

Chapter V



SUMMARY

CHAPTER-5

5.0. SUMMARY

5.1. INTRODUCTION:

In India introduction of ten years school curriculum, envisages teaching of environmental studies from the beginning of school education (NCERT 1975a) Environmental concepts are infused in the already existing curriculum in the school curricula and traditional disciplines are retained. National Curriculum for Elementary and Secondary Education states two general objectives related to environmental education along with other objectives.

These are:

1. Understanding of the environment and its limited resources and the need for conservation of natural resources and energy.
2. Appreciation of various consequences of large families and over-population and need of checking population growth.

To achieve these objectives into practice, science is taught at Class I & II level as 'environmental studies' which is integrated course of natural and social environment. For Class III to V the environmental studies is divided into two parts, part – I deals with natural science and part-II deals with social science. At the upper primary stage environmental studied get separated into two subjects – one is science and other is social science. The incorporation of environmental issues into the present science curriculum can increase the relevance of science knowledge to everyday events.

The topic of pollution is selected as it is a relevant environmental and educational issue on which people would probably have some related conceptions. Pollution is of all sorts. Today we breath in industrial pollution every moment and we have become indifferent to that. There is the industrial pollution, there is a pollution in the world of medicines, even milk is polluted, the field of fruit, flowers, vegetables all have pulsate with pollution. It is necessary to create an awareness of this environmental pollution among us all. The objective of environmental education

also include opportunities to acquire the knowledge, values, attitudes, commitment and skills to protect and improve the environment and to create new patterns of behaviour of individual groups and society as a whole towards society. It therefore, requires that appropriate action takes place in the behaviour to protect and improve the environment.

5.2 PROBLEM: The problem is states as: 'Understanding of pollution among VI and VII grade students'

5.3 VARIABLES OF THE STUDY: For the present study:

- i) 'Grade' and Gender' are the independent variable.
- ii) 'Understanding of pollution' is the dependent variable
- iii) 'socio-economic status' is the controlled variable.

5.4 OPERATIONAL DEFINITION OF POLLUTION: For the present study pollution has been defined as –“ Any process which makes air, water and soil harmful to the living beings is called pollution”.

5.5 OBJECTIVES OF THE STUDY:

- i) To study VI and VII grade students understanding about pollution
- ii) To study gender difference of any related to the understanding about pollution, studying in grades VI and VII.
- iii) To study misconceptions about pollution of VII and VII grade students.

5.6 DELIMITATIONS:

- i) This study has been confined to a sample drawn from a Model School, Piplani, Bhopal
- ii) The study was conducted on the selected students of VI and VII grades.
- iii) Only understanding of pollution has been investigated in this study.

5.7 SAMPLE:

This study was conducted on 15 students of VI grade (6 girls and 9 boys) and 15 students of VII grade (5 girls and 10 boys)

5.8 TOOL AND TECHNIQUE

Keeping in view, the objective of the study, structured interview schedule was prepared for assessing their understanding about concept of pollution. Data has been collected through interview technique

5.9 SCORING:

Students' responses were analyzed and scored at five different level of understanding. i.e. sound understanding, partial understanding, partial understanding with misunderstanding, complete misunderstanding and 'No response'.

5.10 FINDINGS:

The first objective of the present study is, 'To study VI and VII grade students understanding of natural and social science concepts related to pollution.

5.10.1 SIXTH AND SEVENTH GRADE UNDERSTANDING OF POLLUTION ARE AS FOLLOWS:

5.10.1.1 Understanding about sources of air and water pollution:

Majority (87%) of VI grade students have sound understanding of pollution. They pointed out that smoke from factories, vehicles and houses are the sources of air pollution. But majority (67%) of VII grade students was at partial understanding level as they were expected to give additional responses.

grade students was at partial understanding level as they were expected to give additional responses.

Ninety three per cent of VI and VII grade students partially knew about sources of water pollution. According to them bathing, washing of utensils and clothes and waste thrown in water are some of the sources of water pollution

5.10.1.2 1983 Bhopal gas tragedy:

Majority (93%) of the students of both grades has sound understanding about 'Gas Tragedy'.

5.10.1.3 How vehicles and factories pollute air:

Majority of students of both grades was at partial understanding level on these items.

VI grade girls respond that petrol fumes are poisonous and contain certain chemicals, which pollute air. Boys response was smoke exhausted by vehicles contain poisonous gases, which pollute air.

VII grade students answered that smoke exhausted by vehicles get mixed in air causing breathing trouble.

VI grade girls told that burning of coal, production of fertilizers and other chemicals of factories make the smoke poisonous whereas boys answered that molting iron, plastic and burning of waste results n production of poisonous gases, which come out of the chimney and pollute air.

Majority of VII grade students talked about only smoke of factory as a pollutant of air.

5.10.1.4 None of the student was able to answer about the names of the chemicals present in exhaust gases of industries, which pollute air.

5.10.1.5 Affects of deforestation:

When asked about the affect of deforestation and cutting of plant, majority of students of both the grades was found at partial understanding level. They answered that deforestation will result in decreased amount of O₂.

5.10.1.6 Pollution of water by pesticides:

Majority of students of both the grades was partially correct that pesticides used for the protection of crops, pollute water.

5.10.1.7 Causes of soil pollution:

Majority of students of both the grades was at partial understanding level and used the term waste thrown on ground as a cause of soil pollution. However, 20% of VII grade students had a sound understanding that waste and polluted water causes soil pollution.

5.10.1.8 Diseases caused by air pollution:

Majority of the students (83% girls and 78% boys) of VI grade have sound understanding that air pollution affects lungs. Girls also knew that air pollution causes asthma but none of the boy gave this response.

Among VII grade students, majority of them was at partial understanding level as they were expected to tell affect on eyes and skin. Also, none of them used the term 'asthama', caused by air pollution.

5.10.1.9 Affects of air pollution:

Majority of VI grade girls had a sound understanding that water pollution affect all living beings. But boys have partial understanding that water pollution either affects human beings and animals or human beings and plants.

5.10.1.10 Diseases caused by water pollution:

Regarding diseases caused by water pollution, majority of VI graders and all VII graders were at partial understanding level and were able to tell cholera, jaundice and diarrhoea are caused by water pollution

5.10.1.11 Control of air pollution:

Majority of students of both the grades were having sound understanding that trees should be planted around houses to control air pollution.

Regarding control of pollution by factories only 40% of VI grade students were having sound understanding that factories should be established far away from the colonies. Among VII grade students none of them have sound understanding as they did not responded that an equipment can be installed to control air pollution. Fifty three per cent of the students were at partial understanding level.

Bio-gas stoves – Only 13% of VI graders and 33% of VII grade had a sound understanding that bio-gas stoves are smokeless and controls pollution. Forty seven per cent of VI graders and 20% students of VII graders were at partial understanding level. Forty per cent VI graders and 47% VII graders gave 'No response'.

5.10.1.12 Control of water and soil pollution:

Majority of VI & VII grade students was at partial understanding level about the concept of control of water and soil pollution. They responded that cleanliness should be maintained around source of potable water. Waste should be thrown in dustbin to prevent soil pollution.

5.10.1.13 Purification of potable water:

When asked how purification of potable water can be done majority of the students of both the grades was at partial understanding level. Fifty three per cent of VI grade students talked about filtration whereas 73% of VII grade students talked about use of Phitkari and boiling of water

5.10.1.14 Over-population is directly related to pollution:

All the students of VI and VII grade have sound understanding that over-population will result in increased amount of pollution and loud sound causes noise pollution.

5.10.1.15 Definition of air-pollution:

All the students of both the grades were able to define air pollution partially as impure and poisonous air containing chemicals and dust particles caused by the smoke of vehicles and factories.

5.10.1.16 Definition of pollution:

Majority of students of both the grade defined pollution in the form of pollutants i.e. smoke from cars and factories, waste cause water and soil pollution. Intense sound cause noise pollution.]

CONTENT ANALYSIS OF SCIENCE TEXT BOOKS: Content analysis of VI & VII grade science text-book showed that no reference is there about the ozone layer, but some students have mentioned about it.

5.10.1.17 Ozone layer:

Twenty per cent of VI and VII students partially knew that ozone layer prevent heat of the sun to reach earth and it is dissolving due to pollution. Majority of students of both the grades gave 'No response'.

Only one student of VII grade had a sound understanding that ozone layer prevent harmful ultra violet rays of sun to reach earth. He also knew that chlorofluorocarbon(CFC) is responsible for depletion of ozone hole, which is causing skin cancer in humans.

5.10.1.18 Acid rain

Only 13% of students of both the grades have partial understanding about the concept of acid rain. From VI grade only girls responded that, chemicals from factories causes acid-rain. From VII grade only boys gave a response that polluted air causes acid rain. Majority of students do not know about acid rains.

5.10.1.19 Volcano:

Fifty three per cent of VI grade students and 47% of VII grade students partially knew that lava and poisonous gases come out from volcano, which pollute air. Remaining students gave 'No response'.

The second objective of the study is, "To study gender difference if any, related to understanding of pollution among students of a VI and VII grades".

5.10.2 GENDER DIFFERENCE RELATED TO UNDERSTANDING OF POLLUTION

There is a marked difference in the percentage of girls and boys of VI grade on total seven items given in Table 5.11.2.1.

TABLE 5.10.2.1. Gender difference among VI grade students at sound understanding level

Item No.	Pollution related concepts	Percentage of girls	Percentage of Boys
12	To control pollution by factories these should be far away from colonies.	83%	22%
15	Air pollution causes 'asthama'.	50%	None
23	Water pollution affects all living beings	50%	None
40	Due to all types of pollution earth has become poisonous	50%	22%

Gender difference among VI grade students at partial understanding level

Item No	Pollution Related Concepts	Percentage of Girls	Percentage of boys
5	How factories pollute air ?	83%	56%
14	What is acid rain ?	33%	None
16	How eruption of volcano pollute air?	33%	67%

Similarly, marked difference is seen among girls and boys of VII grade. These students show marked difference in sound understanding and partial understanding on total eleven items (see Table – 5.11.2.2)

Table – 5.10.2.2 Gender difference among VII grade students at sound understanding level:

Item No.	Pollution related concepts	Percentage of Girls	Percentage of Boys
1	Sources of air pollution.	60%	10%
4	Pollution of air by vehicles.	40%	10%
5	Pollution of air by factories.	40%	10%
7	Diseases caused by air pollution.	40%	10%
8	Effects of deforestation on environment.	40%	10%
12	Control of pollution around residential area	100%	50%
29	Control of pollution by bio-gas stoves.	None	50%
29	Polythene which cannot decompose causes soil pollution.	20%	50%
38	Sources of knowledge about pollution.	80%	50%

Gender difference among VII grade students at partial understanding level

Item No.	Pollution related concepts	Percentage of Girls	Percentage of Boys
21	Pesticide pollute water.	100%	60%
32	Soil pollution by factories.	60%	20%

The third objective of the present study is: "To identify misconceptions about pollution of VI and VII grade students".

5.10.3 MISCONCEPTIONS:

Some misconceptions about pollution held by VI and VII grade students are as follows;

- i. Heat of the sun is responsible for the depletion of ozone layer. (16% of girls of VI grade)
- ii. Deforestation and cutting of trees causes soil pollution (6% of VI and VII graders)
- iii. There would not be any rains, due to deforestation (20% of VII graders). Also, due to deforestation, CO₂ will get spread in environment resulting in death of human beings. (13% of VII graders)
- iv. Twenty per cent of the boys of VI grade and 10% boys of VII grade said that air pollution affects kidneys and brain.
- v. Polluted water vaporizes and causes acid rain (10% of VII grade boys).

5.11 CONCLUSION AND IMPLICATIONS:

Knowledge is a powerful tool. Positive values towards the physical and social environment are key elements in changing behaviours of individuals. Findings of the present study show that children have conceptions determining their understanding of the world and their acquisition of new knowledge. All the students of grade VI and VII understand the significance of deforestation but could explain partially transfer of CO₂ between plants and animals. What is missing in students' understanding are basic science concepts to support such claims. Teachers must provide a bridge between science knowledge and popular conceptions that can help facilitate student understanding. Similarly, understanding about the impact of growing population is present in students at both the grades. They believe that "the greater the population, the greater the levels of pollution". They were able to explain

that more population will result in more use of vehicles, more trees will be cut for building houses, more will be the noise, resulting in more pollution.

At upper primary stages Environmental Education is not treated as separate subject in India. The environmental concepts are infused in the already existing curriculum and traditional disciplines are retained. This is done, by relating the concepts of Environmental Education with various disciplines. A viable science curriculum should include a set of organized experiences that will aid students in developing knowledge and awareness concerning pollution. But unfortunately, the knowledge, awareness and understanding does not necessarily lead to action among students. If the curriculum takes into consideration the existing knowledge of students based upon the generalized knowledge statements as indicated in the results of our interviews, teachers can be better prepared to promote meaningful learning experiences for the students.

This study can lead to the production of multidisciplinary curriculum units and appropriate teaching strategies that address students' understanding of complex natural phenomena and contribute to the process of logical thinking. The study of pollution also involves students with real life issues and reinforces the understanding that scientific facts must be accumulated and analyzed in order to make valid value judgements that science is everyday life and not the rote memorization of meaningless facts from a text book. Such study stresses the inter-relationship of all life and the factors that affect life on the planet. Earth and emphasizes that to preserve this very complex and fragile system we need a general populace knowledgeable in the area of both natural and social science.

As the children grow and progress through our schools they learn a tremendous number of new ideas from a variety of sources. Parents, teachers and books, as well as television, radio, contribute to children's

complex understanding of natural phenomenon. Children's existing knowledge and the inherent relevance provide valuable tools for teachers to use in teaching science. It is the teachers responsibility to help their students relate school subjects such as biology to real phenomenon such as pollution. Since the basic objective of Environmental Education is not environment itself but concerns environmental problems, the successful Environmental Education programme includes development of correct values and attitudes towards environment.

5.12 SUGGESTIONS

- i. Knowledge, awareness and understanding should necessarily lead to action among students. Science is important in everyday life and the rote memorization of facts from text-books does not help.
- ii. Basic science concepts should be emphasized, so that students can support their answers.
- iii. Teachers must provide a bridge between science knowledge and popular conceptions that can help to facilitate students understanding about environment.
- iv. In classroom some pictorial things and dramatization activities regarding pollution may be organized.
- v. The results of the present study show that understanding about pollution of VII grade is not very sound when compared with VI grade students. More inputs are required at the entry level of VII graders.
- vi. Students responses shows that they have conception of ozone layer and its depletion. But this topic is not given in text. It means it should be included in their text.
- vii. The disastrous effects of pollution on living beings and environment should be emphasized by giving examples from daily life. Today polythene bags and materials are found scattered all around

