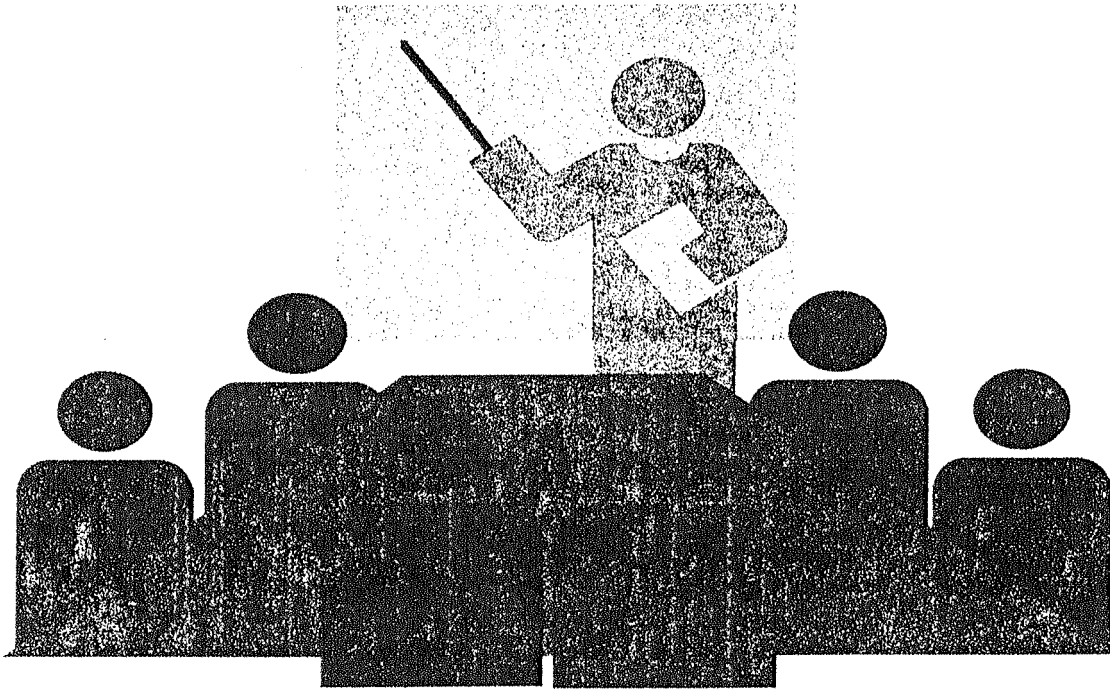


INTERNSHIP IN TEACHING

*A SOURCE BOOK FOR
COOPERATING TEACHERS AND STUDENT TEACHERS*



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CHAPTER 1

CONCEPT AND SCOPE OF INTERNSHIP

1.1 WHAT IS INTERNSHIP?

Field experience occupies a place of importance in all Professional Courses. As a part of pre-service teacher training, the field experience usually known as practice teaching provides an opportunity for the student-teachers to tryout the methods and techniques of teaching which they will have learnt during the course earlier. Student teaching has been accepted as the most important and crucial activity in teacher training. Internship is even more broad based than student teaching. The Regional Institutes of Education have some experience in organizing internship in teaching for their students.

Internship in teaching is an opportunity where the student teacher identifies himself with the school to which he is assigned. While practice teaching to is an important component of the programme, the student teacher participates in every activity of the school in the total school life. During this period, right attitudes interests and abilities are developed shaping the student teacher as a teacher of tomorrow. Internship provides excellent opportunity for the prospective teacher to learn to teach, acquire all the necessary understandings, skills, attitudes and appreciations in a real school-situation. During internship he learns- the art of communication, the ability to solve problems, the tact to handle situations, however delicate and acquires the capacity to think and organize educative and useful programmes for the benefit of his students. All these are done under the supreme guidance of qualified and experienced teachers of the school. Positive correlation between the quality and scope of experiences during internship and success as a beginning teacher, on which there is a general agreement, stresses the importance of student teacher's participation in a wide range of school programmes. In short, internship is a period for the student teacher in which he identifies himself with the school.

1.2 THE RATIONALE

In any professional pre-service course, the theory learnt by the student has to be tried out in a real situation. Field experience provides this opportunity and thereby complements the course. Teaching especially at the under-graduate level is adequately challenging since it calls for the understanding of not only the content but also the pupil who is taught. "In order to teach John, Psychology, one has to understand both John and Psychology". In teacher training programmes, internship provides the opportunity where the student-teacher can find for himself the extent to which the methods and techniques of teaching he has learnt during the course, are useful in a real class room situation. Internship is the period during which the student stays in the school for a certain extended period, mingles with the School Community, gets the first hand knowledge of the school situation and the associated problems, participate in the programmes of the school, organizes new and productive programmes for the benefit of the school, develops in himself the right skills, attitudes, interests and appreciations and makes best use of the expertise and resources in the school to blossom himself as a good teacher who could be an asset to any school providing him vocation in future.

An internee is like an apprentice working under the guidance of highly motivated and experienced teachers of the school. For the first time he faces a cross section of the students which is a mixture of different ability groups often having varied social backgrounds, in a real classroom. While he will have learnt techniques of teaching for different uniform ability groups, he will be called upon to tailor new techniques and methods to suit mixed ability groups and this real challenge gets the best in the internee. It is during the internship that he learns certain time honoured tenets and ethics of teaching profession and lives a simple and disciplined life. It is the period when he should adopt himself to the realistic situation, make best use of whatever resources are available, adjust himself and his needs to whatever is available in his environment and carry on with his duties cheerfully. Internship is the valuable transition between his training and his vocation (or career). To a great extent this transition helps him to be a successful future teacher. Internship experience is a factor which influences, in good measure, the way the shapes himself to be a teacher though this factor may not be decisive.

1.3 OBJECTIVES OF INTERNSHIP

1.3.1 General Objectives

1. To bring about a real integration of theory and practice in the education and training of the student teacher.
2. To develop in him the ability to recall principles, relate them to practices, study them in operation, apply them. Enrich them with meaning, and develop them further to suit the needs and conditions of the changing situations.
3. To develop in him the right interests, attitudes and dispositions, including confidence, which are so important for effective teaching and professional growth and success, and
4. To develop in him all the desirable competencies of a good and successful teacher.

1.3.2 Specific Objectives

1. To develop the ability to define clearly the general and specific objectives of teaching the subject, the different units, and the individual lessons.
2. To develop the ability to select units and subject matter suitable to the class, and resource material and aids-ready made, improvised- suitable to the units.
3. To develop the ability to plan the lesson effectively with an understanding of the principles of learning and organize the subject matter suitably indicating the appropriate techniques and aids to be used at each stage and for each purpose.
4. To develop the ability to prepare the pupils adequately for each lesson and develop it in ways most suitable to the occasion and most appropriate for realizing the objectives set forth.

5. To develop the ability to motivate the pupils sufficiently and appropriately, sustain their interest and attention and maintain good relationships and discipline in the class, making class management an easy and smooth function.
6. To develop the ability to adjust the programme to the varying needs, interests and abilities of the pupils, while making for maximum group progress.
7. To develop the ability, to use different methods and techniques of teaching and use them effectively in appropriate situations.
8. To develop the ability to plan the details of the curriculum with the pupils (teacher-pupil planning) and work out resource units, spelling out the experiences, activities, aids techniques, etc.
9. To develop the ability to develop and apply different techniques and tools for the continuous evaluation of the achievement and progress of the pupils, taken as individuals and as a group, especially the ability to construct and use oral, written and performance tests.
10. To develop the ability to judge the effectiveness of teaching and the success of each programme in relation to the goals, from the participation and performances of the pupils.
11. To develop the ability to diagnose the strengths and weaknesses and the achievements and failures of the individual pupils, in relation to the objectives and decide, plan and organize the reinforcement of remedial assistance needed by each.
12. To develop the ability to correlate his subject and its teaching with other subjects taught in the class, with other activities in the school with life, so that, the education of the child becomes an integrated programme.
13. To develop the ability to plan, organize and guide enrichment activities and field programmes related to the subjects taught.
14. To develop the ability to plan, organize and guide various co-curricular activities, which are considered as important constituents of a rich education for the citizens of tomorrow.
15. To develop the ability to see the school as organized center of the community and relate the provisions and practices in the school to the needs and conditions of the pupils and of the community.

CHAPTER 2

ASPECTS OF INTERNSHIP

Teaching is a very complex process comprising identification of objectives and their specification in terms of pupil learning, selection and organization of appropriate learning experiences and using suitable learning outcomes. Effectiveness of teaching as a whole, therefore, depends upon how effectively each one of its component act is carried out. These different aspects of teaching will be discussed in the following pages.

2.1 TEACHING LEARNING PROCESS

Education is essentially a purposeful activity. The real value of the educational programme lies in the realization of its aims and objectives, desirable and attainable, as they should be. At the first level, there are the broad aims of education, selected and defined on the basis of national objectives, philosophical considerations and the socio-political and economic conditions of the country or community. As means for achieving these broad aims of education, the total school programme is developed. This, therefore, is determined by the above aims and may consist of studies in a number of areas or subjects and different kinds of activities like the co-curricular programme. Each course of study or subject will have its own broad objectives. If education is essentially purposeful, teaching, which constitutes the major part of it, should also be purposeful and goal oriented. Just as an architect or a painter has a vision of the total product and sets objectives relating to the whole product and immediate specific objectives relating to each part of the work, the teacher also needs to have broad ultimate objectives and immediate and specific objectives which ultimately will help in realizing broader objectives and aims.

The first principle in teaching therefore is that it should be objective-based. The instructional objectives of each subject are defined in a broad way in terms of the broad outcomes of learning in that area and they are further analysed into specific learning processes and outcomes. If some generalization is possible, and convenient for the sake of brevity it may be said that in all the content subjects, the students acquire knowledge (information), ability to apply the knowledge and understanding to new situations. It must also help to develop skills in manipulative performances relating to the subject interests, attitudes, appreciations and values. The broad objectives can, therefore, be stated in terms of these broad outcomes for teaching as well as testing. But, to be more specific, each will have to be analysed into a variety of learning outcomes. For example, the learning outcomes in respect of understanding may be a seeing relationship, discriminating, comparing and contrasting, translating from one form to another, detecting errors, giving illustrations and so on. One who is able to apply knowledge and understandings to new situations will give reasons, establish new relationships, form hypothesis, studies procedures, infer, predict and do such other things in respect of new situations. Such learning outcome can be identified for the other objectives as well. An appropriate learning experience planned in the context of the content will lead to total learning outcome, which has the content dimension as well as the learning dimension. Of late there has been a change in the perspectives of a learner and the learning process. The different cognitive and educational theories have emphasized the need for a learner centric approach in school education. It was emphasized that learners have their own ways of viewing world and they are capable of constructing knowledge through observations, and other exploring activities

Traditional school teaching tended to emphasize memorization and mastery of a fixed body of knowledge in each isolated subject. This approach did not encourage students to develop deep understanding and higher order thinking abilities. Broadly speaking, intellectual quality in teaching and assessment refers to the extent to which students are deliberately engaged in learning activities that require, encourage different types of skills and cognitive processes thereby leading to construction of knowledge. In the process of construction of knowledge, learners are required to use to manipulate knowledge by using cognitive processes such as comparing, classifying, abstracting, inductive and deductive reasoning, constructing support, analyzing errors and perspectives, and interpreting. Learning improves when learners are engaged in higher order thinking.

In the case of languages, in general, the basic objective is often said to be the development of the basic skills of listening, speaking, reading and writing. These when defined in terms of the broad outcomes in the pupils would mean comprehension and expression relating to both the oral and written forms, in addition to interest, attitudes, values, etc. Specific learning outcomes can be identified for each of these objectives also.

When learners are engaged in learning, they use a range of different thinking processes, some of which such as 'higher order thinking' require much more mental effort than others. The range of cognitive processes that can be used are often described by hierarchical structures called taxonomies. One of the most well known is Bloom's taxonomy (Bloom, 1956) who developed a classification of intellectual objectives and skills essential to learning which are divided into three domains: Affective, Psychomotor, and Cognitive. Each domain was classified into a category of objectives in a hierarchical manner (Bloom, 1956; Krathwohl, Bloom & Masia, 1964). For over 50 years, these objectives have been used to structure lessons, guide learning, and assess students' performance. Since the publication of the Original taxonomy in 1956, psychological and educational research has witnessed the introduction of several theories and approaches to learning which make students more knowledgeable of and responsible for their own learning, cognition and thinking (eg., Constructivism, Metacognition, Self-regulated learning).

All these theories and approaches see learning as "a proactive activity, requiring self initiated motivational and behavioral processes as well as metacognitive ones". These current educational initiatives and modern theories of learning have prompted the revision of the taxonomy of objectives. A group of specialists led by Lorin Anderson revised the original taxonomy (Anderson et al., 2001) which is referred to as *Revised Taxonomy*.

According to the revised taxonomy, there is a need to address certain questions which are fundamental to teaching. They are:

- What important things should students learn?
- How can instruction be planned and delivered so that students achieve high levels of learning?
- What assessment instruments and procedures will provide accurate information about how well students are learning?
- How can teachers ensure that outcomes, instruction and assessment are aligned with one another?

The revised taxonomy has two dimensions: the *Knowledge Dimension* and the *Cognitive Process Dimension*. In the knowledge dimension, there are four distinct types of knowledge (factual, conceptual, procedural and metacognitive) which are subdivided.

The categories of the cognitive process dimension are intended to provide a comprehensive set of classifications for those cognitive processes that are included in objectives. The cognitive Process Dimension is categorized as shown in the table (2). Each of the six major categories is associated with two or more specific cognitive processes, which are totally 19 are also described by verb forms (see table-2)

Structure of the Cognitive Process Dimension and related cognitive Processes in the Revised Taxonomy

	Process categories	Cognitive Processes and examples
1.0	Remember: Recognizing Recalling	Retrieving relevant knowledge from long-term memory - Recognize the dates of important events in Indian history of independence - Recall the names of the scientists in discovery of cell and its organelles
	Understand: Interpreting Exemplifying Classifying Summarizing Inferring Comparing Explaining	Determining the meaning of instructional messages, including oral and graphic Communication - Paraphrase important speeches and documents - Give examples of various types of plants - Classify the observed plants into herbs, shrubs and trees - Write a short summary of the events portrayed on videotapes on cruelty to animals - Infer grammatical principles from the given examples in English - Compare historical events to contemporary situations - Explain the causes of Second World war
	Apply: Executing Implementing	Carrying out or using a procedure in a given situation - Divide one whole number by another whole number, both with multiple digits - Determine in which situations Newton's second law can be appropriate
	Analyze: Differentiating Organizing Attributing	Breaking material into constituent parts and detecting how the parts relate to one another and to an overall structure or purpose - Distinguish between relevant and irrelevant numbers in a mathematical word problem - Structure evidence in a historical description into evidence for and against a particular historical explanation - Determine the point of view of the author of an essay in terms of his/her perspectives on environmental protection
	Evaluate : Checking	Making judgement based on criteria and standards - Determine whether a scientist's conclusion

	Critiquing	follow from a given data - Judge which of two methods is the best way to solve a given problem
	Create : Generating Planning Producing	Putting elements together to form a story, coherent whole or make an original product - Generate hypotheses to account for an observed phenomenon - Plan a model for constructing a solar heater system in schools - Build habitats for certain species for certain purposes

The action verbs that could be used under these categories are as follows:

Illustrative Action Verbs for defining objectives using Revised taxonomy of objectives

Taxonomy categories	Sample verbs for stating learning outcomes
Remember	Recognize, recall, name, match, label, select, reproduce, state
Understand	Classify, convert, describe, distinguish, explain, describe, extend, give examples, interpret, paraphrase, summarize, translate, estimate, relate
Apply	Apply, arrange, compute, construct, demonstrate, discover, modify, operate, predict, prepare, produce, solve, use, differentiate, infer
Analyze	Analyze, associate, determine, infer, differentiate, estimate, outline, separate, subdivide
Evaluate	Appraise, assess, compare, conclude, contrast, criticize, evaluate, judge, justify, support
Create	Combine, compile, compose, construct, create, design, develop, devise, formulate, modify, plan. Organize, propose, rearrange, reorganize, revise, rewrite

As explained, the changing context of school education from teacher-centric to learner-centric demands a fresh look at the teaching-learning process that take place in the classroom. The constructivist approach to learning initiates the learner into several activities through which the learners construct meanings on their own, of course, sometimes with the support and guidance from the teacher. This approach involves the learners to be engaged in situations, contexts where their thinking is stimulated and further leads to exploring activities. One of the learning designs that has been adopted and imbibed into the present lesson formats is the 5-E cycle. The 5-E cycle learning design includes, engaging, exploring, explaining, expanding or extending and evaluating. The activities, the student and the teacher role under these 5 roles are synthesized into simple 4-step procedure in the lesson format which is as follows:

- i) Introduction (engaging students in situations, contexts, episodes)
- ii) Development (exploring, explaining_
- iii) Application (expanding or extending)
- iv) Review and assignment

A sample lesson plan in biology is prepared based on this which you may find in the appendix.

3.1 ORGANIZING LEARNING EXPERIENCES

Learning experiences are the activities undertaken by the students planned deliberately by the teacher with a particular purpose to bring about desirable changes in their behaviour.

3.1.1 Criteria for Selecting Good Learning Experiences

1. Learning experience should be based on the learning objectives.
2. Learning experiences should be commensurate with syllabus prescribed.
3. Learning experience should be meaningful, relevant and capable of arousing interest.
4. Learning experience should be contextualized
5. The main criterion for selecting good learning experience is that it provokes a good deal of interest in the pupil so as to ensure his full participation in the learning experience.
6. While making selection for a good learning experience, attention should be paid to the age group of the students. For example, the concept of a flower will be simple and free from many technical terms for the lower classes while it will be more comprehensive and elaborate for students of the higher classes.
7. Learning experiences so designed should reflect the socio-cultural milieus.

3.1.2 How to Plan Learning Experiences?

When a teacher wants students to conceptualize certain meanings or construct knowledge on his own, he selects desirable situations, which helps to contribute to the knowledge construction. The degree of his success will depend on how best the teacher has planned the experiences. So it is very essential that the teacher knows how to plan learning experiences.

The following points should always be borne in mind while providing the learning-experiences.

Learning experiences should:

1. be arranged from simple to complex.
2. be organized in such a way that meaningful learning takes place.
3. be connected to the life experiences of students
4. be provided time and again to strengthen learning .
5. Seek pupil's participation to the maximum possible extent.
6. be linked with the goals desired
7. be arranged according to the facilities available in a particular school.
8. go beyond the textbook activities and extend to real life situations and field observations
9. learning experiences may be organized either for individual learners or by forming groups. This depends upon the concepts to be learnt, and the issues and problems to be investigated upon.

For developing the ability to apply scientific principles in daily life, teacher can provide the following activities:

1. Providing situations involving analysis.
2. Allowing students to draw conclusions themselves from the given data.
3. Arranging discussions, and encouraging student's participation.
4. Providing opportunities for improving apparatus.
5. Undertaking nature rambles.
6. Giving illustrations of scientific principles from daily life etc.
7. Providing for field surveys and observations

A single activity can develop many cognitive processes.

For instance dissection of frog will enable the students to develop the following learning processes, skills and outcomes.

- i) Knowledge about the systems exposed.
- ii) Ability to use instruments for a particular purpose.
- iii) Control of muscles.
- iv) Power of keen observation etc.

3.1.3 Material for Planning Learning Experiences

In addition to the formal teaching situations there are also many other materials, which can be profitably employed for designing the learning experiences. Following are some of these:

1. Actual demonstrations by the teacher himself can serve as a useful source for providing experiences in developing the power of minute observation.
2. Laboratory experiments provide enough scope for training in scientific method of thinking developing right type of attitudes and acquiring certain skills.
3. Teaching aids like films, filmstrips, radio, epidiascope, charts, models etc. are a good storehouse for the teacher to find out the relevant experiences, which increase power of observation and understanding and develop interest.
4. Field trips excursions and nature trails etc. provide experiences for developing the abilities to collect, observe, classify and preserve the material in addition to acquiring knowledge.
5. Making of charts, models and improvising apparatus develop constructional, drawing and manipulative skills.
6. Discussions, debates, symposia on curricular topics and contributing articles to through school magazine provide training in expression, collection and arrangement of relevant data.
7. Scientific literature for example is a useful source for improving abilities like locating information, reading, selecting relevant data, organization, interpretation, evaluation and independent thinking.
8. Hobbies can help in developing interest and ability to apply knowledge in every day life. They also reinforce the abilities already developed by classroom activities.
9. Exhibitions, fairs, museums etc., also provide varied types of learning experiences.

But the achievement of desired goals does not depend only on planning the learning-experiences. It is directly related to the teacher pupil participation as well and the success will depend on how best both the pupil and the teacher take part in the teaching learning process.

3.1.4 Teacher-Pupil Participation

In order to make the instructional process effective, the teacher and the taught have to participate actively in the learning situations. The teacher is the guide who plans the activity in a comprehensive and systematic way so that the same can be carried properly. He has to find ways and means to achieve the objectives. He discusses the activity with his pupils for proper realization of the desired goal.

Active participation of the pupil is very important, firstly because it is he who has to learn and secondly because this will help him give vent to his needs, motives, emotions etc. He interacts with the learning situation and that results in learning. Active participation of the pupil under the direction of the teacher leads to effective learning.

3.3 USING LEARNING AIDS

Learning is a process in which the learners construct meanings and develop cognitive processes that lead to higher order thinking abilities. Learning is active It is forming, strengthening the connections between definite stimuli and specific responses. The process of learning has been described as purposeful active and goal directed. Learning occurs when the individual reacts to the situation in which he finds himself. We learn by thinking, feeling, doing and seeing.

Teaching is an art. According to Edgar Dale, "To teach is to transform by informing, to develop a zest for life-long learning, to help pupils become mature, independent learners, architects of an exciting, challenging future..... a kind of communication, a meeting and merging minds."

Teaching is rooted in learning. Learning is rooted in sensation and, therefore, effective teaching must utilize the sensory experiences (senses are the gateways of knowledge) which audio-visual materials provide. Good learning aids enable us to make ideas and concepts clear. They arise learning from verbalism to true understanding.

Audio-visual aids cannot substitute for real teaching. They cannot teach by themselves. They need skilful teaching to make them effective. The teacher must prepare the class for the audio-visual activity, guide the class through it and follow up after its completion. In short A.V .aid instructional device is a device, which assists an instructor to transmit to a learner-facts, skills, attitudes, knowledge, understanding and appreciation.

Before deciding to use a specific A.V.material the teacher must determine whether it will contribute to the expected learning processes and learning outcomes.

Keep in mind the following criteria while using A.V material as an instructional tool:

- a) Does it give a true picture of the ideas that are intended?
- b) Does it contribute to the meaningful content of the topic under study?
- c) It is appropriate for the age, intelligence and experience of learners?

- d) Is there a teacher's guide available to provide help in effective use of the material?
- e) Does it make the students better thinkers, critical-minded?

A.V. materials when properly used in the teaching situation can accomplish the following:

They supply a concrete basis for conceptual thinking and hence reduce meaningless word responses of students. They have a high degree of interest for students. They make learning more permanent. They offer a reality of experience which stimulates self activity on the part of pupils. They develop a continuity of thought; this is especially true of motion pictures. They provide experiences not easily obtained through other materials and contribute to the efficiency, depth and variety of learning.

Of the various audio-visual aids from which you can choose, depending upon your needs and the facilities available in your school are the following:

1. Charts
2. Diagrams
3. Pictures and Photographs
4. Maps and Globes
5. Posters
6. Models
7. Objects
8. The Motion picture
9. The Financial Board
10. The Bulletin Board
11. Radio broadcasting
12. Tape records
13. Television
14. Computer

Every student teacher should understand that the primary purpose of using audiovisual materials in teaching is to improve the communication of ideas. To improve communication is to make learning more effective. Audio-visual materials should therefore be used only when they contribute significantly to the learning experience of children and not indiscriminately. They are therefore required to bestow sufficient thought and attention towards the preparation of relevant and useful audio-visual aids for teaching in the class. In order to prove that you really used these aids for teaching in the class, the supervisor must evaluate these aids. However, there is no stipulation as to number of aids to be made and used.

3.4 EVALUATING LEARNING PROCESSES AND LEARNING OUTCOMES

The concept of evaluation involves controlling the activities such as testing and teaching with reference to the objectives. Good assessment is an integral part of any good instructional programme. The evaluation concept emphasizes that any professional activity cannot be carried out effectively without a clear concept of the purposes to be served by that activity. The success of the professional activity has to be assessed in terms of the objectives.

Education can be looked upon as process by which desirable changes are to be brought about in pupils, in respect of particular subjects studied. The class-teacher should be clear about the purposes of each subjects he teaches and the changes that should be brought about in terms of remembering, understanding, applying, skill and attitudes. The first question of a professional teacher, therefore, is understanding "*What Do I Want To Achieve In Pupils?*" Unless the teacher is clear about what he wants to achieve in pupils, his teaching techniques and his testing procedures are meaningless.

The assessment is linked with the objectives and the teaching-learning process. we cannot assess the learning outcomes of students in the absence of well specified objectives which takes into consideration, both learning processes as well as the learning outcomes. Therefore it is necessary that we should clearly state each of the objectives we want to develop.

After doing this analysis with references to each of the objectives such as *remembering, understanding Applying, analyzing ,evaluating and creating and Skills* the teacher should now proceed to write test items with reference to each of the learning objectives specified. This will help him to judge whether the test item is properly framed so as to enable him to find out whether a particular learning outcome has developed or not. Some test items may be of the essay type, some of the new type or objective type, some of the short answer type. It is better to construct the items or questions which are contextual and situational rather than a conventional and mechanical ways of asking questions which requires and encourages rote memorization. Constructing test items which are contextual will make students to think, analyse, interpret, coming to generalizations through their responses. Rather than concentrating more on testing the lower order thinking abilities such as mere recall and recognizing the facts, it is advisable to construct items as mentioned above where the students will be able to exercise their higher mental abilities. Using revised taxonomy of objectives, a blue print or the table of specifications can be developed before going into the construction of test items while planning for a unit test.

The learning processes of the learners could be assessed by observation, certain indicators which can be evolved with in the task assigned. If a group work is given, the assessment may be carried out for the task carried out by the group members which is evidential and for their group presentations. Teacher may do on –spot evaluation by using certain criteria/indicators.

3.5 PLANNING FOR EFFECTIVE TEACHING

3.5.1. Need for Planning

Educators have always agreed on the need for an intelligent planning of every lesson. To plan is to act with a purpose. A plan is a blue print which helps in the efficient, economical and smooth conduct of any activity. If teaching is to be effective in terms of learning by students, it is necessary to ensure this through careful advance planning which would involve visualizing the entire teaching learning situation as it is likely to develop in the classroom. Every teacher has before him some very specific purposes in teaching a units or a topic. He is anxious to achieve these purposes during the course of the lesson. He needs to think about the best possible manner in which he can realize these purposes with the maximum of efficiency and the minimum of waste of available resources. Whereas this applies to all teachers, the need for such advance planning is all the greater for the beginning teachers and

trainees in teacher training institutions. The entire programme in a teacher college is geared to the development of a numbers of teacher competencies in the trainees. Practice teaching is one element of this programme; its emphasis is on developing teaching ability through supervised experiences. It will be readily agreed that the ability to plan a lesson is of great value and needs to be specifically developed in student teachers so that they may do a good job in the classroom.

3.5.2 Unit Planning And Lesson Planning

The Planning of learning activities and experiences could be done in two stages, first in terms of ' Units ' and then ' lessons'

A ' Unit ' is an organization of various activities, experiences, types of learning around a central theme, problem or purpose. It can also be looked upon as a meaningful whole of content which is build around a central concept. Examples of units are; The universe around, Marine life, Plant life. The food we take, Transmission of Heat, space science, steam and its Power(Science), Means of Transport, Meant of communication, The way we are governed (social studies), Factorization, Percentages and their Uses, Square Root (mathematics). Units can be classified on the basis of the approach followed. A subject matter unit has, as its basis of organization and primary end result, the subject matter itself. An experience unit, on the other hand , has its starting basis the learners experience. The main emphasis is also on such experience and subject matter is used as a means to the understanding of experiences as related to the unit. A problem units, in a similar way, focuses on the solution of a felt problem. (How do we elect our representatives? How do we get our drinking water? How is soap manufactured? How are tomatoes grown? How do Airplanes fly? Etc.,) Some units can be designed using more than one approach.

Unit teaching attempts to build a comprehensive study plan focused on learning experiences based on a single theme. It stresses boards areas of knowledge, skills and attitudes rather than a mere presentation or teaching of restricted skills. It is a more effective way of organizing material so that the student will better understanding what he is being taught. Planning in terms of units enables pupils to see the different lessons as an integral part of the same theme and not as an integral part of the same theme and not as disjointed bits of information.

A unit plan should show the objectives, prerequisite learning, analysis of content in terms of concepts, principles, the kind of learning experiences and activities to be provided and a scheme of continuous evaluation. A suggested design for the unit plan is given below.

UNIT PLAN

Title of the Unit :

Name of the Teacher :

School :

Subject:

Class /Standard :

Total Time:

Prerequisite learning/experiences:

Major objectives: (Concepts, facts, principles, skills, interests , etc.,)

Sub units	Content analysis	Key questions	Learning objectives	Learning strategies/ activities/experiences	Learning Resources	Assessment techniques and devices

Before you start teaching, the first task before you, therefore, it to choose a suitable unit, and prepare the plan for the unit as a whole. (In the case of teaching of English or Languages each prose lesson or poem could be considered as a unit. Or you could have units like: How to write good letters? The use of pronouns, Adverbs etc.,) You may then prepare detailed plans for sub-units or lessons to be taught in one classroom period. Prepare at least one unit plan in each subject of specialization.

3.5.3 Elements of a Lesson Plan

There is no one way of preparing a lesson plan. One could think of a variety of formats to suit different situations. It is not very important that a particular format for drawing up a lesson plan should be ritualistically followed. What is important is to recognise that a lesson plan has a distinct purpose in relation to good teaching that is to follow it. A plan must help to clarity to the teacher the specific learning outcomes, in pupils, in relation to the topic and indicate how these are proposed to be realized and evaluated.

While there need to be no rigidity about the form or pattern of a lesson plan, it may be suggested that the following essential elements should find a places in every good lesson plan:

1. Statement of learning objectives in relation to the topic. It is desirable to state the objectives in terms of the learning processes and the learning outcomes that are assessable so that the evidences for the changes might also be sought in student's learning
2. developing key questions that lead to connecting the new knowledge to the experiences or knowledge that the learner already has undergone in his/her daily life situations
3. Selection and sequential organization of learning activities/episodes in terms of the objectives.
4. Selection of appropriate devices to evaluate the learning outcomes at different stages.

3.5.4 Structure of a Lesson Plan

A Comprehensive plan might indicate at the top the essential identification data like the name of the teacher, school, standard, subject, topic, time etc., The learning objectives could then be selected and clearly stated. What are often stated as general aims could be taken for granted and so need not be repeated lesson after lesson. For example, developing scientific attitude, developing understanding of the physical and social environment, developing comprehension and expression, etc., could be assumed and need not be specifically stated unless some important aspect of this is specifically emphasized in the lesson. The learning objectives in content subjects could conveniently be given in terms of:

1. Acquisition of factual knowledge (of facts, processes, etc)
2. Developing understanding (of concepts, principles, relationships etc.,)
3. Developing ability to apply (knowledge or understandings to new situations)
4. Developing analytical skills
5. Developing certain skills (if appropriate to the topic)
6. Developing interests, attitudes, appreciations, etc. relating to the topic/unit.

In the case of language subjects, particularly prose lessons based on the detailed texts, the instructional objectives could be conveniently defined in terms of the following:

1. Understanding and using the relevant structural items.
2. Understanding and using the relevant vocabulary items(essential or active vocabulary)
3. Acquiring knowledge of content words (recognizing words)
4. Understanding special usages, idiomatic expressions, grammatical relationships etc.,
5. Further development of skills on comprehensions and expression in both oral and written forms.

The above general objectives cannot be assessed unless and until they are specified in terms of assessable learning processes and learning outcomes. The learning processes have been given emphasis in the constructivist context of teaching, as students will be engaged in the situations created, where many cognitive skills will be employed by them in the cooperative learning mode or individually.

If the basic principle that all teaching and testing have to be objective based and learner centered is to be followed, with due emphasis on student role in the process of learning as well as in the product (to be formally tested). The plan should clearly show such learning processes and learning outcomes. These then should be the starting point for indicating the corresponding contents, learning activities, evaluation devices and items etc. Such things could be given in a structured way. (There is no rigidity about the number or different order of columns, but a good comprehensive plan adopting this approach should essentially indicate the important expected learning/ learning outcomes, content, learning activities and an evaluation procedure). The content need not be spelt out in detail nor should every question or small detail be given under learning activities. As far as possible the learning activities could be given from the pupils point of view indicating the teachers role by implication. The aids , materials, etc., to be used could also be indicated under learning activities. If necessary , the black boards work could be indicated by underlining or other means. Where the ‘ process out come’ is indicated no separate item or device need be indicated under evaluation, but techniques like observation of skills in the process of

development could be indicated. Questions for testing ‘ product outcomes’ could also be given. All these could then be given in a structured way in about three or four columns with one to one horizontal relationship. Such a comprehensive plan may take a few pages.

3.5.5 Lesson Plan Format

1. Name of the Student Teacher :
2. Year :
3. Name of the Co-operating School :
4. Date :
5. Duration :
6. Standard :
7. Subject :
8. Unit/topic of the lesson :

Lesson:

Learning Objectives:

Major concepts:

Key questions:

Learning resources:

Prior /previous knowledge:

Concept map of the unit/lesson

Concepts & phases of the lesson	Teacher Initiatives	Learners active learning	Assessment and BB work
Introduction Engaging episode/event			
Development			

Bridging			
Exploring			
Explaining			
Application			
Review			
Assignment			

Specimen Lesson Plans in Different Subjects
 (The specimen lesson plans are provided in Appendices)

3.5.6. Preparing a Unit test
UNIT TEST

Title of the Unit : Nutrition in animals

Learning Objectives

- Explains the meaning of digestion
 - Draws and labels the different parts of the digestive system
 - Identifies the number of teeth in the mouth
 - Relates the type of teeth with their functions
 - Identifies the causes for tooth decay
 - Evolves hygienic measures for prevention of tooth decay
 - Identifies different regions of the tongue help in tasting different types of food.
 - Infers from the observations that saliva breaks down the starch into sugar.
 - Reasons out the causes for indigestion
 - Identifies the act of different digestive juices secreted by different organs and glands on carbohydrates, fats and proteins
 - States the meaning of ingestion, digestion, absorption , assimilation and egestion
 - Explains the role of villi in absorption of digested food.
 - Explains the role of large intestine in elimination of undigested food.
 - Reasons out as to why ORS is administered to patients suffering from dehydration

- Describes the process of digestion in ruminants
- Reasons out as to why cellulose present in the grass is digested only by ruminants and not by other animals
- Identifies the part that helps in taking food in case of amoeba

I. Weightage to Different knowledge and cognitive process dimensions (No. of items and its percentage)

Knowledge dimension	Remember	Understand	Apply	Analyse	Total cognitive process dimension
	Factual	8			
Conceptual		12	4		16
Procedural			2		2
Metacognitive				2	2
Total	8	12	6	2	28

Weightage to the content and the cognitive process dimensions (in percentages)

Knowledge/content dimension	Cognitive Process dimension					Total content dimension
	Remember	Understand	Apply	Analyse	Skill	
Different modes of nutrition in animals		1(1) (%) 1(3) (%)				2(4) (%)
Digestive system in human beings	4(1/2) (%) 1(1)	1(1)			1(3)	7(7)
Process of digestion	1(1/2) 5(1)	3(1) 2(2)	4(3)	2(3)		17(27.5)
Total cognitive Process dimension	11(8.5)	8(10)	4(12)	2(6)	1(3)	25(39.5)

III. Weightage to Different Forms of Questions

Sl.No	Form	Number of questions	Marks	% of marks	Approximate time
1	Short essay	-----	-----		
2	Very short answer	6	7		
3	Short Answer	8	23		
4	Objective type	11	8		
	Total	25	38		

IV. Blue Print/Table of specifications

Subject: science

Class: VII

Maximum Marks:

Unit / Paper: Nutrition in animals

Duration: 60 mts

Knowledge/content dimension	Cognitive Process dimension						Total
	Remember	Understand	Apply	Analyse	Skill		
	VSA SA OB	VSA SA OB	VSA SA OB	VSA SA OB	VSA SA OB		
Different modes of nutrition in animals		1(1) 1(3)					2(4)
Digestive system in human beings	4(0.5)	1(1)					5(3)
Process of digestion	1(1) 2(0.5)	4(1) 4(1)	4(3)	1(2) 1(3)	1(3)		18(32)
Total cognitive Process dimension	7(4)	11(13)	4(16)	2(5)	1(3)		25(40)

V SCORING KEY AND MARKING SCHEME

Q. No.	Key/Value Points/ Outline	Marks allotted for each value point	Total Marks
1.			
2.			
3.			

VI. QUESTIONWISE ANALYSIS

l. o.	Objectives	Specifications	Unit/sub- units	Form of Questions	Marks	Estimated Time	Difficulty level

VII. Weightage to Difficulty Level

Sl.No.	Difficulty Level	Marks	% of Marks
1.	Easy		
2.	Average Difficulty		
3.	Difficult		
	Total		

Unit Test

Section A

Total Marks:40

1. What is the meaning of digestion? (1)
2. The juice produced in the stomach contains an acid as well as an enzyme. Name them. What do the acid and the enzyme do in digesting the food? (2)
3. What happens to the undigested food that remains in the large intestine? (1)
4. Rearrange the process of digestion in the following figure.
Ingestion → Assimilation → Absorption → Digestion → Egestion (1)
5. Mark the regions of tongue in the given figure for sweet and bitter taste (1)

Figure

6. Find out the organ used for nutrition and label it in the following figure of an amoeba. (1)

Figure

Section B

1. Ajay who is a fifth standard student wants to know how food moves in the opposite direction during vomiting. Explain to him with a figure. (3)
2. Make a table showing the type of teeth and the number of teeth the lower jaw and the upper jaw with their functions. (3)
3. Ram who is 11 years old visits a dentist as he was suffering from severe tooth ache. The Dentist examines him and says that he has cavities in 3 to 4 teeth and few others are decayed. What might have been the causes for Ram's teeth condition? What would have been the advice of the Dentist to Ram to prevent his teeth from further decay? (3)
4. The food never comes back into the mouth of a person who is consuming food standing upside down. What is the reason? (2)
5. Leena is suffering from diarrhea. She finds herself very weak to move around even in the house.
 - i) Why was she feeling so weak?
 - ii) You remembered what your family doctor had advised you when you were in the similar condition as Leena is now. Your doctor had advised you to drink ORS. What is ORS? As a friend of Leena, how will you prepare ORS and give it to her? (3)
6. Below is given the incomplete diagram of human digestive system. Complete the diagram and label the parts. (3)

Incomplete figure of the Human digestive system showing only some parts without labels.

7. Here is an experiment where a spoonful of atta or rice flour is taken and six spoons of water is added to make a paste. The paste is divided into two portions and each portions is put into a test tube. Ten drops of water is added to the mixture in tube 1

and an equal amount of saliva is added in the test tube 2. The test tubes are kept in stand for few minutes. Later a few drops of iodine is added to both.

- i) What would be the colour in both the test tubes? (3)
 - ii) Why did the colour change? Give your reason. (3)
8. What is special about a ruminant's stomach? How does it help the animal digest the grass eaten? (3)

Section C

(½ mark each)

Fill in the blanks:

1. Chemical substances produced in the body of an organism to help in the process of digestion are called -----
2. The tube starting from the mouth and ending in the anus through which food passes is called the -----
3. the fingerlike folds in the wall of the small intestine are called-----
4. Glucose breaks down with the help of ----- into carbondioxide and water.
5. bile juice is stored in a sac called the -----
6. The largest gland in the body is -----

Instructions : Each item that is given below has four alternatives. Choose the right answer and encircle it.

1. The walls of the large intestine absorb
 - a. water
 - b. digested food
 - c. undigested matter
 - d. Cellulose.

2. Assimilation is a process by which
 - a. food is digested
 - b. digested food is taken by the blood
 - c. digested food is utilized by the body
 - d. food is broken into simple molecules

3. Cellulose forms a large part of the undigested matter we egest. It is
 - a. undigested protein
 - b. the substance the cell wall of plants are made up of
 - c. undigested starch
 - d. Undigested sugar.

4. The first set of milk teeth is
 - a) 20 in number
 - b) 25 in number
 - c) 15 in number
 - d) 28 in number

- 5 Digestion of food gets completed in the -----
- liver
 - stomach
 - small intestine
 - large intestine

3.5.7 OBSERVATION OF LESSONS

The first step towards becoming an effective teacher is to get acquainted with the techniques underlying good teaching. Therefore, every trainee, before commencing supervised teaching is required to observe a few lessons in each subject of specialization. These lessons may be of different types, given by his peers and teachers, preferably trained and experienced teachers.

The purpose of lesson observation is to develop a deeper understanding of the learning process and not to assess the observed lessons. The approach should be that of a learner who is interested in finding out what happens to pupils and how it happens, not that's of a supervisor or inspector. The business of the observer is to pass judgements but to observe and records the important learning and the techniques, methods experiences, activities etc., used for developing them. No comments need be given about the teachers personality and effectiveness of the teaching etc. In order to make observation effective., it is important to know very clearly what to observes, how to observe and how to record the observations. The questions in the section given below will indicate what one needs to observes in a lesson at different stages. They will also indicate by implication the various aspects or qualities of a good lesson.

3.5.7 What to Look for while observing Lessons

(a)Preparation/Motivation

This is the first stage of a lesson. The following things should be noted:

- How are the pupils motivated?
- what is the situation or episode or an event created by the teacher to engage the learner?
- How is the relevant previous knowledge tested and revised?
- How the topic of the lesson is introduced in the form of question?

(b) Developments of the Lesson

This is the central and the most important part of the lesson:

- What are the important objectives of the lesson in terms of – terms, facts, principles, content, skills, interests etc., (In other words what are the main teaching points). How are they made clear to the pupils?
- How does the teacher use scaffolding in class? Did it help in connecting the new knowledge to the knowledge already experienced?
- What activities and procedures are adopted for realizing these objectives? How effective is the sequencing of learning experiences?
- Did the teacher group the class? How did it help in group tasks and in group learning?

5. What are the various learning outcomes realized through them?
6. Are the strategies, methods and activities effective for realizing the objectives? Are there better procedures which will be more suitable to the situations?
7. How appropriate, clear and effective is the teacher's explanation?
8. Are the questions
 - (a) purposeful and thought provoking?
 - (b) simple , clear and well-worded?
 - (c) put to the whole class?
 - (d) well distributed?
 - (e) effective in securing good pupil participation?
9. Are the answer to the questions
 - (a) accepted wherever correct?
 - (b) corrected when wrong?
 - (c) explained further where necessary?
 - (d) appropriately and effectively improved and emphasised?
10. What teaching aids are used? Are the teaching aids ready-made or improvised? Are they used in the appropriate situations and effectively?
11. Is there any demonstration? Is it well structured, well explained and effective?
12. Is the pupil's interest sustained till the end and how? Were they enthusiastic and attentive?
13. Do the pupils have sufficient opportunity to ask questions, express their thoughts and show initiative?
14. Is there sufficient pupil activity and participation? Were they encouraged to observe, do and learn the things themselves to the extent possible?
15. Is the sequence of the teaching points logical? Was the development of each point psychological?
16. How are the pupils difficulties recognized? How were they tackled?
17. How are important points emphasized?
18. How is the lesson correlated with other lessons, subjects, activities and life situations wherever possible?
19. Did the learners participate in the class room discussion and other interactive processes?
20. What were the process skills that were developed during the lesson?
21. Did the teacher provide application situations in the class where the learners can apply their understanding of the concepts learnt?
22. Were the learners able to explain the concepts after their exploring activities? How did the teacher facilitate learning?
23. Did the teacher use worksheets and assessment devices to assess the learners? were they effective in the attainment of objectives?

(c) **Review**

1. How is recapitulation of the significant points covered in the lesson done?
2. How is the black board summary built up for the benefit of the students?

(d) **Assignment and Evaluation**

1. How is evaluation of pupil achievement done?(oral questions, written test, assignments, observation and other methods.)
2. What kind of remedial work is done?
3. Are there further assignments to be done outside the class? How purposeful, clear, appropriate and useful are they?

(e) **General Aspects**

Social climates in the class Room:

1. What is the nature of relationship in the class, between teacher and pupils and among pupils?
2. Does the teacher give pupils sufficient freedom? Is he able to maintain order and disciplines?
3. Is there an atmosphere of co-operative learning?

(g) **The Teacher:**

1. Is the teacher pleasant, resourceful, enthusiastic, sympathetic?
2. How does he hold the class together? Does he have any difficulty? How does he tackle difficult situations?
3. Is his speech clear and effective?

3.5.8 Tasks Relating to Lesson Observation

1. Observe some lessons given by your supervisor and other teachers of the school in your subjects of specialization.
2. Observe the required number of lessons given by your fellow trainees, in each of the subjects of your specialization.
3. Observe some lessons in other subject areas given to the pupils whom you are teaching. This would help in understanding to some extent the relationship between your subject and others, the impact of the total curriculum on the pupils, the performance of the same pupils in other subject areas, and through this, the pupils themselves.
4. Keeping in view the following aspects of a lesson observe how the pupils responded to its development, preparation, motivation, clarification of objectives for the pupils, teaching points (terms, facts, concepts, skills etc.) their development, procedures adopted, techniques used, provision for individual differences, correlation with other subjects and like situations, use of teaching aids teacher-pupil interaction, questioning, social climate of the class, recapitulation, assignments, evaluation of pupil achievement and further work on that basis , teacher's personality etc.,
5. Record your observations about each lesson, based on the above guidelines in the following form.

3.5.9 PROFORMA FOR RECORDING OBSERVATIONS

The student teacher should give a brief account under each category of observation.

Name of the School :	Name of the Student Teacher:
Name of the Guide Teacher:	Class :
Subject :	Lesson No. and Title :
	Date
Categories	Points for Observation
1. Lesson Plan	: In proper form with the basic elements.
2. Motivation	: Brief account plus its effectiveness and appropriateness.
3. Teaching Learning Materials	: A list of the name of the items should be given, its appropriateness, visibility and clarity is to be mentioned.
4. Handling of TLM	: When the teacher used it in the class, and whether it had the desired effect on the pupil.
5. Black Board work and drawing	: Mentioned about the planning, clarity, visibility and legibility.
6. Teaching Learning Activities	: Mention the activity and also as to whether it was a demo by the teacher or student, individual or group activity.
7. Questioning	: Type of questions, adequacy, appropriateness. Key questions
8. Pupil Participation	: Whether the class was interactive and whether it was more teacher centered or child centered.
9. Reinforcement	: Mention as to what are the reinforces, repetition of points, underlining, stressing, appreciation of pupil reaction, etc.

10. Evaluation : Whether the questions were widely distributed and attention paid to slow learners.
11. Follow-up work : A brief account of the assignment or simple projects given to the pupils.

**Signature of the Student-
Teacher**

**Signature of the
Guide Teacher**

Discuss with the teacher after observing the lesson about selection of objectives, concepts, procedures, etc., and try to understand why the teacher did things as he did. You may also discuss improvements or better procedures, but be very polite and tactful in all such discussions. Bear in mind this is a learning activity for you.

CHAPTER III

ORGANISING INTERNSHIP

Overview: Because of the importance of internship in the total programme of the teacher-training course, as well as the complexities of internship, organizing internship calls for great care and deftness on the part of the organisers of internship. Organisation of internship involves the important stages-selection of internship centers, arranging pre-internship conference, conduct of internship and evaluation. Each stage is crucial for the success of internship. We now turn to examine these stages in some detail.

3.1 SELECTION OF INTERNSHIP CENTERS

The first step in organizing internship is to select the schools for the conduct of internship for our trainees. The selected schools will be called the co-operating schools and the heads and teachers of these schools are the co operating heads and teachers respectively.

The criteria kept in mind for selection of the cooperating schools are-

1. The schools are in the states which comes under the sphere of educational activities of the colleges.
2. The media of instruction are those in which the student teachers will be required to teach.
3. The schools are well equipped in terms of staff and instructional needs of the interneers.
4. The schools are willing to help the college in internship programme.
5. It would be desirable if the schools have a hostel attached to it so that our interneers can be housed during the internship.

Schools that are suitable for the internship are approached to ascertain their willingness to help in internship. Having secured the willingness, the formalities of getting permission by the concerned educational authorities of the schools are attended to by the college. With such a permission the cooperating schools are selected and the same is intimated to the schools formally by the college.

3.2 PRE-INTERNSHIP PROGRAMME

3.2.1 For the Student-teachers:

In order to brief the student-teachers who are proceeding for internship about the internship arrangements and the expectations from them, a pre-internship meet is arranged. During this meet, the student teachers know their duties and responsibilities in their internship centers besides information regarding the centers. Their attention is drawn to the following points:

- teaching responsibilities-the quantum of teaching(in terms of periods) they are required to do.
- The material they get from the centers and those they need to carry with them(as kits, chemicals, books, etc.,)
- The co-curricular and extra-curricular activities they can do at the centres.
- The research projects they can undertake.

- The community work they can undertake.
- The rules and regulations of the co-operating schools and the dos and don'ts that they need to strictly observe.
- The records to be maintained by them for evaluation purposes

Besides the last minute briefing, they are supplied with necessary forms as the teaching profile, the student-teacher diary, lesson observation format, list of records, to be maintained, etc.,

3.2.2 For the co operating heads, teachers and college Faculty:

Conference of cooperating Heads and Teachers:

A Pre-internship conference is conducted prior to the commencement of internship in which the cooperating heads and teachers participate to know about the college in general and about the way the college would like the internship to be in particular. It is an opportunity for the college faculty as well to meet the cooperating heads and teachers to know about the schools in turn. Thus it is mutually beneficial. Through lectures, lecture-cum-discussions and demonstration lessons, different aspects of internship are presented and analysed. Here opinions on different aspects of internship are discussed and clarified such a dissemination goes far in making the internship more meaningful.

The discussions are centre around:

- a) Meaning and scope of internship
- b) Planning a lesson different aspects
- c) Objective based teaching
- d) Evaluation in teaching.
- e) Evaluation of lessons-use of the teaching profile.
- f) Activities during internship besides teaching.
- g) Role of cooperating heads and teachers in internship.

The cooperating heads and teachers will enlighten the student-teachers and the faculty members of the college about their schools during the centrewise meetings.

3.3 The Duties And Responsibilities Of The Student-Teachers During Internship

The internship is organized to benefit the student teachers. The success of the internship is ensured to the extent the student teacher has to fulfill certain obligations during internship, in order that the internship experience is worthwhile and wholesome to him. The internee has a code to conduct for him during internship.

3.3.1 Knowing the School-Community:

The first and one of the most important of all the things that he should do is-knowing the headmaster and the teaching fraternity of the school, finding out the resources and facilities available in the school, knowing the rules and regulations of the school and to impose self-discipline to conform to these rules and regulations, knowing the students to whom he is going to teach and any other information related to the school.

3.3.2 Lesson observations:

This aspect has already been discussed earlier. The student teacher has a lot to learn through observation of lessons of his colleagues and senior teachers of the schools. He must be aware of what to look for in a lesson, know how to record his observations, be able to critically examine the lessons observed, reason why he finds certain learning experiences inappropriate and be able to suggest alternate and more appropriate learning activities. He has to do the observations in a phased manner as already discussed earlier and build the observation records for the perusal and evaluation by his supervisors.

3.3.3 Teaching Assignments:

Practice -Teaching is at the heart of internship. Here comes the climax when the student teacher should put to use all the theory about teaching and learning, his understanding of students' psychology etc., in a real classroom situation which would be invariably far from the ideal classroom. Here he would find the extent to which the principles and methods of teaching he has learnt earlier during the training course are useful. He learns the art of teaching by learning how to choose, modify and improvise teaching techniques appropriate to the classroom situation. Obviously, it calls for an elaborate preparation on his part. The preparation is two fold (i) equipping himself with the correct content that he is going to teach which means knowing the content in all its depth, not just superficially. It is this knowledge that gives him the power to sustain in the class and the confidence to face his students. Knowledge of correct content is more imperative since teaching incorrect concepts and processes entails the process of unlearning on the part of the students, which process is very painful and undesirable (ii) Planning the lesson which effectively takes care of the art of presentation of the content. In other words it is planning to teach. This aspect of preparation can hardly be underestimated and has been discussed at length earlier.

It is very essential for the student teacher to plan the lessons well in advance and discuss the same with his college supervisors/Cooperating teachers and incorporate the outcomes of the discussions in the lesson as such.

After the lesson, the student teacher should know from his peers and the faculty members who will have observed his lessons, the strength and weakness in his lesson for future guidance.

3.3.4 Organisation and effective participation in school programmes-Co-curricular activities:

Need and Importance:

The scope of internship, as has already been explained, goes beyond acquiring the basic skills and competencies required for effective classroom teaching. It also includes training and experience in organizing various co-curricular activities, health and physical education programmes, games and sports. Co-curricular activities, provide opportunities for pursuit of established interests, development of new interests, and for the exercise of creative abilities developing team spirit and build morale, encourage moral and spiritual development, strengthen the mental and physical health of students, and thus contribute towards the all round growth.

General Guidelines:

In addition to classroom teaching, therefore, every student teacher is expected to participate and help in the effective organization and conduct of these activities in the school. Since the duration of internship is not long, he has to exercise great care and caution in deciding about the nature and extent of his involvement in these activities. The following guidelines may be kept in view:

1. Be as punctual as a regular teacher and attend all functions and programmes in the school, from the morning assembly to games and other functions in the evening.
2. First observe and study each kind of activity, and then participate in it, with permission.
3. Participate in activities like morning assembly, various club activities, committee meetings, staff meetings, games, scouting, health services, campaigns undertaken by the school or clubs and other special programmes and student activities as leader, official etc., in different activities as and when appropriate.
4. Participate more frequently and intensively in a few selected activities suited to your interests, tastes and abilities.
5. You may also help in the conduct of examinations, evaluation of scripts, clerical work, and any other kind of work expected of the teachers.
6. Attend programmes like inter-school athletic meet, tournaments, youth festivals, exhibitions etc.
7. Conduct a few well-planned sessions in physical education.

Possible activities that can be organized during internship:

The scope of co-curricular activities as far as the student teachers involvement is concerned as two fold. On the one hand he has to organize a certain number of co-curricular activities on his own initiative and on the other, has to critically study the organization and conduct of some activities that are already functioning in the school, besides participating.

Of the various kinds of activities that one can think of organizing, the following may be mentioned:

- i) Clubs and Associations-
Literary (debates, essay competitions, school bulletins, magazines)
Cultural (music, folk-dance, drama, national and cultural events, fancy dress, mono-acting)
Clubs (Science, hobbies like photography, stamp collection etc.)
- ii) Excursions and visits to place of educational interest.
- iii) Exhibitions
- iv) School Assembly
- v) Student self-government
- vi) Quiz programmes
- vii) Nature rambles, hiking
- viii) Games, sports, athletics
- ix) Parent Teacher Association.

Principles of Organisation:

While organizing any new activity the following principles should be kept in view:

- 1) The justification for each activity must lie in the contribution it can make to the learning and development of the pupil.
- 2) The activity for each school should grow out of the needs of that school and be adapted to the local situation.
- 3) Participation in student activities should be equally available to all students with restrictions related only to competency and interest in the given activity.
- 4) Co-curricular activities should furnish a rich source of motivation for class instruction and also, wherever possible, reinforce classroom teaching.

Critical study of Co-curricular Activities of the School:

More important than starting or adding a new activity to the total school programme is the intensive, scientific study of the planning, organization, conduct and other aspects of existing activities. Such an exercise helps in developing insight into the real purpose and significance of the activities and also in giving you new ideas about bringing improvements in them. While studying any co-curricular activity keep the following points in view:

1. The objectives of the activity
2. Its educational significance
3. Its organization
4. Kinds of programmes undertaken
5. Extent of student participation
6. Frequency of meetings.
7. Provision for the evaluation of the activity
8. Weaknesses in the existing organization and suggestions for improvement.

3.3.5 Records to be maintained during internship:

Importance

In order to derive maximum benefits from your internship experiences, it is necessary to develop the skill of recording and reporting your experiences. To help you develop proficiency in this area, you will be expected to maintain a number of records covering the various aspects of your internship experiences.

Kinds of records and instructions:

Science internship experiences cover a wide range they include preparation for class-teaching, actual teaching, evaluation of student learning, participation and organization of co-curricular activities and so on-proper classification of the same recording and reporting purposes becomes essential. There are, of course, many ways of doing this. Here we give a brief description of some of the important records and also certain broad instructions relating to their

scope and maintenance. The exact number and kinds of records that you have to keep during the internship in a particular year and precise instructions relating to the same will be communicated in the pre-internship sessions.

Mathematics Education Record

In this record the internee will be mainly concerned with the study of the curricular practices pertaining to mathematics as they are seen in the cooperating school. He should record both his observations of the practice and also his own contribution with respect to each of the following area

i. Maths Instruction

Its organisation, planning, supervision and guidance.(consider different kinds of organization planning at different levels, teacher-pupil planning, individual preparation, instructional materials, time-table, methods of teaching and so on)

ii. Learning aids

Availability, utilization.

iii. Enrichment activities and remedial teaching programmes in maths.

Organisation, provision for independent study, group study, supervised study, nature of guidance given by the concerned maths teachers, additional activities-inter student activity in problem solving.

Maths club, its organization, nature of activities, effectiveness.

iv. Evaluation

Philosophy, organisation of evaluation, kinds of tools used, frequency of tests, follow-up, suggestions for improvement.

Science Education Record:

This record is not a collection of a lot of data about the school, for the sake of submitting a voluminous report, but a report of deep study of the various aspects of the school science programme with a view to gain proficiency in handling the problems to be faced by you on becoming a science teacher. You should therefore familiarize yourself with the total science programme of the school and be able to comment critically and offer suggestions for its improvements. The study may be undertaken under the following heads.

i. Science Curriculum

Courses of studies offered at different stages-time allocation: organization of the instructional programme ; subjectwise organization: co-operative planning: individual preparation: supervision and guidance; instructional materials used and prepared

Instruction to teachers in the implementation of the new curriculum material-teachers' guides or supplementary materials-orientation programme conducted to train teachers -nature of the inservice programmes-State or RCEM -effectiveness or insufficiency-Methods of science teaching followed-lecture demonstration-discovery-inquiry.

ii. Science Laboratory

Facilities for science practical-separate room/demonstration table in classroom, gas, water, electrical facilities. Store and preparation rooms.

Equipment in different sections and for different purposes. Adequacy and utilization.

Dimensions of the laboratory furniture-maintenance funds available per year student-how much by the school and how much by the Government.

iii. Science Evaluation:

System of tests and examinations-assignments given and corrected-frequency tests-progress cards and cumulative cards-remedial teaching-backward and gifted students. Whether results of tests are analysed statistically? Whether parents intimated? Whether final examination or school conducted? Policy for promotions. Test if they are conducted in their time table hours or after class hours. Your suggestions for improvement.

iv. Time table

Organisation of the science class hours-provision for double periods-time for independent study-group study-supervised study.

v. Science Library

Nature and Number of books, periodicals, encyclopaedias-magazines-adequacy. Finance-effective use and suggestions for improvement.

vi. Co-curricular Activities

To strengthen science teaching. Field trip educations tour-finances-planning-frequency. Science magazines-by students. Speeches by Scientists. Community resources available and utilized.

vii. Science club

Nature of activities. Frequency of meeting-finance-number of members-investigatory projects -suggestions for improvements.

School Organization Record

You may study any one of the following areas in detail and present a report of your findings. Your reports should cover the aspects mentioned under each area and should include review of theory, your observations in the school and critical evaluation and suggestions for follow-up for

the area studied. This study should not be a repetition of the aspects already reported in your Science/Mathematics Education Record

i. *Curriculum*

Principles of curriculum construction. The extent to which these principles have been followed Modern tendencies-courses of study offered at different stages with time for each correlation among different topics of the same branch subject-correlation of the subject with the other school subjects.

ii. *Library*

Location-provision-number and classification of books, journals etc.,-Organisation, service and utilization of the library- personnel and financial aspects.

iii. *Time-table*

Need and importance of the time-table –important principles of time-table framing-Relative importance-and difficulty of subjects-Element of fatigue-The extents to which these principles have been followed-types of time-table in use-difficulties experienced in time-table.

iv. *Student self government*

Need and importance-its organisation, working, pupil participation and responsibility-activities planned and undertaken-usefulness of the activities teachers role as a guide in these activities.

v. *Evaluation*

Philosophy and principles-evaluation scheme in uses in the school systems of tests and examinations-kind of tools used-place of cumulative records as a tool for evaluation-promotion, results.

vi. *Guidance*

Places of guidance in the school-organisation of the guidance programme-activities undertaken-role of the school personnel in guidance-effectives uses of the opportunities provided by the pupils.

Lesson Observation Record

Phase I	5 Lessons (Min)
Phase II	5 Lessons
Phase III	<u>10 Lessons</u>
Total	20 Lessons (Min)

Details have already been discussed in ChaptII,2.8ord

Evaluation Record

This should include two units tests in the two subjects of specialization and the statistical analysis and interpretation of the scores.

The record should be complete with the blue print, weightages for different types of tests, content, objectives, tests items, scoring key and raw scores. Calculate the following from the frequency distribution-Mean, Median, Mode SD, correlation. Draw the frequency distribution, Histogram and ogive

Student-Teacher's Diary

(To be submitted immediately after returning from Internship Centre)

1. Name:
2. Centre:
3. School:
4. No. of lessons observed by
 - a) all the colleges supervisors
 - b) The cooperating Teachers

	Method I	Method II	Total
Total			

5. Total No. of lessons given by the student teacher:
6. Details of the lessons given:

Sl.No.	Date	Period	Class	Subject/Topic	Evaluated by (with the teacher's name)	Remarks

7. Details of lessons observed by the students teacher:

Sl. No	Date	Period	Class	Subject/Topic	Name of the teacher	Remarks

8. Total No. of lessons observed:

Subjects	Methods I	Methods II	Total
No.of Lessons			

9. Details of tests conducted by the student teacher:

Sl.No	Date	Class	Period	Subject/Topic	Total Tests

10. Co-curricular activities organized/participants:

Signature of the Student Teacher

3.4 ROLE OF COOPERATING SCHOOLS IN INTERNSHIP

The importance of Cooperating schools in the internship programme is matchless and the role of the schools in the programme can hardly be over emphasised. It is the cooperating school which provides the plank for the activities of the student teacher to learn to teach. It is under the assuring shelter of the cooperating schools the student-teacher shapes himself as the teacher of tomorrow and it is likely that the cooperating schools get the services of the teachers thus prepared, in course of time. Thus there is a cycle which the cooperating schools ought to perceive-the student teachers belonging to a region get the field experience in the schools of the region so that the regions are benefited by these trained teachers in course of time.

3.4.1 Role of Cooperating Heads:

The heads of schools can play a vital role in a constructive way:

- a) by giving the student teachers a sense of confidence and security.
- b) By providing whatever facilities that are available-physical facilities, consultancy and guidance from the school faculty.
- c) By creating a climate where even the slow, the shy and the withdrawing are encouraged to work.
- d) By appropriate counselling.

- e) By helping them through sorting out problems involving human relations and
- f) Above all by looking upon the trainee as a younger brother or sister in the profession who needs guidance, consideration and grooming.

The student teacher needs to be:-

- i) introduced to the school community by letting him know about the different aspects of school and its organization.
- ii) Assigned to the cooperating teachers who are willing to help.
- iii) Provided access to library and laboratories.
- iv) Provided hostel facilities wherever they exist.
- v) Encouraged to do cocurricular and extracurricular activities under the guidance of senior teachers.
- vi) Cautioned against indiscrete acts.
- vii) Told to conform to the conventions and rules of the school.

3.4.2 Role of Co-operating Teachers:

The guidance of cooperating teachers of the schools to the student teachers is very essential for the growth of the intern as a teacher. It is under the valuable help of the cooperating teachers, the trainee shapes himself as a teacher. The trainee learns the art of teaching by observing his cooperating teachers' lessons, the way the teachers handle the situations, students and so on. It is under the instructions of the teachers, the trainee conducts and organizes activities for the benefit of students. In a number of ways, the cooperating teachers can help the trainees during internship. The cooperating teachers would assist the student teachers by –

1. Giving useful information relating to the classes handled by the student teachers.
2. Assigning as many lessons as possible.
3. Letting them know the extent and depth of the content which the student teachers are to teach.
4. Drawing their attention to books reference and materials for enrichment purposes.
5. Informing them of the schedule of classes the student teachers will handle, in advance.
6. Helping them in planning the lessons and discussing the plans before the lessons.
7. Allowing the student teachers to observe the lessons of the cooperating teachers.
8. Making the library and laboratories accessible to the student teachers.
9. Observing their lessons and evaluating them as well.
10. Conducting post lesson discussions for the benefit of the student teachers.
11. Giving them ideas, physical facilities and encouragement for conducting useful co-curricular and extra curricular activities.
12. Giving them appropriate advice on all matters concerning professional interests and attitudes.
13. Promptly dispatching the teaching profiles and other records if any to the institute authorities, after the internship.
14. Providing them facilities to conduct tests on whatever the student teachers have taught.

3.5 ROLE OF INTITUTE SUPERVISORS IN INTERNSHIP:

The institute supervisor who visits the internship center and stays there for a certain period has many duties to perform. He represents the institute and plays the role of a liason officer between the institute and the school. Besides assisting the student teachers in their activities including teaching he has to sort out any problem- be it of human relationship involving the student teachers and the school community or of health and security calling for immediate action, the institute supervisor has to exercise utmost caution, patience and wisdom and handle the delicate situations with tact and firmness. While there cannot be any prescription about the way different situations are to be handles, it would be enough to remind that the institute supervisor's resourcefulness, human qualities, comprehension of the situation warranting effective and immediate action. Of the duties and responsibilities of the institute supervisors that are many fold, we can enumerate some of the most important ones below:

1. Reporting to the center on the scheduled date and commencing the work punctually and go on till the scheduled last date of his stay at the center.
2. Visiting the cooperating schools and finding out problems of the student-trainees, the way things are going on, their progress etc. both from the student trainees and their cooperating teachers and heads.
3. Conducting pre-lesson and post-lesson discussions for every observed lesson.
4. Insisting on lesson plans.
5. Keeping the student trainee informed about his strength and weakness as for his lessons.
6. Giving him useful cues and ideas for better classroom performance.
7. Conducting meeting of cooperating teachers and internees to discuss problems relating to the internship at the center.
8. Suggesting organization and conduct of useful activities at the school, looking to the available resources in the school.
9. Attending to any problem that may crop up immediately (like the health of the trainees, the personal security of trainees, discipline problems, problems with the school community etc.) and keeping the concerned (viz, the college, school authorities, the guardians/parents of the internees) informed of the action taken at the college supervisor's level.
10. Evaluating the lessons promptly and properly (by enlisting the observations and rating in the profile) and other records (such as observations records) for submission to the college.
11. Maintaining the diary (of college supervisor) which should show the lessons observed with all details, for submission to the colleges.
12. Conducting inservice programmes by way of lectures, demonstrations etc. for the benefit of school teachers, if requested.

Teacher's Reflective Journal

Name:	School:	Class:	Subject:	Lesson
No:	Topic of the lesson:	Date:		

1. Lesson / task description – prior to teaching

- What I want them to learn?
 - In terms of subject matter
 - In terms of developing thinking abilities
- Materials that I wanted to use
- Learning strategies that I wanted to use
- Tasks that I wanted to give to the learners

2. Lesson / task description – after teaching

- Procedures (how I worked: time, organisation, etc.)
- Learners' response and outputs (how they responded to the task and what they actually did in the lesson)
- My role in facilitating learning process: (what I actually did and how)

3. Reflection on the actual outcome (what worked well?)

- Could I accomplish what I had planned and intended to do in the class?
- What were the aspects that I could not accomplish in the class?
- Why I could not accomplish?
- What is the most important thing I have learnt about student learning?
- What is the most important thing I have learnt about my teaching?
- What is the most important thing I have learnt about my students?
- How can I use my learning to improve student learning in my classes
- What could I do differently next time?
- Do I feel satisfied with my teaching of this lesson?
- What were the reactions of my supervisor/cooperating teacher and friends who observed my class?
- What are the feedback points that might help me to improve my teaching?
- What are the feedback points that may be difficult for me to imbibe in my teaching process? And why?

4. And from time to time...

- What do I need to do to improve the quality of what I do?
- What might I do instead of what I do now?
- What innovation could I introduce?
- List the outcomes you hope to achieve.

Signature of the supervisor

Signature of the student teacher

SUPERVISOR'S LESSON OBSERVATION DIARY

(To be submitted to the Principal immediately after returning from the Internship center)

1. Name of the college Supervisor: _____ Period of Internship supervisor _____

2. Centre: _____

3. Period of internship supervision: _____ From _____ To _____

4. Details of the lessons observed:

Sl.No.	Date	Name of the teacher trainee	Name of the school	Period	Lesson Subject/Topic	Remarks
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5. Total number of lessons observed: _____

6. Details of meetings/in-service programmes conducted.

Sl.No	Date	Nature	Participants	Purpose	Remarks
1	2	3	4	5	6

7. Problems attended (Give a brief summary of the problem indicating its nature and the action taken by the college supervisor), if any.

8. Any other matter deserving special mention.

Date:

Place:

Signature of the college Supervisor

3.6 EVALUATING THE STUDENT TEACHING

3.6.1. Need for Proper Evaluation of Student Teaching:

Even though the scope of internship is far beyond practicing classroom teaching, student teaching is one of the most important aspects of internship on which internship stresses. Aspects other than student teaching are difficult to evaluate however desirable such an evaluation might be. Often the evaluation of these aspects tend to be subjective. This makes it imperative to evaluate student teaching during internship as far objectively as possible. The

responsibility of evaluating student teaching rests with those who guide the students during internship. It is essential to have a proper scheme of evaluation of student teaching. The advantages of the evaluation are many to behold. Effective guidance is based on the knowledge, on the part of the supervisor who guides the trainee, of the strong and weak points of the student teaching. While the knowledge of strong points boosts the trainee's confidence, the recognition of defects in the student teaching helps the supervisor to suggest remedies for setting the subsequent lessons right. Identification of the strength and weakness in student teaching is possible through proper evaluation of the same.

Effective evaluation of student teaching depends on the evaluation tool used for the purpose. Such a tool should (a) help the supervisor to identify the strength and weakness of student teaching in respect of various teaching skills and competencies (b) offer concrete guidelines to the supervisor about the trainee as for his teaching abilities (c) assess objectively his level as a teacher. Teaching is one of the most challenging tasks because of its complexity. Evaluation of this calls for construction of a evaluation tool that gives an objective appraisal about the teacher who is evaluated. Proper use of such an evaluation tool is another matter, which can hardly be over looked. The major aspects to be considered in evaluating a lesson are-

- a) the preparation that has gone into by the student teacher before he teaches,
- b) the performance of the student teacher in the classroom situation, and
- c) the personality of the teachers itself.

The components under these aspects and criteria to be used for evaluation of the components are given in the RIEM student teaching profile.

REGIONAL INSTITUTE OF EDUCATION, MYSORE – 570 006
STUDENT TEACHING PROFILE

Centre:..... Subject Student teacher:..... Roll.no.....

Name of school:..... Standard Institute Supervisor:..... Lesson Number.....

Period & Time:..... Topic of the lesson:..... Cooperating Teacher:..... Date.....

Aspects & Criteria		Comments and Suggestions with reference to the criteria shown under each aspect	Rating scale									
			Poor									Excellent
1.	LESSON PLAN											
1.1	Content <ul style="list-style-type: none"> • Clarity, Adequacy, Accuracy, Relevance • Appropriateness of Concept Mapping 		1	2	3	4	5	6	7	8	9	10
1.2	Learning Objectives <ul style="list-style-type: none"> • Clarity, Adequacy, Accuracy, Relevance to content • Appropriateness to Process Skills, Inclusion of Higher Order Abilities 		1	2	3	4	5	6	7	8	9	10
1.3	Development of Lesson <ul style="list-style-type: none"> • Effective engagement process, Approaches followed, Arousing interest • Relevance to content and objectives, Linking to previous knowledge • Relevance of key questions • Learning experiences/activities, adequacy, appropriateness • methods/techniques followed, hands on activities • application to new situations, group/individual activities • selection of learning resources, Explanation and questioning 		1	2	3	4	5	6	7	8	9	10
1.4	Assessment, Review and Assignments <ul style="list-style-type: none"> • Coverage of objectives, Variety of questions, Continuous evaluation • Assessing techniques (group assessment, worksheets, activities etc.,) • Scope for reflection, Appropriateness of evaluation • Appropriate review, Suitability of assignments 		1	2	3	4	5	6	7	8	9	10
2	TEACHING LEARNING PROCESS											
2.1	Lesson Introduction <ul style="list-style-type: none"> • Appropriateness to arouse interest • Method adopted to engage pupil (inquiry, situational, questioning, problem based, experimenting, activity, narration etc.) • Linkage to previous knowledge • Focus on key questions of the lesson 		1	2	3	4	5	6	7	8	9	10

2.2	Development of Lesson <ul style="list-style-type: none"> • Use of appropriate skills and strategies • Adequacy and appropriateness of learning activities • Effective scaffolding • Development of process skills • Opportunities for pupil to explore and explain • Assignment of group/individual tasks, Consolidation of pupil view points • Effectiveness of concept attainment/generalizations • Effective explanation and questioning • Handling of pupils' responses • Pupil participation and engagement in activities • Creativeness in extending what is learnt to new situations 		1 2 3 4 5 6 7 8 9 10
2.3	Content Competence <ul style="list-style-type: none"> • Adequacy of content, Use of appropriate examples/non examples • Establish linkage between and among different concepts • Effective clarification of pupil misconceptions • Effective integratedness of concepts across different subjects 		1 2 3 4 5 6 7 8 9 10
2.4	Learning Resources <ul style="list-style-type: none"> • Appropriate and effective use of charts/models/specimens • Demonstration of experiments • Facilitating pupils to use resources/materials/equipment • Use of locally available/improvised resources • Appropriate to develop higher order thinking 		1 2 3 4 5 6 7 8 9 10
2.5	Assessment, Review and Assignment <ul style="list-style-type: none"> • Effective closure of the lesson • Attainment of objectives, Continuity of assessment • Effective assessment techniques (oral questions, worksheets, group assessment, self assessment etc.) • Relevance and variety of questions (open ended, divergent and reflective) • Assignments (relevance, variety, interesting and application oriented) 		1 2 3 4 5 6 7 8 9 10
3	CLASSROOM MANAGEMENT <ul style="list-style-type: none"> • Effective grouping of pupils • Communication and confidence • Democratic atmosphere of the class • Meeting the individual differences • Mannerisms and gestures 		1 2 3 4 5 6 7 8 9 10
Overall Comments: (Rate out of 10)			

Name and signature of the Institute Supervisor/ Cooperating Teacher with date

APPENDIX

Lesson Plan in Biology

Name:

Class: Unit:

Lesson: How leaves are designed to suit their environment in which they grow?

Learning Objectives:

During the course of the lesson and at the end of the lesson, the students will be able to

- Observe and identify different types of leaves and their designs
- Differentiate between aquatic, mesophytic and xerophytic adaptations of leaves
- Cite examples of known plants for aquatic mesophytic and xerophytic adaptations
- Reason out for the large leaves of certain trees in rain forests.
- Reason out for the adaptation of leaves of desert plants and aquatic plants
- Reason out for the adaptation of leaves in certain plants through performing activities
- Given a number of examples, students will be able to classify them into hydrophytes, mesophytes and xerophytes.

Major concepts:

- Leaves are adapted to suit the environment in which they are growing.
- Leaves of certain plants are variously designed to perform certain functions other than the basic functions.
- Those plants that have adapted to living in or on aquatic environment are called hydrophytes.
- The terrestrial plants which inhabit regions with moderate temperature and climatic conditions are called mesophytes
- The plants that grow in a very dry habitat with water shortages are called xerophytes
- Characteristics of hydrophytes, mesophytes and xerophytes

Key questions:

Why is it that the leaves of different plants are designed so differently?

What makes the plant to adapt to a particular environment?

Learning resources:

Pictures and specimens of aquatic, mesophytic and xerophytic plants

Prior /previous knowledge:

- Familiarity with different types of leaves around in daily life; Basic functions of leaf

Concepts & phases of the lesson	Teacher Initiatives	Learners active learning	Assessment and BB work
Introduction Engaging episode/event	<p>The teacher narrates the following incident, The other day, my neighbour's kid, a six year old girl had come to my house. I usually like to ask her some questions for which she may not be able to give the right answers sometimes. But, she does manage to answer my questions always, though wrongly. I have always found her responses very interesting. The other day also, when she had come to my place, I had asked her the following question showing the trees in my garden.</p> <p>Why is it that the coconut tree leaves grow only on the trunk of the tree, and not directly from the ground? I thought she would give me one of her funny and interesting answer. But I was surprised when she put a question back to me. She asked me why the coconut tree leaves grow only on the coconut tree and not on a mango tree.</p> <p>What a meaningful question indeed! I wonder, how many of you will have asked a similar question to yourselves.</p> <p>Why is it that the coconut leaves are different from leaves of the mango tree?</p> <p>Why in the cactus, the leaves are not like those of the banana plant? Or why is it that the leaves of different plants are designed so differently?</p> <p>Today we all shall try to find answers to this question as to how the leaves are designed and why they are designed so differently. (writes the topic of the lesson in the form of a question on the BB)</p>		<p>(On BB) Why is it that the leaves of different plants are designed so differently?</p>
Development Group work	<p>Let us try to do a small exercise to begin with. Write down the different types of plants that you have come across and draw their leaves. Teacher divides the class into small groups and gives 5 to 7 minutes for learners to</p>	Group discussion Discuss in groups and list down the names of the plants known to them with the rough diagram of their leaves	

	complete the task		
Bridging	<p>Teacher asks one member from each group to read out what the groups have listed and draw the figures of leaves on the BB. Based on the examples listed, teacher asks the following questions.</p> <p>What are the differences that you find in these leaves that you have drawn?</p> <p>What are the common things that you find among all the plants that you have listed?</p> <p>Why are the plants green in colour?</p> <p>How does it help the plants?</p> <p>What is the process known as?</p> <p>Good. In which part of the plant does this process take place generally?</p> <p>Good. When there is a common function that take place in all types of leaves, why are they different in size and shape?</p> <p>Let us examine certain examples and see whether environment is the cause for the difference in size and shapes of leaves</p>	<p>Observe that some are small, some are big, and leaves have different shapes.</p> <p>Infer that they are green in colour</p> <p>Recall that due to the presence of chlorophyll</p> <p>Recall that chlorophyll along with the other factors such as water, air and sunlight help in preparation of food.</p> <p>Recall the process as photosynthesis.</p> <p>Identify that photosynthesis takes place mostly in the leaves of the plants.</p> <p>Hypothesize that it may be due to the environment in which they grow.</p>	Students from each group draw the figures of different types of leaves on BB.
Adaptation of leaves in aquatic plants Exploring	<p>Teacher shows the leaf of a lotus and asks whether they had seen it earlier anywhere</p> <p>Well. What is the shape of the lotus leaf?</p> <p>Yes. It is almost round in shape. Where are the roots of the lotus found?</p> <p>Where do the roots draw water and minerals from?</p> <p>What happens if excess water is taken in by the roots?</p>	<p>Identify the leaf as belonging to the lotus plant and recall that it grows in ponds</p> <p>Observe and describe the appearance of the leaf</p> <p>Recall that it is submerged in water</p> <p>Recognize that roots draw water and minerals from the soil at the bottom of water.</p>	

<p>Concept of Hydrophytes</p>	<p>carefully. How do the leaf surfaces feel in both the cases?</p> <p>Now can you answer my question (teacher repeats the question).</p> <p>Good. it is due to this waxy coating, water does not stagnate due to which the pores get blocked.</p> <p>What happens if the stomatal pores get blocked?</p> <p>So, those plants that have adapted to living in or on aquatic environment are called hydrophytes.</p> <p>Now let us see if you can identify other aquatic plants. Teacher shows some of the pictures of aquatic plants and asks students if they have seen them in their surroundings. Teacher asks students to observe the pictures carefully. What do you observe in common among the aquatic plants seen in the pictures?</p> <p>Good. Some of the aquatic plants are submerged under water while some of them are free floating on water. Observe the pictures and find out the free floating and submerged plants.</p> <p>Teacher gives the names of some of the plants which the students do not know like, duckweed, lemna, pistia and so on.</p> <p>Teacher further probes, What other features that you observe among these plants?</p> <p>Good. Can you guess why they have a reduced root system?</p> <p>Right. Similarly we also find other features in aquatic plants which are different from terrestrial plants. They have a reduced support and vascular system and specialized leaves.</p>	<p>Identify that the leaf surfaces in both cases are different.</p> <p>Observe that the leaf surface in case of lotus, has a waxy coating, whereas in case of rose plant, it is little coarse.</p> <p>Reason out that the water drops do not stick to the lotus leaf due to the waxy coating on the surface and it is due to this the leaves do not get decayed even though they are submerged in water.</p> <p>Reason out that transpiration will be affected, thereby leading to excess of water in plant which affects the plant.</p> <p>Observe the pictures and recall that they have seen some of them growing in the water.</p> <p>Identify that some aquatic plants are submerged totally under water, and some of them are grown on water.</p>	<p>What are hydrophytes?</p>
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<p>Explaining</p>	<p>In that case, how does lotus plant survive in that condition? Good. Now let us take an example of a hibiscus plant. Suppose, we keep the plant for many days in the water where it is in a condition of submerged or floating, will it survive as lotus does? What happens to the hibiscus plant? Based on the responses, Teacher encourages students to ask questions related to the concept.</p> <p>Good questions. Can any one in the class try to answer the first question?</p> <p>Well. How is the loss of water through the leaves compensated?</p> <p>What is the process of loss of water through stomata called? Good. Now can any one try to answer the second question? why lotus leaves do not get decayed by being constantly in water? Since there is no response, teacher asks some students to volunteer and do an activity in front of the whole class. They are given some lotus leaves and rose plant leaves with petioles and beaker of water, and water in a bucket.</p> <p>After the students conduct the activity, teacher asks</p> <p>Why the water drops do not stick to the lotus leaves, whereas they stick to the rose plant leaves?</p> <p>Good. Now observe both the leaves (rose, lotus)</p>	<p>Infers that it might harm the plant</p> <p>Hypothesize that excess water is thrown away through stomata.</p> <p>Predict that it would not survive</p> <p>Predicts that it would get decayed.</p> <p>Students inquire..... - What happens if all the water is lost through stomata? - Usually, when leaves are kept in the water for a longer period, they get decayed. Why do the lotus leaves not decay, although they are in the water constantly? Predict that in case of total water loss, the plants would go dry.</p> <p>Hypothesize that as water is lost through their pores, more need for water is generated and water is absorbed by the roots. Recall the term Transpiration</p> <p>Activity 1 Students put water on the lotus leaves and on the rose plant leaf. They observe that water rolls on the lotus leaf, whereas in the rose plant, the leaves get wet.</p>	
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	<p>What are the other features that you find in the leaves? Good. most of these aquatic plant have leaves with large surface. So what are the problems that are not faced by the aquatic plants unlike the terrestrial plants? You have seen that leaves of some plants are freely floating on water. Give an example of such plants. Correct. These plants have air cavities in their roots, stem and leaves which allow for gas storage and diffusion. At the same time they help the leaves in floating on water. What is the term that is used for something that floats? You have said that the excess water is expelled through the stomata. Where could the stomata be in these plants?</p> <p>Yes. The stomata are present on the upper surface of the leaves, as the surface is exposed to air and they help in transpiration. But stomata are not active in all aquatic plants. For example, those aquatic plants submerged under water do have stomata in them, but they are inactive.</p>	<p>Observe the pictures and identifies the free floating and submerged aquatic plants and also recalls the names of some of the plants</p> <p>Observe that the aquatic plants have reduced root system. Reason out that they need not penetrate into the soil like the terrestrial plants to draw water.</p> <p>Identify that the leaf surface is large.</p> <p>Hypothesize that the aquatic plants will not face the problems of transpiration, wilting and drought.</p> <p>Recalls that the leaves of lotus plant are freely floating on water.</p> <p>Recall the term 'buoyancy'</p> <p>Identify that the stomata are present on the upper surface of the leaves.</p>	
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<p>Application</p>	<p>Teacher shows hydrilla plant and asks if they have seen the plant and if so, where. Teacher tells the name of the plant as "Hydrilla", then asks, How are they adapted to live in water?</p> <p>How do you prove that leaves allow the water to pass through?</p>	<p>Observe the plant and identifies the shape of the leaves. Hypothesizes that the leaves allow water to pass through them.</p> <p>Activity 3 Confirm their hypothesis by doing an activity (dipping the hydrilla plant in large amount of water taken in a bucket) and proves by explaining that the fine finger like leaves allow the water current to pass through, thereby adapted to live against water currents.</p>	
	<p>Good. Now give some examples of aquatic plants that you have observed in your surroundings. If you do not know the names of the plants, you can draw on the BB.</p>	<p>Give examples of aquatic plants observed in their surroundings using their local names. Some students who do not know even the local names, but have observed the plants draw them on the BB.</p>	
	<p>Teacher provides the names of the plants for the examples given by the students where local names have been used and for those drawn by the students on BB. Provides a worksheet which has a combination of both aquatic and terrestrial plants and asks students to identify the aquatic plants</p>	<p>Identifies the aquatic plants in the worksheet and name them</p>	<p>Worksheet consisting of different types of plants. Task: to identify the aquatic plants</p>

<p>Adaptation of leaves in terrestrial plants</p>	<p>Now let us move on to the other plants to explore how leaves are designed. Give some examples of terrestrial plants that you have observed in your surroundings</p>		
<p>Exploring</p>	<p>Teacher provides the samples of leaves and asks students to identify the mango leaves Observe the mango leaf and tell how the leaves are structured.</p> <p>Well. Now pour some water on to the leaves and see what happens to the water.</p> <p>What do you understand by this?</p> <p>Good. this is called drip tip which helps in draining water and thereby preventing the water blockage. These terrestrial plants which inhabit regions with moderate temperature and climatic conditions are known as mesophytes</p>	<p>Give examples such as mango tree, coconut, banana tree and so on.</p> <p>Identify the mango leaves from the given sample of leaves Observe the mango leaf and identifies that the leaves are pointed.</p> <p>Activity 4 (in groups) Students pour water on to the mango leaves and observe that the water gets drained through the tip.</p>	
<p>Concept of Mesophytes</p> <p>Explaining</p>	<p>Teacher provides the pictures palm tree, coconut tree and the banana tree. And asks the students to observe the similarities and the differences. What are the similarities and the differences between the coconut tree and the banana tree?</p> <p>Good. As you have said, the leaves of the coconut tree are long spindle and appear like a feather. Why is it so? And where do you find them usually growing? Yes. The coconut trees are usually found growing in the coastal regions, though in many other parts of the land and in households also we find coconut trees growing. As these trees grow tall, they have to face a lot of pressure from wind. So they are designed in such a way to adapt themselves to the environment.</p>	<p>Infer that the tip of the leaf helps in draining the water.</p> <p>Observes that they both have large single leaves and have no branches. Observes the differences in the leaf designs Reason out that the coconut leaves are so designed in order to save from strong winds. Recall that they are usually grown in the coastal plains.</p>	

	<p>How are the banana leaves designed?</p> <p>Right. But why are the leaves of banana large sized?</p> <p>Right. That's one of the reasons. Let us look into the other reasons. What are the factors essential for photosynthesis?</p> <p>Good. You said that light is one of the important factor for photosynthesis. Banana plants were found originally growing in wild conditions in the shade of huge trees in the rain forests. In the forests, there is no scarcity for water. Yet the leaves of banana plants are large. Why?</p> <p>Good. . Plants require light to grow and the leaves trap the light to manufacture food. Also, more the area of the leaf more is the amount of the light trapped by the leaf. Therefore, the banana leaves are large in size. You have also said that the leaves of banana are found torn sometimes. Why it is so?</p> <p>Right. The large size of the leaves is disadvantageous to the plants or trees growing in the windy places like the coastal areas.</p> <p>From the above examples, what do you conclude about the characteristics of mesophytes?</p> <p>Good. not only this. As you must observed the mesophytic plants have well developed roots and vascular system</p>	<p>Describe the banana leaf as long and broad and torn to shreds later.</p> <p>Reason out that there are very few leaves in a banana plant which is insufficient for manufacturing food, and so they are large in size.</p> <p>Recalls the factors essential for photosynthesis.</p> <p>Hypothesize that light is less in shaded places. So if the size of the leaf is large, then more light can be trapped.</p> <p>Reason out that the leaves get torn due to blowing wind.</p>	<p>What are the trees that are grown with large sized leaves in the rain forest region?</p> <p>What are the trees that are grown in coastal areas other than coconut trees?</p> <p>How are their leaves designed? Teacher asks students to draw them on the BB.</p>
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<p>Application</p>	<p>Give some examples of plants with large leaves Why do some plants growing in open area and dry lands do not have large leaves? Right. Let us take the examples of Neem and Gooseberry plants. Teacher shows the leaves of Neem and Gooseberry and asks How are the leaves designed here? Yes. The leaves are bifurcated. What do you call these types of leaves as? So how do the compound leaves help terrestrial plants?</p>	<p>Generalizes as follows: Mesophytes require moderate and continuous supply of water; leaves are larger in some cases and thinner in some cases; more stomata are present on the undersides of the leaves</p>	
<p>Concept of xerophytes</p>	<p>Teacher shows a picture of various types of plants and asks Find out the plants that are grown in the desert and try to name them Good. How are the leaves designed in cactus? Yes. Why are they reduced to thorn like structures? Yes. The water loss in the desert plants will be greater than in the plants grown in other regions due to the hot temperature in the desert areas. So the leaves are designed in such a way, that the water loss is reduced. Plants growing in desert areas are known as xerophytes. Teacher directs the students observation to the surface of the leaf of cactus and asks, How does it feel? Yes. The spongy nature of the leaf takes the stored water deep inside away from the surface You have seen that the mesophytes have more number of stomata. What about the stomata in these plants? Teacher corrects the response by saying that the stomata</p>	<p>Gives examples of plants with large leaves Reason out that they do not have large leaves in order to prevent excess transpiration Observe that the leaves are bifurcated. Recalls that they are known as compound leaves Reason out that they prevent transpiration without decreasing photosynthetic area. Observe the picture and identifies those plants that are grown in the desert regions and names the known plants Observe that the leaves are spine like.</p>	<p>What are the difference between Mesophytes and hydrophytes? Which of the following is a Mesophyte? (mustard, pea, lily, tamarind, casuarinas, pumpkin, pine)</p>

<p>Application</p>	<p>are sunken in these plants in order to prevent excessive loss of water. Besides the prevention of water loss, what are the other functions of spines? Give an example for this.</p> <p>Teacher asks the students to observe the leaf surfaces in the given pictures and as well as in the specimen provided. How do the leaf surfaces look like or feel like?</p> <p>Teacher provides the names of the desert plants seen in the pictures.</p> <p>Teacher provides a worksheet consisting of different types of plants and asks the students to classify them under hydrophytes, mesophytes and xerophytes</p> <p>Till now you have learnt about the plants and their leaf designs modified to suit the dry, moderate climate and rainy conditions. Have you seen the plants growing in extreme cold conditions? How are the leaves of the plants growing in extremely cold regions designed? How do their shape, size ,or other special features of leaves help the plants to adapt to freezing conditions? Teacher asks students to find answer for the above questions by contacting different sources including web resources.</p> <p>Teacher reviews the lesson by asking the following questions.</p> <ul style="list-style-type: none"> • Why are the leaves of the banana plant large and broad in size? Why are the leaves of the coconut tree dissected? • How do aquatic plants expel the excess of 	<p>Reason out that they are reduced to thorn in order to prevent water loss.</p> <p>Observe that it is spongy to touch</p> <p>Hypothesize that the stomata may not be present.</p> <p>identify that the spines also protect the plants from other organisms. Cite examples of animals grazing the plant Cite known examples of desert plants such as opuntia.</p> <p>Observe that some are hairy; some are spiny, while some are fleshy.</p>	
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(a) Example of Lesson plan

Topic : Algebra
Unit : Relations

Class : XII
Time : 45 minutes

Instructional Objectives:

At the end of this lesson, a student will be able to

1. define an equivalence relation
2. state the characteristics of an equivalence relation
3. identify equivalence relation from the given relations
4. cite examples of equivalence relation
5. relate equivalence relation with other type of relations.

Teaching Point

Equivalence relation on a set is a relation on the set which satisfies Reflexive Property, Symmetric Property and Transitive Property.

Previous Knowledge

Reflexive, Symmetric and Transitive Relations.

Expected Learning Outcomes	Sequential Learning Activities with inbuilt Evaluation	Blackboard Work
<p>Compares and contrasts the binary relations which satisfy all the properties from that of other binary relations.</p> <p>States the sufficient condition.</p> <p>Gives reason for the binary relation as the non-example of equivalence relation.</p> <p>Give reasons for a binary relation to be an equivalence relation.</p>	<p>S_6: "is equal to", "is parallel to", etc. are satisfying all the three properties when compared to other binary relations.</p> <p>T: Good. The binary relations which satisfy all the three properties are called equivalence relations (writes on the board).</p> <p>T: What is required for a binary relation to be an equivalence relation?S_7</p> <p>S_7: It should satisfy reflexive, symmetric and transitive properties.</p> <p>T: Good. (Gives a binary relation "is less than and equal to" and asks). Is this an equivalence relation?S_8</p> <p>S_8: "is \leq" is not an equivalence relation.</p> <p>T: Why do you think so?S_9</p> <p>S_9: It does not satisfy symmetric property.</p> <p>T: Good. Give me an example of an equivalence relation?S_{10}</p> <p>S_{10}: "5 divides x-y" in a set of all integers.</p> <p>T: Why is it an equivalence relation?S_{11}</p> <p>S_{11}: Since it satisfies all the three properties.</p> <p>T: Right. We have seen that there are 3 conditions for a binary relation to be an equivalence relation.</p>	<p>Teacher rounds of those binary relations which satisfy all the three properties.</p> <p>Equivalence Relation: Equivalence Relation is a binary relation which satisfies reflexive property, symmetric property and transitive property.</p> <p>1. "is less than or equal to" in a set of Real numbers. 2. "is to the left of" in a set of points on a line. 3. "is collinear with" in a set of points in a line.</p> <p>1. Reflexive, 2. Symmetric and 3. Transitive properties.</p>

Review and Evaluation:

What is an equivalence relation?

What are the characteristics of an equivalence relation?

An equivalence relation is a kind of relation?

What similarities and differences do you find between equivalence relation and other relations?

Today we learnt about equivalence relation.

Strategy :

Compare and contrast → Definition → Sufficient condition → Non-example → Necessary condition → Example → Sufficient condition.

(b) Example of Lesson Plan

Topic : Linear equations in two variables
Unit : Algebra

Class : IX
Time : 45 minutes
Date : 21.10.10.

Instructional Objectives : At the end of the class students will be able to

1. states the definition of linear equations in two variables.
2. state the characteristics for an equation to be linear equation in two variables.
3. cites example for the linear equations in two variables.
4. identifies linear equations in two variable.
5. formulates the linear equations in two variables.

Previous Knowledge

1. Definition of linear equation in one variable
2. Formulate linear equation in one variable

Teaching points :

1. Linear equations in two variables is an equation that contains two different variables each of degree one.
2. General form of linear equation in two variable, is $ax+ by +c =0$, where a, b and c are real number, with a and b both not equal to zero.

Expected learning outcomes	Sequential Learning Activities with inbuilt evaluation	Evaluation/Blackboard work
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	T : Good morning S ₃ : Very good morning sir	
	T : In your earlier classes you have learnt linear equations in one variable. Give a few example for linear equations in one variable.	
recalls examples for linear equations in one variable.	S ₁₀ : $x + 5 = 0$ $y - 2 = 0$ $2z = 6$	$x + 5 = 0$ $y - 2 = 3$ $2z = 6$
	T : Why do there are called linear equations ?	
States the necessary condition for equations to be linear.	S ₁₅ : These are linear equations because, the degree of the variable is 1.	
	T : How many variables are there in each of the equations	
Identifies the number of variables in the equations.	S ₆ : One T : Ram and Rahim together have 5 more books than Ram. Find the number of books Ram and Rahim have? S ₉ : Let x be the number of books Ram have. So Rahim will have $x + 5$.	
Solves the problem by formulating the linear equation in one variable.	$\therefore x + x + 5 = 25$ $2x + 5 = 25$ $2x = 25 - 5 = 20$. ie $x = 10$. So Ram have 10 books Rahim have $10 + 5 = 15$ books. T : Good. See here on the black board a set of equations given in one column as set A and in other column as set B. All the equation in set A has some thing common which is not found in each of the equations of set B observe and tell me what is that?	

Set A	Set B
1) $x + 2y = 3$	$x - y + z = 8$
2) $2r + 5s = 0$	$n = 5$
3) $u = 2v + 4$	$u + v + t = 0$
4) $x - 2z = 6$	$2x + y + u + 3 = 5$
5) $3t = 5u - 8$	$x + 8u = 3z$

Table - 1

Compare each of the equations in set A & contrasts with equations in B and state the findings.

S₇: equations in set A contains two variables where as in set B the equation have the number of variable either 1 or more than 2.

T: Yes good in set B, each of the equations contain two variables.

T: Now observe the equations in table - 2. see the each of the equations in set A has some thing common and which is not found in every equation of the set B. Try to find out that.

Set A	Set B
1) $x + 2 = 0$	$x^2 - 5 = 3$
2) $x + y = 5$	$x^2 + y^2 = 4$
3) $u = 2v + 4$	$r + 2s^2 = 0$
4) $s - 2t + 5$ $u = 6$	$r^2 + 2t - u^3 = 9$

Table - 2

Compares and contrasts and finds the commonalities in set A.

S₁₀: All the variable is each of the equation given in set A are of degree 1, while it is not so in the equations given in set B.

T: Good. Now any one of you come to black board and write equations which contain two variables and each of degree 1.

Writes the equations

S₂: (Writes) $x + y = 5$

$$2t + 5 = 3u$$

T: Good. What do you call an equation containing variables of degree 1

Recalls from the previous knowledge

S₃: It is a linear equation.

T: what is a linear equation in two variables.

Tries to define

S₅: A linear equation in two variables is an equation that contains two variables and of degree 1.

T: Then, is $x + 2y^2 = 5$

a linear equation in two variables?

Recognizes the lack of necessary condition.

S₁: No, S₁₂ Because one of the variable is of degree 2.

T: Can any one restates the definition given by S₅.

Modifies the definition given by S₅.

S₆: A linear equation in two variables is an equation that

contains two variables and each of degree 1.

T : Yes good. So a linear equation in two variables is an equation having two variables and each of degree 1.

T : S₇ give two examples of linear equation in two variables

Gives examples.

S₇ : 1) $15u - t = 0$

2) $x - 8y = 5$

T : Good. (Write an equation on the black board)

Is this a linear equation in two variables ?

$x = 8$

S₅ : No

T : Why?

Identifies the lack of necessary condition.

S₅ : Because it does not contain two variables.

T : (Writes) Is this linear equation in two variables ?

$t + 5u = 8$

S₈ : Yes.

T : Why?

Identifies the sufficient condition for an equation to be linear in two variable.

S₈ : Because it contain two variables and also each of the variable is of degree 1.

T : (Writes) Is this a linear equation in two variables ?

$t^2 = 5$

S₅ : No

T : Why,

Identifies lack of necessary condition.

S₅ : It is not linear.

T : Yes do for an equation to be linear in two variables it should contain two variables and also each variable should be of degree 1.

T : (Writes a set of equations on the black board) White down the equations which are linear in two variables and that are not.

List the linear in the variables & others.

S₆ : Writers.

- 1) $x + y = 8$
- 2) $2x^2 - y = 4$
- 3) $2t + u = 10$
- 4) $x^2 - u^2 = t^2$
- 5) $x^3 - y^3 = 8$
- 6) $x + y = 2t$

linear in two variables are equation : 1, 3, 7, 10

others 2, 4, 5, 6, 8, 9 one not the linear equations in two variables.

T : Mr. kalyani has a few hen and a few pigs in hen form. Total legs of the hens and pigs is 50 and the heads is 17.

Can you express these in the form of equations.

S : (Silence)

T : Is one variable enough to represent the situation.

S : Looks no.

T : Then how many variables are necessary?

S : May be we require two variables one for pigs and one for hens. So let the number of hens be x and the number of pigs be y .

T : Then how many heads each one of the hen and the pigs has,

S : Each one has one head.

T : How many heads x hens and y pigs have.

S : $x \times 1 + y \times 1 = x + y$

But it is given equal to 17

$\therefore x + y = 17$

T : Now can you represent the legs of the hen & pigs in equation form.

S : $2x + 4y = 50$.

T : Each student in IX class has 4 text books & 6 Note books and each student in V class has 2 text books 2 note books. Total number of Text books are 100 and the note books are 140 can you represent these in the form of equations.

S : Let x be the number of IX class students

$$7) s + 2u = -8$$

$$8) r + s^2 = t^2$$

$$9) a + b = c$$

$$10) 5a + 6b = 9$$

Identifies the variables

Represents in the form of an equation.

Represents the data in the form of equation.

& Let y be the no. of V class students

then

$$4x + 2y = 100$$

$$6x + 2y = 140$$

Review : In a right angled triangle. Write the equation representing the sum of the other two angles (besides the right angle) what are the variables.

Assignment : Prabhakar has some Rs 5/- notes and a few Rs 10/- notes. Total value of the money is 125. Can you express this as a linear equation in two variables.

LESSON PLAN

Subject: Physical Science

Class: VIII

Topic: Types of Chemical Changes

Learning Objectives:

The students

- Recall some Chemical reactions
- Predict the possible ways elements and compounds react
- Identify different types of reactions
- Generalise combination, Decomposition, Displacement and Double displacement reactions
- Cite examples and non examples for different types of reactions
- Classify given reactions into different types

Major Concepts:

Chemical Reactions are of different types.

- In a combination reaction two or more substances combine to form a single substance.
- In a Decomposition reaction a single substance splits up into two or more substances.
- In a Displacement reaction an element combines with a compound to form a new element and a new compound.
- In a Double decomposition reaction two compounds exchange their radicals to form two new compounds.
- A redox reaction may not be of combination, Decomposition, Displacement or Double displacement type
- Combination, Decomposition, Displacement reactions are Redox type while Double displacement reaction is not

Key questions

- How many types of Chemical reactions are known?
- Why are reactions specific in their direction?
- Why are all reactions not reversible?

Pre Requisite Knowledge

- Elements, Compounds, mixtures
- Symbols, formulae and Equations
- Physical Change and Chemical change

Learning Aids/ Resources

Periodic Table, Zinc granules, Dil. Hydrochloric acid, Match box

Students activity and responses	Teacher Initiatives	Assessment
<p>Students observe the presence of hydrogen.</p> <p>1.1 Pupils recall that it is a Chemical change.</p> <p>1.2 Pupils recognize the formation of a new substance.</p> <p>1.3 Pupils list out Reactants and Products</p> <p>1.4 Pupils classify them into Elements and compounds.</p> <p>1.5 Pupils give divergent answers</p>	<p>Tr. draws the attention of students by showing the action of dilute Hydrochloric acid on Zinc' granules. Hydrogen formed is tested by a splinter. Asks students to explain whatever has happened and to represent it by word equation. Tr. Asks:</p> <p>1.1 What type of change is the one you just saw?</p> <p>1.2 Why do you think it is a chemical change?</p> <p>1.3 Name the Reactants and Products in the reaction</p> <p>1.4 What type of substance is each reactant/ product?</p> <p>1.5 Could an element and a Compound react differently?</p> <p>Tr. Informs the class that they would learn more about 'Types of Chemical Reactions'</p>	<p>Do you think a Chemist should explain such reactions? Why?</p> <p>What is an equation?</p> <p>Why can we not write $Zn+HCl \rightarrow Zn+H+Cl$?</p>
<p>2.1 Students are actively engaged in exploring.</p>	<p>Tr.gives a Worksheet to each group of 4-5 students and asks them to work and fill up the sheet.</p> <p style="text-align: center;">OR</p> <p>Tr tells:</p> <p>2.1 I give you two elements A and B and two compounds CD and EF. Write as many types of reactions can you form using them?</p> <p>Tr. Asks students to write them on Black Board. Accepts the following: $A + B \rightarrow AB$ $CD \rightarrow C + D$</p>	

<p>Pupils apply the knowledge of basic radical and acid radical.</p> <p>2.2 Pupils cite examples</p> <p>2.3 Pupils try to generalize and define the reactions.</p> <p>2.4 Pupils classify the reactions</p> <p>2.5 Pupils cite examples of combustion and rusting.</p>	<p>$A + CD \rightarrow AD + C$ $CD + EF \rightarrow CF + ED$</p> <p>Discusses other possibilities / impossible ones providing reasons or asking students to reason. Tr. Uses the analogy of forename and surname to show the irreversibility of the names of compounds.</p> <p>2.2 Give an example each for the above types of reactions. Tr. now names the reactions as Combination, Decomposition, Displacement and Double Displacement reactions respectively.</p> <p>2.3 Looking at the general and real examples define each one of the types of reaction. If the definitions are not acceptable Tr. hints and asks them to modify their definitions.</p> <p>2.4 Collects a list of reactions from students and asks them to classify into the four types.</p> <p>2.5 In our daily life there are many combination and displacement reactions that we see around us. List a few of them.</p> <p>Tr. draws the attention of students to the Periodic table and shows the groups of elements which have a tendency to combine readily. Asks students to give some examples and non examples.</p> <p>Tr. also informs the students that heavier metallic oxides are thermally unstable. Asks students to give some examples and non examples.</p> <p>$CuCO_3 \rightarrow CuO + CO_2$</p>	<p>Can we write as follows: $CD + EF \rightarrow CE + DF ?$</p> <p>How are you justified in making the statement: Combination is the reverse of Decomposition.</p> <p>Give an example of a combination reaction in which there are 3 reactants. $NaCl + H_2O + CO_2 + NH_3 \rightarrow NaHCO_3 + NH_4Cl$</p> <p>Give an example of a Decomposition reaction in which there are 3 products. $Pb(NO_3)_2 \rightarrow PbO + NO_2 + O_2$</p>
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	<p>Tr. gives the electrochemical series and informs that the metals at the top only can replace lower metals and not vice-versa. Asks students to give some examples and non examples.</p> <p>Tr. informs the class that Double displacement reactions are specific and not reversible. Asks students to give some examples and non examples.</p> <p>Tr. gives an equation which cannot be classified under the above four types of reactions: $\text{Cu} + \text{HNO}_3 \rightarrow \text{Cu}(\text{NO}_3)_2 + \text{H}_2\text{O} + \text{NO}$ Such reactions are Redox reactions and you will study them later.</p> <p style="text-align: center;">Teacher Reflections</p>	
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Assignment:

1. Link the following through a concept map- Elements, compounds, combination, Decomposition, Displacement, Double displacement, reversible reactions, Redox reactions
2. Neutralisation reactions belong to which type of reactions?
3. How do you demonstrate all the four type of reactions using the following chemicals: Sodium, Hydrogen peroxide
4. Write about 10 reactions from a Chemistry book and classify them into different types.
5. Can a redox reaction also be of the four types that we studied?

FAQs

1. Why do reactions take place?
2. Why all compounds do not decompose?
3. Why any element cannot displace any other element?
4. Why are replacement reactions not reversible?
5. Why are double decomposition reactions usually fast?

Hard spots

Formulae of compounds

Which type of reactants undergo which type of reaction?

Decomposition and dissociation