Assessing the Science Curricula and Evolving a Science Kit for Children of Standards IV and V

BY

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Introduction

1. INTRODUCTION

'Science teaches what evidence is

What proof is'

- Canon Wilson

Educators call middle childhood "the elementary school age" or "the primary school age" (Hurlock, 1980). Development during the years of middle childhood is an existing phenomenon. The period of middle childhood begins at age five or six with the entrance into the formal school, and it concludes with the onset of puberty, which heralds the arrival of adolescene (Schiamberg and Smith, 1982).

School is the child's first step into the larger society. The environment it affords has a major influence on the development of a child's personality, intellectual capabilities, inter-personal skills and social behaviour (Zanden, 1989). Walia (1985) states that every child's mind is very plastic and impressionable during childhood years.

Hurlock (1980) also explains that the elementary school age is the time when the child is expected to acquire the rudiments of knowledge to adult life. It is also the time when the child is expected to learn certain essential skills botth curricular and extra curricular.

Erikson (1964) says, during the elementary school years, children confront the challenge of developing healthy, self-conceptions.

An another important feature of these years is an advance in children's ability to gain knowledge about themselves and their environment. During this time, they come to rely increasingly upon the mental manipulations of concept in adapting to their world. Their reasoning abilities become progressively more rational and logical.

According to Schiamberg and Smith (1982) there is an emphasis on the building of child skills such as reading, writing, inter-personal relationships and game activities. Learning skills is one of the most important and impressive factors of middle childhood. During this period children develop many significant skills in thinking, writing, drawing, reading etc. Reading is one of the most important skills a child will learn. It is essential to success both in the school and afterward, in the working world.

Primary education or elementary education occupies a significant place in the educational reconstruction of a developing country, as said by Bhatia, et al., in 1985. Ever since educational consciousness developed in India a great deal of thinking has gone into developing adequatte programme of Primary Education.

'Well begun is half done' is a well known maxim. As told by Saiyidain (1982) the entire superstructure of the educational set up of a nation rests upon Primary Education. It is on the start that the entire growth, development and enrichment of mental as well as physical potentialities of the child depend. "Primary education"

is not concerned with any particular classes or groups, but has to deal with the entire population of the country; it touches life at every point and it has to do more with the formation of national ideology and character then any other single activity, social, political or educational.

The Article 45 of the Indian constitution refers to primary education as "free and compulsory education for all children until they complete the age of fourteen years". The National Policy on Education (1986) specially lays emphasis in the development of young children. The new thrust in elementary education will emphasise two aspects:

1. Universal enrollment and universal retention of children upto fourteen years of age and
2. a substantial improvement in the quality of education.

The policy also emphasises that a warm welcoming and encouraging approach, in which all concerned share a solicitude for the needs of the child, is the best motivation for the child to attend school and learn. A child-centred and activity based process of learning should be adopted at the primary stage.

The aims of Primary Education as recommended by Mudaliar Commission (1952 - 1953) may be stated as follows:

- to acquaint the students with the 3 R's;
- to develop in them the tools of learning and thinking;
- to provide the basic knowledge and skills tthat enable them to lead a useful life;

- to hand them over the keys of the gates of learning and
- to inculcate in them the love for learning.

(Murthy, 1982)

Lorton and walley (1979) emphasised that young children are very curious about the natural world and surroundings. Science education is the process by which children's needs to know, discover and to create are met through daily experiences in and out of the classroom. Science is not so much giving children right answer to their many questions as it is setting up situations in which young children can help in finding the answers.

Das (1985) has rightly pointed out that science is included in a school's curriculum as it inculcates certain special values peculiar to it and which no other subject can provide. Besides satisfying the usual needs for its inclusion as a subject in the curriculum-such as intellectual, cultural, moral, aesthetic, utilitarian as well as vocational values - science learning provides training in scientific method and also helps to develop a scientific attitude of mind in the learner.

Swartland (1988) says that science education in primary schools should prepare children for life in the physical and social environment which they will experience after they leave school. There is widespread recognition of the importance of giving pupils genuine scientific experiences involving observations, experimentation, data collection and analysis and hypotheticodeductive thinking.

Elementary science is an integral part of both self realization and citizenship education. It is essential for all children, if it is directed toward the goals of science teaching. It will help pupils:

- to intelligently understand and use the biological and physical environment;
- to develop insights and to inculcate the kinds of attitudes by which citizens respond and reach to a society where almost every facet of existence is affected and to acquire and use the process skills of critical thinking (Lewis and Potter, 1970).

The emphasis given to science education at the elementary level by the National Policy on education of 1986, as reported by Rajput (1987) is that science education must be strengthened so as to develop in the child well defined abilities and values, such as the spirit of inquiry, creativity, objectivity, the courage of question and an aesthetic sensibility. Science education programme must be designed to enable the learner to acquire problem solving and decision making skills, and to discover the relationship of science with health, agriculture, industry and other aspect of daily life. Every effort must be made to extend science education to the vast numbers who have remained outside the pale of formal education.

Kothari (Education) Commission (1964-1966) has recommended that science should be taught as a compulsory basis to all pupils as a part of general education during the first ten years schooling.

At lower primary sttage (I to IV)

a. The focus should be on the child's environment - social, physical and biological;

b. There should be emphasis on cleanliness, formation of healthy habits, personal hygiene, sanitation and development of power of observation;.

c. Introduction of formal areas of science such as

- the plants and animals is one's surrounding
- the air we breathe
- the water we drink
- the weatherwhich affects our daily life
- the simple machines
- the body we should take care of and
- the heavenly bodies we look on at night

(Bhandula, et al., 1986)

Gupta (1987) states that the syllabus for science should be ultimately connected with the life around and should be illustrative. They should cover aspects like methods of science, application of science, technological contrivances and elementary principles of physical and life sciences giving a deep insight of various phenomena. Most of these topics should be such as could be comprehensively illustrated by actual life size examples, or through working models. Normally topics which are not demonstratable or which cannot be observed by children themselves should not be included in the curriculum.

According to Jacobson (1970) an important contribution of elementary sciences is the opportunity of children to have first hand experiences with phenomena of the environment. The years of childhood are precious, and a child's experience in school are of critical importance. So the elementary science education is facilitated through science experiences and science kit.

Hence the study has been take up with a view to

- find out the science experiences available for children at home and in school
- help children to develop wholesome interests and attitudes in knowing science facts by evolving a science kit suitable for children of Standard IV & V.
- help the children come to know some science principles that they can use in solving problems in their daily life.
- help teachers to use the science kit and science experiences effectively in order to enrich the children's concept in science.

Review of Literature

II. REVIEW OF LITERATURE

The literature pertaining for the study, "Assessing the science curricula and evolving a science kit for children of standards IV and V" has been reviewed under the following headings:

A. Significance of Primary School Children

B. Importance of Science to Children

C. The Place of Science in School Teaching

D. Importance of Different Methods and Aids for Teaching Science

E. Recent Issues on Science Education

A. SIGNIFICANCE OF PRIMARY SCHOOL CHILDREN

According to Hurlock (1980) most people think of childhood as fairly long period in the life span - a time when the individual is relatively helpless and dependent on others. The beginning of late childhood is marked by the child's entrance into first grade. Entrance into the first grade is a milestone in every child's life, therefore it is responsible for many of the changes that take place in attitudes, values and behaviour.

Devadas and Jaya (1984) state that as the world of the child expands to include the school and community he is faced with new social expectations. No longer his 'childish' behaviour is accepted with the same tolerance and understanding extended when he was younger.

Now the child is expected to 'act his age' and to act in accordance with adult expectations.

New and varied social contacts in late childhood result in great awareness of the child, now he compares with members of the peer group leading to new expectations and aspirations. He needs to adjust the greater demands from the environment and from within himself. In order to achieve a place in the social group, the older child must master the developmental tasks, society expects of him (breckenridge and Vincent, 1965).

Parents, educators and psychologists apply various names to late childhood, and these names reflect the important characteristics (Hurlock, 1980). To many parents, late childhood is the 'trouble some age' the time when children are no longer willing to do what they are told to do and when they are more influenced by their peers. Educators call late childhood the 'elementary school age' as it is the time when the child is expected to acquire the rudiments of knowledge that are considered essential for successful adjustment to adult life. To the Psychologist, late childhood is the 'gang age' - the time when children's major concern is acceptance by their age mates and membership in a gang, especially a gang with prestige in the eyes of their age mates.

According to Kastenbaum (1979) a girl or boy at the elementary school age level may be looked upon as a philosopher. The term 'Philosophy' asserts a love (Philos) of wisdom or an advanced state of knowledge (sophos). Many children at this age group are intellectually

vibrant. They enjoy learning, taking on mental challenges, and extending the limits of their minds. The early school years often represent one of the peak stage of philosophical activity, that is finding excitement and pleasure in the use of one's mind.

An important feature of the elementary school years, as stated by Zanden (1989) is an advance in children's ability to gain knowledge about themselves and their environment. During this period they come to rely upon the mental manipulation of concepts, in adapting to their world. They become more adaptive at processing information, in other words, their reasoning abilities becomes progressively more rational and logic.

Kastenbaum (1979) quoted Kozol (1967) and he says, in later childhood, questioning and curiosity are processes that seem to be closely related. Questioning adults is one of the ways in which that curiosity expresses itself. There is pleasure in taking things apart to see what they are made of, pleasure in performing experiments to see 'what would happen if....' and pleasure in observing older children and adults who are engaged in interesting activites. The opportunity to follow his or her own curiosity is a significant component of self education for the young child and provides a useful balance to the more standardized instructional conditions that prevail in school.

According to Stevenson (1972) referred by Kastenbaum (1979). "The product of experience is not the acquisition of new responses but an increased sensitivity to the ways in which stimuli are alike and how they are different. The basic mechanism of learning is differen-

tiation, the abstraction of distinctive characteristics, not association of stimulus and response. Behaviour becomes more complex, not because the child has learned more responses, but because the environment has become more differentiated. The child sees more and hears more because he has learned to discriminate more.

Some of the important characteristics developmental tasks, confronting the elementary child as put forward by Hurlock (1980) are the development of various intellectual and academic skills, and the motivation to master them, learning how to interact with peers; increased autonomy and independence, development of moral standards, conscience and learning to deal appropriately with anxiety and conflict.

B. IMPORTANCE OF SCIENCE TO CHILDREN

Shukla (1984) says that we live in an dynamic world marked by great and rapid changes. The slow progress in technology, and consequentlY the stable physical and social conditions of living in earlier times, gave ample time for individuals to adjust themselves to the prevailing conditions. But things have changed now. Advances in science, technology, and other fields brought far reaching changes within a single generation This is all the more alarming because, the pressures thus built up are cumulative, and they may prove disastrous too unless we prepare ourselves to face the challenge.

Besides preparing, through development of scientific attitudes, for adjustment to a fast changing world, science is needed by us in a more direct sense as well. As mentioned by the UNESCO Planning

Mission (1964) in their report entitled 'Learning To Be', "The ever growing importance of science and mathematics for the economy and culture of any country and the ever growing knowledge every year in the field of science have set the urgent task before all countries of the world to provide modern science and mathematics education to the youth so as to prepare the young people for life for mastering technical, agricultural, medical and other specialisations which are necessary for economic and cultural progress" (Shukla, 1984).

Jacobson (1970) points out that the years of childhood are precious, and a child's experiences in school are of critical importance. Too often there are missed opportunities and too seldom can we say that our children have had the best education that we know how to give. Since science is an area of the curriculum where changes are great and profound it is especially important to become cognizant with them.

Jacobson (1970) continues saying that science is an essential part of elementary school education; it is recognised as the '4th R: Often the elementary school provides children with their only opportunities to consider the common, everyday phenomena of their environment with the help and guidance of the teacher. The new science courses in the secondary schools and colleges are becoming more abstract and often do not deal with the phenomena of the natural and technological environment. If children are to study and understand these phenomena, they will have to have an opportunity to investigate them in the elementary school.

NCERT (1984) has stated that the emphasis of teaching science at the elementary school stage has to be on developing of concepts through inquiry oriented activities involving the use of skills in science processing. Further the purpose should not be to stuff the mind of children with facts and information but to sharpen their intellect and to enable them to observe their environment. Each child should be encouraged to work as a scientist would do to find solution to his problem. In this way it should be possible for the primary school children to pick up not only the scientific attitudes but also the scientific method of doing things, (Shukla, 1984).

Lorten and Walley (1979) jointly opine that to make science learnings stimulating, meaningful, and useful, teachers must stay close to the daily experiences of the children. Although many of the interests of young children are very fleeting some are very profound. Sometimes a brief time provided so, children can share or explore new interests in all they need to go on to something else. There is a need to use a kind of informal science programme where children are regarded as fertile fields in which seeds of curiosity, facts and information can only be shown and can only flourish under the heat of the children's own fleeting imagination. The science programme becomes, therefore, a subdued insistance that children become intellectually curious about the laws of nature without being forced to memorize facts.

Rai (1983) has brought some points to emphasize the fact that 'Science is important to children'.

They are listed below:

1. Children of this age group are active and curious to know about all the things, they come in contact with.

2. Children of this age group come in contact with the natural as well as social environment. Therefore, they should be trained to know about the relationship that exists between the community and the nature.

3. Children need to know how to develop habits of personal family and community cleanliness. They should be trained to keep themselves as well as their environment clean.

4. Children should be trained to know about the utility of science in life and the several contributions made by science for the betterment of human life.

5. Children should be encouraged to know about the causes of several events that they observe around them. This will ultimately help them in the development of the scientific outlook.

6. It is necessary to develop a practical outlook for children of this age. As they are pretty active, this activity may be so channelized that it may ultimately lead to the development of a practical outlook. This practical outlook would help them to make proper use of their theoretical knowledge.

Thus it is clearly evident, science knowledge is very essential for the elementary school age children.

C. THE PLACE OF SCIENCE IN SCHOOL TEACHING

"There is, Of course, one thing about which we feel no doubt or hesitation, education, science based and in coherence with Indian culture and values, can alone provide the foundation as also the instrument for the nations progress, security and welfare"

- Indian Education commission
(1964 - 1966)

Bhandula, et al., (1986) bring out the fact that the system of education in India is adopted from England on account of British legacy. The poor state of science education in India, is reflected in the reviews of the Government of India. Till a few decades back, science was given a step motherly treatement and was considered to be a subject meant for less promising students, the more promising students were encouraged to study the classic and mathematics as being more worthy and suitable subjects

Not to exaggerate, science even did not form a school subject in the beginning of the 20th century. It was of course, having slight tinge at the University level. It was the Mudaliar commission (1952 - 1953) that recommended primarily the teaching of general science in this high and higher secondary schools in India, but as a compulsory subject (Bhandula, et al., 1986).

Science education in India has been developed in pursuance of the Science Policy Resolution, which was one of the most important contribution of Jawaharlal Nehru, for nuturing scientific research and education in this country. Science education at the first level (I-VIII) emphasis the idea that 'Science is doing' (UNESCO Bulletin, 1977).

Bhatia and Bhatia (1984) have said about the importance of science as a school subject. After years of active and persistent efforts the claim of science for inclusion in the school curriculum came to be recognised. Nowadays science has established its supremacy in every field, on the land, at sea and in the air. It has almost revolutionised human life and proved indispensable for existence. In fact, so great is its impact on man and society that we live in an 'age of science'. Now there is none who needs convincing that it is wise to include science as a school subject. The victory of science as a school subject may be assigned to the following reasons:

1. Science provides a unique training in observation and reasoning. It teaches the learner to reason from definitely ascertained facts and to form clear concepts.

2. By its discoveries, it has added to the prosperity of the human race and vastly increased our knowledge. We live in a world of scientific achievements.

3. Science has utilitarian value. It trains the child to use this leisure properly.

4. Science has a cultural value. Like other subjects, it has a literature of its own.

An all India Seminar on Teaching of Science was held in 1956 at Tara Devi in Simla. This was the first of its kind that touched almost all the aspects on the teaching of science in the secondary schools. It suggested a unique and uniform system for the whole nation that suited to its needs and resources. It also suggested the ways to improve, (Bhandula, et al, 1986).

Development in science and its impact on human living opened the eyes of almost all politicians and public. In August 1961, a committee headed by Lal Bahadur Shastri was constituted as Indian Parliamentary and Scientific commmittee. This committee studied the problem of science education in Primary, Secondary and Higher Secondary schools. It also tried to study the relations between the policies and decision of the centre to the state and courses offered in the schools. Some of the allied problems like shortage of teachers, growing importance of science and its aim, etc. were also looked into by this committee. The committee recognised the gap between what is taught and what should be taught at various levels, (Bhandula, et al, 1986).

Sood (1987) brings out the need of science in Indian schools. Most of the changes in this century have been due to the contributions of science and technology. Thus, science and technology affect every aspect of our lives. Because of its members, every person, in order to function effectively, must be scientifically literate. Every citizen

should understand the fundamental nature and significance of science for the following reasons:

1. Science education will help a person to understand and function effectively in a world dominated by science and technology which are contributing new discoveries every minute.

2. Science education develops background of the individual to take up jobs as scientists and technologists.

3. Science education presents logical explanatations for the behaviour of the objects in nature and dispels suspicions and fears.

4. Science education provides a chance to study personal hygiene eradication of epidemics, population control, pollution and nuclear fall out etc.

5. Science education develops rational thought processes of individuals based on the values of objectivity and rationality.

The Approach paper relating to Curriculum for the Ten Year School issued by the NCERT had stated: "There is hardly any need today to justify the place of science in a scheme of general education for school children. Science is all pervasive, modern societies exist on the basis of science, science is ultimately related to the means of production and means of communication including transport, and every one in any walk of life must be aware of certain quantum of science and technology," (Shukla, 1984).

Reference in connection with primary stage education may be made to the key note address on the curriculum for the first ten school classes given by Prof. Rai Ahmed, Director, NCERT, to the All India Conference of DEO's held in Vigyan Bhavan, New Delhi in March 1976. He said, "In the very early stages of learning, it is expected that the teaching of science, of social science and of humanity will go hand in hand to show the integral and organic unity of knowledge and it will carry the little of environmental studies. Firsthand facts will be collected by the students and they will discover the relationship between the facts which will give them both the joy of discovery and an inborn grasp of the nature of the phenomenon" (Shukla, 1984).

According to the UNESCO Bulletin (1977), the curriculum in Science at the first level (I-VIII) emphasizes the teaching of science as a set of environmental studies. In the first two classes in the school it begins as a composite course including both the natural and the social environment, but in later years, it is diversified into two subjects:

1. Environmental studies based on natural science and
2. Environmental studies based on social science.

The emphasis is not on specific topics to be covered in a syllubus, lest the students' minds be cluttered up with dry facts and information only. The objective is to sharpen their senses and train them to observe their environment and enrich their experiences. The science curriculum has been based on the environment around the child so as to make it interesting and meaningful. The content of science

knowledge is not built on abstract concepts alone, but on the solid foundations of experiences drawn from the environment of child. The environmental studies also offer the opportunity for an interdisciplinary approach and this approach is emphasisesd upto the end of the first level of education.

An important contribution of elementary science is the opportunity of the children to have firsthand experiences with pheonomena of the environment. In the elementary school, children should have a chance to germinate seeds and see how they grow, study the mechanisms of the electric bell,see some of the effects of the expansion of water on freezing and to watch the behaviour of animals, an acquarium etc. (Jacobson, 1970).

Sharma and Sharma (1972) feel that it will be futile to prepare separate case for the inclusion of General Science in the curriculum because the reasons for its inclusion are exactly the same as those for the inclusion are exactly the same as those for the inclusion of subjects other than science, though it has been given a core place in the curriculum because of some special values provided by science only and not by any other subject. All school subjects are taught because they provide a liberal education; they are part of the equipment and preparation for life which we expect the school to give its pupils so that they may play their part in the community as intellectual citizens . Science takes its place side by side with other subjects as an essential element of one's education. It affords a knowledge of certain facts and laws and an insight into methods and data peculiar

to the domain of science. However the inclusion of any subject in the curriculum should satisfy the intellectual utilitarian, vocational, cultural, moral and aesthetic values. Besides these, the teaching of science imparts training in the "Scientific Method" and develops "Scientific attitudes which are very valuable and at the same time are transferable to other situations in life".

Bhatia and Bhatia (1984) say that science is taught because general education is not complete without it. In schools, science is taught to acquaint pupils with natural phenomenon, the physical laws, properties of matter and the application of scientific principles met within our everyday life. Our aim is not to turn scientists, but to impart liberal education.

According to Thomson (1984), Science teaching should have two objectives:

1. To make pupils reason about things they have observed and to develop their power of weighing and interpretting evidence.

2. To acquaint pupils with the broad outline of great scientific principles and with the ways in which these are exemplified in familiar phenomena and applied in the services of man.

D. IMPORTANCE OF DIFFERENT METHODS AND AIDS IN TEACHING SCIENCE

Rai (1983) opines that certain aids are required for the teaching of the subject. These teaching aids make the teaching of a subject lively and interesting. They help the students to have a realistic idea of the subject matter. Really speaking, these aids are employed

to make the teachings of the subject realistic. It is said that 85% of knowledge comes through seeing and hearing. The aids and materials which help our senses of hearing and seeing to learn more effectively are called Audio-Visual Aids. In using these aids, we should proceed from simple to complex, direct to indirect, concrete to abstract and known to unknown.

a. Methods in teaching Science

The various methods used in teaching science are discussed below:

1. Text Book Method:

According to Quest (1984) a good text book has five general uses:

a. it may be a source of knowledge;
b. a guide;
c. a tool;
d. a means of interpretting truth and
e. an inspiration to the pupil

In Science, although other ways of learning have been considered more valuable, the text book has been and continues to be the basic guide to both teachers and pupils. Texts are followed because they organize materials, give basic knowledge, help to illustrate syllabi, develop uniformity in school work, thus making transfers to credits possible between schools in different localities.

Barman and Kotar (1989) point out that a text book lesson contains information about varied types of matter. It presents photographs of various items like fruits, flowers and seeds, as well as accompanying written material.

2. The Lecture Method:

The Indian Education Commission (1964-1966) views this method as one of the most commonly employed in the science class room. This is very popular and is practically the only method that is used in colleges. This method unfortunately prevails in some schools also. When used in the schools, it usually means an informal talk. This may be punctuated with questions and illustrated by means of black board work. If the teacher is stimulating and uses picturesque description, the lectures become of great value from the stand point of motivation. (Bhatia and Bhatia, 1984).

3. The Heuristic method:

The method was put forth by Dr. H.E. Armstrong, Professor of Chemistry at City and Guilds Institute, Kensington (1888 - 1928). The word 'Heuristic' means 'I discover' Professor Armstrong described the method in the following words, 'Heuristic methods of teaching are methods which involve our placing students as far as possible in the position of discoverers - methods which involve their finding out instead of being merely told about. 'He believed that telling is no teaching, pupils learn by doing everything practically. The teacher is there as a friend and guide. It excites interest in common object

object and pheonomena. Habits of observing exactly or correctly are acquired.

4. The Demonstration Method

The Indian Education Commission (1964-1966) have recommended that demonstration experiments performed by the teacher, or by selected students form an important and integral part of science teaching. There should also be provision for experiements to be performed by team or groups of students (Nanda, 1983).

Smith (1990) says, 'Demonstration have always been an integral part of my lesson plan to help illustrate certain principles and stimulate student thought. I find that there are several advantages in opening the class session with a demonstration. One is that it captures the students interest immediately. A second advantage is that these demonstrations can what the students; appetite for more information about a topic".

In the words of Bhatia and Bhatia (1984) in this method, both lectures and laboratory are taken into account. In a school, the lecture room is a place for teaching and demonstration table is the teacher's laboratory table. The one who performs the experiment to illustrate, confirm or verify fact and principles, is called the demonstrator. The assembled students listen, see, observe and make notes. The lecture demonstration method with its definite explanations of ways of doing and means of arriving at an end is of great value. In this method

the practice and theory go hand in hand. The oral discussion method, if used as a means to an end in the laboratory demonstration is undoubtedly of the greatest importance.

5. The Assignment Method

The year's work is divided into assignments and the pupils are asked to do those assignments as they like and when they like. This makes the child teach himself. This is a good method of instruction in science. A particular work is divided into assignments. These are given to the pupils who are required to read certain pages of their text before doing the assignment questions. The pupils thus prepare a part of the theory and practical work. This serves as a sort of stimulant. It also serves as a key to the ability of a pupil (Bhatia and Bhatia, 1984).

6. Field Trips and Excursions

Sampath, et al., (1984) jointly say that when excursions are undertaken by students of an educational institution, the main aim is not only recreation and pleasure but also gaining additional knowledge through direct experiences. Hence, it is necessary to select a suitable place to visit. When excursions are undertaken for the specific purpose of development of knowledge by a group of pupils, it is termed as 'field trip'. The specific advantage of a field trip lies in the fact that after the completion of the same, the pupil can justly say 'I have seen', instead of 'I have read about' or 'I have been told etc'.

During the field trip the pupil has concrete learning experiences in a real situation which has been undertaken with a specific purpose.

Rai (1983) puts his view in the following words: In science teaching, we find that the subject matter of the classroom has a relation to larger things which cannot be brought within the limits of the class room. These things are either situated or are taking place in the places situated outside the schools. Students have to go over and visit these places. Factories, laboratories, botanical gardents etc are the places where the students may be taken to see and understand the working of certain princples of science, the theories which they have already learnt in the class room.

Nanda (1982) also agrees that experience is another thing which children love. To instil in them the love for nature and specially for lessons in nature study and Biology, an outing can be arranged. The children see flowers in full bloom. Let them handle/pluck these flowers. Let them by firsthand information know about the various parts of flowers. Let them observe trees and play with butterflies. Let them learn about sun, moon, stars the four weathers and many such things.

Every student should write an account of the field trip and get the same scrutinised by the staff member as a follow up activity. Group discussions, quiz programmes etc. can be conducted after the trip, during which the knowledge gained can be consolidated. After participation

as a member of a group, which had undertaken a trip to a suitable place, there will be considerable gain of accurate knowledge of things and specific processes since knowledge is gained by direct experiences in a meaningful, natural learning, situation which is part of necessary activity (Sampath, et al, 1984).

Bhatia and Bhatia (1984) also feel that excursions help in providing first hand knowledge of the application of science. These stimulate interest, but teachers should prepare the students before hand and should tell them what they are going to see. An excursion having been made should be followed by a discussion and evaluation.

7. Science Fairs and Exhibitions

In science fairs, interesting experiments, charts, models and specimens collected by the students during excursions may be placed on view. Instances of application of scientific principles in every day life, may also be exhibited in these fairs. These fairs would give to the students an opportunity to show their intelligence and skill as well as interest in the science.

Science exhibitions are nothing but a collection of various scientific things and apparatuses at a place for public display. This display may be organised either by the school or by the science clubs. Parents and guardians should be invited to visit these fairs and exhibitions. This would provide encouragement to their wards and students in general (Rai, 1983).

Sampath, et al. (1984) have also brought out the importance of science exhibitions. They say exhbitions are familiar items in our environment today. When we go around an exhibition, our attention is often focussed on a group of objectives and materials that are displayed according to a deliberate plan. The exhibition that are arranged in schools are usually planned to communicate something valuable parents, public, and students. The values of exhibitions can be listed as follows:

1. An effective mode of mass communication.

2. Individual tastes, fancies and skills are exhibited. Special talents become known and creativity is fostered.

3. Team spirit and co-operative effect are encouraged.

8. Science games

Ball (1981) in an article entitled "What is in a game," have given the following values of game, which can be taken as values of science games:

- an educative process and used in relation to other bearing activities.

- usually requires thinking and planning.

- encourage social interaction and influence attitude;

- should be selected like other media for instructional purposes; and

- should be selected and used to meet specific educational objectives.

9. Science Experiences

According to Devadas and Jaya (1984), through science experiences children can learn a deal of facts if they are observant, deeply interested and stimulated. The values children gain from science experiences help them to:

a. gain necessary first hand experiences,
b. develop basic concepts and increase basic knowledge,
c. increase their skills of observation,
d. give them opporunities to use tools, equipment and familiar materials,
e. aid them in problem solving,
f. stimulate their curiosity, desire for exploration, discovery and seek answer to their questions and
g. aid in their sensory, physical, emotional, intellectual and social development.

b. Aids for teaching Science:

The different aids that are employed in the teaching of science are dealt below:

1. Chalkboard:

According to Chikkara and Sharma (1986), the classroom boards are generally used for writing down, drawing sketches, diagrams, making calculations and so on. It is an economical and effective teaching aid. It helps in systematic teaching. Working on the board catches attention of the students.

Chalk board is never failing friend of a teacher's equipment for visual instruction. This is probably the most widely used. It is the cheapest and most valuable teaching device. It is used for making instruction concrete and understandable (Bhatia and Narang, 1984).

2. Models

Models is actually a copy of some real thing. In the class room often we need the copies of certain real things. These copies are needed in order to present the subject matter in a realistic manner. As far as possible, the model should be realistically drawn and painted. If the colour and other things of the models are not realistically presented, these models are likely to be not very useful (Rai, 1983).

According to Mangal (1985), models are replicas of real object with a suitable change in size, complexity, timing, safety and cost factors. They are so designed as to match the real objects and suit the desired instructional purposes. Working models can be manipulated and operated to demonstrate operations or processes of the objects represented by them, for example model of a water pump.

3. Pictures and Pictorial Illustrations:

Through this media, it is possible to present before the students several objects and functions that would not be very easy to explain theoretically. These pictorial illustrations supplement the theoretical teaching (Rai, 1983).

4. Specimen:

Chhikara and Sharma (1986) feel that preserved specimens of living things are good visual aids that can be employed in teaching science. By seeing the actual things, students develop adequate concepts, about them regarding size, shape, sturcture, colour etc.

Rai (1983) is of the opinion that sometimes it is not possible to present the whole thing in the class, and so only a specimen of it is presented there. For example, it is not possible to present a whole tree in the class. Only a twig of a tree with the leaves can be presented and they would give an idea of the tree to the students.

5. Charts and Maps:

These are also important teaching aid for science. Charts are generally used for displaying the relationship between the two specified things and to present a comparative position of the said two things. They should be exact, neat, artistic and properly drawn. The charts are drawn on mathematical lines.

Maps are also helpful in science teaching. Through these maps, it is possible to explain to the students location of places of scientifc importance. It is also possible to explain the students the climate and temperature.

The importance of both charts and maps are brought out by Rai (1983).

6. Diagrams:

These may be defined as the graphic visual description of a process or phenomenon. Actually they try to explain rather than representing a thing or pheomenon (Mangal, 1985).

7. Slides:

According to Bhatia and Narang (1984) slides carry immense value in teaching procedures. This is a successful teaching device which helps in the retention of the material taught in the minds of the pupils. Right from the lower primary to the post school level slides serve useful teaching purpose.

Chhikara and Sharma (1986) say that slides are good visual aids. By arranging the slides in required sequence, we can present the topic systematically. Certain phenomena like growth in plants and animals, seed germination etc. can be illustrated very well by arranging the slides.

But the major difficulty of using this is the non availability of the slide projector in every school.

8. Films and Film strips:

These are visual aids which help the science teaching. They serve very useful as a media for explaining things to the students in the classroom. Films are useful in presenting things that are of a dynamic nature, that cannot be presented in the class room, with the help of models, replicas etc. In order to present a film, there should be a screen and projector. There are extension departments running in different states, where all these things are lodged (Rai, 1983).

9. Radio:

Radio brings us news and programmes of far distance. Some radio stations have regular science programme, talks on scientific discoveries and discuss certain science affair. The difficulty with using radio is that the programmes are generally not broadcasted during school time and also it is somewhat costly (Chhikara and Sharma, 1986).

Bhatia and Narang (1984) feel that the use of radio to fulfil certain educational purpose is quite of recent origin but an important phase of education in India. Primarily designed to entertain the general public, the educational use of radio both in city and rural schools is fast gaining ground.

According to Mangal (1985), radio is an effective audio device and is capable of providing valuable assistance to the teacher in the classroom by presenting worthwhile infomation and learning experiences simulataneously to a large number of students. The educational value of radio broadcasting depends merely on the use of sense of hearing. A continued listening on the part of the students may take them uninterested, inattentive in the task of gaining leaning experiences.

10. Television:

According to Bhatia and Narang (1984) educational television though of very recent origin, is without any doubt, 'one of the most versatile audio visual aids, ever developed." More and more teachers as well as students running with the flowing stream of progressive education, are being influenced by the potential value of television, or are eager to bring it in use in the classroom.

Mangal (1985) feels that television is a powerful medium of communication that calls for the use of auditory as well as visual senses of the leaners in receiving education. Like most of the advanced developing countries of the world, India has also started to use television in education for improving the quality of education at levels, to expand educational facilities.

11. Science Kits:

Victor (1975) says science kits are boxes or chests of science materials. The kits are especially designed for the elementary school for use in any grade. The boxes or chests are specially built, are quite sturdy and have handles so that they can be carried easily from room to room; they pose no storage problems. They contain a variety of materials, useful in teaching science. Included in the kit is a booklet of suggested experiments and demonstrations that either teacher or the children can do.

Science kits are available that provide all, or almost all, the materials and equipment needed for teaching lessons in a science programme. These kits have an important advantage in that they provide everything that is needed for a laboratory approach to science. Usually, the materials and equipment are organised in a very convenient way so that they are readily accessible to children and teachers. The kits have a disadvantages of being relatively high in cost if geared specifically to a particular programme (Jacobson, 1970).

On the other hand, science kits of a generalised nature can be provided. usually, these generalized science kits provide materials and equipment that can be used in a wide variety of science lessons and programmes. For example, such kits usually include balances, magnet and electrical equipment that can be used in a wide variety of lessons and unit. These generalized science kits have greater flexibility are less expensive and are not as closely meshed with a particular kind of science programme, (Jacobson, 1970).

NCERT developed different types of kits used at different levels. We shall see the type for the primary level. Science kits are for demonstration and for students, work. This kit covers the complete syllabus as designed by the NCERT. The kit is helpful both to the teachers for demonstration and the students for experiment. The kit has the following items.

1. General items - like kerosene lamp, torch, thermometer etc. are fifty in number.

2. There are 14 consumable items like candle, rubber, balloons, etc.

3. There are 12 chemicals like sugar, copper sulphate etc.

4. There are 3 containers for chemicals.

5. A set of charts is there.

6. There are tools for minor repairs of kit items by the teacher as and when required. Items like plier, hammer, screw driver etc. are there. The total number of such items is 8.

(Bhandula, et al., 1985)

Bhandula, et al, (1985) say that science kits establish a link between laboratory and teaching. It is desirable that students may use the experience gained in laboratory in their daily life also. The authors have also brought out the importance of the use of science kits in general science.

1. Science kits are useful for demonstration to set up apparatus in less time. These can be used as a mobile and mini laboratory.

2. Through kits, real and stable knowledge of science can be provided to the students.

3. It helps students develop methods of science such as observation, experimentation, problem solving and investigatory approach.

4. It develops the inherent scientific interest of the children.

5. It helps students get an opportunity to undertake practical work very easily and in a simplified manner.

6. Kits help students develop mechanical, experimental and mental skills, by the way of giving opportunity to handle various types of tools, equipment and material of general science.

Therefore, we can say that the minilaboratory in the form of kits saves time, resources as well as energy. They are useful in science teaching to elementary school children.

E. RECENT ISSUES ON SCIENCE EDUCATION

A critical study of science teaching in primary school was done by Lal and Subramaniam (1976). The major finds of the study are as follows:

The majority of the teachers have considered the following objectives of teaching science in primary school:

a. to develop the power of accurate observation
b. to create interest in science
c. to develop a habit of enquiry
d. to apply scientific knowledge in day to day life
e. to remove superstition and fear of the unknown
f. to develop a sense of neatness and order.

2. Majority of the teachers do not follow experimental, demonstrational and project method of teaching science. This is because, proper facilities are not provided in primary schools.

3. Majority of the teachers do not show interest and enthusiasm to prepare improvised aids. Materials for constructing equipment are not readily available in rural areas. Further proper facilities and tools are not provided in schools.

At a UNESCO training workshop on the development of teacher support materials in integrated science, held at Galorone, Botswana in 1984, the following aims of integrated science in junior secondary school level were suggested by one contributor (Kahn, 1984).

- to learn how to observe, experiment and carry out systematic enquiry;

- to study science with the goal of healthy life in harmony with nature;
- to understand the impact of science and technology on work and leisure on a democratic society;
- to study that part of science, relating to the local reality;
- to appreciate the technological part of the national cultural heritage.

The Indian Prime Minister Mr. V.P. Singh, has urged the scientific community to give utmost priority to eradication of scientific illiteracy and rapid enhancement of education in all areas of science. presiding over the official function to coincide with the fourth National Science Day (NSD) on February 28th the Prime Minister underlined the need to popularise science. NSD is observed to commemorate Sir C.V. Raman's discovery of what came to be known as 'Raman effect' (Hindu, March 1990).

Dr. Gowrikar (Secretary, Department of Science and Technology) said the science day was not to glorify the birth of Sir Raman but his act. The National Council for Science and Technology Communication (NCSTC) is confronted with a peculiar problem of popularizing science in a country where only one out of every hundred people was scientifically literate (Hindu, March 1990).

Inaugurating the five day 18th Jawaharlal Nehru National Science Exhibition of children, organised by the National Council for Educational Research and Training (NCERT) and the Andhra Pradesh Government, the Indian President Mr. R. Venkataraman called upon those in-charge of science education in schools to harness the young active minds to the rapid progress taking place in science and technology. He said science teachings in schools should not be a rolling out of a fixed set information, it should set in motion a chain reaction - teach children to "learn how to learn". The President stressed that school children and youth should understand that the application of science and technology must remain consistent with those finer human values for which our society has been noted (Hindu, February, 1990).

Dr. Chenna Reddi (1990) Chief Minister of Andhra Pradesh has said that science should not be treated merely as a subject taught in school but as a means which will provide the day to day facilities as also the further development. (Hindu, February 1990).

Arvind Gupta, the 1987 winner of the prestigious Jawaharlal Nehru Award for popularisation of science among children (the first ever winner) is passionately devoted to science. He has been deeply involved in teaching children. To him goes the credit of designing low cost science teaching aids in close collaboration with village school teachers and children, using locally available material. He is on the UNESCO panel for science teaching. (Indian Express, November, 1989).

In his words "I think the capacity of children has been vastly under estimated. We have a wrong notion that children learn only at school. But, learning is a continuous process and kids learn by doing things. Today's life is dominated by science, so child must see science in its right perspective. Even in a very best schools there are no adequate equipment to generate interest in science. Feed back shows that whenever a centralised kit gets to city schools it remains locked for most of the time" (Indian Express, November, 1989).

The Indian Prime Minister presented awards to writers and institutions for their contribution in the field of popularisation of science, on February 28th 1990, the National Science Day. The Asian Science society was awarded Rs.1,00,000 for its outstanding and sustained efforts in popularisation of science, particularly in the north eastern regions. Dr. R. Ramachandran, Science Correspondent of The Hindu and Mr. Anjan Ghosh of The Statesman were honoured jointly with a cash prize of Rs.50,000 for best science and technology coverage in mass media. Dr. Lalit Kishore of Bhatinda and Mr. J.C. Soni of Delhi have been chosen jointly for the award of Rs.50,000 for their outstanding and untiring efforts in popularising science among children all over the country by devising and demonstrating ingenious and low cost 'do it yourself' science experiments, toys and kits using locally available materials (Hindu - February and March, 1990).

The Director of NCERT, Dr. K. Gopalan said that a new programme of 'Children meet Scientists' has been mooted for this year. The purpose of the programme was to familiarise the school children with the scientific work going on in the universities, national laboratories and institutions of national importance, (Hindu, February, 1990).

Experimental Procedure

III. EXPERIMENTAL PROCEDURE

The procedure for the study on "Assessing the science curricula and evolving a science kit for children of standards IV and V" has two major steps.

I. Assessing the science experiences available for children at home and in school, and

II. Evolving science kit and science experiences for children of standards IV and V.

I. ASSESSING THE SCIENCE EXPERIENCES AVAILABLE FOR CHILDREN AT HOME AND IN SCHOOL

Before evolving the science kit for primary school children, it was considered necessary to assess the science experiences available. Hence this aspect was taken into consideration for the study. This part of the study comprises of the following steps:

A. Selection of the area

B. Selection of the sample

C. Selection of the tool

D. Collection of the data.

E. Analysis of the data.

A. SELECTION OF THE AREA:

As the study aimed to find out the science experiences obtained by primary school children at home and in school, the Corporation schools in Coimbatore city were selected, randomly. The Corporation schools were selected because majority of children in general attend corporation schools. The selected schools were located one in each of area - Devangapettai, Wedderburnpet and Devangar High School Road in Coimbatore.

The schools were selected by the investigator by seeing the proximity of distance as this would reduce wastage of time. Moreover the Headmistress and Headmasters of the schools had promised to render their full co-operation for the conduct of the study.

B. SELECTION OF THE SAMPLE:

Children belonging to the age group of 9-10 years were selected randomly from IV Standard for the study. In total there were 80 children, of which 40 were girls and 40 were boys.

C. SELECTION OF THE TOOL:

To assess the science experiences produced by children, an interview schedule was considered suitable.

Wilkinson and Bhandarkar (1982) opined that "interview method is quite effective in giving information about person's perceptions, beliefs, feelings, motivations, anticipations of future plans, past and private behaviour".

Chava and David (1981) stated that the most structured form is the structured interview schedule in which the questions, their wording and their sequence are fixed and identical for every respondent.

Before finalising the interview schedule, a pilot study was carried out with a selected group of primary school children of IV Standard, to check whether the wordings and meanings of the questions are framed properly and eliciting the needed information accurately. Based on the pilot study, the questions were modified and the final interview schedule was framed (Appendix I).

The interview schedule which was used as the tool for conducting the study comprised of the following aspects: general background information of children and their families; knowledge in science and science programmes on radio, television and magazines; opportunities for tours and excursions; science experiences through seeing, hearing, experiencing and reading; and participation in science activities in school and at home.

D. COLLECTION OF THE DATA:

To conduct the study in the corporation primary schools, the consent of the District Education Officer of Coimbatore was obtained. Later, the Headmistress and Headmasters of the three schools were approached and the purpose of the study was explained to them. After developing rapport with the children, they were interviewed individually with the help of the interview schedule. While administering

the schedule, the children were encouraged to answer the questions without any fear or compulsion. Also the investigator asked the questions in Tamil to help the children to understand the questions easily and to make them feel free while answering.

ANALYSIS OF THE DATA:

The gathered data on assessing the science experiences available for children at home and in school was analysed, tabulated and discussed in the following chapter.

II. EVOLVING SCIENCE KIT AND SCIENCE EXPERIENCES FOR CHILDREN OF IV AND V STANDARDS

A science kit for the first three classes of the primary section has been evolved by Subhashini and Jayapoorani (1989)*. To provide for the remaining two standards such as IV and V, the present study aimed to evolve a kit as a follow up study.

The science text books prepared by the Tamilnadu Text Book Society, Madras for the IV (1989) and V (1988) standards were selected for evolving the science kit, as these were the books followed in the selected schools. The contents of the books were scrutinised. Each chapter in the text books were read carefully for better understanding of the contents, illustration, experiences and assignments. After the scrutinization, the investigator planned to add some of the suitable items like charts, posters, models and other teaching aids along with the experiences. These were tabulated.

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* *Unpublished dissertation submitted in partial fulfilment of Degree of Master of Science to Avinashilingam Institute for Home Science and Higher Education for Women (Deemed University) in May 1989.*

Teaching aids and experiences are very important in science teaching. Sampath, et al., (1984) have clearly emphasized the use of teaching aids through the following statement:

"I here, I forget;
I see, I remember;
I do, I understand".

According to Jacobson (1970) experiences also play an important role in elementary science teaching. In his words, "If children are to study and understand the science phenomena, they will have to have an opportunity to investigate then in the elementary school. They should have a chance of germinating seeds, see how they grow, study the mechanism of the electric bell see some of the effects of the expansion of water on freezing and to watch the behaviour of animals etc."

So it is stressed that aids and experiences are very much important in learning science. Thus, based on the scrutiny, the various aids were prepared by the investigator along with the suitable experiences pertaining to the content of the text book chosen.

The content of the text books of science for standards IV and V, the aids to be provided, methods to be adopted and the varied experiences related with the science chapters are given in the following chapters.

Results and Discussion

IV. RESULTS AND DISCUSSION

The results of the study, "Assessing the science curricula and evolving a science kit for children of standards IV and V" has two major parts.

I. Assessing the science experiences organised for children at home and in school.

II. Evolving science kit and experiences for children of standards IV and V.

I. ASSESSING THE SCIENCE EXPERIENCES ORGANISED FOR CHILDREN AT HOME AND IN SCHOOL.

The results for this part of the study has been discussed under the following headings.

A. General details of children and family

B. Science experiences at home and in school

C. Different toys and household appliances at home

D. Availability of sports items and teaching aids in school

E. Places of interest for field trips and facts learnt from them.

F. The different ways of knowing science facts.

G. Participation in science activities

A. GENERAL DETAILS OF CHILDREN AND FAMILY

The general details of the selected children and family include the following aspects:

1. Age
2. Religion
3. Type of family
4. Ordinal position of children
5. Area of residence
6. Distribution of children in schools
7. Size of the family
8. Occupation of the parents
9. Income of the families
10. Educational status

1. Age:

Table I gives the details about the age distribution of the children in standard IV.

TABLE I
AGE DISTRIBUTION AMONG CHILDREN

Age (in years)	BOYS (40)		GIRLS (40)	
	Number	Percent	Number	Percent
8	6	15	5	12.5
9	14	35	23	57.5
10	15	37.5	8	20
11	3	7.5	4	10
12	2	5.0	-	-

Among boys a higher percentage of children belonged to the age group of 9 and 10 years while majority of the girls (57.5 percentage) belonged to the age of 9 years.

2. Religion:

The information regarding chidren's religion is given below in Table II.

TABLE II

DISTRIBUTION OF SELECTED CHILDREN'S RELIGION

Religion	BOYS		GIRLS	
	Number	Percent	Number	Percent
Hindu	32	80	36	90
Muslim	7	17.5	3	7.5
Christian	1	2.5	1	2.5

More than 80 percent of both boys and girls belonged to the Hindu religion and in both cases, only 2.5 percent were from christian religion.

3. Type of family :

With regard to the type of family, majority of the boys (72.5 percent) and girls (57.5 percent) belonged to the nuclear family.

4. Ordinal position of the children

Table III deals with the position of the children in the family.

TABLE III

ORDINAL POSITION OF THE CHILDREN IN THE FAMILY

Ordinal Position	BOYS		GIRLS	
	Number	Percent	Number	Percent
1st	10	25	14	35
2nd	16	40	11	27.5
3rd	8	20	6	15
Above 3rd	6	15	9	22.5

It is evident from the Table that among boys, 2nd born are leading the rest, while for girls, 1st born lead the rest. It can also be inferred that there are still people who haven't taken the "two child born" into consideration.

5. Area of Residence

Majority of the children (about 80 percent) resided in the urban area while about 15 percent were from slum area.

6. Distribution of children in schools

Table IV presents the number of children taken as samples from the three different schools.

TABLE IV

DISTRIBUTION OF CHILDREN IN SCHOOLS

Sl. No.	Schools in Coimbatore	BOYS		GIRLS	
		Number	Percent	Number	Percent
1.	Corporation Middle school, wedderburnpet	17	42.5	18	45
2.	Corporation Middle school, Devangar High School Road	10	25	3	7.5
3.	Devangapettai Corporation Primary School	13	32.5	19	47.5

It is clear from the Table that majority of the children were from the Corporation schools of Wedderburnpet and Devangapettai.

7. Size of the family

Table V deals with the number of family members, and shows whether the families are large or small.

TABLE V

NUMBER OF FAMILY MEMBERS

Number of family members	BOYS		GIRLS	
	Number	Percent	Number	Percent
3	1	2.5	2	5
4	6	15	6	15
5	12	30	6	15
6	9	22.5	8	20
7	4	10	8	20
8	5	12.5	6	15
Above 8	3	7.5	4	10

From the Table, it is clear that among boys, 5 and 6 member families were more prevalent than the rest. There were only minimum percentages for 3 member family and family with more than 8 members.

Among the girls, there were more or less equal percentages for families containing 4,5,6,7 and 8 members. Like boys, there were minimum percentages for families with 3 members and more than 8 members.

8. Occupation of the parents

The different varieties of occupations, in which the parents of the children were involved are brought in the following Table.

TABLE VI

OCCUPATIONS OF THE PARENTS

Sl. No.	OCCUPATIONS	BOYS		GIRLS	
		Number	Percent	Number	Percent
1.	Professionals	-	-	-	-
2.	Business	6	15	13	32.5
3.	Skilled workers	17	42.5	14	35.0
4.	Clerical job	9	22.5	3	7.5
5.	Public servants	-	-	4	10.0
6.	Others	8	20	6	15.0

Majority of the children's parents, as indicated by the Table belonged to the category of skilled workers (above 35 percent) which included work like weaving, basket making, carpentary, goldsmith etc. The point that none of the parents were professionals is noteworthy.

9. Income of the parents

Table VII brings out the details of the income distribution in the families of the selected boys and girls.

TABLE VII

INCOME DISTRIBUTION IN FAMILIES

Sl. No.	Total monthly family income (Rs.)	BOYS		GIRLS	
		Number	Percent	Number	Percent
1.	100-300	1	2.5	1	2.5
2.	300-500	10	25	10	25
3.	500-700	12	30	6	15
4.	700-900	8	20	10	25
5.	900-1000	1	2.5	5	12.5
6.	Above 1000	8	20	8	20

The distribution of family income levels according to HUDCO (1984) is given below:

Low income group - Below Rs.1,500/=

Middle Income Group - Rs.1,500 - Rs.2,500

High Income Group - Above Rs.2,500/=

The Table brings out the fact that almost all the families were below the low income group.

10. Educational status of the family members:

The educational status of the members of the families of children is given below in Table VIII.

TABLE VIII

EDUCATIONAL STATUS OF FAMILY MEMBERS

Sl. No.	Educational Status	BOYS		GIRLS	
		NUMBER	PERCENT	NUMBER	PERCENT
1.	Illiterate	57	23.9	37	16.6
2.	Primary	98	41.3	117	52
3.	High School	80	33.6	66	30
4.	Higher Secondary	1	0.4	3	1
5.	College	2	0.8	1	0.4
	TOTAL	238		224	

It is surprising to note that there were illiterate family members for both boys and girls (about 25 percent). In both cases, the total percentage of members at the primary and high school level sum up to more or less the equal. There were minimum percentage of higher secondary and college level education.

B. SCIENCE EXPERIENCES AT HOME AND SCHOOL.

1. Radio

a. Radio Ownership and habit of listening

Table IX is concerned with the ownership of radio among children, and their habit of listening to programmes.

TABLE IX

RADIO OWNERSHIP AND HABIT OF LISTENING

Children	Owning Radio				Habit of Listening			
	YES		NO		YES		NO	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Boys	27	67.5	13	32.5	23	57.5	17	42.5
Girls	24	60.0	16	40.0	20	50	20	50

Among both boys and girls, more than 50 percentof them possessed radios and likewise, more than 50 percent of them also expressed their habit of listening to the radio programmes. Reset of them neither own a radio nor have the habit of listening.

b. Programme Listened

Table X brings out the different programmes listened by the children by radio.

TABLE X

PROGRAMMES LISTENED

Sl. No.	Programme	BOYS		GIRLS	
		Number	Percent	Number	Percent
1.	Songs	22	55	17	42.5
2.	Drama	16	40	12	30
3.	News	7	17.5	5	12.5
4.	Science Programme	5	12.5	-	-
5.	Children's Programme	-	-	2	5

It is clearly evident from the Table that majority of the children had interest towards radio listening, as above 40 percent of boys and above 30 percent of girls expressed their liking for listening to songs and drama. Most of the children (about 80 percent) preferred to listen to radio in the morning than in the evening. Interest and linking gets the greater percentage (about 45 percent) of votes for listening to radio programmes.

It is surprising to note that our children are not listening to sciences programmes. It may be due to their lack of interest or unawareness of the science programme. More propaganda can be given for this. As the songs attract children, science facts can be incorporated in between songs like advertisement. (Fig. 1).

C. Interest in Listening to Science Programmers

Information on the children's interest in listening to science programmes and the reasons for listening revealed that very few boys (12.5 percent) had the Interest in listening to science programmes as they learn new facts related to their subjects.

According to Rai (1983), in different states of our country, radio programmes for students have been going on for the last several years. These programmes generally consist of talks on teaching of science and talks on various subjects that have a bearing on the subject matter of science.

So, although science programmes are broadcasted specially for students, it is to be stated that unawareness of science programmes and lack of interest in listening were the two main reasons for the children not listening to science programmes. It is to be emphasized here that children must be motivated to get scientific attitudes and perception. This can be successfully handled by the teachers and parents by providing various activities and experiences. The primary schools must also provide opportunity to listen the radio programmes in schools.

d. Science Programme Listened

Those children 12.5 percent who had the interest in listening to science programmes stated that they would like to hear programmes on animals and birds; human body, housing and science fiction. The

reasons for listening were found to be subject oriented and interesting to listen.

2. Television

a) Ownership of Television

From the Table XI, we can find how many children own television sets at home.

TABLE XI

OWNERSHIP OF TELEVISION AT HOME

Owning Television	YES		NO	
	Number	Percent	Number	Percent
BOYS	6	15	34	85
GIRLS	6	15	34	85

It is inferred from the Table that only 15 percent of both boys and girls owned television sets at home. It is very clear that the majority of the children belonged to the low income group and their income level did not permit them to own a television Set.

b. Habit of watching programmes and reasons

Though they do not possess television at home, more than 70 percent of children had the habit of watching programmes from

nearby houses. The various reasons for watching televisions programmes were stated as interesting, time passing and informative. Above 85 percent of the students preferred watching evening programmes than the morning ones.

c. Programmes watched and interest in science programmes

The different programmes watched by the children on television are depicted in Table XII.

TABLE XII

PROGRAMMES WATCHED ON TELEVISION

Sl. No.	Programmes	BOYS		GIRLS	
		Number	Percent	Number	Percent
1.	Movies	34	85	34	85
2.	Drama	26	65	27	67.5
3.	Songs	24	60	19	47.5
4.	Science Programmes	23	57.5	18	45
5.	News	8	20	4	10
6.	Children's Programme	5	12.5	5	12.5
7.	Advertisement	4	10	1	2.5
8.	Sports	2	5	-	-
9.	Farmers Programme	2	5	-	-
10.	Letters	-	-	2	5

Programmes like movies, drama and songs captured children's main interest in watching television programmes. A few showed interest in children's programme and news.

Regarding the science programmes, nearly 50 percent children had the habit of watching it. Rai (1983) says, television is an important mass media of education as well as indoor cheap and best entertainment. Through television talks and films having bearing on the science subject, may be seen by students which cost to increase the scientific knowledge of scholars. (Fig. 1).

Some of the reasons felt by the children for watching the science programmes were informative, subject oriented, nature learning and for increasing the knowledge.

The reasons of the children who didn't have the habit of watching science programmes were stated as unaware of the programmes, boring, and not allowed by the parents.

3. Magazines, Books and Dailies

a. Children's interest in reading science matter and reasons

Table XIII reveals the interest of the children in reading science matter.

TABLE XIII

CHILDREN'S INTEREST IN READING SCIENCE MATTER

Interested to read science matter	BOYS		GIRLS	
	Number	Percent	Number	Percent
YES	10	25	5	12.5
NO	30	75	35	87.5

It is heartening to note that the habit of reading science matter seems to be very poor among boys and girls as only 10 to 15 percent stated their interest in reading science matter. (Fig. 1).

Sikka (1984) points out that "special concern is the currently most widespread approach to science journalism. Popularisation of science and the development of a scientific temper are of great importance for a country like ours". In such a case, it is sad to find a poor reading habit among school children. The major reasons for not reading are as follows:- books are not bought at home, unable to read and understand, not allowed to read, not interesting and lack of motivation and guidance from the parents part.

The fact that is more than 30 percent of the families of boys and girls do not buy books, it shows their lower economical level. More over, the parents' educational status is also low, so that they do not take any initative in helping their children like buying

INTEREST IN KNOWING SCIENCE FACTS THROUGH MASS MEDIA.

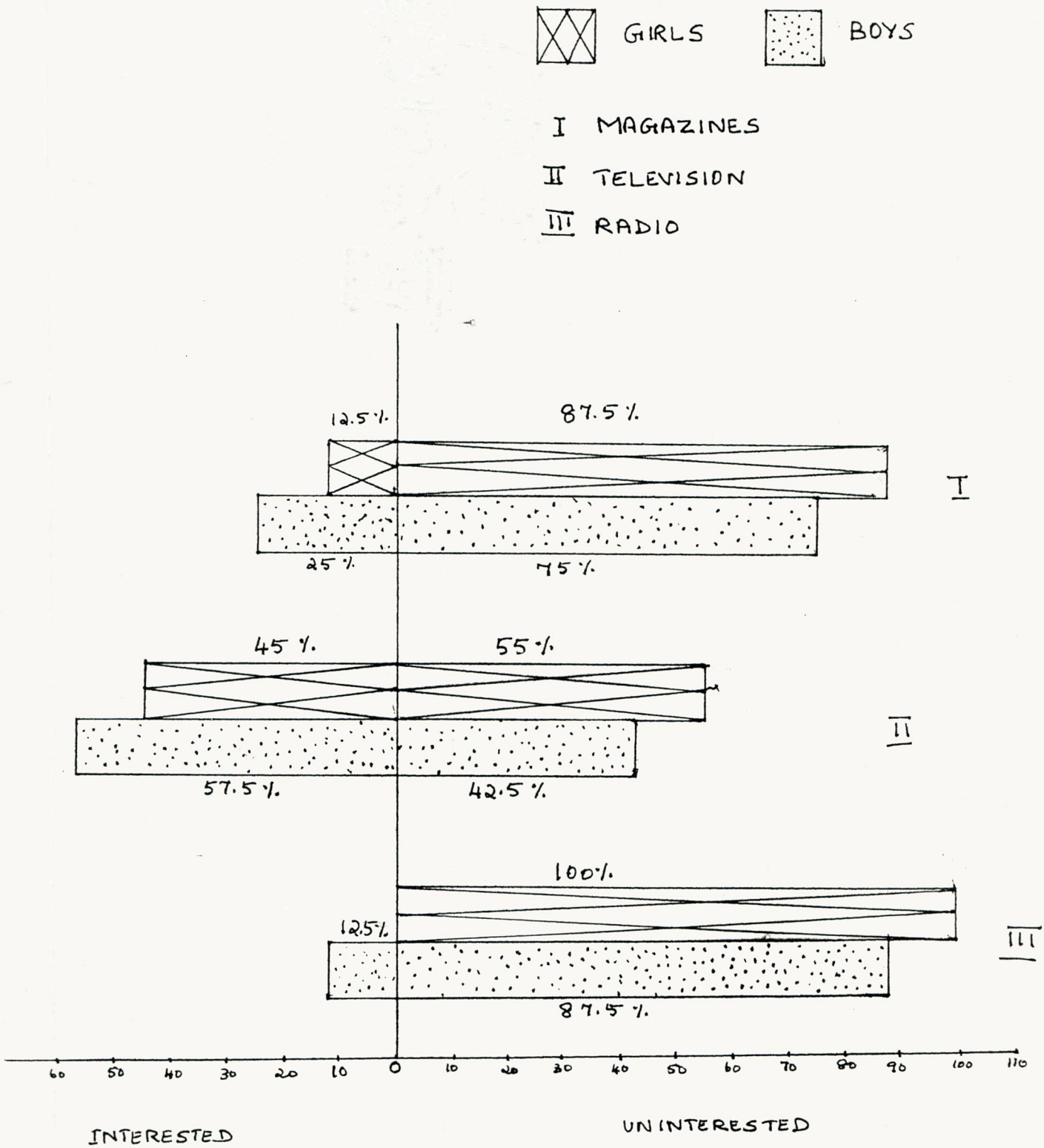

FIGURE - 1.

the books and asking the children to read.

b. Details of books/Magazines/dailies bought at home

The details about the books, magazines and dailies that are bought at home is given in Table XIV.

TABLE - XIV

DETAILS OF BOOKS/MAGAZINES/DAILIES BOUGHT AT HOME

Sl.	DETAILS	BOYS		GIRLS	
		Number	Percent	Number	Percent
	BOOKS	-	-	-	-
	Magazines				
1.	Devi	-	-	1	2.5
2.	Rani	-	-	1	2.5
3.	Kumutham	2	5	1	2.5
4.	Kalkandu	-	-	1	2.5
5.	Siruvar Malar	1	2.5	-	-
6.	Ambulimama	1	2.5	-	-
	Dailies				
1.	Daily Thanthi	5	12.5	3	7.5
2.	Dina Malar	2	5.0	1	2.5
3.	Malai Murasu	3	7.5	1	2.5
4.	Malai Malar	-	-	@	5.0

Tamil magazines and dailies were bought only in minimum percentage of houses. As discussed earlier, this may be due to the lack of provision to buy books or dailies at home. It may also be

due to the ignorance of parents to provide children with magazines or dailies. About 5-10 percent of children, in whose houses magazines and dailies were bought, stated that they read science titbits and politics.

c. Types of Science books available in schools

About 7.5 to 12.5 percent children were found interested to read more about science. The varieties of topics they wanted to read, as stated by them are : Human body, animals, flowers, trees, stars and also class books. All three schools do not possess library. This also might be one of the reasons for the children's lack of interest in reading science matter. It is to be stated here that schools should provide library for children and enable the children to develop the habit of reading. To create interest in reading science books, stories or interesting presentation of facts are needed. So the writers can be given directions towards this sort of tasks.

4. Experiences in gardening

Chhikara and Sharma (1986) say, "school garden is a good place to keep different plants growing. Students can undertake comparative studies on plants regarding their growth, size, flowers and habitats. School garden is a place where instruction can go along with activities and it provides with various plants for experiments in the laboratory".

a) Possession of garden at home and in school

Table XV clearly explains the position of children in possessing garden at home and in school.

TABLE XV

POSSESSION OF GARDEN AT HOME AND IN SCHOOL

Garden at home	BOYS		GIRLS		Garden in School	Yes/ No.
	Number	Percent	Number	Percent		
YES	2	5	1	2.5	1	Yes
No.	38	95	39	97.5	2	Yes
					3	Yes

It is striking to see that only a minimum of 5 percent (for boys) and 2.5 percent (for girls) had garden at home. This implies that children are not exposed to direct learning experiments at home.

On the other hand, all the three schools had gardens. This is quite nice to hear. This means children will have the opportunity to engage in direct science experiences. Gardening is one of the important exposures, where children learn by first-hand information.

It is alarming to see that more than 40 percent of the children felt gardening was a boring activity. For those children who had the gardening interest (30 percent of boys and 7.5 percent of girls), the following reasons for liking were listed:

- gardening is interesting
- like to see the plants grow
- like to see the flowers

25 percent of the interested children engage themselves in gardening work for 10 to 15 minutes every day.

C. DIFFERENT HOUSEHOLD APPLIANCES AND TOYS

1. Household appliances and toys at home.

To elicit information for the question in the type of household appliances and play items related to science and responses of children are shown in Table XVIa. and XVIb.

TABLE XVI a

HOUSEHOLD APPLIANCES AT HOME

Sl. No.	Household appliances	BOYS		GIRLS	
		Number	Percent	Number	Percent
1.	Radio	7	67.5	24	60.0
2.	Fan	18	45	18	45
3.	Iron box	12	30	7	17.5
4.	Sewing Machine	7	17.5	7	17.5
5.	Television	6	15	6	15
6.	Pressure Cooker	6	15	9	22.5

Sl. No.	Household appliances	BOYS		GIRLS	
		Number	Percent	Number	Percent
7.	Grinder	5	12.5	4	10
8.	Mixie	3	7.5	3	7.5
9.	Gas stove	2	5	2	5

More than 60 percent of both boys and girls had the priviledge of owning a radio. With regard to fan, 45 percent of children stated their possession at home. Majority of the houses were inadequate to possess the other household appliances.

TABLE XVI b.

CHILDREN'S PLAY ITEMS

Sl. No.	Play items	BOYS		GIRLS	
		Number	Percent	Number	percent
1.	Bat and ball	23	57.5	29	22.5
2.	Vehicle toys	21	52.5	9	22.5
3.	Soft toys	12	30	20	50
4.	Mechanical toys	10	25	2	5
5.	Vessel set	2	5	22	55
6.	Rolling carts	2	5	-	-

Sl. No.	Play items	BOYS		GIRLS	
		Number	Percent	Number	Percent
7.	Blocks	2	5	1	2.5
8.	Assembling toys	1	2.5	-	-
9.	Matching toys	-	-	-	-

From this Table it is very clear that there is difference between the play of boys and girls. Boys used more of vehicle toys, bat and ball. While more percentage of girls used soft toys and vessels set for their play. This may be due to their interest and identification of roles. In the preference of toys also 45 percent of boys had selected bat and ball while 37.5 percent of girls had selected vessel set. This leads us to think that boys are engaged in very active play while girls satisfied themselves by playing with vessel set.

2. Vehicles at home

It is always easy for the children to see and learn science facts. More over they can observe, explore & practice only if they have an opportunity. In order to know other scientific concepts regarding transports the question was framed to find out the vehicles available at home. The responses are given below in Table XVII.

TABLE XVII

VEHICLES AT HOME

Sl. No.	Vehicles	BOYS		GIRLS	
		Number	Percent	Number	Percent
1.	Bicycle	13	32.5	19	47.5
2.	Scooter	2	5.0	1	2.5
3.	Motor bike	1	2.5	1	2.5
4.	Autorickshaw	1	2.5	1	2.5

Both boys and girls, 32.5 percent and 47.5 percent respectively stated that their family members in general had bicycle as their vehicle and only very few stated their possessions on scooter, motorbike and autorickshaw.

D. AVAILABILITY OF SPORTS ITEMS AND TEACHING AIDS IN SCHOOL

Teaching aids, as the name indicates help in teaching. Children are captured by the aids and are able to concentrate on lessons better. The information regarding the different aids used in schools is dealt in Table XVIII.

TABLE XVIII

USE OF TEACHING AIDS IN SCHOOLS

Sl. No.	Aids used	BOYS		GIRLS	
		Number	Percent	Number	Percent
1.	Charts	10	25	14	35
2.	Models	31	77.5	29	72.5
3.	Demonstration	10	25	3	7.5
4.	Pictures	21	52.5	17	42.5
5.	Maps	3	7.5	2	5.0

Models and pictures had gained the greatest attraction among the children. It was also seen that the total population of children liked the use of aids for teaching science. More than 60 percent of the children felt that the aids helped in easy learning and better understanding.

Children's views on teaching aids should be given a deep thought. As children themselves prefer it, this point can be given more weightage and better use of aids by teachers shall be encouraged.

With regard to the availability of sports items, it was shocking to find out that neither of the schools provided sports items like ball or tennikoit to the children.

E. PLACES OF INTEREST FOR FIELD TRIPS AND FACTS LEARNT FROM THEM

Field trips are liked by all children. These trips should not only be for enjoyment, but also for learning too. Table XIX a deals with the places of interest for field trips and the role of home and school.

TABLE XIX a

PLACES OF INTEREST TAKEN TO BY HOME OR SCHOOL

Sl. No.	Places of interest	BOYS				GIRLS			
		Home		School		Home		School	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1.	Hospital	40	100	-	-	39	97.5	-	-
2.	Temple	38	95	6	15	38	95	3	7.5
3.	Bus stand	37	92.5	-	-	36	90	-	-
4.	Bazaar	33	82.5	-	-	35	87.5	-	-
5.	Exhibition	26	65	-	-	16	40	-	-
6.	park	22	55	1	2.5	20	50	2	5
7.	River	21	52.5	-	-	20	50	-	-
8.	Railway station	21	52.5	-	-	22	55	-	-
9.	Zoo	19	47.5	-	-	15	37.5	-	-

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
10.	Hill area	18	45	-	-	17	42.5	-	-
11.	Bird sanctuary	12	30	-	-	13	32.5	-	-
12.	Carpentary	11	27.5	-	-	4	10	-	-
13.	Weaving Unit	11	27.5	-	-	8	20	-	-
14.	Schools	11	27.5	-	-	6	15	-	-
15.	Cowshed	9	22.5	1	2.5	6	15	2	5
16.	Dyeing Unit	8	20	-	-	2	5	-	-
17.	Field	7	17.5	-	-	8	20	-	-
18.	Poultry farm	7	17.5	1	2.5	9	22.5	3	7.5
19.	Milk Industry	7	17.5	-	-	5	12.5	-	-
20.	Airport	6	15	-	-	3	7.5	-	-
21.	Aquarium	6	15	-	-	2	5	-	-
22.	Waterfalls	3	7.5	-	-	3	7.5	-	-
23.	Dam	1	2.5	-	-	1	2.5	-	-
24.	Museum	-	-	-	-	1	2.5	-	-

It is disheartening to see that the schools have not taken interest to take children, for field trips to many places, and it is clear that home has taken a leading role in taking children to the places of interest. The highest percentage of places seen by the children were hospital, temple, busstand, bazaar, exhibition and park. Even

when the schools had taken a little efforts, many children stated that parents did not give money for them to go.

It is to be recommended here that Government can allot some funds for the schools to arrange field trips to the nearby places of children's interest.

Children's interest in going for field trips and the places they wish to see are brought out in Tables XIX b and c respectively.

TABLE XIX b

CHILDREN'S INTEREST IN GOING FOR FIELD TRIPS

Like to go	BOYS		GIRLS	
	Number	Percent	Number	Percent
Yes	35	87.5	31	77.5
No.	5	12.5	9	22.5

More than 75 percent of boys and girls expressed their happiness to go for field trips as a study cum enjoyment trip.

TABLE XIX c

PLACES WISHED TO SEE BY THE CHILDREN

Sl. No.	Places	BOYS		GIRLS	
		Number	Percent	Number	Percent
1.	Hill Station	13	32.5	15	37.5
2.	Park (Zoo)	5	12.5	2	5
3.	Airport	4	10	3	7.5
4.	Railway Station	4	10	1	2.5
5.	Dam & Waterfalls	2	5	2	5
6.	Temple	3	7.5	5	12.5
7.	Weaving Unit	1	2.5	-	-
8.	Carpentry	1	2.5	-	-
9.	Beach	-	-	1	2.5
10.	Cities	-	-	4	10
11.	Exhibition	-	-	1	2.5
12.	River	-	-	1	2.5

A higher percentage of boys and girls showed great interest in visiting hill stations (32.5 percent and 37.5 percent), temple (7.5 percent and 12.5 percent) and parks (12.5 percent and 5 percent) respectively. Also they showed quite a bit of interest to visit airport. It is surprising that girls had interest in seeing big cities.

The reasons stated by the children to undertake field trips to various places is reported below:-

- enjoy nature
- interested to see places
- to see the living patterns of animals and birds
- to see the landing and take off of planes
- to see the rails and bogies of the train
- to see how objects are made
- to see cloth making
- heard about the places.

Field trips are important that children learn by direct experiences. The facts learnt through field trips by the children is clear from the Table XIX d.

TABLE XIX d

DETAILS OF FACTS LEARNT THROUGH FIELD TRIPS

Sl. No.	FACTS LEARNT	BOYS		GIRLS	
		Number	Percent	Number	Percent
a.	TRANSPORT				
1.	Buses are for various places	24	60	19	47.5
2.	Usefullness of transport	16	40	9	22.5
3.	Trains have bogies	12	30	5	12.5
4.	Railway signals	10	25	5	12.5

Sl. No.	FACTS LEARNT	BOYS		GIRLS	
		Number	Percent	Number	Percent
5.	Rails and movement of trains	9	22.5	7	17.5
6.	Seating arrangement in a bus	9	22.5	2	5
7.	Parts of a bus	5	12.5	3	7.5
8.	Lending and take off of planes	4	10	2	4
9.	Use of steering wheel	2	5	-	-
10.	Size of planes	1	2.5	-	-
B.	HOSPITAL				
11.	Curing of illness, use of injection, tablets	26	65	25	65
12.	Duty of doctors and nurses	14	35	11	27.5
13.	Use of stethoscope, Thermometer	10	25	3	7.5
C.	BAZAAR				
14.	Varieties of goods	25	62.5	19	47.5
15.	Buying essential items	10	25	6	15
16.	Different kinds of shops	10	25	7	17.5

Sl. No.	FACTS LEARNT	BOYS		GIRLS	
		Number	Percent	Number	Percent
17.	Buying and selling of goods	4	10	4	10
d.	PARK, ZOO AND BIRD SANCTUARY				
18.	Colours of flowers	19	47.5	18	45
19.	Living patterns of animals & birds	19	47.5	10	25
20.	Shapes of flowers	9	22.5	13	32.5
21.	Sounds of animals and birds	7	17.5	2	5
22.	Smell of flowers	4	10	8	20
23.	Colours of animals and birds	4	10	1	2.5
24.	Milking of cows	12	30	3	7.5
25.	Varieties of fishes	6	15	2	5
26.	Varieties of hen	5	12.5	2	5
27.	Laying and hatching of eggs	5	12.5	5	12.5
28.	Fodder for hen	-	-	4	10
29.	Ploughing and harvesting	5	12.5	3	7.5
30.	Selling of milk	4	10	1	2.5

Sl. No.	FACTS LEARNT	BOYS		GIRLS	
		Number	Percent	Number	Percent
e.	NATURE LEARNING				
31.	Concept of higher altitudes	7	17.5	6	15
32.	Trees and rocks in hill area	9	22.5	7	17.5
33.	Usefulness of river water	7	17.5	3	7.5
34.	Fishes in water and boating	11	27.5	6	15
35.	Sand in river bed	3	7.5	2	5
36.	Purity of running water	3	7.5	4	10
37.	Force of falling water	3	7.5	1	2.5
38.	Concept of stored water	1	2.5	1	2.5
f.	CARPENTRY AND WEAVING				
39.	Smoothing of wood	6	15	2	5.0
40.	Making of an object	6	15	3	7.5
41.	Method of weaving	7	17.5	5	12.5
42.	Dyeing of thread	6	15	2	5
43.	Drying of dyed thread	2	5	1	2.5

Sl. No.	Facts learnt	BOYS		GIRLS	
		Number	Percent	Number	percent
44.	Warp and weft of cloth	3	7.5	2	5
45.	Usefulness of cloth	4	10	2	5
46.	Different colours of dyes	2	5	-	-
g.	TEMPLES AND SCHOOLS				
47.	Concept of praying	17	42.5	13	32.5
48.	Pooja and aarathi in temple	13	32.5	9	22.5
49.	Temple building	6	15	3	7.5
50.	Garden in school	6	15	-	-
51.	School building	5	12.5	4	10
52.	Play material in school	2	5	-	-
H.	EXHIBITION				
53.	Models and Exhibits	14	35	9	22.5
54.	Experience in giant wheel	7	17.5	8	20

From the Table, it is very clear that children have gained a lot of information through their field trips.

a) Transport

Children have gained information about the various methods of transports, various facts about buses, trains and planes and their usefulness to people. The different transport are every day sight and easy to absorb matter. More of pictures and films may be used to teach more facts.

b) Hospital

Majority of children had the chance of visiting the hospitals. The Table brings out the fact that children learnt facts from hospitals like the use fo stethoscope and thermometer, how tablets and injection cure ailments and the duty of doctors and nurses.

c) Bazaar

This is a place which children visit many days with their parents. As stated by the children, they have learnt about the different varieties of goods sold there and the different shops there.

d) Park, Zoo and Bird Sanctuary

Children have had a varied kinds of new facts like the facts about flowers, animals and birds.

The school can take more interest in organising for field trips for children.

e) Nature learning

The children have gained knowledge about the rivers, mountains, water falls and dam.Children could be taken for a nature walk if some mountains or rivers are nearby. This helps in better concept formation in children.

f) Carpentry and Weaving

The making of object and the way cloth is woven are seen and learned by some of the children. If any of the parents are carpenters or weavers, children may be taken to their houses for seeing the procedure. This is one of method that can be followed. This would not be of any cost.

g) Temples and Schools

Even these places are of great interest to children. They have learnt about the way pooja is conducted in the temples and the garden and school buildings have attracted children.

Once in a year, a trip may be arranged to visit some temple and another school for the children who are unable to visit one.

h) Exhibitions

In big cities every year exhibitions are set up. The parents play a great role in taking children to field trips. Exhibits and models arranged in the exhibition attracted the children most. The giant wheel and other related play items also are liked by the children.

F. THE DIFFERENT WAYS OF KNOWING SCIENCE FACTS

Science is a subject which can be learnt through many ways, and in our day to day life, we use scientific facts and tehre by learning too. Tables XX a,b,c and d bring out the different ways of learning science facts.

TABLE XXa

KNOWING SCIENCE FACTS THROUGH SEEING

Sl. No.	SEEING FACTS	BOYS		GIRLS	
		Number	Per cent	Number	Per cent
1.	Different colours	40	100	39	97.5
2.	Vegetabls and fruits	40	100	38	95
3.	Value of money coins	39	97.5	40	100
4.	Sun, Moon and stars	37	92.5	36	90
5.	Functions of human body parts	38	95	35	87.5

Sl. No.	SEEING FACTS	BOYS		GIRLS	
		Number	Per cent	Number	Per cent
6.	Wind	36	90	32	80
7.	Uses of fire	37	92.5	37	92.5
8.	Duties of family members	36	90	31	77.5
9.	Different kinds of houses	35	87.5	34	85
10.	Plants around us	35	82.5	36	90
11.	Different types of sand	33	82.5	33	82.5
12.	Growth of plants, parts and functions	30	75	23	57.5
13.	Seasons	27	67.5	26	65
14.	Different kinds of cloth	27	67.5	25	62.5
15.	Food habits of animals and birds	25	62.5	33	82.5
16.	States of water - ice, water, vapour	20	50	23	57.5
17.	Objects - metal, cloth cork etc.,	18	45	18	45
18.	Sources of water, filtration	13	32.5	12	30
19.	House hold appliances	13	32.5	20	50
20.	Seeds and their dispersal	11	27.5	11	27.5

Sl. No.	SEEING FACTS	BOYS		GIRLS	
		Number	Percent	Number	Percent
21.	Length, breadth and volume of objects	9	22.5	12	30
22.	Taking length and breadth	6	15	6	15
23.	Taking of height and weight	5	12.5	11	27.5

Observation is one of the best ways of learning. Children learn science facts by seeing the plants and the things around them. Table above shows clearly that above 90 percent of boys and girls had clear idea about colours, money, heavenly bodies and fire. More than 80 percent of children stated their learning by seeing different houses, plants and sand. Observation and seeing helps in concrete learning of children.

TABLE XX b

KNOWING SCIENCE FACTS BY EXPERIENCES

Sl. No.	EXPERIENCING FACTS	BOYS		GIRLS	
		Number	Percent	Number	Percent
1.	Functions and Celebrations	40	100	38	95
2.	Tastes of food	39	97.5	38	95
3.	Hotness and chillness	38	95	35	87.5
4.	Dissolving properties	31	77.5	26	75
5.	Functions of human body parts	30	75	32	80
6.	Rearing of pets	24	60	18	45
7.	Gardening	23	57.5	11	27.5
8.	Immunization	22	55	22	55
9.	Seasonal clothing	21	52.5	21	52.5
10.	Higher attitudes, slopes and valley	18	45	16	40
11.	Filtration of water	15	37.5	12	30
12.	Pressure blowing balloon	11	27.5	10	25
13.	First aid	7	17.5	8	20
14.	Taking of weight	4	10	10	25
15.	Uses of household appliances	4	10	7	17.5
16.	visit different kinds of houses	2	5	3	7.5

An important contribution of elementary science is the opportunity of children to have first hand experience with pheonomen of the environment. Above 75 percent to children stated their experiences in celebrating functions, tasting, food, hotness and chillness of some items, dissolving properties of sugar, salt, sand etc., and functioning of the different body parts.

We can educate the parents with regard to simple science experiments which can be easily carried out at home level. This will encourage the children to carry out many such experiments and through the experiences gained, chilldren will know science facts in a better manner.

TABLE XX c

KNOWING SCIENCE FACTS BY READING

Sl. No.	READING FACTS	BOYS		GIRLS	
		Number	Percent	Number	Percent
1.	Parts of the body	35	87.5	28	70
2.	Parts of the plant	30	75	31	77.5
3.	Water	28	70	28	70
4.	Solar System	18	45	16	40

More than 70 percent of children stated that through reading they came ot know about parts of the bodies, parts of the plants and about water.

TABLE XX d

KNOWING SCIENCE FACTS BY HEARING

Sl. No.	Hearing Facts	BOYS		GIRLS	
		Number	Percent	Number	Percent
1.	Uses of electricity	37	92.5	26	65
2.	Vehicles	31	77.5	32	80
3.	Sounds of animals & birds	24	60	23	57.5
4.	Computer	1	2.5	-	-
5.	Heart, beat	-	-	1	2.5

Hearing is one of the important ways of learning. From the above Table, it is seen that both boys and girls (above 55 percent) stated their knowledge on hearing science facts was about electricity, vehicles and sounds of animals and birds.

Teaching aids and methods create great interest among children. There are numerous aids and methods that can be used. The following Table XXI gives the information on children's interest in using teaching aids and methods.

TABLE XXI

CHILDREN'S INTEREST IN VARIOUS TEACHING AIDS AND METHODS

Sl. No.	Teaching aids and methods	BOYS		GIRLS	
		Number	Percent	Number	Percent
1.	Explanation by teachers	17	42.5	18	45
2.	Charts	9	22.5	10	25
3.	Models	10	25	9	22.5
4.	Demonstration	8	20	6	15
5.	Books	7	17.5	8	20
6.	Black board	6	15	3	7.5
7.	Field trips	3	7.5	6	15
8.	Pictures	6	15	-	-
9.	Posters	2	5	5	12.5

Boys and girls showed a great interest in the use of different teaching aids and methods. Their interest was mainly given on the use of models, charts and demonstrations. Field trips were also preferred by children.

Some kind of refresher courses may be organised for the teachers in the preparation and use of various teaching aids. This will be helpful for the teachers to teach children in an effective manner.

It was also found that parents and teachers of the children encouraged them in the learning of science.

Science is a subject that is very interesting for discussion. It was shocking to find out that only 22.5 percent of boys and 15 percent of girls had habit of discussing science facts with their friends. Their topics of discussion were found to be animals, birds, flowers, seeds, plants, fruits, human body, vehicles and sports.

The teacher can initiate a discussion in the class which involves the children's participation. This may continue even outside the class and end in discussion with friends on various science facts.

Another point to note here is that children are not aware of any scientists. Only 2.5 percent of boys and girls were able to name Rakesh Sharma as a scientist. It can be recommended that an assignment method can be followed by which children can bring names of scientists and write it on the chalk board.

G. PARTICIPATION IN SCIENCE ACTIVITIES

Table XXII gives the views of children on ways of knowing science facts.

TABLE XXII

CHILDREN'S INTEREST IN KNOWING SCIENCE FACTS

Interested to know more of science	BOYS		GIRLS	
	Number	Percent	Number	Percent
Yes	33	82.5	27	67.5
No.	7	17.5	13	32.5

There is wide difference in knowing science facts among boys and girls. Boys as seen in Table, about 83 percent wanted to know more science facts while about 68 percent of girls expressed their desire for knowing science facts. Children felt that they can know more of science facts through their teachers and parents.

More stress should be given for science programmes on radio, television and books. If proper guidance and facilities are provided for the children, there are more possibilities for learning science facts.

To find how far the children are taking part in science activities at home or in school the question pertaining to this was asked and the responses are presented in Table XXIII.

TABLE XXIII

PARTICIPATION OF CHILDREN IN SCIENCE ACTIVITES

S.No.	Science activities	BOYS		GIRLS	
		Number	Percent	Number	Percent
1.	Collecting items	13	32.5	11	27.5
2.	Preparing models	8	20	7	17.5
3.	Growing plants	6	15	-	-
4.	Rearing pets	3	7.5	3	7.5
5.	Doing demonstration	1	2.5	-	-

Table reveals that children's interest in collecting items in science activities seemed to be more compared with others. The rest may be made more interesting for activities.

The various items like pictures of animals, birds, vegetable and fruits, marbles, dolls, money and feather were collected by the children. The reasons expressed by the children for collecting the items include to make an album, for playing, saving of money, to know the different animals and birds and to make models.

II. EVOLVING SCIENCE KIT AND EXPERIENCES FOR CHILDREN OF STANDARDS IV AND V

For evolving the science kit and experiences, the following steps were followed:

a. Analysis of science books
b. Collection of needed materials for the kit
c. Description of the kit
d. Guidelines for the teachers for the use of the kit

a. ANALYSIS OF SCIENCE BOOKS

To help the children to have better understanding and to get clear concept on various science facts, a science kit was decided to be evolved as per the requirement of IV and V standard text books. For evolving the science kit, the first step was to analyse the science syllabi prescribed by the Tamil Nadu Text book Society, Madras. The concept of the science books for standards IV and V is given below.

STANDARD IV

CONTENT

1. Uses of Plants and Animals
2. Parts of the plant and Functions of the Parts
3. Types of sand
4. Maintenance of Plants and Animals
5. Parts of the body and their functions

6. Nutrition
7. Clean water
8. Environmental Sanitation and Prevention of Diseases
9. Air, Water and Time
10. Objects and their characteristics
11. Power, work and energy
12. Our Earth and Sky

STANDARD V

CONTENT

I. Our Universe
   1. Moon
   2. Lunar Eclipse
   3. Solar Eclipse

II. Air, Water and Time
   1. Air and Pressure
   2. Useful gases present in air
   3. Water

III. Rocks Sand and Minerals
   1. Rocks
   2. Coal
   3. Petroleum

IV. Energy, Force and Work
   1. Levers
   2. Liquid
   3. Volume and Weight

V. Salts and Salts used as Manure

VI. 1. Housing

2. Clothing

VII. Plants

1. Germination of seeds

2. Dispersion of seeds

3. Maintenance of plants

VIII. Human Body - Health and Hygiene

1. Nervous System

2. Skeletal System

3. Muscular System

4. Infectious Diseases

IX. Protection and First Aid

The assessed science curricula and the suggested experiments and experiences for standards IV and V are given below in Tables XXIV and XXV.

b.COLLECTION OF NEEDED MATERIALS FOR THE KIT:

To make science learnings stimulating, meaningful and useful, teachers must stay close to the daily experiences of the children. There is a need to use a kind of informal science programme where children are regarded as fertile fields in which seeds of curiosity, facts and information can only be sown and can only flourish under the heat of the children's own fleeting imagination (Lorten and Walley, 1979).

TABLE XXIV

ASSESSED SCIENCE CURRICULA, SUGGESTED EXPERIMENTS AND

EXPERIENCES FOR STANDARD IV

No. (1)	Name of the Lesson (2)	Contents (3)	Related Experiences and Experiments (4)	Suggested Materials (5)
1.	Uses of plants and Animals	Plants: Cereals, Pulses, roots and tubers, fats and oils, food chain, medicinal values and commercial products. Animals: Milk and milk products, fleshy foods, ploughing, pulling cart, leather goods, silk and fur and natural manure.	An assignment given to the children to collect the various by-products of paddy, wheat and bengal gram.	1. Samples of grains and pulses. 2. Flash cards of animals doing work. 3. Samples of leather, silk wool and fur.
II.	Parts of a plant and functions of the parts	Description of the parts of a plant, functions of the parts - absorption of water photo-synthesis, experiments, on the functions of roots, stomatal openings, parts of a flower.	A demonstration may be done by the teacher. A shoe flower can be taken and the longitudinal section of the flower can be cut and shown to students.	1. Picture of the longitudinal section of a flower. 2. Collection of seed of various modes of dispersion.

(contd.)

TABLE XXIV (contd.)

(1)	(2)	(3)	(4)	(5)
III.	Types of Sand	Different types of sand, characteristics, differences in the sand, different plants growing on different lands and formation of sand.	1. Experiment showing that air is present in soil. 2. An assignment for children to make a table where plants and their respective sands may be listed	1. Samples of sand 2. Beaker or bottle for experiment.
IV.	Maintenance of plants and animals	Proper procedures in the maintenance of plants, enlisting of forest animals and birds, uses of forests, the consequences of defore-station, importance of wild life sanctuary and bird sanctuary	1. Experiment bringing out the need of sun and water for the growth of plants. 2. Maintenance of garden by children in the school. 3. Assignment to list the domestic and wild animals and birds.	1. Charts on various step on plant maintenance. 2. Plant pots for experiment
V.	Parts of the body and their functions	External structure, internal structure, functioning of different internal organs, experiments on the fun-ctioning of heart and lungs	A visit may be organised to a hospital to show the use of stethoscope for children.	Stethoscope

(contd.)

TABLE XXIV (contd.)

(1)	(2)	(3)	(4)	(5)
VI.	Nutrition	Different nutrients, nutrients present in difference foods, storage of foods and protection of foods	Dramatisation of the nutrition skit may be encouraged among children at the class room level.	1. Nutrition games 2. Stick puppets for skit.
VII.	Clean water	Why do we need water? The ways people spoil water; Different sources of getting water, experiments on getting clean safe drinking water.	Demonstration on the ways of obtaining clean water through sedimentaion and other methods.	Beakers for the demonstration.
VIII.	Environmental Sanitation and prevention of diseases	Why to keep the environment clean? How to dispose the waste water? The ways of preventing mosquito breeding, diseases that are spread through contaminated water and ways of obtaining clean water.	Lecture cum discussion is apt for the lesson. Children can also be involved to tell out their points for discussion.	Chart on mosquito prevention.

(contd.)

TABLE XXIV (contd.)

(1)	(2)	(3)	(4)	(5)
IX.	Air, water and Time	The difference in time, differences in heating time on diff. matters, difference in drying time of clothes, the cycle of evaporation and condensation.	Children can be asked to do an assignment with fabric. The drying time of different types may be tabulated and compared.	Chart on evaporation and condensation.
X.	Objects and their characteristics	Characteristics like heating capacity, passing of light, solubility, volume, change of state, visibility etc.	1. An assignment to list out the characteristics of different objects - like transparent, conducts electricity, attracted by magnets etc. 2. Demonstration of the solubility of water with various items.	Beakers for demonstration.

(contd.)

TABLE XXIV (Contd.)

(1)	(2)	(3)	(4)	(5)
XI.	Power, work and Energy	The different types of work that needs force and energy, differences in their potentials, different forms of energy, conservation and conversion of energy.	Assignment for children to try and list various conversions of energy.	
XII.	Our Earth and Sky.	Solar System, rotation and revolution of earth and the different seasons	Dramatization with children for the solar system.	Model of a Solar System.

TABLE XXV

ASSESSED SCIENCE CURRICULA, SUGGESTED EXPERIMENTS AND EXPERIENCES FOR STANDARD V

S.No. (1)	Name of the lesson (2)	Content of the lesson (3)	Related experiences and experiments (4)	Suggested materials (5)
I.	Our Universe 1. Moon 2. Lunar Eclipse 3. Solar Eclipse	Details of the Moon, Experiments to bring out an importance of water and air for plants and animals, occurance of Lunar and Solar Eclipses.	1. Experiment showing water is needed for plants. 2. Experiment showing how air is needed for animals. 3. Formation of Solar and Linear Eclipses can be performed in the classroom.	1. 2 Plant pots. 2. 2 wide mouthed bottles 3. Balls of different sizes. 4. Mirror
II.	Air, Water and Time 1. Air and Pressure 2. Useful gases present in air 3. Water	Characteristics of filled in air, uses of objects filled with air, pressur and its uses, experiments showing the need for pressure, gases present in air, their percentage composition, experiments, showing the presence of different gases; Different sources of water; How it is polluted ; Experiments showing straining and evaporation of water	1. Working of inkfiller and syringe 2. Characteristics of air through a baloon/baloon experiment 3. Transferring water from upper to lower level 4. Experiment showing that oxygen is necessary for burning 5. Sedimentation 6. Filtration of water 7. Experiment on evaporation of salt from salt solution	Balloons, ink filler, syringe glass jars, rubber tube candle, beaker.

(contd.)

TABLE XXV (contd.)

(1)	(2)	(3)	(4)	(5)
III.	Rocks, Sand and Minerals 1. Rocks 2. Coal 3. Petroleum	Types of rocks-sedimentary, igneious metamorphic; Formation of volcano, Presence and uses of minerals, Minerals useful for agriculture, Informations about coal and petroleum	1. Taking the students for a field trip to visit the coal and petroleum mines. 2. Assignment to students to list the different petroleum products. 3. Visit to fields to see the use of fertilizers and pesticides.	Collection of different types of rocks and sand. Magnifying lens
IV.	Energy, Force and work 1. Levers 2. Liquid Force 3. Volume and Weight	The uses of wedge and screw their working principles; working of pulleys; pressure; Difference in weight in air and water; Measuring jars and finding out the weight using it, the differences in weight of the same volume of weight of the same volume of either solids or liquids; Density of solids and liquids.	1. Demonstration of working of pulleys. 2. Demonstration of the weighing of solids and liquids in the class. 3. An experiment that shows the conversion of heat energy to mechanical energy 4. Assignment to bring materials that will and will not float	1. Measuring jar 2. Small size Aluminium kettle 3. Different materials for floating experiment

(contd.)

TABLE XXV (contd.)

(1)	(2)	(3)	(4)	(5)
V.	Salts and Salts used as Manure	The concept of solvent, soluble and solution. The use of mineral salts for the growth of plants	1. Demonstration of solubility 2. Study of the progress of plants with the help of various salts 3. Tasting of different dishes with and without salt.	1. Beaker
VI.	1. Housing 2. Clothing	The importance of basic necessities ; The need for house-parts of a house ; Types of roofs, need for windows and maintenance of houses ; The need for clothing, seasonal clothing; Types of fibres-artifical and natural; Handloom and powerloom; Proper care and maintenance of clothes.	1. Field visit to show the different types of roofs. 2. Demonstration on sliding and flat roof models. 3. Preparing a clothes album 4. Visit to handloom and powerloom mills.	1. Collection of various clothes.

(contd.)

TABLE XXV (contd.)

(1)	(2)	(3)	(4)	(5)
VII.	Plants 1. Germination 2. Dispersion 3. Maintenance of plants	Uses of flowers, fruits and vegetables in our daily life; Need for optimum condition for germination; Experiments showing the various factors for germination; Different modes of seed dispersion-air, water and animals. Types of plants growing on various soil; Ways of maintaining plants and storage of seeds.	1. Different experiments with plants showing the need for fertilizers water and sunlight can be done in the classroom. 2. Encouraging students to grow indoor plants like crotons and money plant	1. Chart on the stages of germination life cycle 2. Test tubes 3. Seeds of different modes of dispersion
VIII.	Human Body - Health and Hygiene 1. Nervous system 2. Skeleton system 3. Muscular system 4. Infectious Diseases	The different senses and the ways by which one can experience these senses; The bones of our body and the different joints; Description about voluntary and involuntary muscles; cleanliness and hygiene and methods of preventing infectious diseases.	1. Science games that deals with the senses of touch, taste, smell, sight and hearing. 2. Organisation of exercises for students for muscular development 3. Seeing programmes on TV dealing with exercises, yoga or gymnasium. 4. Story for the clean habits and prevention of diseases.	flash cards for story.

(contd.)

TABLE XXV (contd.)

(1)	(2)	(3)	(4)	(5)
IX.	Protection and First Aid.	Fire and its destruction; Experiments to show that air is needed for burning and water is not needed for burning; Influences of kerosene petrol: How to help a burning person, use of an extinguisher; First aid for burns, Fracture and snake bite.	1. Experiment which shows that a wet paper does not burn 2. Demonstration of experiment that shows the need for oxygen for burning.	1. Glass tumblers 2. Candles

With regard to the above mentioned aspect of science programme, the materials needed for the kit were collected. Most of the items were locally available or indigenous materials. The items were collected with a view that they will help in children's concrete understanding of science facts. A small booklet as a teachers's guide was also prepared and given in the kit.

Following Table shows the list of the collected items and the approximate cost of the items.

TABLE XXVI

LIST OF ITEMS AND THEIR APPROXIMATE COST

S.No.	Items	Approx. Cost in Rs.
1.	Samples of grains and pulses	5.00
2.	Flash cards of animals doing work	8.50
3.	Longitudinal section of a flower	2.00
4.	Seeds of various methods of dispersion	-
5.	Samples of types of sand	-
6.	Chart on plant maintenance	8.50
7.	Plant pots for experiments	3.00
8.	Stethoscope	50.00
9.	Nutrition games	-
10.	Skit on importance of nutrition	-
11.	Stick puppets for the skit	8.50
12.	Chart on preventing mosquito growth	8.50
13.	Chart on evaporation and condensation	8.50

S.No.	Items	Approx. Cost in Rs.
14.	Model solar system	25.00
15.	Wide mouthed bottles (2)	-
16.	Balls of 2 different sizes	4.00
17.	Mirror	6.00
18.	Balloons	0.50
19.	Ink filler	1.00
20.	Syringe	3.50
21.	Rubber tube	-
22.	Candles	3.00
23.	Beakers (4)	60.00
24.	Test tubes (4)	20.00
25.	Magnifying lens	11.50
26.	Aluminium kettle	34.00
27.	Fabric album	2.00
28.	Flash card on germination cycle	2.00
29.	Flash cards for story	10.00
30.	Story on health, hygiene and cleanliness	-
31.	Glass tumblers	7.00
32.	Various experiments	-
33.	Games which will initiate the use of senses	-
34.	Feel Box	-
35.	Leather purse	4.50
36.	Booklet for teachers' use	-
	TOTAL	296.50

FLASH CARDS AND CHARTS PREPARED

FOR THE KIT

FIGURE 2

ITEMS PROVIDED IN THE KIT

FIGURE 3

ITEMS AND SCIENCE KIT

FIGURE 4

C. DESCRIPTION OF THE KIT

Steps in construction

1. Plywood of half inch thickness was used to make the kit
2. The measurements of the box:

   Height - 35 cms

   Length - 80 cms

   Breadth - 65 cms

3. A drawer was placed, which is 15 cms in height from the bottom
4. The 20 cms height above this is the kit
5. There are 4 partitions on the box where flash cards, samples, test tubes, items for experiments etc are placed separately.
6. The lid of kit opens upwards
7. There are two clamps to hold the lid in the upward position
8. There is the provision of side handles for making the carrying work easy
9. A latch is provided to the kit so that it can be locked and safety is assured
10. The kit is finished with varnish coat
11. The name "SCIENCE KIT" is written on the kit with white paint (Figure. 5)
12. Cost of the kit Rs.998.00

D. GUIDELINES FOR THE USE OF THE KIT

To enable the teachers to make use of the kit properly for the benefit of children, some of the guidelines are given below. These guidelines deal with the different methods and aids relevant for the

SCIENCE KIT

MEASUREMENTS.

HEIGHT : 35 Cms.

LENGTH : 80 Cms.

BREADTH : 65 Cms.

SCALE : 1/10th of the measurements.

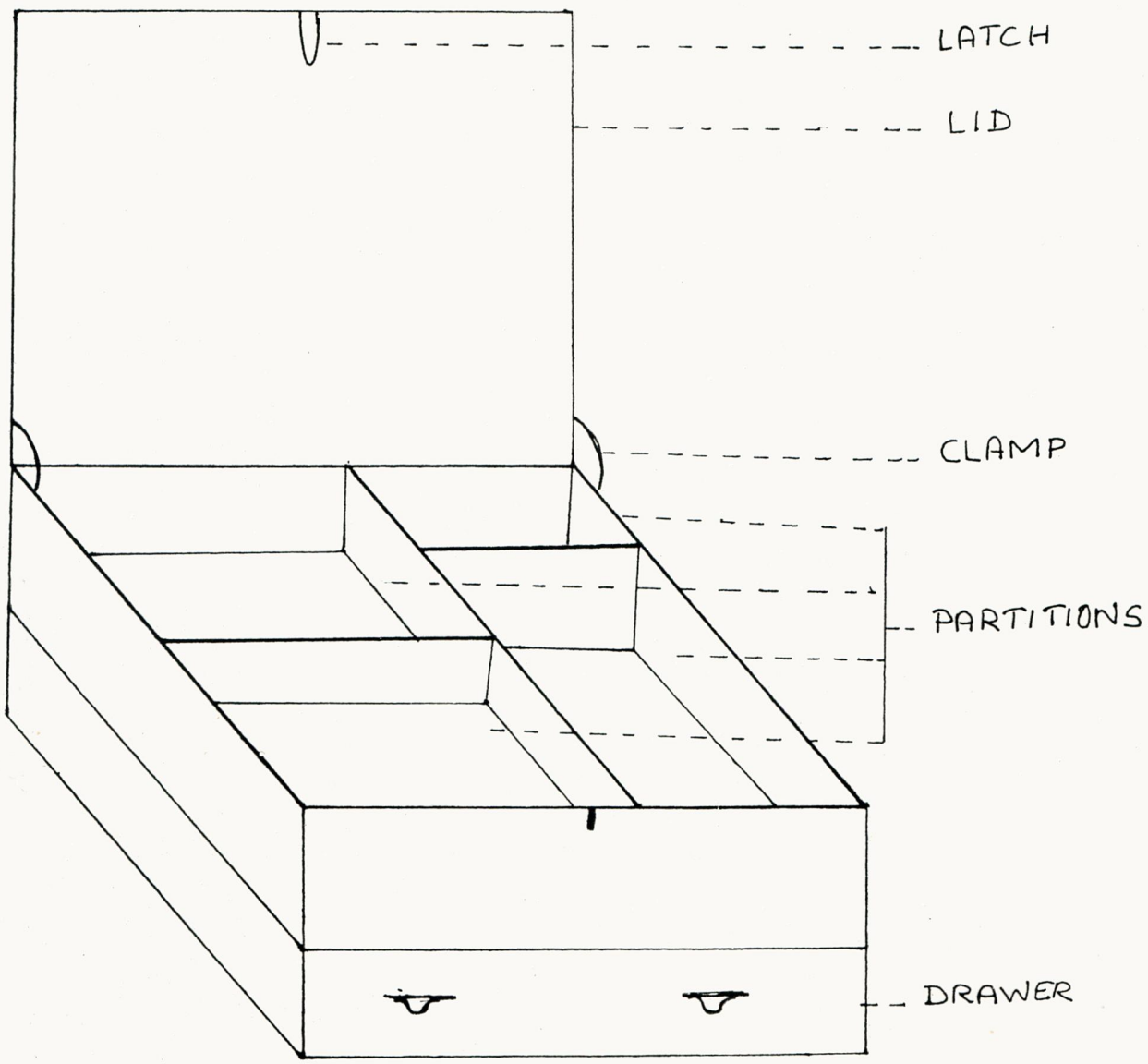

FIGURE. 5.

science lessons for standards IV and V. Along with this, the various experiments and games that can be incorporated along with teaching are also enlisted and described.

Methods and aids relevant for science lesson

1. Lecture Cum Discussion:

Lessons like Energy, Force and work, environmental sanitation and Air, Water and time may be discussed after a lecture session.

2. Demonstration:

Solar and lunar eclipses, working of pulleys, weighing of solids and liquids, solubility, flat and slanted house roofs - all these can be demonstrated in the classroom by the teacher so that the students might understand more easily.

3. Assignment:

Products of rice, wheat and bengal gram, garden in School, the various characteristics of objects-to list, collection of pictures of various types of work to make a scrap book, listing of different petroleum products, collection of materials with floating and sinking qualities, and growing of indoor plants are some of the activities that can be assigned to the students and create interest in doing by themselves and there by enhance self-learning.

4. Field Trips:

Places like handloom and powerloom mills, different types of houses, fields where fertilizers and manures are used may be of edu-

cational interest to the children. They can learn more easily and effectively. The children might be given opportunity to learn from direct first hand experiences.

5. Experiments:

Presence of air in sand, importance of light and water for plant growth, filtration of water, oxygen is necessary for burning candle, conversion of energy, tasting dishes of different tastes are a few of the experiments that may be performed with children in small groups. Seeing the actual happening help the children to register the facts easier and remember well. A stethoscope may also be provided for the children to experience heart beat. The details of the experiments are given in the following pages and also provided in the kit for the teacher's use.

6. Physical Exercises:

For the lesson on muscular system, physical exersises may be organised. The children can also be encouraged to watch television programmes on exercises, yoga or gymnastics, which might help them to have an idea of building good physique.

7. Games :

Nutrition games and puzzles may be devised in such a manner they play a dual role in helping children. Children on one hand enjoy playing the game or working on the puzzle and on the other hand, imbibe information from the game or puzzle about nutrition facts. Nutrition games

and puzzles devised by the investigator are provided in the kit.

8. Story :

A story on health, hygiene and cleanliness has been developed by the investigator and given in Appendix II.

9. Dramatisation :

A drama can bring out the importance of nutrition and how it is essential for our lives. The children may be asked to enact the roles and take part in the drama, which can be made at classroom level itself. A skit on nutrition developed by the investigator is given in Appendix III.

10. Flash Cards :

This aid may be prepared for the story, animals doing different kinds of work and longitudinal section of a flower are used effectively in teaching the respective lessons (Fig. 2).

11. Charts :

Various steps in plant maintenance, various food groups, preventing of mosquito, evaporation and condensation, all these can be represented in teaching the respective lessons. (Fig. 2).

12. Models :

For the solar system, a model can be presented so that it helps the children to frame the right concepts about the planets and their arrangements.

13. Puppets:

For the drama, stick puppets will be an easy method of getting an aid. Any puppet brings interest in children. Glove puppets may also be made to create our effective learning. (Fig. 3).

Some of the suggested experiments that can be conducted in classroom with the help of the items provided in the kit are given below.

1. Presence of air in sand :

Dry sand is taken in a bottle. To this sand, water is added so that the level of water rises above the level of sand. When this is done, air bubbles appear and breaks out at the surface. This proves that air is present in dry sand.

2. Stethoscope :

This may be provided to the children. They may be asked to operate it just like the doctors and find out by themselves, the heart beat of an individual.

3. Water is needed for plants :

2 Plants are taken separately. One plant is watered regularly while the other is not done so. In a few days time, the one which was not watered will whither and the watered plant will stay as fresh as ever.

4. Evaporation :

Salt solution is used for this experiment. Place the salt solution

in a flat surfaced dish under hot sun. After a few hours, it will be seen that water has evaporated and salt particles remained at the surface of the dish.

5. Conversion of heat to mechanical energy :

Water is boiled in an aluminium kettle. The water vapour comes out through the spout. When a small hand-made fan is held at the mouth part, the fan starts rotating. This is to prove that heat energy is converted to machanical energy.

6. Sunlight is needed for plant growth :

Two plants in pots are taken for this experiment. One plant is placed where it can get optimum sunlight. The other plant is kept in a dark corner of a room. Both the plants are watered. The result will be found after a few days. The plant watered and kept in sun is fresh and healthy. But, the plant kept in darkness will be seen drooping, proving sunlight is necessary for plants to grow.

7. Wet paper does not burn :

Take two similar bits of paper or cardboard. Soak one water and make it wet. Now one bit is dry and the other is wet. Now light both the bits. You can find that the dry one cathes fire while the wet one does not burn. This will show that water acts antogonistic to fire.

8. Oxygen is needed for burning a candle :

Take a candle and light it. Now close the candle with the glass

tumbler. The supply of air (that is oxygen) is cut off, and the light gets off. Then place two wooden pieces at the bottom. Again burn the candle. This time close the tumbler, but the tumbler will rest on the wooden pieces. So that there is supply of oxygen. This time the candle continues to burn showing air is necessary for burning.

Games that initiate the use of senses :

1. Sense of touch :

Place cloth of different varieties and also objects with varied types of surfaces like smooth, rough, rugged etc or cloth like cotton, polyester, silk, velvet, wool etc. The child's eyes should be tied and then allowed to feel the different exhibits. By the feeling of touch, they should differentiate objects. This can be played by giving points for right answer and see who's the winner.

2. Sense of hearing :

This game can be played with the casette player. Different sounds of vehicles, musical instruments, animals and birds can be recorded and the children can be asked to identify the sounds. This can be played as a group game in the classroom itself and the winner of the class may be applauded. Through this game, the children will be in a position to know the unknown sounds.

3. Sense of smell :

Familiar items that have strong smell may be brought to the

class for the children to identify. Here also the eyes of the children are tied and only with the help of the olfactory system, children should identify the items. Items like garlic, ginger, mint and corriander leaves, flowers-rose, jasmine, chrysanthemum etc, are some of the items which can give work to the sense of smell.

4. Sense of taste :

For the use of this sense, a game can be played in the class. A "tasting squad" should be first appointed. This may be a team of 4 or 5 students. Another group of children may be asked to bring items of varied tastes. This may be cooked, or raw vegetables like carrot, tomato etc. The "tasting squad" should find out the different tastes. Till everyone in the class gets a chance to play like this, the game can be rotated, and played.

5. Sense of sight :

Incomplete pictures may be shown to them, and ask them to find out the missing parts. For eg. a flower without a calyx, a cow without horns, a leaf without veins etc., may be provided and ask whether they will be able to find out the missing parts.

6. Feel Box:

In a box nearly 25 items are put and covered. There is a hole for just a hand to go in. The children should insert the hand and feel the items inside and find the items. The one who gets the highest score is the winner. The feel box is presented in the kit.

Summary and Conclusion

V. SUMMARY AND CONCLUSION

The study undertaken on "Assessing the science curricula and evolving a kit for children of standards IV and V" was primarily aimed at assessing the organised science experiences for children at home and in school, to assess the science curricula and evolve a kit pertained to the curricula.

The study was carried out in two parts. Assessing the science experiences organised for children at home and in school was the first part. 80 children (40 boys and 40 girls) of standard IV were selected as samples from three corporation schools in Coimbatore city. An interview schedule was administered to elicit the required information.

For evolving a science kit, the science curricula of standards IV and V was analysed and the items to be supplied in the kit were prepared. Some science experiences and games suitable for children were also included in the kit.

The major findings:

1. 42.5 percent of boys were from the Corporation Middle School Wedderburnpet and 47.5 percent of girls were from Devangapettai Corporation Primary School.

2. About 30 percent of boys hailed from families having monthly income from Rs.500-700, one 25 percent of girls came from families of income Rs.300-500 and another 25 percent from families of monthly income ranging from Rs.700 - Rs.900.

3. 57.5 percent of boys and 50 percent of girls had the habit of listening to radio programmes. 30 percent of boys liked to listen to radio programmes and for 40 percent of girls the programmes were interesting.

4. Only 12.5 percent of boys had the interest to listen to science programmes on radio. while 37.5 percent of boys were unaware of science programmes on radio, 22.5 percent of girls felt them uninteresting.

5. Science programmes on television interested 57.5 percent of boys and 45 percent of girls.

6. The science programmes on television was considered for knowledge by 32.5 percent of boys and 15 percent of girls. Another 15 percent of girls felt they were informative also.

7. Science facts in magazines and dailies were read only by 25 percent of boys and 12.5 percent of girls.

8. The three schools selected for the study did not have library facilities.

9. The use of aids for teaching was easy to learn and understand for 60 percent of boy and 65 percent of girls.

10. Discussing science facts with friends was preferred by 22.5 percent of boys and 15 percent of girls.

11. 82.5 percent of boys and 67.5 percent of girls wanted to Know more of science facts.

12. Collecting items related to science interested 32.5 percent of boys and37.5 percent of girls.

13. A science kit was prepared for the children of standards IV and V along with a book let on guidelines for the teachers inorder to help them to use the aids properly in the proper method of teaching. A follow up study is suggested to find out the impact of kit on the scientific perception and achievement of children.

The recommendations emerged out of the study are given below:

1. Each school can be provided with a kit along with the guidelines booklet for teaching science effectively. Teachers can be given orientation on this aspect.

2. To popularise and create awareness on science, the concerned authorities of All India Radio and Doordharshan can chalk out suitable science programmes for primary school children and broadcast/telecast the same for the benefit of children during working hours of the schools.

3. The Education Department can help to arrange in the schools once in three or four months, film shows or slide shows regarding science.

4. Books that bear scientific facts can be collected and provided by the school. This will later lead to the collection of more books for school library.

5. Funds may be provided by the Government to the schools for arranging field trips to places of children's interest.

6. A refresher course may be organised for the teachers, inorder to orient them on the preparation and use of various teaching aids and methods of teaching science facts.

7. Parent education classes can be arranged in order to make parents realise how the household and environmental activities encourage children to get scientific perceptions.

8. A follow up study may be carried out to find out the impact of the science kit and the academic achievement and scientific perceptions of children.

Bibliography

BIBLIOGRAPHY

Armstrong, H.E.
1888 - 1928.

Cited by Batia, K., Bhatia, B.D.
The principles and methods of Teaching
Delhi : Doba House, 1984, P. 400.

Ball.
1981.

Cited by Hoffman, H.A., Young, J.,
Klesis, E.S. Meaningful movement for
children. London : Allya and Bacon, P. 186

Barman, C.R.,
Kotar, M.
1989.

"Science and Children - The learning
cycle". in The Hindu, October, 22 P.
P. 22.

Bhandula, N.,
Chadha, P.C.,
Sharma, S.
1986.

Teaching of Science.
Ludhiana : Parkash Brothers,
pp. 7, 32, 197 - 200.

Bhatia, K.K.,
Kadyan, K.S.,
Chadha, P.C.,
Sharma, S.
1983.

Modern Indian Education and its Problems.
4th Edn., Ludhiana : Parkash Brothers,
pp. 61-62.

Bhatia, K.K.,
Kadyan, K.S.,
Chadha, P.C.,
Sharma, S.
1985.

Modern Indian Education and its problems.
Ludhiana : Parkash Brothers, pp. 16-17
75-77.

Bhatia, K.K., Narang, C.L. 1984. Principles of Education (Methods and Techniques). Ludhiana : Parkash Brothers, pp. 206, 210, 212, 219. pp. 206, 210, 212, 219.

Breekenridge, Vincent. 1965. Cited by Devadas, R.P., Jaya, N. A Text Book on Child Development. Delhi : Macmillan India Limited, 1984, p. 125.

Bulletin of the UNESCO Regional Office for Education in Asia. 1977. "Science Education in the Asian Region: India", 18, pp. 37-41, 47.

Chava, N., David, N. 1981. Research Methods in the Social Sciences. New York : St. Martin's Press, p. 188.

Chhikara, M.S., Sharma, S. 1986. Teaching of Biology. Ludhiana : Parkash Brothers, pp. 88, 89-100.

Das, R.C. 1985. Science Teaching in Schools. 2nd Edn. New Delhi : Sterling Publishers Private Ltd., p. 2

Devadas, R.P., Jaya, N. 1984. A Text Book on Child Development. Delhi : Macmillan India Limited. pp. 125.

Erikson, E. 1964. Cited by Zanden, J.W.V. Human Development. 4th Edn, New York : Alfred A. Knopf, Inc., 1989, pp. 373, 374.

Gupta, C.P. 1987 "Towards a new Education System," The Education Quarterly. XXXIX, 3, p. 16.

Hurlock, E.B. 1980. Developmental Psychology - A Life Span Span Approach. 5th Edn. New Delhi : Tata McGraw Hill Publishing Company Ltd., pp. 114, 156.

Indian Expresss 1985. HUDCO - Income Range for Low income family, Housing and Urban Development Corporation, December, 28, p. 7.

Indian Express 1989. "Science for children", Science Express, November, 14, IV.

Jacobson, W.J. 1970. The New Elementary School Science. New York : Van Nostrand Reinhold Company; pp. 7-9, 12, 13, 66, 67, 539.

Kastenbaum, R. 1979. Humans Developing - A Life span perspective. London : Allwyn and Bacon Inc., pp. 301-302, 306-307, 310-311.

Lal, S.J., Subramaniam, E.V. 1976. "A critical study of science teaching in primary schools", Journal of Educational Research and Extension. 13, 2, pp. 116-119.

Lewis, J.E., Potter, C.I. 1970. The Teaching of Science in the Elementary School. New Jersey : Prentice-Hall, Hall, INC, Eaglewood Cliffs, p. 9.

Lorton, W.J., Walley, B.L. 1979 Introduction to Early Childhood Education. New York : D. Van Nostrand Company, pp. 201, 203-205.

Mangal, S.K. 1985. Fundamentals of Educational Technology (Essential of Teaching and Learning). Ludhiana : Parkash Brothers, pp. 84, 88, 98, 100.

Murthy, S.K. 1982. Philosphical and Socialogical Foundations of Education. 4th Edn. Ludhiana; Parkash Brothers, pp. 70, 77.

Mussan, P.H., Conger, J.J., Kagan, J. 1974. Child Development and Personality. 4th Edn. New York : Harper and Row Publishers, pp. 422, 487.

Mussan, P.H., Conger, J.J., Kagan, J., Huston, A.C. 1984. Child Development and Personality. 6th Edn. New York : Harper and Row Publishers, p. 419.

Nanda, S.K. 1982. Primary Education. Ludhiana : Parkash Brothers, pp. 117-119.

National Policy on Education, 1986. Ministry of Human Resource Development, Government of India, pp. 11, 23.

Quest, H. 1984. Cited by Bhatia, K., Bhatia, B.D. The Principles and Methods of Teaching. Delhi : Doaba House, 1984, p. 398.

Rai, B.C. 1983. Method of Teaching Science. Lucknow : Prakashan Kendra, pp. 3, 10-11.

Rajput, J.S. 1987. "Environmental Education", The Education Quarterly. XXXIX, 3, pp. 14, 15.

Saiyidain, K.G. 1983. Cited by Bhatia, K.K., Kadyan, K.S., Chadha, P.C., Sharma, S. Modern Indian Education and Its Problems. 4th Edn., Ludhiana : Parkash Brothers, 1983. p. 61.

Sampath, K., Pannirselvam, A., Santhanam, S. 1984. Introduction to Educational Technology. 2nd Edn. New Delhi : Sterling Publishers Private Limited, pp. 20, 171-173, 176, 178.

Schiamberg, L.B., Smith, K.U. 1982. Human Development. New York : Macmillan Publishing Co., Inc., pp. 343-345.

Sharma, R.C., Sharma, D.N. 1972. Teaching of Science. 5th Edn, Delhi : Dhanpat Rai and Sons, p. 15.

Shukla, P.D. 1984. Towards New Pattern of Education in India. New Delhi : Sterling Publishers Private Limited, pp. 106-108, 110.

Sikka, P. 1984. "Science News Service for India", Emerging Technologies for Mass Communication, Edited by Pradeep Chaturvedi, pp. 168, 172.

Smith, J.L. 1990. "Science and Children - Break-the ice demos". The Hindu, January, 21, p.22.

Sood, J.K. 1987. Teaching Life Sciences. Chandigarh : Kohli Publishers, p. 2.

Swartland, J. 1988. "Interdisciplinarity in the teaching of teaching of science during the first 9-9-10 years of basic education", Innovations

Swartland, J. 1988. "Interdisciplinarity in the teaching of science during the first 9-10 years of basic education", Innovations in Science and Technology Education. II, pp. 91, 92.

The Hindu 1990. "National Awards for Popularising Science", February, 21, p. 4.

The Hindu 1990. "Science teaching should spur young minds: RV", February, 22, p. 8.

The Hindu 1990. "PM Calls for promoting science", The Hindu. March 1, p. 6.

Thomson, J.J. 1984. Cited by Bhatia, K., Bhatia, B.D. The Principles and Methods of Teaching. Delhi : Doaba House, 1984, p. 394.

Victor, E. 1975. Science for the Elementary School. New York : The Macmillan Company, p. 216.

Walia, J.S. 1985. Principles and Methods of Education. Jalandhar : Paul Publishers, p. 18.

Wilkinson, T.S., Bhandarkar, P.C. 1982. Methodology and Techniques of Social Research. Bombay : Himalaya Publishing House, pp. 183, 185.

Zanden, J.W.V. 1989. Human Development. 4th Edn, New York : Alfred A. Knopf, Inc., pp. 334, 373-374.

Appendix

APPENDIX I

INTERVIEW SCHEDULE TO ASSESS THE SCIENCE EXPERIENCES OF PRIMARY SCHOOL CHILDREN

I. General Information

1. Name of child :
2. Age (years) :
3. Sex : Male/Female
4. Name of the school :
5. Home Address :
6. Area of residence : Rural/urban/Slum
7. Type of family : Nuclear/Joint
8. Religion : Hindu/Muslim/Christian
9. Ordinal Position : 1st/2nd/3rd

II. Information about family members.

S.No.	Names of family members	Relation to the child	Sex	Age (yrs)	Edu-cation level	Job	Monthly income (in Rs.)

Other sources of income/ month :

Total monthly income of the family :

III. Science experiences at home and school.

a) Radio

1. Do you possess radio? Yes/No.

2. If yes, do you have the habit of listening to radio? Yes/No.

3. If yes, give the details of programmes Listened on radio.

S.No.	Programme listened	Time	Reasons for hearing

4. Are you interested in listening to science programme? Yes/No.

Reasons

5. If yes, what are the programmes you like to listen.

S.No.	Programmes	Time	Reasons

b. Television

1. Do you possess a TV at home? Yes/No.

2. If yes, do you have the habit of watching TV? Yes/No. Reasons.

3. If No, do you watch TV in neighbour's house? Yes/No.

Timings of watching :

4. Details about programmes watched on TV

S.No	Programmes watched	Time	Facts learnt or Reasons for watching

5. Are you interested in watching Science Programmes on TV?

Yes/NO.

Reasons.

c. Books/Magazines/Dailies

1. Do you have the habit of reading science matter in books, magazines or dailies?

Yes/No.

Reasons.

2. If yes, details of reading.

Those that are read	Bought at home	Facts read	Facts that are learnt
Books			
Magazines			
Dailies			

3. How much time do you require to read science matter In books or magazines?

4. What type of science books do you like to read?

5. Do you have a library in the school? Yes/No.

6. If yes, do you use it read science matter?

Yes/No.

If yes, how often you use? Daily/weekly/Fortnight.

d. Gardening:

1. Do you have garden at home? Yes/No.
2. Do you have gardens at school? Yes/No.
3. If yes, do you like to do gardening?

   Yes/No.

4. How much time do you use to do gardening work?

e. Play items and household appliances related to science.

1. What are the items present in your house?

   (Please tick (✓) what are present at home)

S.No.	Household appliances	Play items
1.	Grinder	Pulling Carts
2.	Mixie	Blocks
3.	Pressure Cooker	Soft toys
4.	Iron box	Mechanical toys
5.	Gas stove	Transport toys
6.	Refrigerator	Assembling toys
7.	Washing Machine	Matching toys
8.	Fan	Vessel set
9.	Television	Magnetic toys
10.	Sewing machine	Electric toys
11.	Water heater	Others if any

S.No.	House hold appliances	Play items

Vehicles

1. Cycle
2. Scooter
3. Bike

2. Which is your favourite toy?

3. Different sport items and teaching aids in school.

S.No.	Items available at school	Way of using it	Like to use them		Reasons
			Yes	No.	

F. Field trips

In your school or home, have they taken to the below mentioned places?

	Places	Home		School		Fact learnt
		Yes	No	Yes	No	
1.	Park					
2.	Field					
3.	Zoo					
4.	Bird santuary					
5.	Museum					
6.	Poultry form					
7.	Cow shed					
8.	Milk industry					
9.	Carpentry					
10.	Airport					
11.	Railway station					
12.	Bus stand					
13.	Bazaar					
14.	Exhibition					
15.	Temples					
16.	Preservation centre					
17.	Hospital					
18.	Hill area					

	PLACES	Home		School		Facts learnt
		yes	No.	Yes	No.	
19.	River bed					
20.	Waterfalls					
21.	Weaving unit					
22.	Dyeing unit					
23.	Aquarium					
24.	Plant nursery					
25.	Other schools					
26.	Sericulture					
	OTHER IF ANY					

2. Are you interested in going for field trips?

Yes/No.

Reasons

3. Which places do you intend to visit?

S.No.	Places wish to visit	Reasons

g. Ways of knowing science

1. Please tick the different items known to you.

S.No.	Different ways and facts
I.	Learnt Science by seeing
1.	Growing of plant, parts & functions.
2.	Seeds and seed dispersal
3.	Vegetables and fruits
4.	Plants around us
5.	Different colours
6.	Objects - length, breadth and volume
7.	Measurement - Taking of height
	Taking of weight
	Taking of temperature
8.	Value of money
9.	States of water ice, water, vapour
10.	Sources of water and filtration
11.	Food patterns of animals and birds
12.	Uses of fire
13.	Sun, Moon & Star
14.	Weather
15.	Different types of sand
16.	Air

S.No.	Different ways and facts
17.	Objects - metal, wood, cork etc.
18.	Household appliances
19.	Different types of houses
20.	Different types of cloth
21.	Parts of human body and functions.
22.	Duties of family members
II.	Learning through experience
1.	Dissolving items
2.	Hot and cold
3.	Pressure
4.	Tastes of food
5.	Taking of weight
6.	Gardening
7.	Rearing of pets
8.	Work done by different body parts
9.	Seasonal clothing
10.	Visiting different types of houses
11.	Use of household appliances
12.	Filteration of water.
13.	Immunization
14.	Celebration of festivals
15.	First aid
16.	Hight attitudes, slope & Valley

S.No.	Different ways and facts
III.	Learning through reading
1.	Parts of the body
2.	Parts of a plant
3.	Solar system
4.	Water
IV.	HEARD AND LEARNT
1.	Computer
2.	Uses of electricity
3.	Parts of a heart
4.	Sounds of animals and birds
5.	Vehicles
	Other if any

2. What type of help is required for learning science?

3. Do your parents/teachers encourage in learning science?

	Yes	No
Parents		
Teachers		

4. Name any 2 scientists

1.

2.

5. Do you discuss with your friends about science?

Yes/No.

6. If yes, list any 5 topics of discussion.

1.

2.

3.

4.

5.

7. Are you trying to know more about science?

Yes/No.

If yes, through what source?

8. Participation in science actitivities.

1. Have you taken part in any of the following science activities?

S.No.	Activities	At home	At School	Reasons
1.	Demonstration			
2.	Models			
3.	Collection of items related to science			
4.	Growing plants			
5.	Rearing of pets			
6.	Visiting science programme			

2. How are you using the collected items related to science?

S.No.	Things collected	ways of using

APPENDIX II

STORY

CLEANLINES IS NEXT TO GODLINESS

In a small village, there was a primary school. A new headmistress was to come and take charge on that morning. Morning 10 O' Clock, all the students had assembled for the prayer meeting and the new headmistress came to address them.

H.M. : Good morning dear children!

Chn : Good morning teacher!

H.M. : Children, from today I am your new H.M. I feel very happy to meet you. You are all must come in your uniform regularly and learn well. Okay!

Chn : Yes teacher.

After the prayer meeting, children went to their respective classes with their teachers. Teachers started their duty to teach.

When the interval bell rang, all the children ran towards the gates of the school. They were attracted by the sweet vendors. They were happy to buy and eat. They did not bother about the flies, mosquitoes and drainage nearby.

Seeing this, the H.M. was very upset. On seeing her sad face, a staff approached her and enquired. H.M. with deep thought told the staff that children did not know the importance of hygiene and cleanliness.

Staff : Whatever we tell the students, they do not just listen to us.

H.M. : The solution for this problem does not lie in our hands alone. Parents should be aware of all this. Tomorrow itself we should conduct parents meeting and also I will talk to the children.

Staff : Okay Madam, we shall arrange for both.

Next day morning after the prayer meeting, H.M. spoke to the children about cleanliness and good habits. She also told that every day they should take bath and keep their body clean.

H.M. : Children, you should not buy the items sold out with all those flies and if done so, it will lead to disease like Malaria, elephantasis and many other diseases when medical officers visit for giving immunization, no one should refuse. Be good and go to your classes now.

The evening itself parents meeting was conducted, H.M. Spoke to the parents.

H.M. : Dear parents, this meeting is not only for the good of your children but also for our villages good also. Our village should be clean for the healthy lives of children and people.

One parent : To keep our environment clean, what should we do Madam?

One staff : Close the wells with gauge. Do put the dust in the bin.

H.M. : Grow trees in your houses. These will help in bringing rains. Send your children neatly dressed, with books at correct time. Tell your children not to buy items are kept open to flies. Insist that items are good when kept in closed containers. This will prevent the children from diseases. You must help in developing better village and healthier children.

Parents : Thank you Madam for the great informations you had given us. We will do our best. Thank you.

Now the village is looking gay and bright. The houses and roads are very clean. Children buy sweets in good shops and are hale and healthy, and all of us know,

"Today's children are tomorrow's leaders".

APPENDIX - III

SKIT

NUTRITION FOR LIFE

For our daily work, we need energy. This energy we get from our food. All cereals, pulses, vegetables and fruits are full of nutrients. Here is a small play, through which we can bring out the importance of nutrition.

Ashok and Amutha are 9 and 7 years respectively. They are settled abroad. For their summer vocation, they come to their maternal grand parents' house after a long gap. The habits of their grand parents are very interesting for them to observe. They asked lot of questions and their granparents answered them in a conducive manner.

Morning 7.00 am

Ashok : Grandma, I want Coffee,

G.M. : As soon as you get up from bed, you should brush your teeth. Only after that I will give you coffee.

(Ashok and Amutha brushed their teeth, had their coffee, bathe and came for breakfast)

Amutha : Grandma, what is for breakfast?

Grandma: Idly and chutney.

(Both them were fascinated by the soft idlies and chutney. They asked about the preparation of idlies).

Grandpa : It is prepared by mixing rice and black gram dhal in a particular ratio, ground, fermented. Next day it is pressure cooked. They contain a lot of nutrients

(Children ate the idlies and after that they went to the market for buying vegetables).

Ashok : Grandpa, why do you select vegetables from the lot. These greens are big and healthy. Why don't you select them?

Grandpa : Tender vegetables are only good for health. They contain a lot of nutrients than the other ones. In greens you have vitamins and minerals. Carrot contains Vitamin A and its good for sight.

(After the purchase, the returned home. There they saw their grandma had soaked green gram).

Amudha : Grandma, why have you kept this in water?

Grandma : This is green gram.After soaking, it is tied in a cloth, the next day morning you will see sprouts coming out. The sprouted gram is a rich source of vitamin C. You can eat it like that or cook and eat.

Ashok : Grandma, why do you cut the pieces so big?

Grandma: When they are cut in big pieces and cooked in small amount of water, the nutrients are not wasted. When the rice and vegetables are cooked in pressure cooker, the nutrients are retained better.

(All four of them had their lunch and after that had a short nap)

Evening

Children have their evening milk. After that they went for a walk with grandfather. They sit in the river bed and watched people playing kites etc. Grandfather explained about the kites and nature to Ashok and Amutha. Later they returned home.

Grandma: Ashok! Amutha! Both of you look very tired.
Come, we shall have our dinner.

Grandpa: What have you prepared for children as dinner?

Grandma: Chappathi and Khurma.
(All of them had their dinner)

Grandpa: Give them some fruits.

Amutha : Grandma! why have you covered the fruits with a net?

Grandma: This is to protect the fruits from the attack of flies and mosquitoes. You should eat foods that are very nutritious. Every day you should take milk and fruits. For our daily work and strength we should eat balanced meal.

Granpa : Now you have beared about nutrition so much. You should not waste food and skip meals. Eat well and keep you bodie healthy.

Ashok
and
Amutha : We will do as you said grandpa.

(Screen)