CHAPTER – III

METHODOLOGY OF THE STUDY

3.1 INTRODUCTION

This chapter discusses the variables used in the study, design of the study, sampling procedure, description of the samples, selection of teaching contents, instruments used, procedural details and statistical techniques used for analysis.

3.2 DESIGN OF THE STUDY

The present investigation was carried out to study the effectiveness of the constructivist approach in learning of social studies. The design adopted in the study is quasi-experimental, which is different from true experimental designs in two ways; Firstly, the participants are not randomly selected from the specific population and secondly, the participants are not randomly assigned to experiment and control groups. Nevertheless, Quasi-experimental designs provide a relatively high degree of experimental control in natural settings and it clearly represent a set-up from pre experimental designs because they enable the researchers to compare the performance of the experimental group with that of a control group. In other words, quasi-experimental designs enable researchers to move their experimentation out of the laboratory and into a natural setting or context (Martella, 1999). “Often in educational research, it is simply not possible for investigation to undertake true experiments …” (Cohen, 2007, p. 282). Quasi-experimental design is applied to much educational research where the random assignment of schools and classroom is quite impracticable (Kerlinger, 1970).
Nonequivalent control group design was employed for the present study, which is similar to the pre-post-test control group design except for the absence of the random selection of the participants from a population and the random assignment of participants to groups. This design is similar to the static group comparison design except that both groups are given a pre-test, which can be used to determine whether two groups are equivalent, even though they have not been formed by random assignment. This design is represented by following diagram:

```
<table>
<thead>
<tr>
<th>Experimental</th>
<th>O</th>
<th>X</th>
<th>O</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>O</td>
<td></td>
<td>O</td>
</tr>
</tbody>
</table>
```

Here, X represents experimental treatment, O represents the pre-test or post-test measurement of dependent variable and broken line indicates that the experimental and control groups are not randomly formed (Campbell & Stanley, 1963).

This design begins with the identification of naturally assembled experimental and control groups. The naturally occurring experimental and control groups should be as similar as possible and the assignment to one group or the other is assumed to be random. “When random assignment of students in the classroom is not possible, investigators opt for non-equivalent design” (Cohen, 2007, p.283). There are research studies conducted (Hur, 2001; Zhang, 2001), employing non-equivalent control group design to find the effectiveness of constructivist approach in classroom situations. This design was found to be appropriate in the present study in order to examine the effect of Constructivist approach on learners’ learning of social studies in the natural setting without disturbing classroom climate by either controlling or manipulating the variables.

The design of the present study is given in figure 3.1.
This design takes care of the threats to internal validity i.e. maturation, selection – maturation interaction, mortality, instrumentation, testing and history that result in changes in the performance of the experimental groups. The nonequivalent control group design does not control the statistical regression that can result in changes in the performance of the experimental group. The four threats to internal validity i.e. experimental treatment, diffusion, compensatory rivalry by the control group and resentful demoralization of the control group that result in the changes in the performance of the control group are controlled by giving an equally desirable and alternative intervention to the control group students. The primary threat to the internal validity of this design in the possibility that difference on the post-test scores of experimental and control group are the result of initial differences rather than the effects of the independent variable. Hence ANCOVA was used to control initial difference between the experimental and control groups by statistically adjusting the pre-test means of the groups.
ANCOVA, which is done after post-test is given, achieves the same results as matching without discarding of shifting any subjects. The experimenter selects two intact groups, administers the experimental treatment and then adjusts pre-test means to compensate for the lack of equivalency between the two groups. When the assumptions underlying ANCOVA can be met, this is the most desirable tool to employ for this design (Dalen & Meyer, 1966).

A summary of the design is represented in the table 3.1

Table 3.1: Design of the study

<table>
<thead>
<tr>
<th>Phase</th>
<th>Experimental group</th>
<th>Control group</th>
</tr>
</thead>
</table>
| Pre-test               | • Coloured Progressive Matrices Test  
• Achievement Test in Social Studies  
• Critical Thinking Ability Test  
• Value Preference Scale  
• Family Environment Scale  
• Socio-Economic Status Scale                                                                                                                                 | • Coloured Progressive Matrices Test  
• Achievement Test in Social Studies  
• Critical Thinking Ability Test  
• Value Preference Scale  
• Family Environment Scale  
• Socio-Economic Status Scale                                                                                                                                 |
| Experimentation (5 months) | • Teaching Social Studies using Constructivist Approach                                                                                                                                                           | • Teaching Social Studies using conventional method                                                                                                                                                                    |
| Post-test              | • Achievement Test in Social Studies  
• Critical Thinking Ability Test  
• Value Preference Scale  
• Perception Scale on Constructivist Approach                                                                                                                                                                    | • Achievement Test in Social Studies  
• Critical Thinking Ability Test  
• Value Preference Scale                                                                                                                                                                                                 |
| Class                  | VIB of St. Thomas School, Thiroor                                                                                                                                                                                  | VIB of St. Pious School, Wadakanchery                                                                                                                                                                                   |
| Total number of students | 42                                                                                                                                                                                                             | 39                                                                                                                                                           |
3.3 VARIABLES OF THE STUDY

The independent variable, dependent variables and the control variables used in the present study are as follows.

3.3.1 Independent Variable

An independent variable is the variable that has been manipulated. In this experimental study the approach to teaching has been considered as manipulated to find out what kind of effect it can produce on the dependent variables. Unlike a true experiment which is done on inanimate objects (the independent variable is under the control of the investigator) where it is able to measure, but in subjects of Education, the measuring of independent variables becomes less accurate. In this study the constructivist approach in teaching social studies was taken as independent variable.

3.3.2 Dependent Variables

A dependent variable is the measured or observed variable. By observing the dependent variable the effect of the independent variable can be seen. It is to be tested whether the independent variable constructivist approach in teaching social studies would have an effect on achievement in social studies, critical thinking ability and value preference of students. These dependent variables were observed and measured to determine whether the independent variables had any effect.

3.3.3 Intervening Controlled Variables

Control variable is a variable that has the potential to impact the dependent variable as well as the independent variable but its effects are removed or controlled by research design or statistical manipulation. The variables that were controlled for the experiment to get homogeneous groups were: intelligence of the
students, classes chosen for the experimental treatment, contents selected, features of the school, size of the sample and age of the students. For the statistical analysis the pre-test scores and intelligence were used as covariance to control their effects on the outcome.

3.3.4 Intervening Uncontrolled Variables

Variables that have an unpredictable or unexpected impact on the dependent variable were unable to control. Some of these variables are fatigue, absence of some students during experiment, motivation, anxiety, interest of the students, socio-economic status, family environment, previous exposure to teaching strategies, present teaching in other subjects, physical resources of the students, education of parents, study habits, academic ability in the subjects, teacher competence in a particular treatment, enthusiasm and others. These variables remained uncontrolled during the experiment.

3.3.5 Situational variables

Situational variables like time, duration of treatment, type of management, subjects to be taught etc, were controlled administratively and through selection of sample and equating the time interval.

Variables of the present study and the type of control employed are given in the following table.
Table 3.2: Variables of the study and type of controls employed

<table>
<thead>
<tr>
<th>Independent variables</th>
<th>Dependent Variables</th>
<th>Variables controlled</th>
<th>Controls employed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constructivist Approach</td>
<td>1. Achievement in social studies</td>
<td>1. Classes to be taught</td>
<td>Only sixth standard was taken for the study</td>
</tr>
<tr>
<td></td>
<td>2. Critical thinking ability</td>
<td>2. Academic subject to be taught in treatment</td>
<td>Only social studies lessons were used in the treatment</td>
</tr>
<tr>
<td></td>
<td>3. Value preference</td>
<td>3. Size of the sample</td>
<td>Classes had nearly equal number of subjects</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Average age of the sample</td>
<td>All the students were of the age between 10 and 12 years.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Situational Variable</td>
<td>i) The treatment was administered for a period of five months.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>ii) Experimental group was taught for 60 periods of 40-45 minutes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Intelligence</td>
<td>Statistical</td>
</tr>
</tbody>
</table>

3.4 SAMPLING PROCEDURE

The population of the study consisted of pupils of upper primary schools in Kerala state. Purposive sampling technique also known as judgement sampling was used wherein the unit of sample is selected at the discretion of the researcher, wherein he/she may exercise his/her own judgement based on experience or expert judgement (Kalton, 1983) for including a given student in the sample. Such a sample is arbitrarily selected because there is good evidence that it is a representative of the total population (Kaul, 1984). “Where matching is not possible, the researcher as advised to use samples from the same population or samples that are as alike as possible” (Kerlinger, 1970). The class as a whole in its
natural settings was considered for implementing the study. The sample was drawn from the two intact divisions of standard VI of St. Thomas School, Thiroor and St. Pious School, Wadakanchery as experimental and control group respectively. The students belonged to the age group of 10-12 years.

Students of Standard VI were chosen for various reasons: the government had planned to revise the text books of standard VI in a phased manner. So before the revision of the text book the investigator intended to study the effectiveness of constructivist approach in the existing text book of standard VI. Besides the above factor, it was easy to get permission and cooperation from the headmaster/headmistress and the teachers for sixth standard when compared to fifth and seventh standards. Hence sixth standard was considered to be the suitable class from both the academic and administrative points of view for conducting the experiment.

In order to present a picture of the schools that were selected for the present study, some of its features are listed below:

- The Curriculum prescribed by the SCERT, Kerala (State Council of Educational Research and Training) was followed in the schools.
- The schools were under the administration of Kerala Government Education department.
- Both schools are aided schools run by Private management of Christian community.
- Both schools have same pattern of examination conducted by SCERT, Kerala.
- Both schools have similar infrastructure facilities.
- Admissions criteria and procedures followed are same in both the schools.
• Both the schools have trained social studies graduate teachers. The recruitment of teachers is carried out by conducting tests in the particular subject area which is followed by interviews.

• The students were from semi urban area.

• Students of both the schools were from almost same socio-economic background, belonging to Hindu, Christian and Muslim communities and economically middle class background.

• The teachers in both the schools were exposed to various training programmes conducted by SCERT and DIET (District Institute of Education and Training).

3.5 SAMPLE OF THE STUDY

The intact groups of 45 students in experimental and 45 students in control group were initially taken for the study. Later 3 students from experimental group and 6 students from control group were eliminated from the sample due to their absence in the pre or post-test. Finally the sample comprises of 81 sixth standard student including both experimental and control group. The sample included 42 boys and 39 girls in total. The details of the distribution of sample are given in the table 3.3.

**Table 3.3: Details of the distribution of the sample**

<table>
<thead>
<tr>
<th>Sample Group</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Group</td>
<td>22</td>
<td>20</td>
<td>42</td>
</tr>
<tr>
<td>Control Group</td>
<td>20</td>
<td>19</td>
<td>39</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td>39</td>
<td>81</td>
</tr>
</tbody>
</table>
The experimental group (St. Thomas School, Thiroor, Trichur, Kerala) consisted of 42 sixth standard students, of which included 22 boys and 20 girls and the control group (St. Pious School, Wadakanchery, Trichur, Kerala) consisted of 39 sixth standard students, which included 20 boys and 19 girls.

Randomisation in selection of the sample condition of a true experimental design has not been met, as reshuffling of the students would have disturbed the regular schedule and intactness of the class. Moreover a true experimental study could be envisaged only in large educational projects. Added to this, making the children conscious of the control too can affect learning conditions. Thus, the class as a whole (intact) was considered without any stringent measures of exercising control over them.

3.6 PROCEDURAL DETAILS OF THE STUDY

The study was carried out in the following two stages:

3.6.1 Stage I – Preliminary Stage

3.6.2 Stage II – Implementation Stage

In the Stage-I of this study, lesson plans based on constructivist approach were developed and the tools for measuring the variables were constructed/selected. In the Stage II of this study, the pre-tests were administered to the experimental and the control groups, followed by interventions in teaching of social studies. At the end of the interventions, post-tests were administered to both the experimental and control groups.
3.6.1 Stage I – Preliminary Stage

Following activities were carried out in the preliminary stage of this study:

3.6.1.1 Content Analysis

3.6.1.2 Development of unit plans in social studies

3.6.1.3 Development of lesson plans in social studies using constructivist approach

3.6.1.4 Development and standardisation of the instruments.

3.6.1.1 Content Analysis

The topics for the experimental treatment were selected from the social studies text book prescribed for the sixth standard students of Kerala state. Before the selection of the topics, the curriculum and the text book prescribed for sixth standard were analysed for the content and its categories such as facts, concepts, generalizations and values. In addition to this, experts and teachers were also consulted to discuss about the programme and get their opinions about students’ understanding levels, suitability of the topics.

The Social Studies textbook of sixth standard consisted of seventeen units. But for the purpose of experimental treatment in the study, only six units were selected. The details of the units are given below.

Table 3.4: Details of the units selected for the experimental study

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Unit No.</th>
<th>Name of the Unit</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12</td>
<td>The Soil that yields Gold</td>
<td>Geography</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
<td>For the wheels to move on</td>
<td>Economics</td>
</tr>
<tr>
<td>3</td>
<td>14</td>
<td>News from Industry</td>
<td>Economics</td>
</tr>
<tr>
<td>4</td>
<td>15</td>
<td>Many a Mickle makes a Muckle</td>
<td>Economics</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>Union is Strength</td>
<td>Civics</td>
</tr>
<tr>
<td>6</td>
<td>17</td>
<td>For the People: By the People</td>
<td>Civics</td>
</tr>
</tbody>
</table>
These six units were analysed to identify the major concepts and values. The units and their major concepts and values are given in the Table 3.5.

### Table 3.5: Units selected and their major concepts and values

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Unit No.</th>
<th>Major Concepts</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unit 12</td>
<td>Agricultural Crops of India, Agricultural crops of Kerala, Classification of agricultural crops, Changes in the cultivation of agricultural crops, Factors influencing the cultivation of crops.</td>
<td>Concern for environment, Conservation of environment, Respect for food, Cooperation</td>
</tr>
<tr>
<td>2</td>
<td>Unit 13</td>
<td>Raw materials of industry, Energy for industry, Communication facilities in industry, Transportation in industry, Banking, Insurance in industry.</td>
<td>Concern for others, Fellow feeling, Conservation of environment, Dignity of labour</td>
</tr>
<tr>
<td>3</td>
<td>Unit 14</td>
<td>Types of Industries, Facilities needed for industries, Renewable and non-renewable raw materials, Advertisement in industry, Industrial development, Service sector industry, Agro industries.</td>
<td>Dignity of labour, Conservation of environment, International understanding, Sense of social responsibility, Duty consciousness</td>
</tr>
<tr>
<td>4</td>
<td>Unit 15</td>
<td>Importation and exportation of goods, Public and private Sectors, Transportation facilities in trade, Various sectors for investing money for industry, Protection of Public sector.</td>
<td>International understanding Justice, National Consciousness, Appreciation of ancient things, Scientific temper</td>
</tr>
<tr>
<td>5</td>
<td>Unit 16</td>
<td>P.T.A. School Associations, Unity in Diversity, World a Family, Various association and groups, Family a Union, Joint family and Nuclear family.</td>
<td>Co-operation, Patriotism, Concern for others, Peace, Non-violence, Tolerance, Solidarity of mankind</td>
</tr>
<tr>
<td>6</td>
<td>Unit 17</td>
<td>Organs of government, Election procedures, Election commission, Political parties</td>
<td>Democratic decision making, Equality, Liberty, National integration, Scientific temper, Duty consciousness</td>
</tr>
</tbody>
</table>

Fifty lesson plans in social studies were prepared for sixty instructional hours with the time duration of 40-45 minutes.

### 3.6.1.2 Development of Unit Plans

Planning of a unit include major concepts, learning objectives, teaching-learning process, learning resources, activities and assessment. Concept maps and unit wise analysis of six units selected for the study were done. They are given as follows.
Unit-12 The soil that yields gold

- Division of different crops
  - Cereals
    - Paddy
    - Barley
    - Wheats
    - Beans
    - Cashewnut
    - Tea
    - Coffee
    - Rubber
    - Nutmeg
  - Plantation crops
    - Cardamom
    - Pepper
    - Ginger
    - Cinnamon
    - Cloves
  - Spices
    - Apple
    - Orange
    - Grapes
    - Mango
    - Plantain fruit
  - Fruits
    - Paddy
    - Tea
    - Rubber
    - Coconut
    - Cashewnut
  - Cereals
  - Plantation crops
  - Spices
  - Fruits

- Crops cultivated in Kerala
- Factors influencing cultivation
- Changes occurred in the cultivation
  - Availability of water
    - Climate
      - Rain fall
      - Temperature
    - Physiography
      - Topography
      - Soil
  - Seeds scientifically developed (e.g. Rohini, Jaya)
  - Mods of Agriculture (Artificial fertilizers are used)
  - Equipments (Tractor)
  - Irrigation (Motor pump)
Unit 12 – The soil that yield Gold

Major Concepts

• Division of different crops
• Crops cultivated in Kerala
• Factors influencing cultivation
• Changes occurred in the field of cultivation

Learning objectives

The students

• explain the agricultural crops of their locality
• list out the past agricultural crops that were cultivated in Kerala
• list out the present agricultural crops that are cultivated in Kerala
• identify different types of crops that are cultivated in India
• list out the main crops of India
• appreciate the beauty of various fruits
• analyse that why Apple is not produced in Kerala
• explain the geographical division of Kerala based on agriculture
• classify crops as cereals, spices, plantation crops and fruits
• compare the crops of Kerala with other states of India
• identify the relationship between crops and climates of various states
• locate the places from the map, where various types of crops are produces
• analyse the factors influencing cultivation
• examine the changes happened in the cultivation of crops

Teaching-Learning process

i. Divide the class into cooperative learning groups and is asked to classify agricultural crops

ii. Questioning in between the class to identify misconceptions, prior learning and understanding of concepts such as what are the main crops cultivated in your locality? What are the reasons for changes occurred in the cultivation of crops?
iii. Plan questions for group discussion and for assignment such as, discuss the various crops that are cultivated in Kerala. Find out the festivals related to cultivation in various seasons.

iv. Plan materials for the learning activities like flash cards that contain the questions for discussion.

**Learning resources**

Pictures of various agricultural equipments (plough, tractor etc.), samples of original fruits, map of India, paper cuttings which contains the news on cultivation of crops.

**Activities**

i. Group discussion on the various crops that are cultivated in Kerala

ii. Recording of the main concepts given by the farmer in the classroom.

iii. Locating places in the map of India where important crops are cultivated

iv. Group activity to classify the agricultural crops

v. Draw the map of Kerala and locate the district ‘Palakad’ in the map

**Assessment**

i. Assessment of reports of the students on the group discussion, regarding various crops cultivated in Kerala.

ii. Write up on agricultural crops during paddy field visit by discussing with farmers is assessed.

iii. Learner’s participation during the group discussion on classification of agricultural crops are assessed through Observation Schedule.

iv. Evaluation of worksheets on factors influencing cultivation.

v. Self-assessment sheets of individual and group work are assessed.
Unit 13 – For the wheels to move on

Major Concepts
- Different types of industries
- Infrastructural facilities for industrial development
- Raw materials for industry

Learning objectives
The students
- collect data of the raw materials used for industries of their locality
- identify the need for infrastructural facilities in industry
- classify various sources of energy
- list out the various power stations of Kerala and in India
- classify conventional and non-conventional sources of energy
- mention the ways of saving the electricity
- list out various solar equipments
- explain the reason for the use of CF lamps instead of ordinary electric bulbs
- collect data on structure and functioning of ANERT (Agency for Non-conventional Energy & Rural Technology)
- describe the importance of communication devices in industry
- check the role of advertisement in industry
- classify different types of transport facilities in industry
- explain the importance of banks in industrial money transaction
- interpret the value of insurance services

Teaching-Learning process
i. Students are divided into groups for various learning activities
ii. Teacher intervention in between the class when need occurs
iii. Providing real life experience by conducting a field trip to nearby bank
iv. Students are divided into two groups and debate is conducted for understanding the influence of advertisement in our life and in industry
v. Proper scaffolding is provided to the students to form questions for an interview with LIC agent
Learning resources

Maps of India to locate important industrial places, Slogan cards which contain the slogans for protecting electricity, Newspaper cuttings, Still model that shows the Emblem of LIC.

Activities

i. Note preparation on the raw materials needed for a match box

ii. Completion of the table that shows various industries and the raw materials needed for it

iii. Seminar paper presentation in groups on the sources of energy used for various household purpose

iv. Preparation of slogans for conservation of energy

v. Debate on the impact of the advertisement in our life

vi. Field trip to nearby bank to understand the procedures of a bank.

vii. Interview with the bank manager

viii. Preparation of advertisement edition

Assessment

i. Assessment of students’ diary that contains the notes on raw materials needed for a match box.

ii. Continuous assessment of group work through observation.

iii. Assessment of field trip report prepared by the students.

iv. Assessment of collage on advertisement prepared by students.
Unit-14 News from Industry

Type of Industries
- Agro Industries
  - Used as Food
    - Beans
    - Green Chilly
    - Soya Bean
    - Ground Nuts
  - Used in Industry
    - Jute
    - Cotton
    - Rubber
    - Tea
  - Used as both food & Industry
    - Coconut
    - Cashewnut
    - Wheat
    - Fruits
    - Tapioca
- Non Agro Industries

Facilities needed for Industry
- Used as Raw Material
  - Renewable
    - Sugar Cane
    - Bamboo
    - Wood
  - Non Renewable
    - Coal
    - Petrol
- Transportation
- Energy
- Labourers
- Tele communication

Service as Industry
- Courier Service
- Travel Agencies
- Catering Services
- Home Nursing
Unit 14 – News from Industry

Major Concepts

• Important industries of India
• Division of agro industry
• Facilities needed for industry
• Renewable and non-renewable sources of energy
• Service as Industry

Learning objectives

The students

• classify agricultural products on the basis of its utility
• list out the industries that depend on agriculture
• identify the industries that are not depended on agriculture
• draw the map of India and locate important industrial places
• analyse various industries and their importance
• collect data regarding the facilities needed for industries
• explain the importance of raw materials in the industry
• classify renewable and non-renewable sources of energy
• discuss the industrial development of India
• summarise the importance of service sector as industry

Teaching-Learning process

i. Divides the students into various groups according to the nature of the activity

ii. In Question Answer contest teacher motivates the students to ask as many questions regarding the topic to the other group
Learning resources

Map of India, and Atlas to locate important industrial places, Newspaper cuttings, raw material such as jam, sugar, milk powder etc.,

Activities
i. Classification of agricultural products based on their utility
ii. Construction of questions with respect to industrial map of India
iii. Question Answer contest – Based on the various industries found out from the map. It is a group activity and each group has to ask questions to other group and they have to answer it.
iv. Preparation of industrial map of India and locate important industrial places of India
v. Group discussion on facilities needed for industries
vi. Classification of raw materials needed for Jam, Milk powder, Sugar, Newspaper, furniture and textile industries
vii. Priority Test: From the given list of industries students have to list out the industries based on its utility in our day today life.
viii. “Who is King play”: Students are divided into various groups and they have to find out the state which has more industries from the given maps.

Assessment
i. Assessment of tables prepared by students on agricultural products based on their utility.
ii. Question Answer contest was assessed based on the performance of each group.
iii. The maps prepared by the students are assessed by its precision and the number of places marked.
iv. Individual participation in the group work is assessed using self-assessment form.
Unit-15 Many a mickle makes a muckle

Trade

Internal trade

Things brought to Kerala (Import)

Onion
Rice
Vegetables
Beans
Apple

Jack fruit
Rubber
Ginger
Prawn
Cashewnut

International trade

Imported Items

Chemicals
Machineries
Medicine
Petroleum
Fertilizers
Sulphur

Exported Items

Pepper
Tea
Ivory
Spices
Fertilizers
Cotton

Private Sector

TATA
Airtel
Infosys
Wipro
Hero Honda

Public Sector

Railway
KSRTC
HAL
Postal Department

Joint Sector

Airindia
Oil refinery

Co-operative Sector

BSNL
Nedumbaseri Airport

Co-operative Banks

Investment of money for Industry
Unit 15 – Many a mickle makes a muckle

Major Concepts

- Trade
- International and Internal trade
- Investigation of money for industry
- Private sector
- Public sector
- Joint sector
- Cooperative sector

Learning objectives

The students

- collect data on the agricultural crops produced outside Kerala
- identify the agricultural crops produced in local area and in Kerala state
- analyse the importance of export and import in the development of a country
- examine the relevance of international trade
- classify various sectors into private, public, Joint and cooperative

Teaching-Learning process

i. Teacher promotes every student to participate in the brainstorming session

ii. Teacher facilities the students to participate actively in the debate and interferes in the group activities when required

Learning resources

Photos of great industrialists – Mukesh Ambani, Ratan Tata, Map of India, Cotton cloth.
Activities

i. Table preparation – Students are asked to classify and tabulate the things that brought to Kerala and things taken out from Kerala

ii. Group discussion – Importance of export and import in a country

iii. Classification of table – The items that are imported and exported in India

iv. Preparation of questions for an Interview with a person who lived more than ten years abroad

v. Brain storming session – Whether we protect our public sector?

vi. Classification of items into various sectors such as private sector, public sector, Joint sector and cooperative sector

vii. Debate – Public or private sector contributing more to the progress of country.

viii. Preparation of cooperative Edition – Students are asked to prepare a cooperative edition that includes various institutions, functions etc.

Assessment

i. Assessment of the table prepared by students on exported-imported materials.

ii. Assessment of students’ involvement during brainstorming session on protection of public sector based on their response.

iii. Self-assessment of worksheets on various topics.

iv. Assessment of edition on cooperative sector prepared by students based on its quality.
Unit 16 – Union is Strength

Major Concepts

- Family
- School
- Association/Group
- Students’ associations
- Types of groups
- Unity in diversity
- World is a family

Learning objectives

The students

- analyse the functions of family in a society
- list out the features of nuclear and joint family.
- identify the reasons for the growth of nuclear family
- analyse the role of P.T.A. in schools
- identify different types of student associations
- classify groups into natural and organized groups
- collect data regarding the special features of natural and organized groups
- discuss the common features of various associations/groups
- list out the associations to which Father, Mother and student has membership
- analyse the diversities observed in the Indian society
- list out the elements that unites Indians together
- identify the importance of unity among the countries.

Teaching-Learning process

i. Motivation is given to the students to write questions for the interview

ii. Various examples have to be provided by teacher at the end of every session

iii. In the beginning of the group activity proper situation are to be given to the students to engage with the problem
Learning resources

Various pictures of Joint family and nuclear family, Emblems of Scout and NCC, Paper cuttings of international news.

Activities

i. Group discussion – for finding out the reasons for the growth of nuclear family

ii. Completion of table – Functions of family in one’s life

iii. Preparation of questions for the interview with head teacher of the school to understand the details of P.T.A.

iv. Interview with the head teacher of the school to understand the functions and details of P.T.A.

v. Classification of Table on natural and organized groups

vi. Project work – list out the associations to which students’ Father, Mother and student has membership

vii. Group activity – to find out the unifying forces and diversities observed in the Indian culture

Assessment

i. Assessment of the project work on different associations by monitoring project work sheet.

ii. Assessment of the reports of the group discussion using observation schedule.

iii. Assessment of interview questions prepared by students based on its content and relevance.

iv. Evaluation of worksheets of group work.
Unit 17 – For the people: By the people

Major Concepts

- Organs of government
- Legislative, Expectative, Judiciary functions of government
- Various departments, offices and officers at central and state level
- Election procedures
- Election commission
- Political parties

Learning objectives

The students

- state the meaning of democracy
- analyse the three organs of government
- identify the data regarding parliamentary system
- analyse the functions of Lok Sabha and Rajya Sabha
- list out various departments, offices and officers at central and state level
- discuss the importance of State Legislative assembly
- list out the functions of Judiciary
- identify various types of courts in Judiciary system
- analyse the role of Election commission
- list out the procedures of presidential election
- collect data about the election procedures of Vice president, Prime minister, Chief minister, Supreme court judge, M.P. and M.L.A.
- interpret the role of ruling party and opposition party

Teaching-Learning process

i. Organising of quiz competition with the help of students.
ii. Students are to be motivated in conducting Mock parliament and proper roles to be selected by the students.

iii. Appropriate guidelines are to be provided in the process of project work.

**Learning resources**

Pictures of great political leaders, still model of Parliament, Paper cuttings of news that are connected with the functions of three organs of government, National flag

**Activities**

i. Classification of various paper cutting news into Legislative, Executive and Judiciary.

ii. Group discussion – to find out the procedures of general election

iii. Interview with lawyer and collect details of judicial system

iv. Quiz competition about the various departments, offices and officers at central and state level

v. Preparation of picture album including pictures of our political leaders and their activities

vi. Role play on the topic Lok Sabha and Rajya Sabha

vii. Mock Parliament

viii. Project work on election procedures of Indian parliamentary system

**Assessment**

i. Assessment of project work on election procedures of Indian parliamentary system using rubrics.

ii. Involvement of students is assessed during ‘Mock Parliament’ session by using observation schedule.

iii. Assessment of the students’ learning process during quiz competition.
3.6.1.3 Development of Lesson Plans

Lesson plans were planned for each selected units in which the constructivist approach was applied. The content in the lessons were organized based on the background knowledge and experience of the students following the principles of constructivism. Fifty lesson plans were prepared from the selected units, which are summarized in the table 3.6.

Table 3.6: Number of lessons in each unit

<table>
<thead>
<tr>
<th>Unit No.</th>
<th>Name of the Unit</th>
<th>No. of Lessons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit-12</td>
<td>The Soil that yields gold (Geography)</td>
<td>6</td>
</tr>
<tr>
<td>Unit-13</td>
<td>For the wheels to move on (Economics)</td>
<td>9</td>
</tr>
<tr>
<td>Unit-14</td>
<td>News from Industry (Economics)</td>
<td>10</td>
</tr>
<tr>
<td>Unit-15</td>
<td>Many a mickle makes a muckle (Economics)</td>
<td>6</td>
</tr>
<tr>
<td>Unit-16</td>
<td>Union is strength (Civics)</td>
<td>7</td>
</tr>
<tr>
<td>Unit-17</td>
<td>For the people: By the people (Civics)</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
</tr>
</tbody>
</table>

Lessons were planned based on the “5E Model” proposed by Rodger Bybee et al. (1989) a team of experts of Biological Science Curriculum Study (BSCS). They developed the 5E model based on the constructivist principles of learning. The BSCS 5E Model is the most effective way of engaging students in learning (Ergin, 2006). The Five Es is a teaching model, based on Piagetian theory, which can be used to implement an implicit constructivist (more specifically neo-Piagetian, human or social-constructivist) view of teaching and learning. It is built around a structured sequence and designed as a tangible and practical way for teachers to implement constructivist theory.
This model uses a conceptual focus that helps the learners to construct meaning, encourages students to expand understanding of that fundamental meaning, and evaluates student performance in authentic ways. Several studies (Tinnin, 2000; Coulson, 2002; Akar, 2005) suggest that the BSCS-5E Instructional Model is more effective than alternative approaches at helping students master the concepts. Findings by Boddy, Watson, and Aubusson (2003) reported increased higher-order thinking by students after a unit of work based on the 5E instructional model. Nortel (2007) conducted a study and found that 5E model is effective in social studies. Bybee (2010) the principal investigator of 5E model remarks that: “Based on the available evidence, I would infer that the model would be effective in developing one or more 21st century skills among diverse groups of students” (p.19) So the investigator adopted 5E model for developing lesson plans in social studies teaching for the experimental group.

In this model the process is explained by employing five “Es”. They are: Engage, Explore, Explain, Elaborate and Evaluate. The learning cycle of 5Es are given below.

**Figure 3.2: Learning Cycle of 5Es**
ENGAGE

Description: Introductory part of lesson stimulates curiosity and activates prior student knowledge. The activity given is a problem or an event that raises questions and motivates students to discover more about the concept.

Link to cognition: Students bring knowledge about how the world works but it is based on limited experiences and on misconceptions.

Teacher’s Role

- Teacher asks questions/creates an episode/a problematic situation to capture students’ interest.
- Teacher presumes the kind of questions the students might ask after the engagement.

EXPLORE

Description: Students need the opportunity to actively explore the concept in a hands-on activity. This establishes a commonly shared classroom experience and allows students to share ideas about the concept.

Link to cognition: Experiences occur before the explanations. Students are actively engaged with little explanation from the teacher. Students acquire a common set of concrete experiences allowing them to help each other understand the concept through social interaction.

Teacher’s Role

- Teacher provides activities that suit to explore the concept.
- Teacher asks conceptual questions that encourage and/or focus students’ exploration.
EXPLAIN

Description: Teacher uses questioning strategies to lead students’ discussion of information discovered during the Explore stage. Teacher introduces new scientific terms and explanations at appropriate times during the discussion.

Link to cognition: When students engage in meaningful discussions with other students and the teacher, they can pool their explanations based on observations, construct new understandings, and have a clear focus for additional learning.

Teacher’s Role

- Teacher asks questions or plan techniques to help students, connect their exploration to the concept under examination.
- Teacher asks higher order thinking questions that will use to solicit student explanations and help them to justify their explanations.

ELABORATE

Description: Students are encouraged to apply, extend, and enhance the new concept and related terms during interaction with the teacher and other students.

Link to cognition: Providing additional active learning opportunities for students to incorporate into their mental construct of the concept allows them to confirm and expand their understanding.
Teacher’s Role

- Teacher helps the students to develop more sophisticated understanding of the concept.
- Teacher uses appropriate vocabulary and connect it with students’ observations.
- Teacher encourages the students to apply the knowledge in our daily lives.

EVALUATE

Description: Students demonstrate their understanding of the concept.

Link to cognition: In learner-centered instruction, it is important for students to be aware of their own progress as an outcome of instruction. Students construct knowledge over time and need additional experiences to refine their understanding of the concept.

Teacher’s Role

- Teacher gives chance for students to demonstrate that they have achieved from the lesson objective
- Teacher evaluates students throughout the lesson as well as at the end of the lesson

The lesson plans were prepared, by careful analysis and it consists of learning objectives, key questions, learning strategy/activities, resources, and assessment. An example of lesson plan is given in the table 3.7 and another copy is given in the Appendix XIII.
### Table 3.7: Sample Lesson Plan

**Unit: Many a mickle makes a muckle (Unit-15)**

**Topic: Various Sectors of Industry**

**Learning Objectives**

**Student**
- Classifies various sectors of investment of money for industry.
- Cites examples of various sectors of industry
- Explains the features of various sectors
- Critically evaluate advantages of various sectors

**Key Questions**

- What are the various sectors of investment of money for industry?
- What are the examples of various sectors of industry?
- Which are the features of various sectors?
- What are the merits and limitations of various sectors?

**Learning strategy/Activity**

- Group discussion
- Debate
- Completion of worksheets

**Resources**

- Flash cards showing the examples of various sectors
- Newspaper cuttings related to privatization of industry
- Worksheets
- Self-assessment form of group work
<table>
<thead>
<tr>
<th>Phases</th>
<th>Learning activities</th>
<th>Response</th>
</tr>
</thead>
</table>
| Introduction (Engage) | - Teacher asks the students about the money their parents spend for products and services in the day to day life.  
- Students are asked to list the name of the companies which provide this services/product.  
- Students are divided into different groups and ask to find out the owners of the companies mentioned above through group discussion.  
Teacher provides a worksheet to each group to record their findings. | - Students listed various products and services.  
- Students listed the name of various companies that provide services/products |
| Explore    | Teacher shows flash cards containing the examples of various companies and asks to discuss in group the motives behind running a company which makes some products or deliver services.  
Students are asked to record their findings in their social studies diary. | - Students recorded their findings in the given worksheets and they were aware of the owners of various companies |
| Explain    | - Teacher asks the students to think and discuss why all are not running a company to make profit. Teacher adopts “Think-Pair-Share technique”.  
The findings of some of the pairs are asked to present in the entire class.  
- Teacher asks the students to suggest ways for starting a company without much money. The suggestions are recorded one by one on the chalk board.  
- Teacher asks the students to prepare a list of companies for the products and services. Teacher provides a worksheet to every student for recording their findings. | - Some of students presented their findings in the entire class. All the pairs presented that money is an important element to run a company.  
- Various suggestions were listed by students such as through loan, through joint process etc.  
- Every student prepared list of various companies. |
Examples of companies for products and services

- Then teacher provides some of the examples of various sectors on the basis of ownership. Teacher provides a worksheet and students are asked to classify them under various heads.

| Work sheet-3
| Keltron, B.S.N.L. Milma, TATA, KSRTC, Reliance, Cooperative Bank, Oil Refinery |

<table>
<thead>
<tr>
<th>Public</th>
<th>Private</th>
<th>Joint</th>
<th>Cooperative</th>
</tr>
</thead>
</table>

- Some of the students are asked to present their classification table in the entire class.

Elaborate

- Students are asked to discuss in groups the advantages and disadvantages of public and private sectors. Teacher provides worksheets to record their findings.

| Work sheet-4
| Advantages and Disadvantages of Public and private sectors |

<table>
<thead>
<tr>
<th>Public sector</th>
<th>Private sector</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advantages</td>
<td>Disadvantages</td>
</tr>
<tr>
<td>Disadvantages</td>
<td>Advantages</td>
</tr>
</tbody>
</table>

- Every group wrote the advantages and disadvantages of public and private sectors.

Evaluate

- Teacher shows newspaper cuttings which shows the examples for the privatization of industry and asks students to conduct a debate on the topic: “Privatisation of public sector”

- Teacher asks questions connected with the topic such as What are the various sectors of investment of money for industry? What are examples of various sectors of industry? What are the merits and limitations of various sectors?

- Teacher asks the students to fill the “self-assessment form of group work”.

- Students were divided into two groups and they conducted a lively debate.

- Students answered the questions raised by the teacher.

- All the students individually filled the assessment form of group work.
3.6.1.4 Development and Standardisation of the Instruments used in the Study

Seven instruments were used to gather data for this study: (i) Coloured progressive Matrices Test-CPMT (Raven’s, 1976), (ii) Critical Thinking Ability Test (CTAT), (iii) Achievement Test in Social Studies (ATSS), (iv) Value Preference Scale (VPS), (v) Socio-Economic Status Scale (SESS) and (vi) Family Environment Scale (FES) (vii) Perception Scale on Constructivist Approach (PSCA). The details of the instruments used for the study are given as follows.

Self-Assessment (Group Work)

<table>
<thead>
<tr>
<th></th>
<th>Less than others</th>
<th>Same as others</th>
<th>More than others</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How much did you contribute to your group’s project?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Did you offer ideas?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. On a scale of 1-10, rate yourself on how well you are working with others in your group.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Very</th>
<th>Bad</th>
<th>Very</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>*</td>
<td>*</td>
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<tr>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

Assignment

- Collect information on the cooperative institutions in your locality and prepare a cooperative edition.
Table 3.8: Details of the instruments used for the study

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Name of the instruments</th>
<th>Author</th>
<th>Variable Measured</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>Achievement Test in Social Studies (ATSS)</td>
<td>Investigator</td>
<td>Pre-test and post-test scores of achievement in social studies</td>
</tr>
<tr>
<td>3.</td>
<td>Critical Thinking Ability Test (CTAT)</td>
<td>Investigator</td>
<td>Pre-test and post-test scores of critical thinking ability</td>
</tr>
<tr>
<td>4.</td>
<td>Value Preference Scale (VPS)</td>
<td>Investigator</td>
<td>Pre-test and post-test scores of value preference</td>
</tr>
<tr>
<td>5.</td>
<td>Socio-Economic Status Scale (SESS)</td>
<td>Rajbir Singh et al. (2005)</td>
<td>Socio-economic Status</td>
</tr>
<tr>
<td>7.</td>
<td>Perception Scale on Constructivist Approach (PSCA)</td>
<td>Investigator</td>
<td>Perceptions of students on constructivist approach</td>
</tr>
</tbody>
</table>

The descriptions of the above tools are given below.

3.6.1.4.1 Coloured Progressive Matrices Test (CPMT)

Non-verbal intelligence of the students participating in the study was measured by administering the Coloured Progressive Matrices (Ravens, 1976). This test of intelligence estimates the subjects’ ability to discern and utilise a logical relationship presented by nonverbal materials. The Coloured Progressive Matrices Test (CPMT) was administered as a preliminary test to measure the intelligence of the participants, to be used as a covariate.

The test is made up of three sets of diagrammatic puzzles exhibiting serial changes in two dimensions simultaneously. Each puzzle has a part missing, which the person taking the test has to find among the options provided. The test consists
of thirty six problems divided into three sets (A, Ab, B) each made up of 12 problems. The maximum score of this test is 36. To attract and hold the attention of young children, each problem is printed on a brightly-coloured background.

This test is a standardized one and its validity and reliability values have been established. The reliability coefficient as reported by Raven (1976) varies from 0.80 to 0.90; in most studies retest reliability is above 0.80. The validity of the test has been established in various ways. When Wechsler Intelligence Scale for Children (WISC) was used as a criterion, correlation was of 0.91. Students were categorized into three groups based on their percentile scores according to the instructions given in the coloured progressive matrices. Students whose percentile scores are above 75th percentiles were categorised as high intelligent students, between 25th to 75th percentile were categorised as average intelligent students and below 25th percentile were categorized as low intelligent students.

3.6.1.4.2 Achievement Test in Social Studies (ATSS)

To test the pre and post achievement levels of students of experimental and control groups achievement test in Social Studies was designed by the investigator. The details of construction of Achievement Test in Social Studies are as follows.

During the preparation of lesson plans, the concepts, teaching points and learning objectives were listed out. The revised taxonomy of Benjamin Bloom proposed by Lorin Anderson et al., (2001) was used in planning the objective. Bloom’s original cognitive taxonomy was in a one-dimensional form. With the addition of products, the Revised Bloom’s Taxonomy takes the form of
two-dimensions (Knowledge and Cognitive process dimensions). The Knowledge Dimension indicates the kind of knowledge to be learned while Cognitive Process Dimension indicates the process used to learn. The knowledge dimension consists of factual, conceptual, procedural and the metacognitive categories. The cognitive process dimensions are listed as follows:

- Remembering
- Understanding
- Applying
- Analysing
- Evaluating
- Creating

Based on this the questions were constructed under different categories using the action verbs as illustrated in the revised taxonomy of objectives.

3.6.1.4.2.1 Item Pooling

The items were pooled based on the objectives framed. Appropriate weightages were given to cognitive process dimensions, content and the types of questions. The assessment was objective based and the test planned included both closed and open ended questions.

The investigator framed 102 items including multiple choices, fill in the blanks, match the following and short answer questions in the beginning. The test items thus framed were further scrutinized and edited by the investigator from the point of view of language suitability, ambiguity and comprehensibility. Number of items prepared in the test in the initial stage and weightage given to cognitive processes, content and form of questions are given in the following tables.
Table 3.9: Weightage given to cognitive processes dimensions before try out

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Cognitive processes dimensions</th>
<th>No. of items</th>
<th>Marks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remembering</td>
<td>11</td>
<td>26</td>
<td>11.3%</td>
</tr>
<tr>
<td>2</td>
<td>Understanding</td>
<td>33</td>
<td>69</td>
<td>30%</td>
</tr>
<tr>
<td>3</td>
<td>Applying</td>
<td>14</td>
<td>31</td>
<td>13.47%</td>
</tr>
<tr>
<td>4</td>
<td>Analysing</td>
<td>16</td>
<td>38.5</td>
<td>16.76%</td>
</tr>
<tr>
<td>5</td>
<td>Evaluating</td>
<td>16</td>
<td>37.5</td>
<td>16.30%</td>
</tr>
<tr>
<td>6</td>
<td>Creating</td>
<td>12</td>
<td>28</td>
<td>12.17%</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>102</strong></td>
<td><strong>230</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 3.10: Weightage given to content before try out

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Content</th>
<th>No. of items</th>
<th>Marks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Soil the yields Gold</td>
<td>11</td>
<td>26</td>
<td>11.30%</td>
</tr>
<tr>
<td>2</td>
<td>For the wheels to move on</td>
<td>19</td>
<td>40</td>
<td>17.39%</td>
</tr>
<tr>
<td>3</td>
<td>News from Industry</td>
<td>23</td>
<td>47.5</td>
<td>20.10%</td>
</tr>
<tr>
<td>4</td>
<td>Many a mickle makes a muckle</td>
<td>11</td>
<td>25.5</td>
<td>11.08%</td>
</tr>
<tr>
<td>5</td>
<td>Union is Strength</td>
<td>15</td>
<td>28</td>
<td>12.73%</td>
</tr>
<tr>
<td>6</td>
<td>For the People: By the People</td>
<td>23</td>
<td>63</td>
<td>27.40%</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>102</strong></td>
<td><strong>230</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 3.11: Weightage given to form of questions before try out

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Form of items</th>
<th>No. of items</th>
<th>Marks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Multiple choice</td>
<td>18</td>
<td>44</td>
<td>19.13%</td>
</tr>
<tr>
<td>2</td>
<td>Fill in the blanks</td>
<td>16</td>
<td>33</td>
<td>14.34%</td>
</tr>
<tr>
<td>3</td>
<td>Match the following</td>
<td>16</td>
<td>32</td>
<td>13.91%</td>
</tr>
<tr>
<td>4</td>
<td>Short answer questions</td>
<td>52</td>
<td>121</td>
<td>52.60%</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>102</strong></td>
<td><strong>230</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>
The test consisting of 102 questions was given to experts from social studies background. They scrutinized and studied the items of the test in terms of their sampling individual units and ensuring coverage of cognitive process comprising of Remembering, understanding, Applying, Analysing, Evaluating and Creating. Fourteen items were deleted from the achievement test before try out. On the basis of their suggestions, appropriate modifications were made and a total number of 88 items were selected for the achievement test for try out.

The test items were arranged in such a way that the similar kind of items appeared together and care was taken to see that each set of items was preceded by specific instructions as to how the learner would have to respond to the set of items. The scoring procedure and marking scheme was prepared.

3.6.1.4.2.2 Initial Try out

The achievement test in social studies was administered to a small group of 30 students who were about to complete their VI standard of Clelia School, Trichur, following the state syllabus of Kerala. This was done to know the clarity of items and to understand the words that are difficult to follow. The items were modified based on the results obtained from these students who participated in the initial try out.

3.6.1.4.2.3 Final Try out

The test items were subjected to a formal try out on a sample of two hundred and twenty students in six divisions of VII standard from J.M.J. School, Athani, Trichur. The seventh standard students were selected for the tryout of achievement test as they have already learnt the sixth standard syllabus and their performance on the tool will help in deciding upon the items difficulty. Before the
administration of the test, the purpose of the test was made clear to the students. All the necessary guidelines about the test and additional information needed were given. All the two hundred and twenty response sheets were scored with the help of answer key. The incomplete response sheets were deleted and two hundred response sheets were selected for item analysis.

Final try out was performed in order to identify weak or defective items to make further improvement, identify ambiguous and intermediate implausible distracters, very difficult and easy items, determine the difficulty level of each individual test item and lastly to determine the number of test items to be included in the final test. A schedule was drawn after having consultation with the Principals/ headmistress/headmasters of selected institutions. The students were told about the purpose of the administration of the test. They were given both general and specific instructions regarding the test and were asked to answer the items in the question paper itself. All the precautionary measures were taken to avoid mutual help and to avoid unfair means in answering the questions. The average time taken by the students to answer the achievement test was two and half hours.

3.6.1.4.2.4 Item Analysis of the Test

The answer scripts were corrected with the help of scoring key which was prepared in advance. Item analysis was carried out to find out the difficulty index and discriminative power, as the test was content oriented. The item analysis was carried out based on the guidelines of Ebel and Frisbie (1991). The selected response sheets were arranged in the descending order of the magnitude of scores. The scores obtained by the upper fifty four subjects (27%) and the lower fifty four
subjects (27%) were taken as the upper group and lower group respectively. For the selection of the items in the final test, the difficulty index (DI) and discriminating power (DP) of each item was found using the formula:

\[
\text{Difficulty Index (DI)} = \frac{U + L}{2N} \times 100
\]

\[
\text{Discriminating Power (DP)} = \frac{U - L}{N}
\]

Where

- \(U\) = Total number of correct responses to an item in the upper group
- \(L\) = Total number of correct responses to an item in the lower group
- \(N\) = Number of individuals in the upper/lower group.

The result of item analysis of the items in the achievement test is given in the table 3.12.

Since adequate number of items were not available with Discriminative Power greater than 0.40 and Difficulty Index between 40 and 60, some adjustments in this limit were found necessary. Some items having the Difficulty Index between 25 and 70 and Discriminating Power higher than 0.25 were selected. Thus thirty eight items were deleted from the test and fifty test items were selected for the final test. The time fixed for the final test was two hours and the maximum score of the final test was one hundred and twenty.
Table 3.12: Item analysis of Achievement test in social studies

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Upper group (U)</th>
<th>Lower group (L)</th>
<th>Difficulty Index (DI)</th>
<th>Discriminating Power (DP)</th>
<th>Selected Items</th>
</tr>
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<tbody>
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<td>Upper group (U)</td>
<td>Lower group (L)</td>
<td>Difficulty Index (DI)</td>
<td>Discriminating Power (DP)</td>
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<td>0.03</td>
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<td>0.11</td>
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<td>48</td>
<td>07</td>
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<td>0.85</td>
<td>*</td>
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<td>31</td>
<td>41</td>
<td>07</td>
<td>44.44</td>
<td>0.62</td>
<td>*</td>
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<td>03</td>
<td>50.92</td>
<td>0.90</td>
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<td>60.18</td>
<td>0.27</td>
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<td>09</td>
<td>06</td>
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<td>0.05</td>
<td>79</td>
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<td>36</td>
<td>51</td>
<td>18</td>
<td>63.88</td>
<td>0.61</td>
<td>*</td>
</tr>
<tr>
<td>37</td>
<td>54</td>
<td>05</td>
<td>54.62</td>
<td>0.90</td>
<td>*</td>
</tr>
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<td>18</td>
<td>08</td>
<td>24.07</td>
<td>0.18</td>
<td>82</td>
</tr>
<tr>
<td>39</td>
<td>50</td>
<td>07</td>
<td>52.77</td>
<td>0.79</td>
<td>*</td>
</tr>
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<td>09</td>
<td>25.92</td>
<td>0.18</td>
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<td>41</td>
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<td>20</td>
<td>53.70</td>
<td>0.33</td>
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<td>10</td>
<td>22.22</td>
<td>0.07</td>
<td>86</td>
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<td>12</td>
<td>26.85</td>
<td>0.09</td>
<td>87</td>
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<tr>
<td>44</td>
<td>19</td>
<td>09</td>
<td>25.92</td>
<td>0.18</td>
<td>88</td>
</tr>
</tbody>
</table>

* Items selected for the final test
3.6.1.4.2.5 Validity of the test

Content validity was established by evaluating the relevance of the test item individually and as a whole (Cohen, Manion & Morrison, 2007). For estimating the content validity of the social studies achievement test, the investigator subjected the test items for expert’s evaluation. The items, objectives and areas from which the items are selected were given to the experts for scrutiny. As per the feedbacks of the experts, it was found that the test contents cover the significant concepts as well as comprehensive enough in terms of cognitive process dimensions. Thus the content validity of the Social science achievement test was established.

3.6.1.4.2.6 Reliability of the test

Reliability of the achievement test in social studies was established using Test-Retest method. A representative sample of one hundred students in three divisions of VII standard students of J.M.J. School, Trichur, Kerala were selected for establishing reliability of the test on achievement in social studies. Since it was the beginning of the academic year and the students of VII standard had just entered after the completion of VI standard, it was found that they are the right sample for conducting the reliability. Before the administration of the test, the purpose of the test was made clear to the students. The test materials in sufficient numbers were provided. All the necessary guidelines about the test and additional information needed for the test were given. The test was conducted to the students. The retest was conducted for the same sample with the same tool after a gap of fifteen days. The performance of students in both the test and retest were analysed for its reliability.
A test retest coefficient tells the stability of the test. It answers the question concerning how stable or dependable are the measurements over a period of time. High reliability of this kind tells us that the individuals remain rather uniform, or maintain their rank position in spite of changes. A low retest reliability coefficient means that the function or functions measured fluctuate from time to time or the test as an instrument is affected by other things that do fluctuate (Dalen & Meyer, 1966).

The correlation coefficient of the two sets of scores, calculated using Pearson’s product moment correlation, was found to be 0.81. The obtained value of reliability suggests that the test has acceptable psychometric qualities to measure the achievement in social studies of VI standard students. Internal consistency also was found to be 0.79 by using Cronbach’s \( \alpha \) (alpha). Cronbach’s \( \alpha \) (alpha) is a coefficient of reliability, which is commonly used as a measure of internal consistency or reliability of a psychometric test.

The achievement test in social studies in its final form along with its scoring key are given in the Appendices I and II.

### 3.6.1.4.2.7 Final form of the test

The final form of the achievement test consisted of 50 items, including six multiple-choice items, three filling the blanks items; two match the following items and thirty three short answer questions with the allocation of 120 marks on the whole test. The total time fixed for the final test was two hours.

The weightage given to the content, cognitive processes, difficulty level and form of the questions in the test were as follows.
3.6.1.4.2.7.1 Weightage given to the content

The weightage to the content selected for the intervention are as follows:

Table 3.13: Weightages given to the content

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Content</th>
<th>No. of items</th>
<th>Question Numbers</th>
<th>Marks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The Soil the yields Gold</td>
<td>7</td>
<td>12,13,14,15,16,17,48</td>
<td>21</td>
<td>17.50%</td>
</tr>
<tr>
<td>2</td>
<td>For the wheels to move on</td>
<td>8</td>
<td>1,7,18,19,20,21,22,23</td>
<td>17.5</td>
<td>14.58%</td>
</tr>
<tr>
<td>3</td>
<td>News from Industry</td>
<td>9</td>
<td>2,8,24,25,26,27,28,49,50</td>
<td>22</td>
<td>18.33%</td>
</tr>
<tr>
<td>4</td>
<td>Many a Mickle makes a Muckle</td>
<td>6</td>
<td>3,9,29,30,31,32</td>
<td>13.5</td>
<td>11.25%</td>
</tr>
<tr>
<td>5</td>
<td>Union is Strength</td>
<td>5</td>
<td>4,33,34,35,36</td>
<td>9.5</td>
<td>7.92%</td>
</tr>
<tr>
<td>6</td>
<td>For the People: By the People</td>
<td>15</td>
<td>5,6,10,11,37,38,39,40,41,42,43,44,45,46,47</td>
<td>36.5</td>
<td>30.42%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>50</strong></td>
<td><strong>120</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>

3.6.1.4.2.7.2 Weightage given to cognitive process dimensions

While planning the construction of an achievement test in social studies, the specification of objectives based on cognitive categories such as Remembering, Understanding, Applying, Analysing, Evaluating and Creating were kept in mind.

Table 3.14: Weightage given to cognitive process dimensions

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Cognitive process dimensions</th>
<th>No. of items</th>
<th>Question Numbers</th>
<th>Marks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Remembering</td>
<td>6</td>
<td>1,6,9,12,40,41</td>
<td>12.5</td>
<td>10.4%</td>
</tr>
<tr>
<td>2</td>
<td>Understanding</td>
<td>24</td>
<td>2,3,4,5,7,10,11,13,15,18,22,24,25,27,28,32,33,38,39,42,43,44,49,50</td>
<td>56.5</td>
<td>47.08%</td>
</tr>
<tr>
<td>3</td>
<td>Applying</td>
<td>2</td>
<td>29,36</td>
<td>5</td>
<td>4.16%</td>
</tr>
<tr>
<td>4</td>
<td>Analysing</td>
<td>13</td>
<td>8,14,16,19,20,21,30,31,37,45,46,47</td>
<td>33</td>
<td>27.5%</td>
</tr>
<tr>
<td>5</td>
<td>Evaluating</td>
<td>2</td>
<td>23,26</td>
<td>6</td>
<td>5%</td>
</tr>
<tr>
<td>6</td>
<td>Creating</td>
<td>3</td>
<td>17,34,35</td>
<td>7</td>
<td>5.83%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>50</strong></td>
<td></td>
<td><strong>120</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

180
3.6.1.4.2.7.3 Weightage given to difficulty levels

The prepared Social studies achievement test consisted of 50% average questions, 30% difficult questions and 20% Easy questions. Weightage given to the difficulty levels are prepared in Table 3.15.

Table 3.15: Weightage given to the difficulty levels

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Difficulty Level</th>
<th>Marks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Easy</td>
<td>24</td>
<td>20%</td>
</tr>
<tr>
<td>2</td>
<td>Average</td>
<td>60</td>
<td>50%</td>
</tr>
<tr>
<td>3</td>
<td>Difficult</td>
<td>36</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>120</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

3.6.1.4.2.7.4 Weightage given to form of questions

In this achievement test 5.42, 4.16, 5.42, 85 percentage marks were given to multiple choice, fill in the blanks, match the following and short answer questions respectively.

Table 3.16: Weightage given to the form of Questions

<table>
<thead>
<tr>
<th>Sl.No.</th>
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<th>No. of items</th>
<th>Marks</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Multiple choice</td>
<td>6</td>
<td>6.5</td>
<td>5.42%</td>
</tr>
<tr>
<td>2</td>
<td>Fill in the blanks</td>
<td>3</td>
<td>5</td>
<td>4.16%</td>
</tr>
<tr>
<td>3</td>
<td>Match the following</td>
<td>2</td>
<td>6.5</td>
<td>5.42%</td>
</tr>
<tr>
<td>4</td>
<td>Short answer questions</td>
<td>39</td>
<td>102</td>
<td>85%</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
<td><strong>120</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

3.5.1.4.2.7.5 Blue print for the test

A blue print was prepared for the final test on the basis of the weightages given to the Cognitive process dimensions, Contents and Form of items.
### Table 3.17: Blue Print for the Achievement Test in Social Studies

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Cognitive Process Dimensions</th>
<th>Form of questions</th>
<th>Contents</th>
<th>Remembering</th>
<th>Understanding</th>
<th>Applying</th>
<th>Analysing</th>
<th>Evaluating</th>
<th>Creating</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>MC F MF S</td>
<td></td>
<td>MC F MF S</td>
<td>MC F MF S</td>
<td>MC F MF S</td>
<td>MC F MF S</td>
<td>MC F MF S</td>
<td>MC F MF S</td>
<td>MC F MF S</td>
</tr>
<tr>
<td>1</td>
<td>The soil that yields gold</td>
<td>1(3)</td>
<td>2(6)</td>
<td>3(9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1(3) 7(21)</td>
</tr>
<tr>
<td></td>
<td>(Unit-12)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>For the wheels to move on</td>
<td>1(2)</td>
<td>1(1)</td>
<td>3(8)</td>
<td>1(2)</td>
<td>8(17½)</td>
<td></td>
<td></td>
<td></td>
<td>8(17½)</td>
</tr>
<tr>
<td></td>
<td>(Unit-13)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>News from industry</td>
<td>1(1½)</td>
<td>6(15½)</td>
<td>1(2)</td>
<td>1(4)</td>
<td>9(22)</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Many a mickle makes a muckle</td>
<td>1(2)</td>
<td>1(1½)</td>
<td>1(3)</td>
<td>1(3)</td>
<td>2(4)</td>
<td></td>
<td></td>
<td></td>
<td>6(13½)</td>
</tr>
<tr>
<td></td>
<td>(Unit-15)</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>5</td>
<td>Union is strength</td>
<td>1(1½)</td>
<td>1(2)</td>
<td>1(2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2(4) 5(9½)</td>
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<tr>
<td></td>
<td>(Unit-16)</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>6</td>
<td>For the people: By the people</td>
<td>1(½)</td>
<td>2(5)</td>
<td>1(1½)</td>
<td>2(7)</td>
<td>5(13½)</td>
<td>4(10)</td>
<td></td>
<td></td>
<td>15(36½)</td>
</tr>
<tr>
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<td>(Unit-17)</td>
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</tr>
<tr>
<td>Sub-Total</td>
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<td>4(4)</td>
<td>1(1)</td>
<td>2(7)</td>
<td>17(44½)</td>
<td>2(5)</td>
<td>12(31)</td>
<td>2(6) 3(7)</td>
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<tr>
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<td>6(12½)</td>
<td>24(56½)</td>
<td>2(5)</td>
<td>13(33)</td>
<td>2(6)</td>
<td>5(7)</td>
<td></td>
<td></td>
<td>50(120)</td>
</tr>
</tbody>
</table>

- Number inside the bracket indicates the marks allotted.
- Number outside the bracket indicates number of questions.
- MC - Multiple Choice items.
- F - Fill in the blanks items.
- MF - Match the Following items.
- S - Short answer items.
3.6.1.4.3 Critical Thinking Ability Test (CTAT)

The review of literature gave information on measurement of critical thinking and various instrumentations available for measuring. Ennis–Weir Critical Thinking Essay Test (Ennis & Weir, 1985), The California Critical Thinking skills test (Facione, 1990), Cornell Critical Thinking Test (Ennis & Millman, 1985), Watson-Glaser Critical Thinking Appraisal (Watson & Glaser, 1980) are widely used by many researchers for this purpose. These tests served as a benchmark for judging the validity of other critical thinking tests and for evaluating the effectiveness for the development of critical thinking ability.

However, it was felt that there was a need to construct a critical thinking test suitable for testing the critical thinking of the students of upper primary schools because the available tests were not satisfying the age level of students, nature and purpose of the study. Hence it was decided to construct a new critical thinking test as part of this study, with due consideration to the age of the students, nature and purpose of the study.

The cognitive skills given in the Delphi Report (1990) were adopted for the construction of the Critical Thinking Ability Test (CTAT) in this study, since the Delphi Report was found to be an authentic document created through a consensus reached by eminent scholars in the field of psychology, philosophy, science and education. Delphi Report contains detailed description of the cognitive skills and sub skills of critical thinking. In this quasi-experimental study, this Critical Thinking Ability Test was used as pre-tests and post-tests to measure critical thinking ability of students of the experimental and control group.
The cognitive skills and sub-skills adopted from the Delphi Report are described below.

3.6.1.4.3.1 Cognitive skills and sub-skills of critical thinking in the Delphi Report (1990)

1. **Interpretation**

To comprehend and express the meaning or significance of a wide variety of experiences, situations, data, events, judgments, conventions, beliefs, rules, procedures, or criteria.

1.1 **Categorisation:** to apprehend or appropriately formulate categories, distinctions, or frameworks for understanding, describing or characterizing information; to describe experiences, situations, beliefs, events, etc., so that they take on comprehensible meanings in terms of appropriate categorizations, distinctions, or frameworks.

1.2 **Decoding significance:** to detect, attend to, and describe the informational content, affective purport, directive functions, intentions, motives, purposes, social significance, values, views, rules, procedures, criteria, or inferential relationships expressed in convention – based communication systems, such as in language, social behaviors, drawings, numbers, graphs, tables, charts, signs and symbols.

1.3 **Clarifying Meaning:** to paraphrase or make explicit, through stipulation, description, analogy or figurative expression, the contextual, conventional or intended meanings of words, ideas, concepts, statements, behaviors, drawings, numbers, signs, charts,
graphs, symbols, rules, events or ceremonies; to use stipulation, description, analogy or figurative expression to remove confusing, unintended vagueness or ambiguity, or to design a reasonable procedure for so doing.

2. Analysis

To identify the intended and actual inferential relationships among statements, questions, concepts, descriptions or other forms of representation intended to express beliefs, judgments, experiences, reasons, information, or opinions.

2.1 Examining Ideas: to determine the role various expressions play or are intended to play in the context of argument, reasoning or persuasion; to define terms; to compare or contrast ideas, concepts, or statements; to identify issues or problems and determine their component parts, and also to identify the conceptual relationships of those parts to each other and to the whole.

2.2 Detecting Arguments: given a set of statements, descriptions, questions or graphic representations, to determine whether or not the set expresses, or is intended to express, a reason or reasons in support of or contesting some claim, opinion or point of view.

2.3 Analysing Arguments: given the expression of a reason or reasons intended to support or contest some claim, opinion or point of view, to identify and differentiate: (a) the intended main conclusion, (b) the premises and reasons advanced in support of the main conclusion, (c) further premises and reasons advanced as backup or support for those premises and reasons intended as supporting the main
conclusion, (d) additional unexpressed elements of that reasoning such as intermediary conclusions, unstated assumptions or presuppositions, (e) the overall structure of the argument or intended chain of reasoning, and (f) any items contained in the body of expressions being examined which are not intended to be taken as part of the reasoning being expressed or its intended background.

3. Evaluation

To assess the credibility of statements or other representations which are accounts or descriptions of a person’s perception, experience, situation, judgment, belief, or opinion; and to assess the logical strength of the actual or intended inferential relationships among statements, descriptions, questions or other forms of representation.

3.1 Assessing Claims: to recognize the factors relevant to assessing the degree of credibility to ascribe to a source of information or opinion; to assess the acceptability, the level of confidence to place in the probability or truth of any given representation of an experience, situation, judgment, belief or opinion. For example: to recognize the factors which make a person a credible witness regarding a given event or credible authority on a given topic; to determine if a given principle of conduct is applicable to deciding what to do in a given situation; to determine if a given claim is likely to be true or false based on what one knows or can reasonably find out.
3.2 Assessing Arguments: to judge whether the assumed acceptability of the premises of a given argument justify one’s accepting as true (deductively certain), or very probably true (inductively justified), the expressed conclusion of that argument; to anticipate or to raise questions or objections, and to assess whether these point to significant weakness in the argument being evaluated; to determine whether an argument relies on false doubtful assumptions or presuppositions and then to determine how crucially these affect its strength; to judge between reasonable and fallacious inferences; to judge the probative strength of an argument’s premises and assumptions with a view toward determining the acceptability of the argument; to determine and judge the probative strength of an argument’s intended or unintended consequences with view toward judging the acceptability of the argument; to determine the extent to which possible additional information might strengthen or weaken an argument.

4. Inference

To identify and secure elements needed to draw reasonable conclusions; to form conjectures and hypotheses; to consider relevant information and to educe the consequences flowing from data, statements, principles, evidence, judgments, beliefs, opinions, concepts, descriptions, questions, or other forms of representation.

4.1 Querying Evidence: In particular, to recognize premises which require support and to formulate a strategy for seeking and gather information
which Might supply that support; In general, to judge that information
relevant to deciding the acceptability, plausibility or relative merits of
a given alternative, question, issue, theory, hypothesis, or statement is
required, and to determine plausible investigatory strategies for
acquiring that information.

4.2 **Conjecturing Alternatives:** to formulate multiple alternatives for
resolving a problem, to postulate a series of suppositions regarding a
question, to project alternative hypotheses regarding an event, to
develop a variety of different plans to achieve some goal; to dram out
presuppositions and project the range of possible Consequences of
decisions, positions, policies, theories, or beliefs.

4.3 **Drawing Conclusions:** to apply appropriate modes of inference in
determining what position, opinion or point of view one should take
on a given matter or issue; given a set of statements, with the proper
level of logical strength, their inferential relationships and the
consequences or the presuppositions which they support, warrant,
imply or entail; to employ successfully various sub-species of
reasoning, as for example to reason analogically, scientifically, etc.; to
determine which of several possible conclusions is most strongly
warranted or supported by the evidence at hand, or, which should be
Rejected or regarded as less plausible by the information given.
5. **Explanation**

To state the results of one’s reasoning; to justify that reasoning in terms of the evidential, conceptual, methodological, criteriological and contextual considerations upon which one’s results were based; and to present one’s reasoning in the form of cogent arguments.

<table>
<thead>
<tr>
<th>5.1 <strong>Stating Results</strong>:</th>
<th>to produce accurate statements, descriptions or representations of the result of one’s reasoning activities so as to analyze, infer from, or monitor those results.</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.2 <strong>Justifying Procedures</strong>:</td>
<td>to present the evidential, conceptual, methodological, criteriological and contextual considerations which one used in forming one’s interpretations, analyses, evaluation or inferences, so that one might accurately record, evaluate, describe or justify those processes to one’s self or to others, or so as to remedy perceived deficiencies in the general way one executes those processes.</td>
</tr>
<tr>
<td>5.3 <strong>Presenting Arguments</strong>:</td>
<td>to give reasons for accepting some claim; to meet objection to the method, conceptualizations, evidence, criteria or contextual appropriateness of inferential, analytical or evaluative judgments.</td>
</tr>
</tbody>
</table>
6. Regulation

Self-consciously to monitor one’s cognitive activities, the elements used in those activities, and the results educed, particularly by applying skill in analysis and evaluation to one’s own inferential judgments with a view toward questioning, confirming, validating, or correcting either one’s reasoning or one’s results.

6.1 Self-Examination: to reflect on one’s own reasoning and verify both the results produced and the correct application and execution of the cognitive skills involved; to make an objective and thoughtful meta-cognitive self-assessment of one’s opinions and reasons for holding them; to judge the extent to which one’s thinking is influenced by deficiencies in one’s knowledge, or by stereotypes, prejudices, emotions or any other factors which constrain one’s objectivity or rationality; to reflect on one’s motivation, values, attitudes and interests with a view toward determining that one has endeavored to be unbiased, fair-minded, thorough, objective, respectful of the truth, reasonable, and rational in coming to one’s analyses, interpretation, evaluations, inferences, or expressions.

6.2 Self-Correction: where self-examination reveals errors or deficiencies, to design reasonable procedures to remedy or correct, if possible, those mistakes and their causes.

The procedure followed for the construction of the Critical Thinking Ability Test is described in the following sections.
3.6.1.4.3.2 Item pooling

Initially, 60 items based on the cognitive skills and sub skills measuring critical thinking were prepared. These items were discussed with subject experts and based on their scrutiny and criticism, certain items which were not appropriate (19 items) were deleted and only 44 test items were chosen for the pilot testing.

3.6.1.4.3.3 Initial try out

The critical thinking ability test was administered to a small group of 30 students who were about to complete their VI standard of Clelia School, Trichur, following the state syllabus of Kerala. This was done to know the clarity of items and to understand the words that are difficult to follow. The items were modified based on the results obtained from these students who participated in the initial try out.

3.6.1.4.3.4 Final try out

The critical thinking ability test items were subjected to a formal try out on a sample of two hundred and twenty students in six divisions of VI standard of J.M.J School, Athani, Trichur. Before the administration of the test, the purpose of the test was made clear to the students. All the necessary guidelines about the test and additional information needed were given. All the two hundred and twenty response sheets were scored with the help of answer key. The incomplete response sheets were rejected and two hundred response sheets were selected for item analysis.
Final try out was performed in order to identify weak or defective items to make further improvement, identify ambiguous and intermediate implausible distracters, very difficult and easy items, determine the difficulty level of each individual test item and lastly to determine the number of test items to be included in the final test. The students were told about the purpose of the administration of the test. They were given both general and specific instructions regarding the test and were asked to answer the items in the question paper itself. All the precautionary measures were taken to avoid mutual help and to avoid unfair means in answering the questions. The average time taken by the students to answer the draft form of critical thinking ability test was two hours and 94 marks were allotted to the test. Final try out consisted of 44 items.

3.6.1.4.3.5 Item Analysis

The procedure suggested by Ebel and Frisbie (1991) was employed for item analysis. The selected response sheets were arranged in the descending order of the magnitude of scores. The scores obtained by the upper fifty four subjects (27%) and lower fifty four subjects (27%) were taken as the upper group and lower group respectively. For the selection of the items in the final test, the difficulty index (DI) and Discriminating Power (DP) of each item were found out.

The table 3.18 gives the value of difficulty index (DI) and discriminating power (DP) of each item.
Table 3.18: The DI and DP of each item in Critical Thinking Ability Test

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Upper group(U)</th>
<th>Lower group(L)</th>
<th>Difficulty Index (DI)</th>
<th>Discriminating Power (DP)</th>
<th>Selected Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50</td>
<td>24</td>
<td>68.51</td>
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<td>62.03</td>
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<td>04</td>
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<td>7</td>
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<td>16</td>
<td>62.96</td>
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<td>28</td>
<td>73.14</td>
<td>0.42</td>
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</tbody>
</table>

* Items selected for the study
Since adequate number of items were not available with Discriminating Power (DP) greater than 0.40 and Difficulty Index (DI) between 40 and 60, some adjustments in this limit were found necessary. Some items having the Difficulty Index between 30 and 70 with Discriminating Power as 0.30 and higher were selected. From the item analysis eleven items were deleted and thirty three items were selected for the final test. The time duration fixed for the final test was one hour and forty-five minutes and the maximum score of the test was ninety.

3.6.1.4.3.6 Validity of the Test

To establish the face validity, the items of the critical thinking ability test were subjected to experts’ evaluation. The experts confirmed that the items included in the Critical Thinking Ability Test are valid and relevant for measuring critical thinking of sixth standard students.

3.6.1.4.3.7 Reliability of the Test

A representative sample of one hundred students in three divisions of VI standard students of J.M.J. School, Trichur, Kerala were selected for establishing reliability of the critical thinking ability. Before the administration of the test, the purpose of the test was made clear to the students. The test material in sufficient numbers was provided. All the necessary guidelines about the test and additional information needed for the test were given. The retest was conducted for the same sample with the same tool after a gap of fifteen days. The performance of students in both the test and retest were analysed for its reliability.

The test retest method was used to establish the reliability of the critical thinking ability test. The correlation coefficient of the two sets of scores, calculated using Pearson’s Product Moment formula, was found to be 0.73. The
obtained value of reliability suggests that the test has acceptable psychometric qualities to measure the critical thinking ability of VI standard students. Internal consistency also was found to be 0.81 by using Cronbach’s alpha. Cronbach’s $\alpha$ (alpha) is a coefficient of reliability, which is commonly used as a measure of internal consistency or reliability of a psychometric test.

3.6.1.4.3.8 Final form of the test

The final form of the critical thinking ability test consisted of 33 items which consisted of five items from the skill of interpretation, five items from Analysis, five items from evaluation, eight items from Inference, five items from Explanation and five items from Self-regulation. The test consists of sixteen multiple choice items and seventeen descriptive items. Total mark allotted for the test was 90 and time fixed for the test was one hour and forty-five minutes. The critical thinking ability test in its final form along with the scoring key is given in the Appendices III and IV.

The details of the finalized Critical Thinking Ability Test prepared by the investigator are given in Table 3.19.
<table>
<thead>
<tr>
<th>Skill</th>
<th>No.</th>
<th>Sub Skills</th>
<th>No. of Questions</th>
<th>Question Numbers</th>
<th>Total</th>
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<td>Categorization</td>
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<td>Decoding Significance</td>
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<td>1.3</td>
<td>Clarifying Meaning</td>
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<td>2.3</td>
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<td>3.2</td>
<td>Assessing Arguments</td>
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<td>11,19,28</td>
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<td>4.3</td>
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<td>8</td>
<td>1,2,6,7,8,12,</td>
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<td>5.3</td>
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<td>Self-Examination</td>
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<td>6.2</td>
<td>Self-Correction</td>
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<tr>
<td>Total</td>
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<td></td>
<td>60</td>
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<td>33</td>
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</table>
3.6.1.4.4 Value Preference Scale (VPS)

Values are core elements in the moral development of a child. It starts from the very beginning in the immediate environment provided by the parents, friends, neighborhood, school and society at large. This scale is used to measure the value preference among the primary school students. Even though many tools for measuring values (Value Scale by Dorothy D. Nevill and Donald E. Super, 1989; Study of Value by Allport-Vernon-Lindzey, 1960; Personal Values questionnaire by G.P Sherry and R.P. Verma, 1972, Comprehensive Value Scale by K.G. Agarwal) were available, it was felt that there was a need to construct a contextualised Value Preference Scale.

National Council of Educational Research and Training (NCERT, 1979) has proposed eighty four values that are to be inculcated among the children. The investigator considers this as the basis for identifying values. The investigator selected environmental, National, Social and Scientific temper values for the study because these values had high scope in the selected units compared to other values. The situational test items were constructed by giving a situation followed by alternative choices and the students were asked to opt for a choice among the alternatives, as their preference. It is presumed that the students’ choice of behavior in that alternative would reflect his/her value preference.

3.6.1.4.4.1 Item pooling

The investigator developed seventy items in the initial stage. The draft Value Preference Scale was submitted to experienced and qualified experts in value Education field. Based on the expert opinions fourteen items were rejected from the draft scale and fifty six items were retained for the initial try out.
3.6.1.4.4.2 Initial try out

The Value Preference Scale was administered to a small group of 30 students who were about to complete their VI standard of Clelia School, Trichur, following the state syllabus of Kerala. This was done to know the clarity of items and to understand the words that are difficult to follow. The items were modified based on the results obtained from these students who participated in the initial try out.

3.6.1.4.4.3 Final try out

For the final try out Fifty six items under four main values (Environmental, National, Social and Scientific Temper) were selected. Thus there were thirteen items from Environmental values, fifteen items from National values, twenty two items from Social values and six items from the Scientific temper Value. Value Preference Scale were subjected to a final try out on a sample of two hundred and twenty students in six divisions of VI standard of J.M.J. School, Athani, Trichur. They were asked to answer the items on a three-point scale. Among the three options given, they have to mark one which is more preferable for them. Before the administration of the test, the purpose of the test was made clear to the students. All the necessary guidelines about the test and additional information needed were given. All the two hundred and twenty response sheets were scored with the help of answer key. The incomplete response sheets were rejected and two hundred response sheets were selected for item analysis.

Final try out was performed in order to identify weak or defective items to make further improvement, identify ambiguous and intermediate implausible distracters, and lastly to determine the number of test items to be included in the
The students were told about the purpose of the administration of the scale. They were given both general and specific instructions regarding the scale and were asked to answer the items in the question paper itself. All the precautionary measures were taken to avoid mutual help and to avoid unfair means in answering the questions. The average time taken by the students to answer the draft form of value preference was one hour and the maximum mark a student can score is one hundred and twelve.

**3.6.1.4.4.4 Item Analysis of the Scale**

The responses of the subjects were scored by allotting weightages to the items. Highly preferred option was given 2 marks; moderately preferred option was given 1 mark and poorly preferred option was given 0 mark. The discriminating power of each item was found out to distinguish among students having different value preferences. The following method (Edwards, 1969) was used for item analysis:

1. On the basis of total score, 27% of the high scores (high group) and 27% of the low scores (low group) among the groups were identified.

2. The means of the total scores of the high and the low groups were calculated for each item.

3. In order to find the discriminating power of each item, Paired sample t-test was performed on the set of scores in the high and low groups.

4. Based on the results of the t-test, t-value equal to or greater than 1.75 were retained.

The item analysis of the Value Preference Scale is given in Table 3.20.
Table 3.20: Item analysis of Value Preference Scale

<table>
<thead>
<tr>
<th>Item No.</th>
<th>High group</th>
<th>Low group</th>
<th>t-value</th>
<th>Selected items</th>
<th>High group</th>
<th>Low group</th>
<th>t-value</th>
<th>Selected items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.00 0.00</td>
<td>1.81 0.47</td>
<td>3.49</td>
<td>*</td>
<td>29</td>
<td>2.00 0.00</td>
<td>1.49 0.80</td>
<td>5.63 *</td>
</tr>
<tr>
<td>2</td>
<td>1.98 0.22</td>
<td>1.73 0.65</td>
<td>3.56</td>
<td>*</td>
<td>30</td>
<td>0.89 0.67</td>
<td>1.05 0.77</td>
<td>1.41</td>
</tr>
<tr>
<td>3</td>
<td>1.96 0.24</td>
<td>1.81 0.39</td>
<td>2.79</td>
<td>*</td>
<td>31</td>
<td>2.00 0.00</td>
<td>1.31 0.87</td>
<td>7.10 *</td>
</tr>
<tr>
<td>4</td>
<td>2.00 0.00</td>
<td>1.64 0.69</td>
<td>4.63</td>
<td>*</td>
<td>32</td>
<td>2.00 0.00</td>
<td>1.57 0.68</td>
<td>5.65 *</td>
</tr>
<tr>
<td>5</td>
<td>2.00 0.00</td>
<td>1.72 0.53</td>
<td>4.82</td>
<td>*</td>
<td>33</td>
<td>2.00 0.00</td>
<td>1.57 0.68</td>
<td>5.65 *</td>
</tr>
<tr>
<td>6</td>
<td>1.77 0.42</td>
<td>1.51 0.61</td>
<td>3.16</td>
<td>*</td>
<td>34</td>
<td>0.75 0.58</td>
<td>0.81 0.79</td>
<td>0.56</td>
</tr>
<tr>
<td>7</td>
<td>1.95 0.26</td>
<td>1.26 0.93</td>
<td>6.50</td>
<td>*</td>
<td>35</td>
<td>1.91 0.39</td>
<td>1.35 0.80</td>
<td>5.63 *</td>
</tr>
<tr>
<td>8</td>
<td>2.00 0.00</td>
<td>1.07 0.94</td>
<td>8.81</td>
<td>*</td>
<td>36</td>
<td>0.73 0.52</td>
<td>0.80 0.71</td>
<td>0.78</td>
</tr>
<tr>
<td>9</td>
<td>1.88 0.33</td>
<td>1.47 0.69</td>
<td>4.65</td>
<td>*</td>
<td>37</td>
<td>0.73 0.57</td>
<td>0.88 0.73</td>
<td>1.62</td>
</tr>
<tr>
<td>10</td>
<td>1.96 0.19</td>
<td>1.80 0.60</td>
<td>2.25</td>
<td>*</td>
<td>38</td>
<td>1.99 0.11</td>
<td>1.42 0.72</td>
<td>7.23 *</td>
</tr>
<tr>
<td>11</td>
<td>2.00 0.00</td>
<td>1.79 0.51</td>
<td>3.64</td>
<td>*</td>
<td>39</td>
<td>0.69 0.68</td>
<td>0.85 0.67</td>
<td>1.47</td>
</tr>
<tr>
<td>12</td>
<td>1.98 0.22</td>
<td>1.64 0.73</td>
<td>4.04</td>
<td>*</td>
<td>40</td>
<td>0.83 1.30</td>
<td>1.02 0.82</td>
<td>1.26</td>
</tr>
<tr>
<td>13</td>
<td>1.99 0.11</td>
<td>1.70 0.64</td>
<td>3.89</td>
<td>*</td>
<td>41</td>
<td>1.99 0.11</td>
<td>1.54 0.70</td>
<td>5.52 *</td>
</tr>
<tr>
<td>14</td>
<td>1.84 0.43</td>
<td>1.44 0.75</td>
<td>4.27</td>
<td>*</td>
<td>42</td>
<td>1.88 0.45</td>
<td>1.44 0.75</td>
<td>4.49 *</td>
</tr>
<tr>
<td>15</td>
<td>1.75 0.58</td>
<td>1.30 0.85</td>
<td>4.05</td>
<td>*</td>
<td>43</td>
<td>2.00 0.00</td>
<td>1.48 0.69</td>
<td>6.75 *</td>
</tr>
<tr>
<td>16</td>
<td>1.79 0.41</td>
<td>1.10 0.71</td>
<td>8.09</td>
<td>*</td>
<td>44</td>
<td>2.00 0.00</td>
<td>1.51 0.69</td>
<td>6.42 *</td>
</tr>
<tr>
<td>17</td>
<td>1.94 0.28</td>
<td>0.96 0.95</td>
<td>8.89</td>
<td>*</td>
<td>45</td>
<td>2.00 0.00</td>
<td>1.40 0.86</td>
<td>6.32 *</td>
</tr>
<tr>
<td>18</td>
<td>1.90 0.37</td>
<td>1.51 0.74</td>
<td>4.43</td>
<td>*</td>
<td>46</td>
<td>1.95 0.21</td>
<td>1.38 0.79</td>
<td>6.11 *</td>
</tr>
<tr>
<td>19</td>
<td>2.00 0.00</td>
<td>1.63 0.67</td>
<td>4.90</td>
<td>*</td>
<td>47</td>
<td>1.48 0.59</td>
<td>1.12 0.81</td>
<td>3.06 *</td>
</tr>
<tr>
<td>20</td>
<td>1.93 0.26</td>
<td>1.54 0.77</td>
<td>4.39</td>
<td>*</td>
<td>48</td>
<td>1.75 0.48</td>
<td>0.94 0.78</td>
<td>8.74 *</td>
</tr>
<tr>
<td>21</td>
<td>1.99 0.11</td>
<td>1.79 0.56</td>
<td>3.06</td>
<td>*</td>
<td>49</td>
<td>1.84 0.51</td>
<td>1.21 0.83</td>
<td>6.49 *</td>
</tr>
<tr>
<td>22</td>
<td>2.00 0.00</td>
<td>1.65 0.71</td>
<td>4.38</td>
<td>*</td>
<td>50</td>
<td>1.98 0.22</td>
<td>1.46 0.77</td>
<td>5.66 *</td>
</tr>
<tr>
<td>23</td>
<td>1.88 0.33</td>
<td>1.54 0.72</td>
<td>3.79</td>
<td>*</td>
<td>51</td>
<td>1.96 0.19</td>
<td>1.40 0.78</td>
<td>6.11 *</td>
</tr>
<tr>
<td>24</td>
<td>2.00 0.00</td>
<td>1.68 0.62</td>
<td>4.59</td>
<td>*</td>
<td>52</td>
<td>2.00 0.00</td>
<td>1.43 0.83</td>
<td>6.11 *</td>
</tr>
<tr>
<td>25</td>
<td>2.00 0.00</td>
<td>1.63 0.69</td>
<td>4.78</td>
<td>*</td>
<td>53</td>
<td>1.98 0.15</td>
<td>1.38 0.71</td>
<td>7.06 *</td>
</tr>
<tr>
<td>26</td>
<td>1.98 0.15</td>
<td>1.62 0.73</td>
<td>4.41</td>
<td>*</td>
<td>54</td>
<td>2.00 0.00</td>
<td>1.38 0.75</td>
<td>7.39 *</td>
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<tr>
<td>27</td>
<td>1.99 0.11</td>
<td>1.53 0.74</td>
<td>5.53</td>
<td>*</td>
<td>55</td>
<td>1.95 0.21</td>
<td>1.58 0.70</td>
<td>5.04 *</td>
</tr>
<tr>
<td>28</td>
<td>2.00 0.00</td>
<td>1.63 0.66</td>
<td>5.04</td>
<td>*</td>
<td>56</td>
<td>1.99 0.11</td>
<td>1.46 0.82</td>
<td>5.91 *</td>
</tr>
</tbody>
</table>

* Items selected for the final scale

Thus, six items were found to have low discriminating power, as indicated from the t-values, and they were deleted and fifty items were retained for the final scale. The maximum score of the final scale is hundred.
3.6.1.4.4.5 Validity of the Scale

For establishing the face validity of the Value Preference Scale, the test items were given to experts’ evaluation. The experts evaluated the items as capable of measuring value preference falling under four main values mentioned.

3.5.1.4.4.6 Reliability of the Scale

A representative sample of one hundred students in three divisions of VI standard students of J.M.J. School, Athani, Trichur, Kerala were selected for establishing reliability of the Value Preference Scale. Before the administration of the scale, the purpose of the scale was made clear to the students. The test material in sufficient numbers was provided. All the necessary guidelines about the scale and additional information needed for the scale were given. The retest was conducted for the same sample with the same scale after a gap of fifteen days. The performance of students in both the test and retest were analysed for its reliability.

The test retest method was used to establish the reliability of the Value Preference Scale. The correlation coefficient of the two sets of scores, calculated using Pearson’s Product Moment correlation, was found to be 0.83. The obtained value of reliability suggests that the scale has acceptable psychometric qualities to measure the value preference of VI standard students.

3.5.1.4.4.7 Final form of the test

The final form of the Value Preference Scale consists of fifty items (four main values and twenty nine sub values) of which eleven items were related to Environmental values, fourteen items to National values, nineteen items to Social values and six items to Scientific temper values. Average time taken for the completion of scale was forty minutes. The Value Preference Scale in its final form along with the scoring key is given in the Appendices V and VI.
distribution of items in the final scale along with the dimension is given in table 3.21.

Table 3.21: Details of Value Preference Scale

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Main Values</th>
<th>Sub Values</th>
<th>No. of Items</th>
<th>Question Numbers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Initial Final</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>Environmental Values</td>
<td>1. Concern for environment</td>
<td>3</td>
<td>3</td>
<td>1,4,7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Respect life and life in all its diversity</td>
<td>3</td>
<td>2</td>
<td>19,22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Conservation of energy</td>
<td>2</td>
<td>2</td>
<td>25,28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Conservation of environment</td>
<td>3</td>
<td>3</td>
<td>10,13,16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Respect for food</td>
<td>2</td>
<td>1</td>
<td>30</td>
</tr>
<tr>
<td>2.</td>
<td>National Values</td>
<td>1. Democratic decision making</td>
<td>2</td>
<td>1</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Equality</td>
<td>2</td>
<td>1</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. International Understanding</td>
<td>2</td>
<td>1</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Justice</td>
<td>2</td>
<td>1</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Liberty</td>
<td>2</td>
<td>2</td>
<td>14,17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. National Consciousness</td>
<td>2</td>
<td>2</td>
<td>8,11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. National integration</td>
<td>2</td>
<td>2</td>
<td>20,23</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Patriotism</td>
<td>2</td>
<td>2</td>
<td>2,5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9. Secularism and respect for all religions</td>
<td>2</td>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10. Value for National and Civic property</td>
<td>2</td>
<td>1</td>
<td>37</td>
</tr>
<tr>
<td>3.</td>
<td>Social values</td>
<td>1. Appreciation of ancient things</td>
<td>2</td>
<td>1</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Appreciation of cultural values of others</td>
<td>2</td>
<td>2</td>
<td>12,15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. Concern for others</td>
<td>3</td>
<td>3</td>
<td>3,6,9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Cooperation</td>
<td>2</td>
<td>1</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5. Dignity of labour</td>
<td>2</td>
<td>1</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6. Duty consciousness</td>
<td>2</td>
<td>2</td>
<td>35,38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7. Fellow feeling</td>
<td>2</td>
<td>2</td>
<td>18,21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8. Non-violence</td>
<td>2</td>
<td>2</td>
<td>24,27</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9. Peace</td>
<td>2</td>
<td>1</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10. Respect for others</td>
<td>2</td>
<td>1</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td></td>
<td>11. Sense of social responsibility</td>
<td>2</td>
<td>1</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12. Solidarity of mankind</td>
<td>2</td>
<td>1</td>
<td>50</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13. Tolerance</td>
<td>2</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>4.</td>
<td>Scientific Temper</td>
<td>Scientific temper</td>
<td>10</td>
<td>6</td>
<td>36,39,4144,47,49</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>29 sub values</td>
<td>70</td>
<td>50</td>
</tr>
</tbody>
</table>
3.6.1.4.5 Socio-Economic Status Scale (SESS)

The investigator used Socio-Economic Status Scale developed by Rajbir Singh et al. (2005) to assess the socio-economic status of students.

The scale is developed based on the following indicators as education, income, wealth, employment/unemployment, housing, access to services, presence of reading material at home, race, social class, social standing/prestige, material possessions etc. The scale is developed in Hindi and English for both the rural and urban people or having allegiance to both areas. The investigator used English version of the scale. Scale consisted of 25 statements and the average time taken for the completion of scale was thirty minutes. The reliability coefficient found to be 0.65 which was obtained by using test retest method and Cronbach alpha was found to be 0.791. The criterion validity also was found out to be 0.68 by correlating the Socio-Economic Questionnaire of Singh and Saxena (1981). Proper instructions were given before administering the scale. The answers of the items are analysed based on the answer key given in the manual of the scale. The raw scores of the students were converted into T score and the norms for interpretation was made based on this. The norms for the interpretation of the socio-economic status of students are given in the table 3.22.
Table 3.22: T-scores and percentile equivalents of SES raw scores

<table>
<thead>
<tr>
<th>SES categories</th>
<th>Raw Scores</th>
<th>T</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low SES</td>
<td>38 and below</td>
<td>Below 40</td>
<td>Below 17</td>
</tr>
<tr>
<td>Middle SES</td>
<td>38-80</td>
<td>40-60</td>
<td>17-83</td>
</tr>
<tr>
<td>High SES</td>
<td>81 and above</td>
<td>61 and above</td>
<td>84 and above</td>
</tr>
</tbody>
</table>

A copy of the Socio-Economic Status Scale along with the scoring key is given in the Appendices X and XI.

3.6.1.4.6 Family Environment Scale (FES)

The investigator adopted a scale developed by Sanjay Vohra (1997) to measure the influence of family environment of the students on achievement in social studies, critical thinking ability and value preference. This scale was developed as a means to get information about the family environment in an objective and standardized manner. The scale is appropriate for use with ages of 10 years and above, throughout adulthood. The scale gives an accurate appraisal of family environment. The test includes 98 statements and number of items for each dimension is divided equally. Each dimension is independent of each other and plays a dominant role in the family environment. Each statement has two possible answers. There are both positive and negative items in the scale. The following table shows the details of the components measured by Family Environment Scale. A brief description of dimensions measured by Family Environment Scale is given in the table 3.23.
Table 3.23: Brief description of dimensions measured by Family Environment Scale

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Dimensions</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cf</td>
<td>Competitive Framework – the importance shown to achievement oriented or competitive activities (such as school, work etc.) by the family members</td>
</tr>
<tr>
<td>2</td>
<td>Co</td>
<td>Cohesion – the degree of commitment, help, support, calm and cohesion displayed by the family members.</td>
</tr>
<tr>
<td>3</td>
<td>Ex</td>
<td>Expression – the extent to which family members are encouraged to act openly and express their feelings directly.</td>
</tr>
<tr>
<td>4</td>
<td>In</td>
<td>Independence – the extent to which family members are independent, self-sufficient, assertive and make their own decisions.</td>
</tr>
<tr>
<td>5</td>
<td>Mo</td>
<td>Moral orientation – the degree of emphasis shown on ethical, moral and religious issues and values by the family members.</td>
</tr>
<tr>
<td>6</td>
<td>Or</td>
<td>Organisation – the degree of importance given by the family members to clear organization, structure planning and responsibilities.</td>
</tr>
<tr>
<td>7</td>
<td>Ro</td>
<td>Recreational Orientation – the extent of participation in social, recreational, political, intellectual and cultural activities by the family members.</td>
</tr>
</tbody>
</table>

This scale is a power test, but it usually requires around 20-25 minutes for the subject of average reading ability to finish FES. Students are asked to answer all the items. For the intended answer one mark is given and for the unintended answer zero mark is given. Raw scores are to be converted into Sten scores. Norms of the children has to be used for the interpretation. The test retest reliabilities of individuals scores for the 7 sub-scale are all in acceptable range, varying 0.78-0.89. The validity of the test range from 0.77-0.84. The scale
possesses acceptable reliability and validity. The interpretation of the Sten score is given below:

1. High and extremely high score (8-10)
2. Average score (4-7)
3. Low and extremely low score (1-3)

An example of the test item is given below:

- In our family, topic of religion is talked about with great interest.
  a) Yes
  b) No

A copy of the Family Environment Scale along with the answer sheet and scoring key are given in the Appendices VII, VIII and IX.

3.6.1.4.7 Perception Scale on Constructivist Approach (PSCA)

A Perception Scale was constructed in order to know the perception of students towards constructivist approach adopted in teaching social studies. The Perception Scale consisted of four main components namely

- The method used
- The classroom atmosphere
- The evaluation techniques used
- The role of the teacher

With regard to each component few statements were provided that would help the students to know the perception of students towards constructivist approach. The perception scale included both objective and open-ended questions. The objective type items were framed in the question form, which could be answered on a three point scale i.e. Yes/Sometimes/No.
For e.g.: Did the classroom environment help you in building good relationship with the teacher. Yes/Sometimes/No

The students were supposed to tick one among the three options provided. The items were arranged component wise in different sections with a small instruction. Open ended questions were also asked in order to obtain free response of the students. Before administering this perception scale, students were given necessary directions to enable them to respond meaningfully. A copy of the Perception Scale on Constructivist Approach used in the study is given in Appendix XII.

3.6.2 Stage II – Implementation Stage

In the preliminary stage the lesson plans based on constructivism were developed after a detailed content analysis. As mentioned in the preceding section, the necessary tools to the study, the variables included in the study were developed.

As stated earlier, this study was of quasi-experimental nature involving pre-test and post-test wherein the effects of the treatments were judged by the differences in the pre-test and the post-test scores. There was one experimental group in which constructivist approach was followed to teach social studies and one control group which was taught by the regular teacher.

In the implementation stage, the study was carried out in the following phases

3.6.2.1 Phase I: Pilot Study
3.6.2.2. Phase II: Administration of pre-tests
3.6.2.3. Phase III: Experimental treatment
3.6.2.4 Phase IV: Administration of post-tests
3.6.2.1 Phase I: Pilot Study

The draft lesson plans were tried out on forty students of the sixth standard students studying in Clelia School, Wadakanchery. The pilot study was carried out to try out the lesson plans and to obtain insights into the practical difficulties in actual implementation of the instructional programme and to take necessary precautions. The lessons for the pilot study were Agricultural Crops of India, Agricultural crops of Kerala, Classification of agricultural crops, Changes in the cultivation of agricultural crops.

In the beginning of the pilot study, the students were given necessary instructions to be followed during the implementation of constructivist learning. The students were given awareness on the new approach, its goals and objectives and procedural details. The social studies teachers in the school were invited to attend the pilot study sessions to get their opinions, views and comments about the instructional programme. On the basis of the classroom process and the feedback obtained from the teachers, the draft lesson plans were modified, re-edited and finalized.

3.6.2.2 Phase II: Administration of Pre-tests

The tools were administered as pre-test for measuring intelligence, socio-economic status, family environment, achievement in social studies, critical thinking ability and value preference. The tests were administered to the students belonging to the experimental and control group. Necessary permissions were obtained from the concerned head teachers and subject teachers of the two schools before starting the experimental treatment. The time schedule for the administration of pre-test was made. Before administering the tests, the students
were given necessary guidelines regarding the tests. After administering the above said tests, they were scored on all the above said variables which served as the pre-test scores of the sample students on the respective criterion measures. One test was given each day for both the groups to avoid fatigue.

3.6.2.3 Phase III: Experimental Treatment

The sixth standard students of division B studying at St. Thomas School, Thiroor was selected as the experimental group and sixth standard students of division B studying at St. Pious school was taken as control group. The investigator taught lessons using constructivist approach to the students of experimental group in social studies. The researcher maintained a diary where the daily observations of classroom interactions were recorded. The classes were taken in the regular social studies periods of the school. Sometimes the co-curricular activity periods were made use of conducting project works and outdoor visits. Fifty lesson plans in social studies were prepared for sixty instructional hours with the time duration of 40-45 minutes. The experimental treatment lasted for five months excluding vacation, all other school holidays and days of term-wise examinations. Thus the total duration of treatment worked out to be forty five hours distributes over nearly five months.

In the control group, the regular social studies teacher taught the students and covered the selected units approximately using the same number of periods. The teacher of the control group was consulted regarding the duration required for teaching the selected units, mode of teaching and the assessment that followed in the control group. The social studies teacher of control group was known as an competent teacher in the school. The experimenter bias was avoided by involving
the regular social studies teacher in teaching the control group students. The researcher observed the regular teacher’s classes in the control group during which the following observations were made.

- The lessons were not planned regularly by the teacher.
- There was no scope for students to do activities on their own.
- Evaluation was not continuous and performance based.
- The end product of learning was given more importance rather than the ‘process’ or the ‘procedure of learning’.

In the experimental group, the investigator created such an environment in the classroom that the students were able to construct the knowledge related to the given concepts and themes by doing various activities in which already known experiences and knowledge played a significant role. The role of the investigator was to guide and facilitate their learning efforts whenever found necessary. The investigator got continuous feedback from the experimental group students and their regular teachers. The teachers and experts observed some of the classes to verify that the content was transacted using constructivist approach. The investigator made use of constructivist principles given by Brooks and Brooks (1993) in the class are as follows:

- Posing problems of emerging relevance to students.
- Structuring learning around primary concepts.
- Seeking and valuing students’ point of view.
- Adapting curriculum to address students’ suppositions.
- Assessing student learning in the context of teaching.
The continuous and comprehensive evaluation was followed during the learning process. Worksheets were used as a mode of assessment. Social studies diary was maintained by each student in which their experiences of reflections on various social problems, value issues etc. were recorded. A field trip was also conducted to nearby bank to evaluate the functions of banking system.

During the course of this experimental treatment, various assignments, individual as well as group work were given to the students. The purpose of assignments was to supplement the learning experiences students received in the classroom, to increase their retention and for preparing them to receive new lessons; and care was taken to avoid unnecessary addition to students’ work load. The assignments were designed to support the aim of the constructivist model to make learners autonomous in learning by seeking information and processing them to useful outputs in group works. The assignments gave importance to preparing students as autonomous learners who are capable of understanding the concepts themselves by referring to literature, performing experiments, discussing with peer group and thinking critically on alternative solutions and problem solving.

Two examples for the assignments are given below:

i. Project report on energy conservation in a panchayath: This was a group work that required students to visit various places in the panchayath as a team and inquire about the ways to conserve energy and evaluate various solutions to the problem.
ii. Banking system of India: This required students to prepare a paper on banking system and covering topics such as types of banks, role of banks in the industry and so on and make a presentation in the class.

The group work and cooperative activities carried out as a part of the assignments were expected to help and improve students’ attitudes and behaviours; and foster cooperation, leadership, initiative, interest in social studies; and to make them realize the application of the knowledge of social studies in real life situation.

As a part of assignment the investigator gave self-assessment format for assessing the involvement in the group work and also in the individual work. Format for monitoring project work was also given to the students. All these tools helped students to assess themselves and it helped the investigator to know the performance level of students in various activities. Copies of work sheets, self-assessment formats and monitoring project work formats are given in the Appendix XIV. Various other examples of worksheets, projects, assignments of students are given in the Appendix XV in the CD attached herewith.

The classroom procedures in which the students were actively engaged are illustrated through some of the photographs and they are displayed as follows.
Photograph 1: Students engaged in various activities

Photograph 2: Recording the findings of investigation

Photograph 3: Students engaged in Group work
Photograph 4: Students engaged in Group work

Photograph 5: Teacher acting as a member of the group

Photograph 6: Timely scaffolding by investigator
3.6.2.4 Administration of post-tests

Immediately after the experiment was completed, students were administered the post-tests for all the dependent variables – achievement in social studies critical thinking ability, and value preference. Both experimental and control group students were subjected to these post-test one by one. Apart from the above tests the students of experimental group were given a Perception Scale to list their perceptions about the method used, the classroom environment, the evaluation techniques used and the role of the teacher in the context of constructivist approach.

3.7 SCORING AND CONSOLIDATION OF DATA

Coloured progressive Matrices Test, Achievement in social studies, Critical Thinking ability test, Value preference, Socio-Economic Status Scale, and Family environment scale were administered as pre-test to eighty one students belonging to experimental and control group. After the experimental treatment, the tools – Achievement Test in Social Studies, Critical Thinking Ability Test, Value
Preference Scale were once again administered as post-tests. Also a perception scale was administered at the end of the treatment towards experimental group. Achievement in social studies, Critical Thinking ability test, Value preference were scored based on the scoring key and the criteria evolved. The responses were scored and tabulated for analysis. Coloured progressive matrices, Socio-Economic Status Scale, Family Environment Scale were scored based on the instruction given in the manual of each test.

Coloured Progressive Matrices consists of thirty six items. Correct and incorrect answers scored as one and zero respectively. The maximum score was thirty and minimum was zero.

As mentioned in the preceding section in achievement in social studies there were fifty items and in critical thinking ability test there were thirty three items. The correct and incorrect answers were scored based on the scoring key and value points and corresponding marks were given.

In Value Preference Scale there were fifty items. Each item had three statements among which the student should select the one that he/she preferred the most. Hence it was of a three point scale and in that high preferred statement was given two marks, average preferred statement was given one mark and low preferred statement was given zero mark. Hence the maximum score was hundred.

Socio-Economic Status Scale was scored based on the instructions given in the manual. After scoring the raw scores it has to be converted into T-score for analysis. Family Environment Scale consisted of ninety eight items and each item had two corresponding statements that assess the various components of family environment. Statements are stated positively and negatively. One mark is
given for positively preferred item zero mark is given for negatively preferred item.

In Perception Scale there are both objective and descriptive type items. The objective type questions which are in scale form is scored by giving two mark for highly preferred answer, one mark for moderately preferred answer and zero for low preferred answer. The descriptive type items of the scale were scored by percentage.

The data from eighty one VI standard students were obtained, as they comprised the final sample of the study. After scoring, the scores obtained in each test were tabulated and consolidated separately for the experimental and control group.

3.8 PRECAUTIONS OBSERVED

Following precautions were observed during the course of the experiment for ensuring correctness and precision in the experiment conditions that might have impacted the result.

i. All the subjects were oriented to the tests in the beginning of the treatment.

ii. No undue stress or control of any kind was imposed on the subjects at any time during the study and the experiment was conducted in a relaxed natural setting.

iii. Testing as well as teaching was simultaneous in the two groups(one experimental group and one control group) during the pre-test and post-test treatment.

iv. The effectiveness of the experimental treatment was ensured by establishing an amicable rapport in the school, in maintaining natural
setting, harmonious atmosphere and providing sufficient time for various activities during experimentation.

v. It was ensured that the contents of treatment had not been previously taught to the students and not even taught by any other teacher during the experiment to any of the two groups viz. experimental and control group.

vi. Learning material was provided for every student during testing so as to avoid any disturbance.

vii. Teaching periods of 40-45 minutes were utilized fully for treatment and time was not wasted during experimentation.

3.9 STATISTICAL TECHNIQUES EMPLOYED

The pre-test, post-test answer sheets obtained from the students of both experimental and control groups were scored as per the guidelines and scoring keys of each test. The SPSS (17.0 version) was made use for the statistical analysis of data. Descriptive statistics was used to summarise the pre-test scores and the post-test scores. They were inspected to determine if the sample showed departures from the normal distribution. Analysis of covariance (ANCOVA), t-test, Pearson’s Product Moment Correlation, Crombach’s $\alpha$ (alpha), Analysis of variance (ANOVA) were employed to test various hypotheses. The data is also described qualitatively by analyzing certain classroom interactions, student diaries, worksheets and perception of students towards constructivist approach.

The details of the analysis carried out with the finding and discussions are presented in the following chapter.
3.10 SUMMARY OF THE PROCEDURE

Variables

Independent Variable
  
  Constructivist approach in social studies

Sample (Standard VI students)

Selection of experimental and control group

Content Analysis

Selection of topic for treatment

Preparation of lesson plans based on Constructivist approach in social studies

Tools used

Coloured progressive matrices test

Critical thinking ability test

Value preference scale

Family environment scale

Experiment

Achievement test in social studies

Socio-economic status scale

Pre test

Experimental group

Treatment

Control group

Post test

Experimental group

Scoring and consolidation

Control group

Analysis

Results and Interpretation