the laboratory different continent of science of study Lecturers on purpose for one kind of the atmosphere stand up do is, creates an environment, so that students learn science with interest and more attention.

If at school different laboratory No have So of science tools repeatedly one from place Second in place take to go falls is therefore breakage more happen is And to school economic loss to eat falls is.

of Vigyankhanda concept And decoration:

of science main the room where of the class All J professors one with sit down can And of science Professor own Teaching function Curry can, can teach them together, and if necessary, the teacher can also demonstrate the experiment in the same room, such a room in the school is known as science room. This room is also known as Science Lecture Room. Earlier we have understood the concept of school laboratory. The basic difference between science lab and science lab is that in science lab, science can be taught and experiments can be demonstrated by the teacher, but it does not have facilities for teachers to do experiments themselves. While science labs are also provided facilities for demonstration of science experiments by professors and also facilities for teachers to experiment themselves. We don't usually have two such separate rooms in schools there. But if the school is financially viable and the school has space available then the laboratory and science room should be separate. If that is not possible then both the continents should be kept together.

5.4 Organization of Laboratory:

in schools mostly Partly Two phases for laboratories have is. Secondary of school laboratory Higher Secondary school for laboratories. we This Both Kind of laboratories for Plans about should. Secondary in schools of science different different laboratories to make anyone to school economic way affordable no. therefore A.V one laboratory to make should K J of science All branches for the wings became stay. came of the laboratory one Plan below Given is.

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Philosophical table(DT) :

Philosophical table Should be 3 meters long, 1 meter wide and 1.5 meters high. Just behind it should be a black board (BB) 4 m long and 1.5 m wide on the wall. The distance between the black board and the philosophic table is 1 meter. Adjacent to the philosophical table is the teacher's table (TT), on which the teacher's books, some small-sized educational equipment, magazines, etc. can be kept. Ka.Pa. The color should be pleasing to the eye. Two bulletin boards (BLB.) are kept on either side of the kapa, which should be made of butch. It can contain news related to science, photos appearing in magazines and other necessary information about science. Keeping barometers, minimum and maximum temperature gauges, hygrometers, etc. in the vacant space near the bulletin board and assigning to the teachers the task of recording their daily observations and arranging for their graphical representation on the bulletin board, philosophical table and science books can also be kept in the drawers of the teacher's table. , books that can be used by science teachers as well as lecturers for reference. Having a switch board behind DT in the space between BB and BL.B., so that electricity can be supplied in experiments where necessary while demonstrating philosophical experiments to lecturers. Walls can be curved to form glass cabinets above the lintel on all sides, which can hold science books or other science equipment. The viewing table should be 1.5 meters high so that all the participants can easily see the experiments. In the center of the philosophical table can be arranged a revolving table similar to that found on the dining table at home, with the help of which models, specimens, etc. can be easily rotated and shown to the lecturers from all sides. Also, since the professors are arranged to sit in a semi-circle in this laboratory, there will be no problem in viewing philosophical experiments or other philosophical presentations from a distance. Philosopher's table is made of wood, but its upper part is covered with a sheet of cement or asbestos so that it is not affected by acid or alkali, otherwise the table will deteriorate and become unusable after a while. A sink should be placed at a corner on the DT with water intake and disposal of used water. Two compartments should be kept in the lower part of the table, in one of which the scientific instruments shown and in the other the scientific instruments yet to be shown can be kept separately. This space should also have a separate compartment for storing non-breakable equipment such as stands, grids, litmus papers, filter papers and other equipment. Also make a list of the tools kept in that room and stick it outside the room.

of the professor table(TT) :

This table 1 m. x should measure 0.75 m. Under it, three to four drawer type boxes can be kept, one of which can keep files. These files can include a dead stock file, a file showing the names, addresses and locations of scientific instrument manufacturing companies, etc., which can be useful when purchasing new equipment and allowing for selection from different companies. It can also keep the file of exams to be taken, the file of past exam papers etc. Lock this box to maintain the confidentiality of the exam.

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of teachers experiment tables(ET) :

To the professors experiment to do for 2 m. x 1 m. Tables measuring 1 x 1 m are suitable. The top layer of these tables should also be acid and alkali resistant. These tables should be smooth enough to be easy to write on, as they are used by teachers when they are not experimenting. Having a total of 10 such tables, which can facilitate 40 teachers to experiment simultaneously. If the number of classes is more, ten more teachers can be included and a total of 50 teachers can be given the facility to experiment. Arrange these tables in a semicircle around the DT so that the distance to the farthest teacher is less than the distance at the corners of the face and all the students can see the demonstrations clearly. The lower compartments of these tables have doors that fall towards the DT and the seating arrangement is on the opposite side so that the lecturers are not disturbed while writing and the necessary items can be taken from them. Also, during the experiment, the teachers will stand around this table so that they can easily take the equipment from it and put it back. Also, during the experiment, the lecturers can move their seats to a space of 1 meter between two ETs in the same row of the pass. The compartments below the ET contain the equipment that the students need for their own experiments. An order should be adopted for placing these instruments in the cupboards, such as Physics, Chemistry, Biology etc. In that too sub-orders like heat, electricity, light, magnetism can be adopted. Instead of keeping the height of ET cupboards uniform, they should be reduced according to the size of the equipment. Also, different facilities should be provided in different restaurants. Such as burritos and pipettes can be placed horizontally, for which low-height dishes should be kept. Long docked rods should be loaded in a stand that can be held upright by the dock. In this, since the equipment of the experiments to be done by the teachers is under their ET, the teachers will develop qualities like taking care of these tools, taking care of placing them, taking care of washing and using them, etc. Sinks (S) are placed in all four corners of the laboratory for teachers.

* To make a darkroom at the time of projection, to keep black curtains of size on the glass of the windows and air vents and doors, and at other times, tie them with a rope, hang them on a peg above the windows, doors, air vents and make a permanent arrangement for making such a dark room. Professors go to each curtain and leave the door, so the whole laboratory turns into a darkroom in two minutes! to stand up * Higher Secondary School Laboratory:

Higher Secondary school for one not Also In less than less happen different-different of laboratories facility vertical to do will have, Which are as follows :

This in the laboratory one big Philosophical table to be should in which Gas, lights, water system should be there. 2 m for teachers to experiment. x 1.5 m. There should be large tables of x 1 m size. There should be a platform with walls other than a viewing table. There should be plugs at some distance to facilitate light on the platform. There should be two types of stools for

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teachers, small and big. There should be enough recesses to hold the equipment. In addition there should be darkroom facilities.

of chemistry laboratory:

of physics As J equipped with one big Philosophical table to be should. Also of the continent to width into consideration keeping of the continent in the middle ? Consecutive tables should be arranged. The width of each table should be 1.2 m to 1.4 m so that two teachers can stand on it and carry out the experiments. There should be stools for teachers to sit on. Under the table there should be cupboards with sliding doors and in the middle of the table there should be racks for storing bottles of chemicals. Gas arrangement at each table and arrangement of four chairs. An acidproof sink between windows. In the laboratory, keep the obstacles in propagation. Having a nidiwal and acidproof platform. Having chemical balances, ovens and easels for placing chemicals on the platform, having a large water tank on the roof for constant water facility. Keeping large size sinks in two corners, providing adequate ventilation and exhaust fans. Carry a first aid kit containing special medicines for chemical burns.

* Biology Laboratory:

biology for enough the air bright Laboratory should. If the windows less have So Extra tube of lights arrangement to keep. Demonstration table of synch orderly keep. the walls with half meter tall of the platform below slipped away can be Such with doors closet to keep. everyone platform on of synch arrangement to keep, having a track with chemical bottles on each platform. A dissection tray for each subject. to keep Having two types of stools for teachers, small and big. Setting up the microscope near the window form. Adequate provision of storage facilities for storage of necessary materials and samples. Have a frog collection system in a corner.

5.5 Operation, Maintenance and Safety of Laboratory:

This for below wise Some Special arrangement to have should:

of the laboratory management, the school should have a laboratory co-ordinator Laboratory Attendant to help the teacher in maintenance and safety. This employee should be given full responsibility of the laboratory including responsibility for the dead stock of the laboratory. Also higher secondary

of school each one Laboratory for different like this Total Four Such employees being should. This employees broken K used have missed tools K of substances disposal do, make proper arrangement and maintenance of the equipment and record the new purchases made in the laboratory in the dead stock register. During teacher demonstrations or teacher experiments, this employee will provide for the teacher's or teacher's experimental needs.

laboratory for Independent of the peon Facilities at school finish to give. Higher Secondary school for Such Three of peons facility to give. To the professors to give for common facilities, providing

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gas, electricity, water and heating facilities, sometimes providing immediate needs and maintaining day-to-day cleanliness and hygiene are the responsibility of these peoners. of science to the professor on the head class of teaching Responsibility enough Relatively have is. therefore that To the professors experiments to do for Time deleted can not And laboratory on Also enough attention gave can not. therefore of the laboratory maintenance, operation and safety requires a separate Tutor-cum-demonstrator, which should be provided by the school. in the laboratory practical During of the priest discipline too much J importance give should. Fixed Time During Regular And on time to come And to go. of the teacher attention to draw should. of the priest discipline experiment The teacher Democracy दुबे in effect to put should And laboratory for appropriate atmosphere finish to give should. thus will happen So J to the laboratory In the end predetermined purposes Accomplished done will be able to.

of the laboratory Use increases And professors yourself More to More experiment doing happen As As its experiments for substances And chemicals exhaustion done go is. as well some tools of glass experiment tools broke down go is So Also other some tools spoiled Also go is. come at the time New purchase necessary become is, the charge of the purchase department assigned to the science teacher, if a committee has been formed for purchase, it should be possible for him to get immediate receipt of the amount of equipment, materials, chemicals or other expenses purchased. Otherwise there is every possibility of disruption of the planned and regularly functioning laboratory work.

In the laboratory Dead stock Register, a register of new purchases, a register of disposal of old and useless equipment, an experiment card prepared for each laboratory for the students and lists of equipment inside each cupboard. All these references are very essential for the laboratory, so their proper maintenance should also be done properly by the laboratory staff. If test cards become old, lost or torn, new cards should be prepared and replaced immediately. By doing this, the teachers will get the information of the work to be done during the experiment in a systematic way, otherwise in the absence of such cards, they would in an ideal situation separate the laboratory from the school building.

of the teacher attention to draw should. of the priest discipline experiment The teacher Democracy दुबे in effect to put should And laboratory for appropriate atmosphere finish to give should. thus will happen So J to the laboratory In the end predetermined purposes Accomplished done will be able to.

of the laboratory Use increases And professors yourself More to More experiment doing happen As As its experiments for substances And chemicals exhaustion done go is. as well some tools of glass experiment tools broke down go is So Also other some tools spoiled Also go is. come at the time New purchase necessary become is, the charge of the purchase department assigned to the science teacher, if a committee has been formed for purchase, it should be possible for him to get immediate receipt of the amount of equipment, materials, chemicals or other expenses

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Ideal in the situation laboratory of school from the building different to have should Or So in the building Such in place to have should K so that school released After Also professors its Use Curry can.Harmful things And Accident free to have should.the experiment experiment During of teachers Safety be preserved And Kof severe an accident No created its The teacher Care to take should.of accident likely Dangerous of experiments Demonstration The teacher yourself J to do.Such experiments To the professors to do:for to give no.common way in the laboratory the wound to fall, finger cuts, burns, something falling into eyes, unconsciousness due to inhaling poisonous gas, poisoning effect on the body by tasting poisonous substances, electrocution, fire in the laboratory etc. are likely to occur. For each of these accidents, the teacher should give special instructions to them, so that such accidents do not happen, fingers are cut due to broken glassware, or there is a fire. So advise to use such tools carefully. Instructing professors not to smell poisonous gas and not to taste poisonous substances or indeed any laboratory substances. Often acid-like substances fall into the eyes in shocks, which affects the eyesight, so advise to work with such substances very carefully. To give clear instructions to teachers in advance about the precautions to be taken in experiments involving the possibility of electrocution and fire. Also instruct them not to inhale poisons by pipette and not by mouth. In fact, poisons such as potassium cyanide should be kept locked in a separate room in the closet so that the teachers do not get their hands on them. near the burner

6.1 Introduction:

Science Education Naturally way J of the classroom inside And out like this Two in the section Divided go is.Educators Science to education Effective And Effective to make for As become As first-hand And alive experiences complete to put insistence keep is.a for Science to the teacher Science in education Complementary And Assistant counts A.V activities as well Such tools Useful become is.Science to education came Extracurricular from activities roaring to keep Science The teacher Continuous effort doing stay should.therefore to teach Action intimate And experiential become is.Also Science Education a only curriculum enough J Limited not.Science Education by Among professors ExclusiveCultivating qualities is the purpose of developing them. That is why special

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importance of extracurricular activities besides classroom education has been accepted. Several such supporting activities are discussed below.

6.2 Science Club:

"Science teachers should make use of science club to improve the standard of science education in school and make them necessary for the future scientists of India."

"Science of education to the level improve for Science The teachers in schools Scientific Societies start to do should And to them of India the future of scientists A place of nourishment to make should."

"The science club offers the pupil an opportunity for specialization which he does not have in the class-room In short, the club represents freedom and expression whereas the class-room represents conformity and repression."

"in the classroom J proficiency Received done could not to him Received to do for Science Society to the priest chance give is. In short Science Society Freedom And expression finish give is, when the teacher has to work under pressure and compliance in the classroom."

in the classroom Sometimes to the priest Confusing of questions Answer meeting not. So Experimental to the priest free of experiment chance found not. of science Special Reading, project work, discussion etc. can rarely be done in class. Also, a professor who is bright or interested in science cannot be discerned in the regular classroom teaching, even if he can be found, he cannot be given anything to nurture his intelligence and curiosity in the classroom. For all these only the Vigyanmandalhi can provide opportunities.

of science purposes:

In the classroom whose for More Time go As have Such experiment of science Undertaking Professor himself Curry can And More knowledge got can.

In Science professors free consequential experiments Towards turn.

In Science Among professors their Inquisitive of questions Answers to find skill Cultivated And that by Self study for Reading the habit Cultivated.

in the surroundings And in the world As Scientist researches, to familiarize students with practical applications of science and science-based activities.

student in state as well after that Also of leisure of moments good use Science Subjective of activities from the hobby to do for Professor used to.

Professor voluntary way In Science of science principles on based on small-big experiments do, make a sample and thereby develop the observer's power of observation. Creative instincts are nurtured, and they can be made to think scientifically.

of the priest Science talent Search done can is And to feed ways thinking can be is.

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discussion, through questioning, conversation, etc., the expression of clearly explaining science matters can be cultivated in the students and they can be made interested in science. of science expert of persons of lectures To the professors benefit found. to the professor In the classroom Helpful happen Such chart, useful facilities like motels, professors can make gratuity of science society. Among professors Scientist Attitude And Inquisitiveness Cultivated,

In Science to classroom teaching Complementary of activities trial done can. Scientist activities only school Enough Limited No while living all in society diffuse go As to do. Also in society of science Contribution And its Important about Awareness come. professors useless And Useless of things innovative tools by making own of creativity development do, make useful hand-made tools for science education. professors to science due to in the future in society to come from changes Acquaintance happen. professors in thinking Scientist method And Scientist thinking Cultivate, that is, they should be free from superstitions, not accept events or processes uncritically, be able to evaluate the methods and tools of information acquisition, and base their opinions and conclusions on specific evidence. of teachers Imagination, develop reasoning and decision making skills. in science, teachers become increasingly involved in science education and science activities. Among professors Discipline, qualities like faith, patience, punctuality, confidence, cleanliness, enthusiasm, regularity etc. are developed.

the mind the test(Quiz) : Quiz program on science can be arranged in the school meeting once in a fortnight or month. This will inculcate in the students the skill of giving quick answers. Radio conversation: of science members by Inevitability to science pertaining to Radio programs of school tape recorder on Zeely convenient at the time in classes that told can be. Actionable(Working) Sample Making : Pitchkari. The lecturers can gain direct knowledge by seeing the samples like water suction pump, air suction pump, water balance, magnetic monster etc. in operation. Research: no one tiny of research project take, a report can be prepared by doing its experiments. E.g. Two cords instead of one, three cords, two cords on two supports, study of the movements of pendulums hanging from four cords, examining the effects of soluble solids and miscible liquids on the boiling point of various liquids etc.

6.3 Science Fair:

In Science Professors done to tasks displayed to do for Science fair a one Important medium is. the person And of the nation in development Science fair Contribution Significant is. of teachers of work Value Curry them Encouragement to give Important function Science fair by happen is.

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* Importance of Vigyan Mela:

Science fair Important below According to is:

Professors of science in the field done of activities Note take their Value Curry them encouraged to do.

Kital of education Assistant activities

To the professors scientific activities finish said in them existing latent Scientist to vision out bring to develop.

Science towards Specially interest Having bright To the professors Encouragement gave their of development Psychological And social requirements to satisfy.

of science in the field happened from work other schools, to inform parents and scientific communities.

of the general public Science towards Interest to cultivate.

Professors obtained of science of knowledge Use they::Creative activities done do that for motivation And opportunities finish to give as well their interest nurture.

To the professors their Co-worker of friends as well other no one of science societies activities to see as well Interactive idea Exchange to do chance them finish to give.

of society Talented to the children And the future to scientists recognize them appropriate convenience And training gave Excellent Progress happen that Regarding Care to take.

J-that of the area people school, to acquaint the teachers and lecturers with their work and bring them closer to each other.

the person as well of teachers life towards point of view change, to make efforts to make everyone think in a scientific manner and inculcate the role of scientific concepts in them.

To the professors chance, providing guidance and facilities to enable them to take up independent projects and leadership through self-directed activities.

in society of science spread out to do And Scientist experiments, Ta: Dispelling superstitions of illiterate people by presenting miraculous experiments etc.

Science of education of methods evaluation to do.

of teachers Creativity, to stimulate and nurture reasoning, observational, experimental, thinking, etc., as well as to nurture their individual differences.

Talented To the professors Challenging function finish to give And them something Special function to do motivation to give.

Science fair by Science to the teacher but also class to teaching Complementary benefit happen is.

Science fair Preparation for In it Part taker To the professors Special of reading motivation found is.

Science fair type:

of village level Science fair K of school grades Science fair:

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Science fair This in small small type is one of school in the building that school Or of the village Two-Three schools gathered Together come on Science fair held is. District at the level filling up In the science fair presented to do project And of works selection done can that of this purpose is. In this Specially benefit a is K everyone to the priest own work presented to do personal chance is. This Kind of Science fair Responsibility Science Society K professors handled can is.

District of rank Science fair:

of the district of villages All schools for This Fair open have is. This of the fair benefit professors, is very useful and valuable to teachers, parents and the local public. The fair is organized under the joint initiative of Education Authority and District DIET. The purpose of this science fair is to select the best works for the regional level science fair.

Regional of rank Science fair:

service Expansion of the department in the field of work coming of districts Regional of rank Science fair held come is in which service of expansion of work area everyone districts Part Le is. District level In science fairs choose done the best Works This at the fair presented done come is. Regional In the science fair selection Pamela the best to the works State level In the science fair Sent come is.

State level Science fair:

Regional level of science fairs the best Works And project here presented happen is. Hence This Fairs a few Limited become is. rate year Such Science fairs in the state different different in places filled up is And that everyone in the state filled up is. This Science fairs Many J Guided become is, because the success of the work of science education can be measured from the state-level science fair. The State Level Science Fair was held for the first time in February, 1966 in the state of Gujarat.

National of rank Science fair:

from across the country Various of states to science pertaining to The best Sample, the best projects and scientific instruments are presented in this kind of science fair. All the expenses of this kind of science fair are borne by NCERT. In this kind of science fair, the criteria of selection and verification of the first prize is very strict. Also this fair is made more child friendly. Sometimes multinational companies also organize such national level science fairs.

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International of rank Science fair:

This of science fair no one Absolutely Form not, but Japan invites schools from home and abroad and Japan bears all the costs of the selected works. Newspapers there

International Science Competition held in which to India Also invitation was.of science Various Search of research performance Also Japan held is in which Various of countries institutions Part Le is.This Kind of of science fair If Absolutely Form bound So Various countries each other with Mutually With cooperation join And of science of progress introduction get And share from efforts to science public interest for More Useful Made up Associate become.Sometimes other countries Also This Kind of International Science fair held is.

Science fair sections:

In the science fair common way Two sections have is:

- (i) Section for Upper Class Students : It includes Class-8, 9, 10, 11, 12.
- (ii) Section for Lower Level Students : Which includes Class- 5, 6, 7. Assessment in this section should be grade wise.

of science fair Planning And schedule:

Science fair In planning the following of affairs idea to do:

Science fair for appropriate of the place selection to do, where adequate room, ground, water, electricity, etc. facilities are available for the exhibition and accommodation and food can be arranged for the participants.

All J to schools one months Earlier Circular sent its Enough Propaganda to do as well In it Part to take conditions Regarding Precisely to do.

approx expenses, considering the estimated income and making a plan to meet the expenses. main guests, selecting experts, judges etc. and sending invitations to them.

6.4 Field Trips or Excursions:

role:

of education function in the classroom J done can And there Teacher teach a concept Now the old done gone is.to education alive to make And To the professors enough Relatively study experiences complete to put different different Educational methods And Educational of equipment Use done come is, which can only provide limited learning experiences. Outside the four walls of the classroom, teachers learn a lot through hands-on experiences. thus

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"of the classroom Four of the walls out professors Selfishly study Curry can Like that one medium That is field Tourism."

"A field trip is a faculty-organized, faculty-led field trip that enriches the faculty's experience."

"class the outsider no one of the place inclusive Planned Inspection That is field Tourism."

Science of education Assistant activities

"First hand experience however are so important that well-planned trips should be frequent in all schools."

"First-hand experiences are so important that all schools have to get them? Well-planned tours should be arranged."

Freeman And second

our Saint sages Also own Ashramavasi of the disciples in knowledge Increase happen that for to circulation importance giving. thus our in the country since ancient times J to tourism Education with in joining came is. today Also to the priest If basic external of experiences with Directly J placed come So Education more strong And flexible happen.

"of external life real experiences to the priest directly to give Plan That is Excursions."

Science in education Some subjects Such have is K in which direct experiences to give for To the professors of school out take to go falls And possible so much Purposeful experiences to give should. in class teaching at the time Sometimes Pictures, some things are not well understood despite using models etc. Such things are easily understood by taking a trip and giving an opportunity to see it first hand. Like talking about thermal electricity in class and then taking a visit to Sabarmati Power House can give an accurate idea of the real situation. T.V. Instead of giving an idea of how the programs are broadcasted through diagrams, T.V. If you visit the station, you can get an accurate idea of its structure and functioning. In the classroom, professors talk about absolute zero temperature, but if he were to visit a national physical laboratory like PRL, he would see first-hand where the minimum temperature of -296°C is achieved with scientific equipment or methods. Also, by seeing that, the teachers will be able to clearly know what such a low temperature actually is. Similar National Chemical Laboratory is at Pune and National Metallurgical Laboratory is at Jamshedpur.

* Benefits of field tourism:

To the professors alive, original and realistic experiences can be provided.

To the professors school of life one line from the atmosphere something somewhat liberation found is, relieves boredom and refreshes.

in the classroom J experiences to give convenient No have Such directly And First view experiences complete said can be is.

in the group by staying And in the group function By doing Among professors Group spirit produce happen is.

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to the thing original in the form of to watch chance finish said can be is.

Artificial to excitement instead of natural excitement by Enlightenment happen is.

different different subjects connection built up Help do is.

natural And social from the atmosphere personal K in a group stand up happening of questions resolution Curry can be is.

Among professors social of responsibility Consciousness And Citizen of values development happen is.

Among professors Professional Sense And Human of relationships development happen is.

Observing, acquiring information on one's own, recording information systematically etc.

qualities flourish in the students.

Among professors Observability, imagination, reasoning, creativity, exploration, curiosity etc. are satisfied and developed.

Self study And selfishness for To the professors Excellent chance finish said can be is.

journey Tourism by Among professors Scientist of things Collection to do tendency developed can be is as well Science museum for Sample And school garden for of vegetation Sample collect Curry can be is.

Some things Executive in the form of watching at school their model made can be is.

School performance, there is food for thought for the Science Fair and the Science Society.

to the professor of teachers Various Kind of of powers concept come is.

of teachers emotions And in values desired changes bring can be is, such as by visiting the hospital, the spirit of social service, treating the sick, donating body, eye donation, blood donation, worming etc. is born in the students. Thus love and goodwill towards other persons of the society is born in Adhyetas.

classroom teaching Meanwhile The teacher learned in affairs no one Ambiguity remained gone have So to him journey Meanwhile Clear Curry can be is.

field of tourism Places:

of snow factory, visit to small scale industries like handlooms, bakeries, sawmills, power looms, oil mills, ghani, soap and detergent factories, lime kilns, diamond punching bells, brick making kilns, ceramics factory-kiln, stables, small dairies etc.

Millo, visit to big factories, process houses, textile mills, dye factories, drugs, sugar, vegetable ghee, etc. factories, big fertilizer factories like IFFCO, big glass factories like Alembic, refineries, oil wells, oil storage plants, cement factories, mines , Visiting big industries like big milk dairies iron plant, steel plant, chemical factories etc.

T.V.of shop, small shops and businesses like computer shops, radio shops, musical instruments and repairing shops, mixer-grinders, pressure cookers etc. and their repairing shops, welding

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shops, garages, oil engines, electrical equipment shops, workshops, battery charging shops etc. interview

forests, Forests, Beaches, Deserts, Zoos, Lakes, Lakes, Rivers, Springs, Hot Springs, Riverside Cliffs and other Rocks for Geology Education, Hills, Farm, Paddy, River Dam, Nursery, Horticultural Gardens, Night Visiting places related to nature such as open sky viewing, public gardens, botanical gardens, farms, farms, small islands, harbors etc. JK

of science And other storage areas, Aquarium, Community Science-Centre Atira, Physical Research Laboratory, Computer Centre, Observatories, Artificial Planets, Scientific Institutions, Hybrid Seeds and Farming Equipment Shops, Pesticide, Insecticide etc. Shop, Agro Industry, Agricultural Pesticide Shop, Soil Analysis Center, visit to places related to science like railway engines, laboratories of science colleges, hospitals, satellites, windmills, thermal ng power stations, hydraulic power stations etc.

6.5 Akash Darshan (Observation of Sky / Sky Watching):

* Role:

of science in the curriculum to astronomy less importance Given come is.of science History will see So In it to astronomy a lot J importance Given came is.Today's era So Space era is.human being the moon on arrived is And Mars on to go Preparation Curry remained is.believes own Use And Facilities for Artificial Satellites in space floating placed is.floating laboratories Also He in space made is.school at the level in astronomy the sun, solar system, comets, constellations, zodiac signs, moon, stars, planets, satellites, meteors, etc. are to be studied. Even today, science teachers teach all these aspects of astronomy with the help of charts or graphs. Teaches by drawing diagrams. The teacher must make the students observe the sky at the right time to get a real idea of it and provide them with direct experiences. This program can also be held under the initiative of Vigyanmandal.

Importance of Akashdarshan:

To the professors celestial of substances real concept come is.they Various celestial of substances identification get is And them first-hand And direct experiences complete said can be is. earth on becoming Various events like K the night-the day, seasons, tides, magnetic storms, eclipses, etc., which have a profound effect on human life, are understood by the students to be due to the motion of celestial objects.

in the sea Sailors And Tourists, people living in deserts as well as people living in remote rural areas get their sense of direction and time based on celestial objects.

To the professors of the world And of the universe of vastness Experience J happen is.

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Various of substances by touch their about real concept To the professors come is, so that they gain more knowledge by experiencing natural stimulation. Also, team work training, team spirit, entrepreneurial qualities etc. develop in them.

professors of astronomy importance understand is, they become familiar with the contributions of different astronomers and become interested in astronomy.

journey During K Unknown on the spot celestial of substances knowledge schedule And directional of the map roa ok is.

Astrology And In the Almanac Also spatial of substances speed And Study too much J Useful by choice is.

celestial substances of humans the mind on Also effect do is.their From inspection of a person the mind happiness experience is And of teachers of imagination Also development happen is.

From the skies To the professors Astronomy to understand easy will have As J of the world Abyss in depth peek to do them the mind will happen.

school organized sky vision done then at home Also at night of the sky Inspection to do them the habit will have And of astronomy More More knowledge Received doing will happen.

sky vision of the program Planning:

Preparatory:The teacher himself J This of the program Planning to do.I for He himself To the professors of astronomy himself J issues to teach is that Regarding completely Information Received Curry to take should, not only that, but he should acquire a deep knowledge of astronomy. The teacher himself should be familiar with every star, constellation, constellation, constellation, planet, satellite, etc., necessary for study, he should have a thorough knowledge of them and should be able to identify them in the sky. Only then can he impart accurate knowledge of astronomy to the professors. He should study the picture of the sky in which month and at what time from the reference books and take a real darshan of the sky. He should also prepare maps and charts for sky darshan. He should also decide when it will be possible to observe certain things. He should give preliminary information about it in the class in advance.

the place:in the surroundings Also nearby no one the hill, choosing an open ground or a tall building. This place should be within walking distance. If the place is far away, arrangements should be made for the vehicle. There should not be big factories, big industries, mills etc. around the place, because the light of their lights spreads everywhere, which obstructs the view of the sky. The place of Akashdarshan should be a little far from the village or city so that even the light of the street light does not become an obstacle. There should also be no vehicular traffic, as the lights of the vehicles also become a hindrance. Choosing a place where the sky looks completely open.

Time:Professor at night All J To the professors call.of girls with K of boys with Parents to come wanted have So thembut to allow. The seventh or eighth day of Krishna Paksha should be chosen for sky darshan, because during these days the reflected sunlight in the sky is visible, so

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the stars are visible, not too much and not too little. At other times more or less stars are visible than required which is also a hindrance to sky viewing. Do not choose a time when the sky is cloudy. Non-monsoon time is more favorable. 9 to 10 pm is more favorable as the atmosphere becomes calmer then. Number of teachers: All the teachers of the class can join, but a separate program of akashdarshan can be organized for the teachers who are interested and are members of the science society.

approved: This in the program joiner of teachers, should take prior approval of their parents, school principal and venue owner

Equipment: sky vision for the following Equipment necessary

- (i) Binoculars : This requires a powerful telescope that can be rotated easily. If the school does not have such binoculars, get them from another school or elsewhere.
- (ii) Binoculars : Instruct all lecturers to bring binoculars if possible. If this is not possible, the school should arrange binoculars as far as possible.
- (iii) Torch : Using a long and powerful torch of four cells. Holding this torch towards the visible celestial objects will cause it to shine in the sky, which will heal the roar of the guide. As this is rotated, the devotees will be able to see different celestial bodies by turning their eyes. If the teacher keeps telling mythological stories related to different stars, planets, constellations, satellites, the teachers will be more interested and the program will not become boring for them.
- (iv) Maps : To keep maps showing various constellations, charts showing the position of the sky for each month, etc. and show them to the teachers by turning on the light at intervals,

* Things to keep in mind for sky darshan:

Fixed at the time All professors the place on reach then program start of being Advertisement to do, so that everyone calms down.

in advance expert of a person contact Curry His Guidance And Help to get. If Professor himself of the curriculum issues enough sky vision make it And then More Interest falls And If professors More to know desire have So Such professors for of astronomy to the expert Called again come on program arranged them curriculum other than more knowledge to give.

This program then Sometimes Artificial firmament (Arranging a visit to Planetarium) or Observatory. Astrology should be started from the east direction and the rising stars, constellations etc. should be studied first. Try to see the stars in a revolution eight degrees from the east direction. To do pole darshan in north direction. To clarify the relationship of Dhruva with Saptarshi and Sharmishtha Nakshatra. .

Wednesday, To observe the planets Venus, Mars, Jupiter, Saturn etc. by giving information about their color, surface, satellites.

Professor Absolutely of thing directed do then professors in the sky horizontal-bad No looking at that J thing see And understand Like that notification them to give.

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Various the stars, galactic belt, constellations, nakshatras, constellations etc. to observe and give insight to the adhyats.

of sky in the program falling difficulties:

Science Among teachers of astronomy of knowledge lack of have is.to many of sky in the program Interest would have not.teachers come on of the night program arrange for Preparation showing not.

sky vision for The professors no one training received would have not.

in the curriculum And therefore In exams to astronomy Special importance Given coming not.therefore exam oriented the psyche Having teachers And To the professors In it Interest Falling not.

at night program to hold Since All Parents Consent No Also give.

Professor directed do that J thing professors see is K no that know could not.

of astronomy knowledgable Teachers, lack of any other experts or mentors.

sky vision for required Precious tools All schools have having not.

All professors have Binocular like tools not Since they simultaneously In it see is therefore of time

Plenty a waste happen is.thus By doing disorder Also created is.

Such programs for mostly school Management, no encouragement from principal, other teachers and parents.