

Inculcation of Values through Science Textbooks: An Analysis of NCERT Science Textbooks at Upper Primary Stage

Anjni Koul and Gunjan Gupta

Abstract

The National Council of Educational Research and Training (NCERT) develops National Curriculum Framework to provide guidelines for the development of textbooks. The textbooks are essentially developed to guide the teaching-learning of the curriculum in a particular subject. The present paper presents the analysis of NCERT science textbooks of upper primary stage to find out the scope of inculcating values among learners along with the subject knowledge. This study will be important for teachers and teacher educators to identify and understand the hidden values given in the textbooks and can be implemented among learners during teaching-learning process. The analysis will also help curriculum planners and development team (authors) while revising the textbooks of science at upper primary stage.

Key Words: National Curriculum Framework-2005, Human Values, Science, Textbooks, Upper Primary Stage.

Introduction

The textbooks in schools are generally used to learn facts and methods about a certain-subject. Textbooks play a vital role during teaching-learning process. They provide the basic framework within which much of the classroom activities occur and also give every child the best possible opportunities for learning. In science, good textbooks are usually child centric which gives various opportunities to learners to interact and involve them in the process of learning. It is a known fact that values cannot be enforced among learners, while these can be inculcated during the process of socialization and always occurs in a context. A research study reveals that value education is important component of education for administrators to train staff and organise workshops on teaching strategies and school exchange programme for teachers as well as students for inculcation of values at national as well as state level. The study also reveals that parent also plays a very important role in value transmission (Deepshikha et al., 2015). It has been found that when values are inculcated during the teaching-learning of subject, the students relate values with their daily life and transaction of the lesson becomes easier (Tan et. al., 2010). It is a known fact that the role of teachers has the greatest importance in the acquisition of values. Teachers while teaching values to students should use appropriate instructional strategies, methods, resources such as handbooks, reference books, textbooks etc.

The National Council of Educational Research and Training (NCERT) is an apex body constituted by the Government of India for school education. It develops National Curriculum Framework to provide guidelines for development of curricular materials. The National Curriculum Framework-2005 (NCF-2005) emphasizes

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that value education must be a concern that penetrates the school life through curriculum, classroom environment, school management, teacher-pupil relationship, teaching-learning processes and entire range of school activities. The intention of this paper is to analyze the content of Science Textbooks developed at upper primary stage (NCERT, 2006, 2007 & 2008) with reference to human values. The present study is descriptive in nature and will be helpful for teachers, teacher educators and society to know more about human values. **This will also help teachers and teacher educators to transact values among learners during teaching-learning process. The study will be important for curriculum planners and development team (authors) while revising the textbooks of science at upper primary stage.**

Research Questions

Is the content related to human values included in science textbooks at upper primary stage?

Is there further scope for enriching content with respect to values in science textbooks at upper primary stage?

What kind of values can be developed among learners of upper primary stage through science textbooks?

Methodology

This is a qualitative study which aims to derive and comprehend the values reflected in the textbooks of science through first-hand experience and honest reporting. The textbooks of science at upper primary stage developed by NCERT have been taken as the sample of the study.

Analysis of Science Textbooks with Respect to Human Values

The science textbooks at upper primary stage have been developed around seven themes - Food; Materials; The World of the Living; Moving Things, People and Ideas; How Things Work; Natural Phenomena and Natural Resources. An integrated approach to science has been followed at this stage. **The most unusual feature of the syllabus at upper primary stage is that it starts with questions rather than concepts, which introduces children to the investigative process of science and nurtures their cognitive abilities.**

Cover Design of Science Textbooks

It is a well-known fact that cover design of a textbook creates the first impression on its potential readers. The visuals on cover design should make a connection between the book manuscript and the readers. The cover design of science textbooks for class VI, VII and VIII depicts pictures of nature walk, separation of different substances, flood, rainwater harvesting, experimental set-up, structure of earth etc. **The visuals such as, on natural resources portray the message to sensitize the reader about the available natural resources and their judicious use.**



Experimental set-up gives user an idea about the requirement of the experiment and motivate them how to plan, design and set-up an experiment. It allows the intellectual development and encourages students to exercise their integral curiosity that promotes discovery and learning. It allows them to learn about various disasters that happen around and also know, “how to tackle the situations in order to minimize their effect.”

On flipping the cover pages, there is a beautiful message that says “*education is neither a privilege nor favour but a basic human right to which all girls and women are entitled*” and about our National Flag. **It teaches us to respect our National Flag and reminds us of many brave stories of freedom fighters, our victories, struggles etc.** Glimpses about various other books have also been given to promote reading habits among students. The important thing is that teachers must discuss about the text given on these pages not only to make children aware but also have their opinion about the given text.

Preliminary Pages

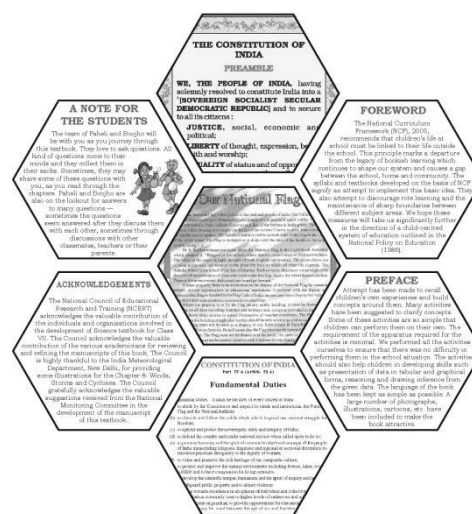
The preliminary pages include title page, foreword, preface, a note for the teachers and students, textbook development committee, acknowledgements and much more.

The Foreword of the textbook is usually written by someone other than the development team (authors). It introduces the readers to the development team (authors) and the book. The foreword of textbooks in science at upper primary stage has been written by Director, NCERT, **where he has emphasized on child-centered system of education** and appealed to principals and teachers to encourage children to reflect on their own learning and to pursue imaginative activities and questions.

A preface is a detailed introduction to the science textbook written by the chief advisor of the textbook. **He has mentioned that attempt has been made to sensitize children to the issues concerning gender, religion, environment, health and hygiene, to prepare children to assume their roles as responsible citizens.** He has also requested teachers and parents to encourage children to perform activities and learn science by doing and avoid learning by rote memorization.

A Note for the Students

A note for the students in textbooks is usually given to motivate learners about how to use the textbook and follow the instructions given while performing the tasks. Students can effectively communicate their thoughts and ideas with their peers and actively engage in their classrooms. In science textbooks at upper primary stage, a team of *Paheli* (riddle) and *Boojho* (answer) is quite motivating. **Learners may appreciate their journey by connecting with them. Students may also get motivated with the questions asked by *Paheli* (riddle) and *Boojho* (answer) and may pose questions; as questioning play a critical role in the overall success of a classroom.** They should perform various activities to seek answer to their queries, which will encourage questioning, freedom from fear, sharing ideas, cooperation, honest reporting etc., and ultimately develop critical thinking, problem solving skills among learners.



Science Concepts Organized around Themes

The science concepts at upper primary stage, i.e. classes VI-VIII are not framed along disciplinary lines, but organized around themes that are potentially cross-disciplinary in nature. Same set of themes are used from class VI to VIII, these are discussed below:

Theme - Food

The theme “**Food**” revolves around the sources and components of food; nutrition in plants and animals, i.e., availability and utilization of food; importance of crop production and its management; about useful and harmful microorganisms etc. The content given in the theme food talks about various values, some are obvious to understand but many of them are so beautifully weaved within the content and are considered as hidden values. The major values which can be inculcated among learners during the transaction of theme ‘Food’ are as follows:

- Variety of food in India has been reflected in the text which communicates the ‘respect for diversity’. The teacher may explain that there is a lot of variation in the food taken in different regions of our country. Food should be made easily available to every part of the nation and also to each and every one of us. The teacher may encourage students to share their food, which develops love, care and respect for each other’s culture. Similarly, the festivals associated with harvest season such as, *Pongal*, *Baisakhi*, *Holi*, *Diwali*, *Nabanya*, and *Bihu* should also be celebrated throughout the nation to develop respect for each other’s culture.
- Autotrophic mode of nutrition communicates that everyone must be self-dependent and take their own responsibilities. Teacher may encourage learners to do their personal chores themselves. Whereas, heterotrophic mode of nutrition guides learner to seek help of their elders in case of any kind of problem or emergency related to their personal life or otherwise. They can also seek counseling from the person they trust most.
- During the discussion on malnutrition and balanced diet, “Unity is strength” can be promoted. If each finger of our hand is considered as one nutrient and child is asked to lift bag of goods by one finger, it will not be possible; but it will be easier to lift the bag using all five fingers and easiest by closing the fist. Teacher can encourage students to have balanced diet and exercise regularly to stay healthy. Balanced diet can be compared with the silos of wealth to keep healthy. Make habit to chew food properly needs to be discussed.
- Adding fertilizers to plants increases their nutritional value. Similarly, regularly inculcating positive values may shape learners future, they may grow up as an independent learner and always encourage them to take challenges in life.
- Farmers are responsible for our crops and livestock that are needed for us to survive. Various separating methods are being used by farmers to provide us the clean food items, which reflect their hard work. They



are the ones who provide us food for our living; this generates respect for farmers and sense of ‘dignity of labour’.

- Symbiotic relationship shows the bond of friendship between leguminous plant roots and rhizobium bacteria. It gives a good example of intentionally and willingly working together for the benefit of all. As fertility of soil is increased by vermicomposting and microbes, it promotes the spirit of team work and cooperation.
- Some micro-organisms can survive under extreme conditions. Similarly, we should also try to survive in all walks of life. We should try to face challenges and hurdles with confidence and never loose heart under any odd circumstances. Children should appreciate that the Polio, smallpox have been eradicated due to the production of vaccines made from microorganisms.
- Different preservatives are added to avoid spoilage of food. Similarly, different methods can be followed to approach diverse problems in life. Learners may appreciate traditional knowledge like adding *neem* leaves to the container having grains may protect grains from insects.
- The teacher may develop the curiosity among learners about the information given on the packets of food such as weight of the packet, date of packaging, expiry date etc. This will help the learners to know the most important information whether the material is still safe to use or not. This will protect their health. Teacher must motivate learners to have home cooked food and say NO to junk food and always wash hands properly before and after having food.
- India is a country with large population. To meet the demand of large population, food grains have to be produced in large quantity. The questions raised by *Paheli* (riddle) ignite the inner consciousness of learners to save food and use it judiciously. It is important for children to realise, the difference between food spoilage and wastage of food.

We know that there are many amongst us, who do not get sufficient food.



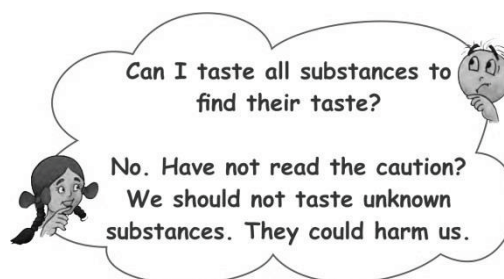
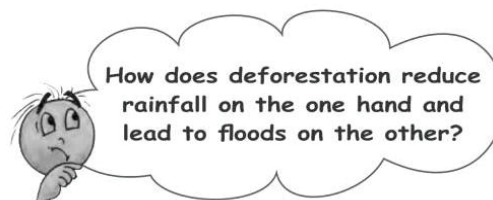
Theme - Materials

The theme “**Materials**” discusses about different types of materials such as, fibres; acid, bases and salts; various types of soils; metals and non-metals; various changes that take place in our surroundings etc. Along with the content given in this theme, one can inculcate various values among learners. Some of the major values which can be inculcated among learners during the transaction of the theme ‘Materials’ are as follows:

- A visit to textile industry/ handloom unit/ fields where cotton is grown, not only inculcates “respect for labourers” but also sense for “dignity of labour”. In India, women are significantly involved in various kinds of industries related to silk production. This promotes ‘gender equity’ in our country.
- While discussing about weaving process that turns a raw material such as cotton yarn into fabric, one has to realize that without weaving the strands of yarn are weak. This means when we work together, we are strong. This shows that working in collaboration in a community can help us to solve problems. We should always value each member for making his/her contribution. Similarly, the process of knitting is not only being fun and creative, but reduces stress and also connects us to our traditional knowledge. History of

clothing material gives idea to learners how clothing evolved with time. A large variety of different style of clothes used in different parts of country connects learners with the “Indian knowledge and tradition.”

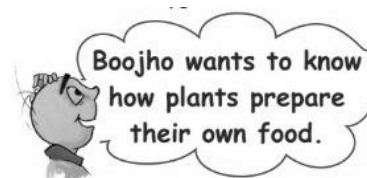
- Use of charkha was popularized by Mahatma Gandhi as part of the Independence movement. This generates a sense of patriotism among children and promotes homespun yarn. Let us join hands and promote *khadi*. It also supports the ‘Make in India’ theme.
- Students may be motivated to classify materials on the basis of their properties. Through this exercise, they may develop a passion towards knowing and exploring new things around them, which will develop belongingness among them towards nature. Similarly, as a human being we should try to collaborate with like-minded people.
- Materials are used after removing harmful or non-useful substances by using different methods of separation. Similarly, in our daily lives, we learn many useful things while interacting with people in our surroundings. Let us imbibe good habits from them and completely ignore bad ones.
- Shearing is just like getting a haircut. However, it requires skill so that the sheep is not injured. It conveys the message that let us not be cruel to animals. We should learn proper skills to take care of our pets and stray animals. Knowing the names of various animals in local and other languages can enhance creativity, adjustment in society, appreciation of local language etc., (Okal,2014).
- A number of different changes occur around us. Changes can be temporary such as, physical changes and can be permanent such as, chemical changes. Changes may be good or bad. One should accept and adjust according to the changes happening with one’s body and life gracefully.
- During discussion about acid, bases and salts, teacher must talk about dental care, brushing and flossing the teeth. This will make them aware of proper oral hygiene. Disobeying this might lead to oral infections, such as, tooth decay and gum diseases.
- While discussing about malleability and ductility about metals, these properties indicate that one has to be as malleable as metals in life and try to get adjusted in the society with harmony. Similarly, displacement reactions give a sense of competition. Healthy competition inspires students to do their best.



Theme – The World of the Living

The theme “**The World of the Living**” discusses about the living and non-living things; their characteristics, habitat, surroundings and the adaptations; the forms and functions of different plants and animals; life processes such as respiration, transportation, reproduction, reaching the age of adolescence etc. Some of the major values which can be inculcated among learners along with the content during the transaction of the theme ‘The World of the Living’ are as follows:

- Let us be sensitive and respectful towards plants, promote discussion about how plants and human beings are dependent on each other. Celebrating festivals based on plantation of trees and adopting plant will develop the sense of belongingness and kindness towards nature.
- Various parts of a plant play significant functions and work for the survival of the whole plant. Similarly, every individual is important and equally responsible to his/her roles and responsibilities when living in a cultured society. That is why, it is said that “alone we can do little and together we can do so much.”
- Soils provide anchorage for roots, hold water and nutrients. Soil plays a vital role in the Earth’s ecosystem. Pots and toys made up of soil in *haat* (bazar), develop respect amongst the children towards potters and it seeks interest among children to learn pottery. Also, teacher may discuss that the way soil particles bind together, similarly, human population should unite together to fight against all kinds of negativity and contribute to the overall development of a country.
- While discussing about various organs and their functions is a perfect example of team work. Breathing and respiration are two processes that occur simultaneously without any interruption. This indicates that division of labor makes any difficult task easy in efficient completion. In different environmental conditions i.e. aerobic and anaerobic respiration, cells follow different pathways to produce energy. Similarly, there can be various approaches to solve a problem. Encourage students to keep trying, until they succeed. Also, the primary function of kidneys, liver and urinary system is to expel toxins that result from body’s metabolism, similarly, one should follow good habits in life and keep away from bad habits.
- The blood circulation is an essential bodily function since it supplies the enough oxygen and nutrients to body’s vital organs to operate. Teacher may discuss about the risk of anemia in adolescent girls due to high growth spurt. They may be encouraged to have more of leafy vegetables, poultry, fish, whole grains, nuts, eggs etc.
- Reproduction in plants is a natural phenomenon to continue the survival of plants on this planet. Teacher may have discussion and promote afforestation. Let us not pluck flowers as they are the parts of plant to increase population of plants. Field trips to different farm locations may be organized so that students get the onsite demonstration of various agricultural techniques and practices. This will not only develop respect towards farmers but also promotes agriculture as a profession. Similarly, in the process of budding, a small bud grows on the body of the parent organism and when the time comes it detaches itself to form a new organism. Teacher may relate this with a bond parents have with their children and it is indeed important to take care of parents especially, when they are old. Teacher may have discussion about natural changes that occur in teenage boys and girls. Teacher may encourage students that sex discrimination should not be tolerated. Girls should be sensitized towards early marriage and motherhood.
- The discussion on skeletal system can be related with the importance of physical exercises such as yoga, sports etc., to maintain fitness, strength and alertness to reduce stress and anxiety; nurture self-confidence and self-belief.



- One of the ways, that humans cause the air pollution is by burning fossil fuels, which causes respiratory problems. Teacher should talk about air pollution and also have discussion on how smoking is injurious

Do not burn leaves! You will not be able to tolerate the fumes!



to health. Say NO to drugs, *gutkha*, tobacco, cigarettes, *bidis*, *hookah* etc. If by any chance or mistake, anyone has indulged in smoking or in any bad habit, he/she must seek help of his/her teacher or any elderly person of his/her family.

- *Paheli* says that while sneezing we should cover our nose and mouth and maintain a distance from infected persons. Children may relate this to the present COVID-19 situation. A person suffering from common cold when sneezes in open, fine droplets of moisture carrying thousands of viruses are spread in air. During breathing, the virus may enter the body of a healthy person.

We should keep a handkerchief on the nose and mouth while sneezing. It is better to keep a distance from infected persons.



Theme – Moving Things, People and Ideas

The theme “**Moving Things, People and Ideas**” discusses about motion; measurement of distance; motion and time; force and pressure; friction; sound etc. Along with the content given in this theme, one can inculcate values among learners. Some of the major values which can be inculcated through the theme ‘Moving Things, People and Ideas’ are as follows:

- While discussing about motion and measurement of distance, teacher may first develop skill of measurement among students and make them aware of the precautions one should follow during measurement. Students may also be asked to explore for various modes of transport of ancient times till date, this will help students to know that “necessity is the mother of invention”.
- The most important value to inculcate among students is about the value of time and to adopt the habit of punctuality. Teacher may motivate students by saying, “early to bed and early to rise, makes a person healthy, wealthy, and wise”.
- Relate motion with traffic rules. Make students aware that not to drive four-wheeler or two-wheeler except bicycle till you attain 18 years of age. Once you start driving vehicle in your life, always follow traffic rules. Short distances should be covered by walking or using bicycle. This habit will not only keep you fit and healthy but also protect the environment. Traffic rules need to be discussed thoroughly to make students understand that the rules are designed for our safety.
- The forces such as, gravity, friction etc., are important concepts to learn. Friction teaches us to handle small and big challenges in life with courage. Gravitational force, a force of attraction teaches us that one should always be grounded, without any ego and hate towards others.
- While dealing with graphs, teacher may encourage students to draw graphs of their strengths and weaknesses, good habits and bad habits etc. Teacher may appreciate their strengths and good habits. Motivate them to work more on their weaknesses and try to replace bad habits with good ones. This will ultimately make them successful in life and good citizens of a country.

Theme – How Things Work

The theme “**How Things Work**” discusses about electric current and its effects; fun with magnets etc. Along with the content given in this theme, one can inculcate various values among learners. Some of the major values which can be inculcated among learners during the transaction of theme ‘How Things Work’ are as follows:

- While discussing about the concepts of electricity, teacher may have discussion in the class about the importance of ISI mark on electrical devices. Always switch off and unplug electric devices after use to save electricity. Sustainable use of energy should be promoted.
- Teacher may also aware students to be cautious near electricity poles. Advise them not to touch electric poles with bare and wet hands or feet. Always wear rubber gloves and proper footwear while handling electrical equipment.
- Magnets attract iron articles; teacher can motivate students to relate properties of magnet with persons having positive attitude and values in life, which should always attract us. Like poles of the magnet, male member of the family may have respect for female members of the family and vice-versa. Always have strong bond and respect with family and friends

You should never attempt to experiment with the electric wires and sockets.



Theme: Natural Phenomena

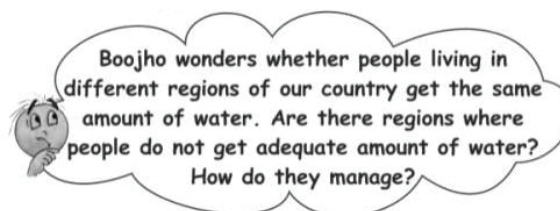
The theme “**Natural Phenomena**” discusses about light and lightning; rain and thunder; shadows; reflections; earthquakes; sound etc. Along with the content given in this theme, one can inculcate various values among learners. Some of the major values which can be inculcated among learners during the transaction of concepts discussed in the theme ‘Natural Phenomena’ are as follows:

- Nearly, everything we seen around us are due to reflected light. Basically, the role of the eye is to convert light into electrical signals that the brain converts into images of our surroundings. Teacher may discuss about the importance of sight and vision. Discussion may be held about the importance of eye donation, which may help visually impaired persons to see the beautiful world. Teacher must encourage students about regular eye examination because correct vision can improve the quality of day-to-day life.
- The luminous objects are visible as they emit light on their own and they also make the non-luminous objects visible. Teacher can highlight that students with good behavior and habits are like luminous objects.
- During discussion on transparent, translucent and opaque; teacher may relate the term transparency; through which light passes, that one should always be transparent in his/her behavior, thoughts and relationship.
- Reflection is one of the important concepts. Reflection is the change in direction of a wave front at an interface between two different media so that the wave front returns into the medium from which it originated. Therefore, reflection of light can be taken as – ‘what you do will come back to you’. Let us respect others to gain respect them.
- While discussing about sound, it is also important to discuss about noise pollution. Researches have shown that humans and animals when exposed to excessive noise may cause a range of health problems.

It is very important that teacher may discuss to follow the limits of noise levels, one should control noise level near sensitive areas such as hospitals, educational institutes etc. Students may be motivated to spread awareness about noise pollution and its effects on human & the environment by exhibiting role plays in community.

Theme: Natural Resources

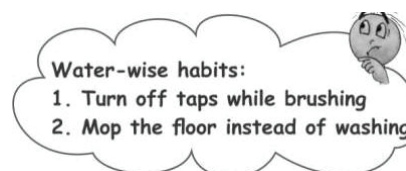
The theme “**Natural Resources**” discusses about water, air, waste materials, pollution etc. Along with the content given in this theme, one can inculcate various values among learners. Some of the major values which can be inculcated among learners during the transaction of concepts discussed in the theme ‘Natural Resources’ are as follows:



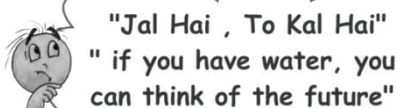
- Water is one of the most important substances for all the living organisms. Water is necessary not only for drinking but also for our day-to-day activities. One cannot imagine life without water. During discussion, teacher may discuss about judicious use of water and sensitize students that there are people in our country who fetch water from far off places. Have discussion in the class that ‘Every Drop Counts.’



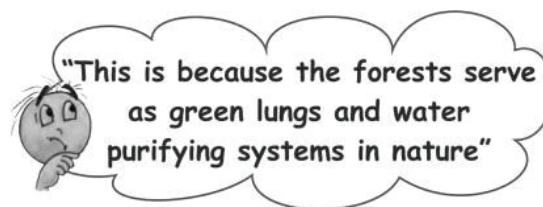
- Teacher may use rain water harvesting as an educational tool to get students realise that rainwater harvesting can fulfil demand during summers. Motivate them to start conserving water in their communities/ schools/homes.
- Rainwater is not only a perfect source of water for many uses and situations, but can also be a great backup water supply for emergency situations particularly in desert areas. Discussions, quizzes, role plays, painting competition etc., may be held in schools to celebrate World Water Day, Earth Day, Environmental Day etc. so that students can understand about access to safe water, environmental protection etc. and can express their creativity and thinking towards these important days. Students’ creativity may be displayed on notice board or showcase during parent teacher meet or exhibitions.



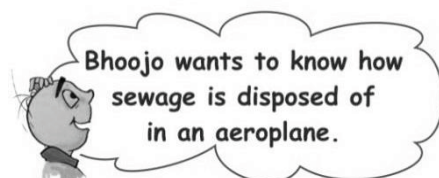
- Motivate students to avoid the area to be cemented to support the recharging of groundwater. While interviewing the farmer, educate them for maintaining *bawris* (pull of water/well) and follow drip irrigation method to save water. Group projects regarding environment management such as reviving of dead lakes, ponds, wells etc., may be assigned to students to have belongingness towards ‘Mother Earth.’ Discussion about collection of stagnant water anywhere in the surroundings may be prevented, which can become a breeding ground for the mosquitoes that transmit various diseases.



- Always discuss with students that breathing pure air is as important as drinking clean water. Debates may be held about the importance of planting more of plants to maintain the oxygen and carbon dioxide level in the atmosphere. Students may be sensitized about the minimal use of CFC based equipments, devices, vehicles etc. that deplete the ozone layer. One should promote use of Liquefied Petroleum Gas (LPG) and Compressed Natural Gas (CNG) as they burn cleaner. Students may be advised to promote the use of renewable resources of energy such as, windmill, solar panels, etc.

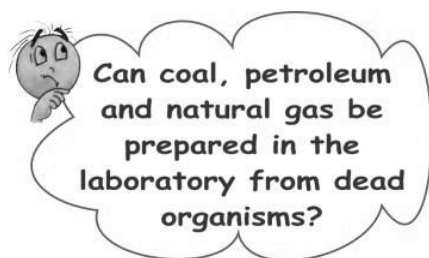


- While discussing about waste management, it is important to talk about the proper disposal of waste, which helps in improving the air and water quality. Debate with students about how to manage waste which is a huge problem. Discussion about global warming can be held which is considered to be



a serious threat around the world. It leads to floods, droughts, etc. Encourage students to know about organic farming, which involves the cultivation of plants and rearing of animals in natural ways. Motivate students to follow vermicomposting in school gardens and avoid synthetic fertilizers to maintain soil fertility.

- Coal and petroleum, which are exhaustible resources, need to be used judiciously. Petroleum Conservation Research Association (PCRA) advocates various activities to follow them, not only to save fossil fuels, but also causes global warming. One can reduce emission by shifting to alternative technologies by choosing



public transport over personal vehicles. If possible, opt for CNG based cars and buses. Various ways may be adopted in schools and homes by students to reduce carbon foot print. Burning of fuel leads to produce harmful products. Discussion about burning of dry leaves in open, use of burning wood/ coal (*angeethi*) in closed room in winters need to be discouraged and make children aware about their harmful effects.

- Use of plastic should be discouraged as these are non-biodegradable materials. It causes environment pollution. Students may be encouraged to promote best practices by not discarding plastic bags on roads and in water bodies; which put animals' life in danger by choking their digestive and respiratory systems. Schools should motivate children to use cloth bags, perform role plays/ road shows in the community to make people aware about Reuse, Reduce, Recycle, Refuse, Replace materials.



- It is extremely important for students to be aware about various disasters such as, fire disaster, earthquake, landslides, tsunami, COVID-19 etc. They should be aware about their mitigation. This will help them in saving their own life and others. Students should also be aware of fire service helpline numbers, mock drills of fire safety, use of fire extinguishers; all these are well addressed in textbooks. Similarly, while

discussing about normal human body temperature and use of clinical thermometer, it becomes more important to know about its usage particularly in the period of COVID-19 pandemic. Maintenance of social distancing, importance of hand washing, use of mask etc., are equally important to know and follow.

Key Words, What You Have Learnt, Exercises and Extended Learning - Activities and Projects

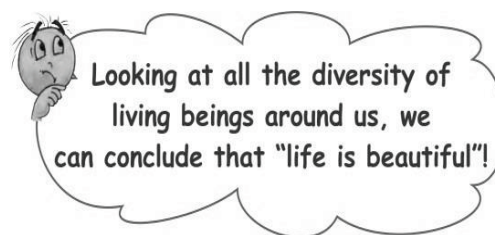
For all the chapters' summary, exercises and suggested activities and projects have been given. Summary gives learners a condensed version of the material they have studied. From summary, students can easily recapitulate the important points of the chapter. Learners can self-evaluate by answering questions given in the exercises, as it is an important part of learning. **Suggested projects and activities promote the development of scientific thinking among students and discourage rote learning.** Students acquire new ways of asking questions and can understand the world around them better. Keywords given in each chapter will highlight the important focal points of the chapter.

From the above examples, one can easily spot many obvious and hidden values given in the textbooks of science at upper primary stage. These can easily be inculcated among students during transaction of concepts. **The only need is that teachers and school system have to understand these hidden values and find various strategies to inculcate them among students during teaching-learning process.** Many activities/ experiments/ projects/ group work/ creative writing etc., have been given in the chapters of the textbooks. These train learners to think critically and creatively and make them more observant and more analytical. Performing these tasks in groups enhances communication skills, discourages gender bias and promotes equal participation of all the learners. Art-integrated learning may be promoted by motivating learners to write poems, songs, stories, draw diagrams, design and develop toys and games etc., on various concepts discussed in the textbooks. This may also help in the identification of hidden talents among students.

Conclusion

Science at upper primary stage is usually taught within the cognitive level of students. Care must be taken by teachers to focus equally on all three domains of learning. One can easily conclude that while teaching science at upper primary stage, the social and moral values can receive increased attention through textbooks and classroom discussions. **If teachers are well trained, these values can be easily inculcated among students while involving them in the process of science.** Along with teachers, **parents also play an important role in shaping the future of their children.** One of the best ways to develop good habits among their children is by setting up good examples.

Therefore, right values and good habits can be incorporated through the existing curriculum of science. Values can be incubated through storytelling, integrating art with science, discussions, celebrating national and local festivals, social service camps etc.



Dealing with values and moral issues are one of the important and integral part of teacher's role. The ultimate message is, schools may bring forth a progressive society that is free of superstitions and promote tolerance among students for differing thoughts and ideas.

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