
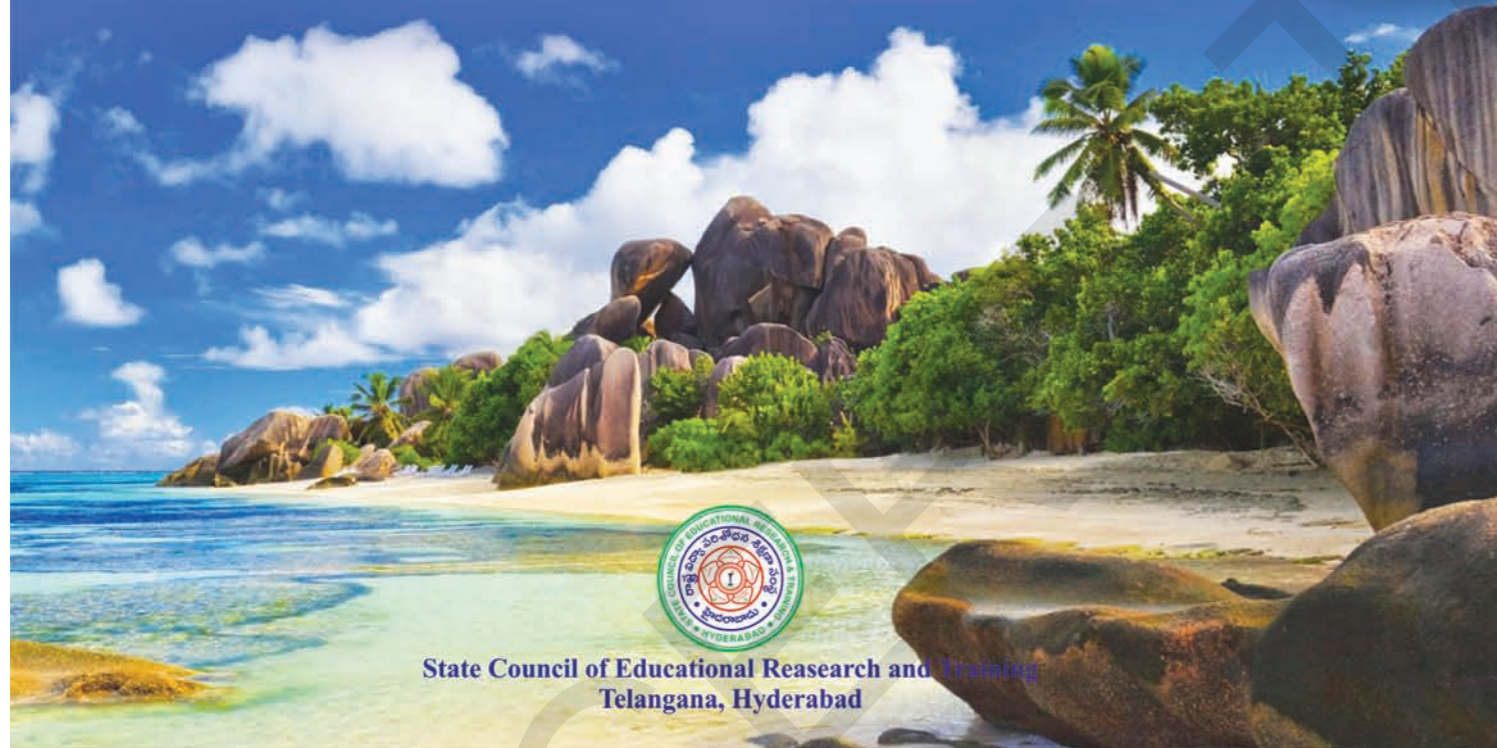


*The forest is a peculiar organism of unlimited kindness and benevolence that makes no demands for its sustenance and extends generously the products of its life and activity; it affords protection to all beings...*

*..... Gautama Buddha*



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# ENVIRONMENTAL EDUCATION

**CLASS 10**



Published by  
The Government of Telangana  
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I feel teaching science is not merely teaching about atomic structure , preparation of oxygen and magnetic lines of force but also to teaching to think scientifically, beyond superstitions and to search for the solutions of problems. If a child learns about water resources, it must know the technology and principles, theories involved in digging a well, a bore well construction of a dam along with the human resources expended and the value of the sweat spilled during those constructions. Only then it develops the attitude of not wasting a drop of water. Children should realise that the food in his plate is the result of hard work and efforts of many. They should respect these efforts and understand the dignity of labour. When science is taught in this way in our class rooms, it becomes the most wonderful tool to provide social justice.

- Giju Bhai Bhageka.





ప్రకృతి నేర్పే పాఠాల కోసం సిద్ధం కావాలి

**ప్రకృతి మిత్ర - ఎన్.జి.సి**



National Green Corps

# ప్రకృతి శిబిరాలు

- అనుభవం నేర్పే పాఠాలు

---

అనుభవం నేర్పే పాఠాలు ఎంతో గొప్పవి. పదిలపరచుకోగల గొప్ప జ్ఞాన మార్గమే అనుభవం అంటాడు ఐన్స్టీన్

ఇది గొప్ప అవకాశం ...పిల్లలకి టీచర్లకి  
.....కలిసి మెలిసి నేర్చుకోడానికి ఆలోచనలు పంచుకోడానికి  
.....ప్రకృతిని ప్రత్యక్షంగా అనుభవించడానికి

చెట్ల నాట్యంలో, మేఘాల పరుగులో, సెలయేటి నడకలో,  
సూర్యకిరణాల తళతళలో, పిట్టల కిలకిలరావాల్లో,  
లేగదూడ గెంతుల్లో, చందిపాప నవ్వుల్లో, కురిసే వాన జల్లులో,  
రాలే నక్షత్రాల్లో, నీళ్ళలో గెంతే చేపల్లో, వాన చినుకుకి పరిమళించే మట్టిలో,  
పాముల బుసలోని గుసగుసల్లో, ఎగిసిపడే సముద్రపు అలలలో,  
నిర్మలంగా ఆగిన చెరువు నీళ్ళలో, మొలకెత్తే గింజల్లో,  
పూసే పూవుల్లో, కాసే కాయల్లో, పండే పండ్లలో,  
ప్రకృతి స్వరూపంలేని స్వభావంతట్టని ప్రదేశం లేదు.

ఆస్వాదించే మనస్సు ఉంటే ఎప్పుడయినా ఎక్కడైనా అనంత విశ్వంలో  
అన్ని కోణాలు అద్భుతంగా కనిపిస్తూనే ఉంటాయి.  
కళ్లు తెరిచి మనస్సు నిలిపి ప్రయత్నిద్దాం.





# ENVIRONMENTAL EDUCATION

## CLASS - 10

### Text Book Development Committee

**Sri G. Gopal Reddy**, Director,  
S.C.E.R.T., Hyderabad.

**Sri B. Sudhakar**, Director,  
Govt. Textbook Press, Hyderabad.

**Dr. Nannuru Upendar Reddy**,  
Professor & Head C&T Dept.,  
S.C.E.R.T., Hyderabad.

### Editors

**Dr. W.G. Prasanna Kumar**, Director, Green corps., Hyderabad.

**Dr. Nannuru Upendar Reddy**, Professor & Head C&T Dept., S.C.E.R.T., Hyderabad

**Sri S. Vinayak**, Co-ordinator, C&T Dept., S.C.E.R.T., Hyderabad.

### Co-ordinator

**Dr. T.V.S. Ramesh**, Co-ordinator, C&T Dept., S.C.E.R.T., Hyderabad.

### Writers

**Dr. T.V.S. Ramesh**, Co-ordinator, C&T Dept., S.C.E.R.T., Hyderabad.

**Sri V. Raghava Rao**, Lecturar, APRJC, Sarvail, Nalgonda (Dt)

**Smt K. Uma Rani**, SA, GHS Ameerpet-1, Jawaharnagar, Hyderabad.

**Smt A. Vanaja**, SA, ZPHS Chandupatla, Nalgonda (Dt)

**Smt P. Parameshwari**, SA, ZPHS Takkallapalli, Nalgonda (Dt)

**Sri B. Jayaraj**, SA, ZPHS, Choutuppal, Nalgonda(Dt)

### Cover page, Graphics & Designing

**Sri K. Sudhakara Chary**, SGT, UPS Neelikurthy, Maripeda, Warangal.

**Sri Kishan Thatoju**, Graphic Designer, Siddipet, Medak.



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*First Published 2014*

*New Impression 2015, 2016, 2018, 2019, 2020, 2021*

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Title Page 200 G.S.M. White Art Card

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*Printed in India*  
at the Telangana Govt. Text Book Press,  
Mint Compound, Hyderabad,  
Telangana.

## Foreward.....

Many rules...! Many more successions...? countless interdependencies...! innumerable accumulations of life...! Disclosure of multiple varieties as we dive in. Nature is the most wonderful manifestation of creativity. The most innovative creator has principled it to be a miracle. new terms / words must be coined to describe nature , Charles Darwin spell bound in his book “Origin of Species”. It is true! countless species of plants and innumerable species of animals found everywhere adds an enchanting element to the nature. Life is found in ocean depths, snow peaks, sandy deserts and where not! Perhaps only the earth exhibits such a vast variety of life in the universe.

Nature is stable yet dynamic, varied but interdependent. Home of all organisms. Each organism has its own habitat, its own food chain. They are knit together but they maintain their identity. They follow rules not to intrude others paths. A tree is a common habitat for an ant a snake a worm and a bird. Nature provides shelter in the form of forests, mountains hills and lakes. Organisms live there abided by rules. Wonderful lessons are taught by each and every creature living in nature, provided we are patient enough and recipient to them. Let’s give this a thinking! A serious thinking in fact?

What are we a negligible part of millions of species, doing when compared to the other organisms? Misusing the boons of nature, wasting natural resources and becoming greedy robbers of nature. No other organism has this credit of destroying mother nature except we, the human beings. Nothing human. We claim to relish the beauty of greenwoods but we manage to cut them down in the name of development. We are fond of giving lectures at every possible opportunity about water being the life giver life saver etc., but we never bother to stop a leaking tap. What an irony! We plunder minerals, we multiply factories polluting the environment in all the ways we can. We face the result in the form of contaminated air and infected food. We are inviting the disaster by piercing the Ozone layer that safeguards the earth. Just think! what are we aiming at?

Do we want earth to be turned into ashes? or is it that we want the next generations to inherit hunger, thirst and screams of helplessness?

No! Absolutely not! It is high time to know our mistakes! Let’s realise them! Let’s be grateful to the environment! Let’s be wise in sustaining the development! What is the fun if the development, costs us our life! We can no more do that! We shall save the beautiful and fertile mother earth not for the sake of earth but for us to live on it.

‘Environmental Education’ the book in your hand lets you know about the do’s and don’ts hence forth. Values cannot be taught, they have to be caught. Caught while acting. Therefore many activities are imparted in this book. Do them with the help of your teacher. Share your Ideas thoughts with all. Hope you’ll inculcate eco friendly behaviour.

**Director**  
**State Council of Educational Research and Training**  
**Hyderabad.**

## **What we do, whom to do**

To reach the goals of environmental education which was implemented as a school subject in our school, teachers and students should implement, it with personal responsibility, ownness and by adding some other concepts and strategies.

### **For teachers...**

- To act as a responsible citizen towards environment concepts discussed in the syllabus are all treated as environmental education.
- Topics are identified based on different themes – food, health, agriculture, industries, natural resources, natural world.
- Before starting every chapter teacher would discuss about the topic with students. So there is a need for teacher to collect some other source material. Activity performance is totally based on these discussions only.
- Collection of data, interview, field trips, projects etc. Strategies are useful to conduct activities.
- Make your students to talk about their observations and presentations. Teacher should add some more questions along with text book, for value discussions.
- The topics in environmental education is not like other subject areas, so don't relate this with exams, slip tests, marks etc. Presentation may be in a free and joyful environment. You should award marks or grades to the students, based on your observation.
- Based on resources, local conditions teacher have freedom to select topics in the book. There is no compulsion to follow only the order mentioned in text book.

### **For students...**

- Relate these items to your local environment and conduct activities.
- Participate in pre and post discussion of every activity and express your feelings and possible solutions.
- Perform activities in groups. Collect whatever information necessary and prepare required reports on them.
- Conduct school level seminars, symposiums, prepare slogans related to environmental awareness every day in school assembly and display it on bulletin board.
- Collect different news items on environmental awareness from news papers, magazines and display them on wall magazine.
- Ask your head master to pay subscriptions for Down to Earth, My school, Readers digest Chekumuki, Prerana and other science magazines.
- Prepare your own activities and implement at your school or village.
- Conduct environmental awareness programmes at factories, fields, slum areas etc.
- Tomorrow is yours only, you are the future nations wealth. You are the responsible persons than your teachers to implement this book. So dear students think scientifically, behave ecofriendly.

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## OUR NATIONAL ANTHEM

- Rabindranath Tagore



*Jana gana mana adhinayaka Jaya he  
Bharatha bhagya vidhata!  
Punjab Sindh Gujaratha Maratha,  
Dravida Utkala Banga!*

*Vindhya Himachala Jamuna Ganga,  
Uchchala Jaladhi taranga!  
Tava shubha name jage!  
Tava shubha asisha mage!  
Gahe tava jaya gatha!*

*Jana gana mangala dayaka jaya he!  
Bharatha bhagya vidhatha!  
Jaya he! jaya he! jaya he!  
Jaya jaya jaya jaya he!*

## PLEDGE

- Pydimarri Venkata Subba Rao

“India is my country; all Indians are my brothers and sisters.  
I love my country, and I am proud of its rich and varied heritage.

I shall always strive to be worthy of it.

I shall give my parents, teachers and all elders respect,  
and treat everyone with courtesy. I shall be kind to animals.

To my country and my people, I pledge my devotion.

In their well-being and prosperity alone lies my happiness.”



## Item-1

# Global warming

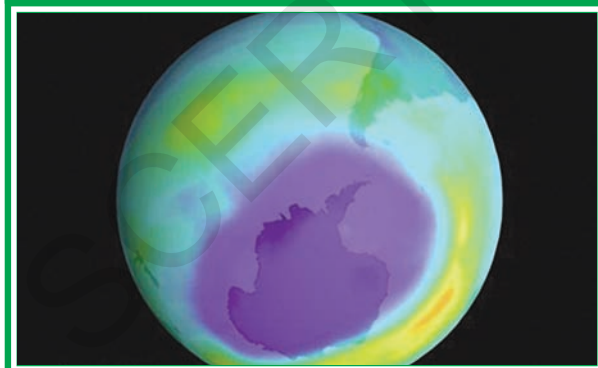
## Objective

1. To investigate the impact of greenhouse effect through simulation.
2. To search methods to reduce global warming.



## Background

Carbondioxide, Nitrogen dioxide, Chloro fluoro carbons, Hydro carbons, Methane are called Earth heating gasses (Greenhouse gasses). Greenhouse gases trap radiation and prevent heat from leaving the earth's surface. In this process they help to maintain the temperature of the earth. Excess presence of these gases in the atmosphere causes, excess global warming.



## Methodology

1. Take two identical glasses of the same material. Put equal quantity of water in them (half filled).
2. Note the temperature of water of both the glasses using a thermometer.
3. Place both the glasses out in open space so that sunlight directly falls on them.
4. Invert a glass bowl or a jar over one glass such that it is covered completely.
5. Atleast after two hours, note the temperature of water in both the glasses.
6. Note the difference in temperature of the two samples. Note which one is hotter.

7. Repeat the experiment with equal amount of ice in the two glasses instead of water. Note the time taken by ice to melt completely.
9. Try to find out the reasons for difference in the temperature of water and the time taken for melting of ice. ‘

### Conclusion

Factories, chemical industries are primary responsible factors for global warming. Different human activities are also responsible for it.

The Chloro Fluoro carbons which are used in air condition are refrigerators, are released into the atmosphere. Burning of house hold wastes, plastic materials are also responsible for global warming.

The reduction of green house gases like  $\text{CO}_2$ , CO is in our hands. For example reducing use of incandescent bulbs. Usage of refrigerators for limited period when actually it is required; instead of burning house hold wastes, they can be converted into manure by using earth worms (vermy compost). By thinking in these lines we can reduce global warming. This is our responsibility.

Relate your observations on global warming.

### Follow-up

1. Observe the temperature of the interior of two similar cars parked in the sun, one with its window glasses completely rolled up and the other with window glasses rolled down. Take the temperatures again after two hours.
2. Collect news items relating to global warming and its impact appearing in newspapers and magazines.
3. What are the harmful effects of global warming? What activities you are going to follow to reduce these effects at your school, house, village level?



## Item-2

### Saviours of our environment

#### Objective

To be acquainted with the work of an environmentalist or an environment movement, that has an impact on policy decision or course of development.



#### Background

Environmentalism is a concern for the preservation, restoration and improvement of the natural and social environment. It includes conservation of natural resources, prevention of pollution and sustainable use of land. As responsible citizens of the country one must assess all the actions, which will have a direct or indirect impact on the environment. Introspection and laying down standards for ourselves are also necessary if we wish to have a healthy environment. Youth has the power to influence adults and peers to a great extent.



#### Methodology

1. Make a list of five environmentalists working in different areas, regions or parts of the country. Also list five powerful environmental movements.
2. Select either an environmentalist or a movement for your study.
3. Find out the focus of the work of the environmentalists and the environmental movements.
4. Collect the following information

about the environmentalist and environmental movements 1. Period 2. Issues 3. Mode of organisation or participation 4. Challenges 5. Executive and judicial interventions 6. Successes 7. Failures and impact.

5. List the contributions they have made towards creating awareness and improving the environment.

### Conclusion

What is environmental movement? What can we do to save environment? Do we need elaborate machinery for this movement?

Saving a tree from cutting, giving medical assistance to a suffering dog or a bird, preventing waste materials from entering a fresh water pond or pool, etc., also are part of environmental movement. Growing of trees in the school compound, keeping the surroundings of tap neat and clean, reducing usage of plastic can also be taken up as a part of environmental movement.

Based on your findings, prepare a report suggesting how students can make a significant contribution in making people aware of environmental concerns. Include the suggestions of your classmates to your report.

### Follow-up

1. Display the information that you have gathered on the school display board.
2. Make arrangement to show documentary films on environment in your school.
3. Arrange Eco friendly programmes in your school. List out it's results.
4. Collect information about environmentalists and environment movements. Fill in the table given below.

S.No	Environmentalist	Environment movement	Issue



### Item-3

## Estimation of particulate pollutants in air

### Objective

1. To be aware of the fact that particulate matters are one of the pollutants of air.
2. Let us learn How and Where large amounts of aerosols get entry into the air.



### Background

Solid particles and liquid droplets present in air are called particulate matter. Their presence in air beyond a certain limit is one of the causes of air pollution. Dust particles, like pollen grains, dust in the smoke and vehicular exhaust, fly ash, coal dust, cement and mist are some of the examples of particulate matter in air. Higher concentration of particulate matter in air prevents solar radiations from reaching the earth's surface. At the same time they also prevent heat to escape from the earth's surface. The net effect of these two phenomena is one of the causes of global warming. They absorb light and reduce visibility, and cause various respiratory diseases.

### Methodology

1. Take six similar clean glass plates/slides. Mark them with numbers from one to six with a marker pen. The number should be written in a laterally reversed manner so that you can easily read it from the other side. Alternately, you can write the numbers on paper and paste them on slides.

- Coat the other side of each slide with petroleum jelly.
- Place the slides with coated side up at different places of your house, such as in open space (at the terrace), on the window sill, in different rooms, inside a table drawer, in the garden. Note the serial number of the slide kept at each site.
- After one week, remove all the slides and place them on a sheet of white paper with coated side up.
- Observe the slides with a magnifying glass or with a microscope to estimate the amount of particulate matter deposited.
- Note down your observation in the form of a table given below.

Slide No.	Location of the slide	Estimated deposition of particulates
1.	Terrace	Thickly deposited
2.	Window sill	
3.	Bedroom	
4.	Kitchen	
5.	Inside a drawer	

### Conclusion

What are your options to keep the mosquitoes away? What material you use to keep the room with fresh smell? What chemical do you prefer to keep away your body odour? Can you answer all these questions in one word. yes It is 'spray'.

Do you know that all the sprays are potential air pollutants? The fine particles of the these sprays enter into the air cause harm to the atmosphere. In small scale industries where the protective measures are not adequate the wastes released by them are polluting the atmosphere. They are causing health problems. Draw a conclusion on the basis of your observation. Did all the slides gather equal amount of particulate matter? Discuss with your teacher / neighbour, the possible sources of particulate matter at your location. Prepare a report of your findings.

### Follow-up

- Repeat this activity in different seasons. You may also perform it in your school/market/factory /busy roads.
- Collect information about different aerosols that enter into the air in your locality. What are the main aerosols in them?

## Item-4

# Vaccination - A shield

## Objective

1. To find out different diseases against which vaccination is done.
2. To make people aware about the importance of vaccination.

## Background

Vaccination is done to protect ourselves from diseases, such as diphtheria, whooping cough, tetanus, cholera, hepatitis, polio, etc. Today the vaccination drive against polio is very intense. There is an international campaign to eradicate polio from the world just as was the case with small pox. India is one of the few countries where polio is still prevalent due to lack of awareness, sheer negligence and bias. It is important that we spread awareness about the importance of vaccination.



## Methodology

1. Find out the diseases against which vaccination is possible.
2. Interview at least twenty families in your neighbourhood, including domestic helps and people engaged in small trades and services like selling vegetables and food items, tailors, hair dressers and find out:
  - (a) Whether they are aware of the importance of various types of vaccinations?



- (b) From where they can have it done free of cost.
- (c) Whether their children are vaccinated. If so, against which diseases?
- (d) If their children are not vaccinated, why?
- (e) Enter collected data in the following table ?

Family No	Children are vaccinated(Y/N)	For which diseases	If not, give reasons

1. Percentage of families with non vaccinated children =  $\frac{\text{No. of families with non vaccinated children}}{\text{Total No. of families} \times 100}$
2. Find out reasons why many families children are non vaccinated.

### Conclusion

We must see that vaccination against diseases must be given. We must develop awareness about the importance of vaccination among the parents in our locality. See that the surroundings must be maintained clean. Let us try to highlight the aspect of cleaning hands before eating, drinking boiled water by giving pamphlets.

Prepare a report indicating the percentage of people who have not got their children vaccinated.

### Follow-up

Spread awareness about the importance of vaccination in your locality. Encourage people to make sure that their children are vaccinated at the appropriate time with proper follow up wherever necessary.





## Mosquitoes - woes

### Objective

1. To be awareness about the diseases spread by mosquitoes.
2. To find preventive measures for such diseases.



### Background

It is commonly observed that as monsoon sets in people suffer from many diseases caused by mosquito bites. Some of such diseases like malaria, dengue, chikungunya, etc. are more common in specific periods of the year, such as the rainy season, etc.

### Methodology

1. Visit a medical doctor, or consult a health worker, or refer to books or search the internet to learn about the types of diseases caused by mosquito bites. Also ask about the microorganisms that cause these diseases.
2. Find out the names of different kinds of mosquitoes that cause each of the diseases. Also collect pictures, drawings, photographs of different kinds of mosquitoes.
3. Find out the breeding grounds of mosquitoes (for example, stagnant water).
4. Look around your house/locality and see if there are any breeding places for mosquitoes.



5. Find out what measures you should take to protect yourself from these diseases.

### Conclusion

Mosquito repellents have become part of our monthly purchases groceries like rice, dhal, etc. According to WHO report people are spending more money on the diseases that are transmitted by mosquitoes. Though we are using many chemicals like repellents, coils, aerosols, body creams from mosquito bites. They are not completely protecting us from mosquitoes. Stagnant water is a ground for breeding mosquito population. We should spray kerosine on stagnant water to kill mosquito larvar. So water should not be allowed to stagnate in our surroundings.

Prepare a report based on the information collected by you.

### Follow-up

1. Prepare a five minutes speech or a presentation about the information that you have collected and present it in your class.
2. Prepare a slogan about diseases spread by mosquitoes and their preventive measures, and display it in the entrance of your building or school.
4. Make a scrapbook of clippings about malaria and dengue from newspapers.
5. Prepare a chart showing the symptoms of diseases spread by mosquitoes.
6. Observe the conditions for breedig mosquitoes in your house or school surroundings.  
What is your plan to perevent it?
7. Collect information for the following table

S.No	Mosquito	Disease	Carrier	Symptoms
1				
2				
3				
4				
5				

## Item-6

### Fossil fuels

#### Objective

1. To be sensitised about the judicious use of energy from fossil fuels.
2. To think and suggest ways of conserving fossil fuels.



#### Background

Fossil fuels are one of the basic sources of energy for all our activities and are exhaustible. For example, coal, kerosene, and LPG are sources of energy for cooking, heating, burning in our households. Petrol and diesel are used for transport and in industry and are also derived from fossil fuels. A large fraction of electricity is produced by burning of coal. Fuel wood, though renewable, is fast depleting due to excessive use. By judicious use of these resources one can conserve fossil fuels and reduce the cost of living.

#### Methodology

1. Visit at least 10 houses in your neighbourhood and find out the types of fuel used for cooking, heating and boiling of food and water.
2. Also find out the type and condition of the *chulha* (cooking stove), burner, oven, etc. used for the purpose.
3. Find out the average consumption per month in terms of money.



4. Find out the sources of leakage or wastage of energy. if any. Ex Burning stove for lone time
5. Collect information from families and record your observations.

Fuel	Family Members	Usage (Y/N)	Usage per day	Usage per Month	Usage per individual
1. Electricity					
2. Kerosine					
3. Coal					
4. LPG					
5. Petrol					
6. Diesel					
7. Others					

6. Discuss with members of families as to how consumption of fuels can be reduced.

## Conclusion

### Ways for saving house hold gas (LPG):

- Put on the stove only after arranging all the things which are necessary for cooking otherwise gas weight of 135 gms cost Rs. 2.11 would be wasted.
- By using pressure cookers 20% gas on rice and 41.5% on meat would be saved when compared to other cooking means.
- Water is essential for cooking. The more water we use for cooking the more fuel is consumed is. For this 65% of more fuel is required. If we filter excess water during cooking we may lose its nutrients also.
- We must reduce the flame as soon as the boiling process starts in a pressure cooker. This process saves nearly 35% of fuel.
- Soaking food material before cooking saves 22% of fuel.
- When broad and low depth Vessels are used for cooking, flame spreads over the bottom portion of the vessel, so completely and food material is cooked in small time. If we use less bottom vessels fuel will be wasted.
- Lid is compulsory on the cooking vessel, otherwise it takes more time to cook. Which leads to wastage of fuel around 7.25 grams of gas per hour.

- It's better to use small burner than bigger one which helps in low consumption of the fuel. Small burner helps in saving 6.5% fuel than big burner.
- Some undissolved minerals get deposited in the form of layers in the cooker. 1 mm thickness of this layer may require extra 10% of fuel. So pressure cooker must be cleaned as and when used.
- Milk or any other thing taken out from refrigerator should not be heated immediately after taking out from refrigerator which needs more fuel. It's better if we heat it after it comes to room temperature.
- Heating the food again and again can be avoided if all the family members take food at a time. It also helps in saving fuel and develop love and affection, among family members
- Prepare a report on effective utilisation of fossil fuels.

### Follow-up

1. Suggest steps to reduce the consumption of electricity or other fuels in your school (specially where mid-day meal is prepared in the school).
2. Encourage people to use solar water heater and solar cooker.



There is a finite amount of fossil fuel found on earth. In terms of years of production left. Oil reserves last for 45 years, Gas reserves last for 72 years, Coal reserves last for 252 years. This means supply of nonrenewable fossil fuels is very limited.

## Changes in surroundings and their effect

### Objective

To learn about the changes taking place in the physical environment / landscape and their effect.



### Background

Everyday we hear about the changes taking place in our environment. This may not be very obvious to us if we compare two consecutive years since in most cases environmental changes take place slowly. But we can understand it better by comparing the environment a few decades ago and with the present scenario.

### Methodology

1. Observe your surroundings and notice if any change is taking place or has taken place during the last five years or so. For example, construction of houses, buildings, etc., widening of roads, filling of ponds, reduction in - agricultural land, felling/plantation of trees, electrification, irrigation facilities, etc.
2. Collect information from your parents, grandparents and elders in the locality to find out the changes which have taken place over the years.
3. Also find out how these changes have affected availability of water, playgrounds, electricity, fuel, fodder, hygiene and sanitation, transport and communication, crop production



(including fruits and vegetables) or any other.

4. Collect articles, photographs, news items from local newspapers on changes in the locality and the life of the people.

### Conclusion

Who are more environmental friendly? The modern man or our ancestors?

The modern TV has replaced the Radio, the mobile occupied the place of landline. The new cement and black top roads are laid on old metal roads. All the new ones are non environmental friendly and are showing their effect on our health. Development is necessary but it should be environmental friendly. We are affected by radiation, if we work hours together on computers and use cell phones. The people living in the houses where cell towers are mounted are carrying radiation on their roof tops. So we must be careful while using such modern equipment.

Prepare a report on the basis of your findings.

### Follow-up

1. Prepare charts of the gradual changes taking place in your surroundings and display them in your school bulletin board.
2. Find out the effects of developmental activities taking place in your locality on the environment.
3. Is it correct to cement the ground in our house surroundings, constructing wall to wall cement roads? What are the impacts of this kind of activities?

Over 1,00,000 people will have to be relocated due to the Sardar Sarovar Dam and about 1,70,000 people due to the Narmada Sagar Dam project.



## Item-8

### Use solar energy - Save electricity

#### Objective

Know about various benefits by using solar energy.

Collect information about various appliances run by solar energy.

#### Background

Solar energy is the best and evergreen energy resource. It is a never reduced and always available resource. Solar energy is a good substitute for our conventional energy resources. This kind of energy is widely utilised throughout world in agricultural fields, and domestic purposes, offices vehicles and industries. Gujrat stands in first place in our country in utilizing solar energy. Karnataka and Tamilnadu stand in 2nd and 3rd places respectively. In our state solar energy utilization is at preliminary state only. So it is very important to know about solar appliances and different ways of its utilization.



#### Methodology

1. Collect information, photographs about solar energy and solar appliances from your school library, magazines, internet and from families who are using solar energy.
2. Observe differences between solar appliances and electrical appliances.



## Conclusion

We can do the following activities in our house

1. Paint the walls of your home with a light colour, Dark colours tend to absorb light, requiring you to use more energy from light bulbs to achieve the same effect.
2. Allow hot foods to cool before putting them in the refrigerator.
3. Replacing a single incandescent bulb with an energy efficient compact (LED) bulb, they are energy efficient and generate little heat.
4. For the best energy savings buy energy star qualified products.
5. Don't keep the refrigerator door open longer than you need.
6. Reduce the temperature on the hot water heater / Geyser.
7. Plant shade giving trees, outside a window, that shields, your house and helps, in saving power.
8. Always turn the lights off when leaving a room.
9. Solar water heaters can help saving on water heating costs by reducing the amount of gas and electricity needed to heat water and are pollution free.
10. Fit fan regulators to control the fan speed.
11. Conserve energy by replacing any 100 watts in candescent light bulb with this 23 watts LED Bulb that emits the same amount of light and has an average life span of more than 15 times that at standard 1000 hours incandescent bulbs.
12. During hot days avoid dryer of washing mechine dry your clothes in light, it can also conserve energy.
13. Avoid turning your thermostat of Electrical appliances up or down dramatically because that wastes energy and increases your electricity costs.
14. Front loader model washing mechine are consuming 25% less energy than a standard model.

Prepare a report based on the collected data on solar energy appliances and your observations. Display your report in your class and discuss on it.

## Follow-up

1. Prepare a report on benefits of solar energy and display it on wall magazine.
2. Prepare some poster or slogans on benefits of solar energy.
3. Try to think and prepare your own solar appliance. Discuss with your teacher.

## Pollination - an interaction of plants and insects

### Objective

To understand the interrelationship between plants and insects through pollination.



### Background

Plenty of variations exist in life forms even in small ecosystems like gardens, parks, agricultural fields, orchards, etc. We observe different kinds of plants, animals, insects and other living organisms around us. Each life form has a definite role to play. All life forms are interrelated to one another facilitating each other's existence. Pollination is one such phenomenon where we can observe interaction between plants and animals wherein both the organisms are benefited. Pollination is the process of transfer of pollen grains from the anther to the stigma of plants facilitating fertilisation. It is carried out by agents like wind, water, insects and birds. For example, insects visit plants to suck the nectar, and in turn, benefit the plant by facilitating pollen transfer.



### Methodology

1. Visit a nearby park/agricultural field/plantation/garden and spend at least two weeks there. Observe the surroundings.
2. Observe the variety of plants and insects. Further, notice the insects that visit the flowers and prepare a list of both.

3. Note if one type of flower is visited by only one type of insect or by different types of insects. Also see if a single insect visits a single flower or different flowers.
4. Also note the duration of visit by a particular insect to a flower.
5. Make sketches of the insects on the flowers. Also, take photographs if possible.
6. To validate that pollination occurs with the help of insects, observe closely to see if pollens are attached on the body parts of the insects.

### Conclusion

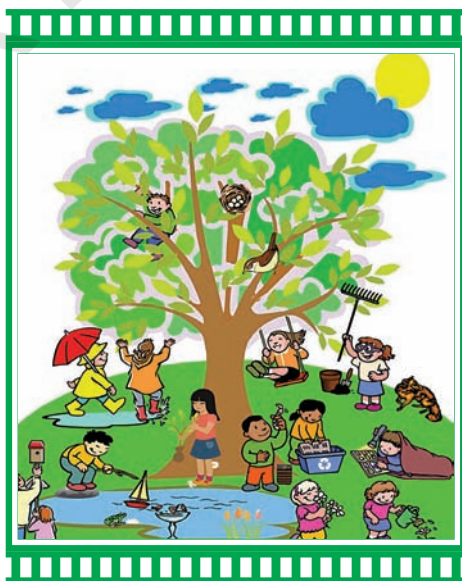
The recent studies showed that the yield of sunflower is considerably come down. The studies showed that the reduction in pollinating insects is responsible for this. The indiscriminate use of pesticides are not only killing the harmful ones but also useful insects

In the fields the more the number of insects like butterflies and honeybees, the more will be pollination. The farmers grow Marrigold plants in fields of Mirchi. They attract insects as the flowers of mirch are small and cannot attract more insects. If we grow different plants in the field which can attract more number of insects there will be better yield.

Present your study by giving a five-minute lecture or making a chart and displaying it in the class. If you have made sketches or taken pictures, then make a poster of them.

### Follow-up

1. Find out other types of interactions that exist between plants and animals.
2. Do you think there is any relationship between insects and crop yielding ? Discuss ?
3. What can we do to have birds in our sourroundings and different insects in fields? Discuss in your class.



## Observing 4 'R's

### Objective

1. To respect the value of materials and resources.
2. To understand the value of the 4 'R's - Reduce Re - use, Recycle and Recover.



### Background

With the increasing level of the population and the changing lifestyle, consumption of materials and resources too has risen. Human activities have led to depletion of resources and addition of waste. This creates pressure on the environment. Therefore, it is our duty to protect and conserve the environment by developing sustainable practices. Assimilating the 4 'R's, i.e., Reduce, Re-use, Recycle and Recover in our way of life will definitely help in controlling, if not curbing, the rate of environmental degradation.

1. Make a note of the materials and resources that you use in your everyday life.
2. Study the list and find out the materials/ resources of which consumption can be reduced.
3. Find out the materials/resources that can be recycled or reused.
4. Based on your study, segregate the materials into four groups/categories - Reduce, Reuse, Recycle, Recover.



5. Make a chart of the different groups of materials by using pictures or sketches and display it in your home/classroom/school display board so that practice of the 4 'R's can be adopted by your family and friends.

## Conclusion

### Some important instructions

1. Try to reduce to produce wastage to a possible extent. These waste materials produce methane gas. On burning it, produces  $\text{CO}_2$  into the atmosphere.
2. Do not over cook or boil food material.
3. Better to use cooker to cook food. Keep lid on cooking vessels during cooking. It will save your time as well as fuel.
4. Recycle whatever plastic material used eg : Plastic cans, bottles, bags. Always ready to use recycled articles.
5. Always keep clean fry Pan like cooking vessel. Oils with other minerals formed layers on your pan, takes more time to heat up.

### Some suggestions during travelling:

1. It is better to travel by metro train or bus instead of personal vehicles.
2. Use your own vehicle for your family purpose only.
3. Stop engine at traffic signals and traffic jams. More fuel is required when engine runs for 10 minutes than re-start. Each litre of petrol produces  $\text{CO}_2$  1/2 times to its weight.
4. Prefer travel by bus only. 40 persons who travel by bus during rush time instead of travelling by their own vehicles will save 70000 litres of fuel per year. 175 tonnes of smoke will be produced.

Based on your study, write a paragraph/poem on how one can practise the 4 'R's.

## Follow-up

You can organise an eco-week where you can hold the following activities and many more.

1. Skits/street plays spreading awareness about ways of practising the 4 'R's and their benefits.
2. Organise an exhibition on topics like 'Make the Best out of Waste' wherein students can make different items like souvenirs, show pieces, etc. from waste.
3. Make a few craft items with waste materials, e.g. paper bags with old newspapers, calendars, etc. Think of other useful items that can be made.

## Item - 11

# Conserving natural resources

## Objective

To be sensitised about the importance of conserving natural resources.



## Background

Our natural resources are depleting at a fast rate. We need to take constructive steps to conserve them. Otherwise we find ourselves in a situation which is beyond our control.

## Methodology

1. Find out the resources available in and around your village/ town. e.g. types of vegetation (trees, shrubs, bushes, coniferous, deciduous etc.), any mineral resource. e.g. coal, stones, sand (river sand), metals; etc.
2. Make a list of these resources and list them as renewable and non-renewable resources.



S.No.	Renewable resources	Non renewable resources

3. Find out how these resources are being utilised by people.
4. Observe how extraction- of these resources affects flora and fauna.
5. Find out if any steps have been taken by the people of the locality to conserve these resources. Find out more about the ways and means to check the overuse /indiscriminate use of these resources.

### Conclusion

We know that the natural resources are two types.

- 1) Renewable
- 2) Non renewable

Generally we are more concerned about non renewable resources like petrol, coal etc., only. Because once they are consumed the life on the earth would be a nightmare for us.

What about the other non renewable resources like stones, sand, mines, forests? Because they are available in sufficient quantities as on now and we are not caring for them. We clear the forests in the name of development, encroach the small streams, mining the sand indiscriminately, crush the hills for metal, occupy the tanks and ponds for constructions.

As a result of which the ground water level is sharply declining. Because of encroachment of the streams, during rainy season, they are changing their course, flooding the colonies.

All these have to be observed in broader view. Are you ready for it?

Based on the information collected by you, prepare a report and present it in the school assembly/class.

### Follow-up

1. Prepare charts on the conservation of natural resources and display them.
2. Suggest methods to spread awareness in the community about conservation of natural resources.
3. What are the harmful effects of destruction of forests and hills for mining?
4. What are the natural resources in your locality? how they misused?
5. What are your suggestions to protect those resources?

As recently as year 2000, about 42,000 - 47,000 plant species and about 90,000 species of fauna were reported to occur in India representing 11% of the world's known flora and a little over 7% of the world's reported animal diversity.

## Item-12

### Over use of groundwater - it's consequences

#### Objective

1. To realise that water should not be wasted.
2. To be sensitised about the decreasing level of ground water.

#### Background

Many studies on water suggest that groundwater is under serious threat because of over use in many parts of the country. More than 300 districts in our-country have reported a ground water level decline of over four metres during the past two decades. It has been noticed that nearly two-thirds of the country is over using groundwater resources.



#### Methodology

Explore and find out in detail about the following.

1. What are the sources of water in your neighbourhood?
2. Are you using groundwater directly or indirectly?
3. What is the approximate consumption of groundwater in your house?
4. What are the reasons for the changes in the pattern of water consumption?
5. Why is groundwater overused?
6. Can there be development without over use of water?
7. Collect information about WLTA act?





## Conclusion

Have you ever calculated how much water you are using in one day? What is the source of water supply? How water is reaching the source? How the water you have used in reimbursed?

The usage of water by the human beings for the domestic, agricultural and industrial use is increasing day by day. We are getting the clean and pure water necessary for our usage in through rain, which percolates into the deeper layers of the soil. Since the water used per annum is more than the water percolated, we have to dig the bore wells more deeper every year. We are not allowing the ground water to get recharged.

Are we using our wisdom in the usage of water? We drawing ground water from deeper layers of the soil and using it for washing, flushing toilets and watering the plants. The water once used is going into drains. We are not following any method to recycle the water. In agriculture also, we are not following any method to conserve water. We are using more water than needed.

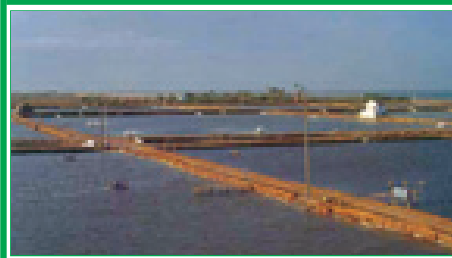
In cities multistoried buildings are built, but the methods for reducing wastage of water are not followed. In many parts of country people are suffering from shortage of potable drinking water. The need of the hour is to save every drop of water, reduce wastage, reduce pollution of water and recycling of water, Everybody should know about water harvesting pits, water management and practice them.

Based on your survey list the reasons for the decline in the level of groundwater.

## Follow-up

1. Find out the methods that should be adopted to improve the quality and increase the quantity of groundwater.
2. Suggest measures to recycle water in your locality/colony.
3. What will happen in future when we dig borewells unwisely?

We are using large number of use and throw material like plates and glasses during festivals, marriages, etc. We use a disposable glass to drink water. per five minutes but decomposition takes place more than hundred years. We are polluting the world by our unwise actions. These heaps of wastes do not allow water percolate into soil. It results in declining of ground water levels.



## Item-13

### Impact of low-cost materials on environment

#### Objective

To study the impact of low-cost imported goods like toys, electrical fittings, batteries, electronic gadgets, etc., on our environment.



#### Background

With the opening up of the Indian economy and liberalisation of import, buyers in India now have a wide variety of choices in procuring consumable as well as durable items. The criteria for selecting a particular brand often include the cost of the item, its attractive finish and novel and unusual features or uses. However, what is often overlooked is the durability, reliability and overall quality of the products selected for purchase. It is particularly true for certain types of imported products that are available at comparatively lower price than those produced indigenously. Some of the low-cost imported items could also be hazardous to the health of individuals and the environment. Moreover, the low cost of such items increases the volume of their consumption which, in turn, leads to generation of larger amount of wastes due to their shorter life span/shelf life.



#### Methodology

1. Select two to three imported items such as toys, decoration items/lights, dry cells, electrical fittings, calendars, etc. which are available at a lower price as

compared to indigenously (locally) produced items.

2. Collect information from shopkeepers/ vendors of imported/ locally produced items regarding the following:
  - (a) Price of a given item.
  - (b) Number of pieces of each type sold in a day, week or a month.
  - (c) Factors that usually compel buyers to go after cheaper imported products. The above information may be collected from 5-10 shopkeepers, and if possible, from different locations.
3. Contact as many buyers as you can of cheap imported items selected for the study to collect information with respect to the following.
  - (a) The factors that affected their decision to purchase the, imported product instead of the locally produced item of the same type.
  - (b) Proper functioning of the product purchased by them, duration for which it worked properly, extent to which they were satisfied with the quality of the product
  - (c) Method of disposing of the product after it became unusable/unserviceable.
  - (d) Their plans for purchasing imported cheaper items in future

### Conclusion

Which one of the following do you prefer.

1. Costly but durable
2. Cheap but less durable

Now a days the markets are flooded with cheap low quality goods. Because they are cheap we prefer them. But with in short span of time you have to purchase a new one. Whether it is durable or not. The raw material required for it is same. So the raw material is wasted for manufacturing their production which is many times more than the demand. In order to get them sold, they advertise and prepare its mentally to purchase it, through we don't need it or never use it. This leads to wastage of raw materials, time power and space.

The colours which are used in food materials to the colours which are used in toys of the children are polluting the environment. So where we purchase articles we should keep in mind the quality, the materials used in their manufacture and their impact on environment etc.

Based on the information collected, conclude whether the decision for buying cheaper goods/ products is economically and environmentally correct. Also conclude whether the low quality cheaper products tend to produce more waste due to their short life.

### Follow-up

Find out how electronic waste is disposed of by the municipality.

## Item-14

# Urbanization - Employment opportunities

## Objective

To learn about the employment generated through local industries.



## Background

Every state or region has potential for increasing the income and employment of the people in that area. Some of these require proper planning and support from the government. The encouragement given to such local industries will help to draw the labour from the agricultural sector and lessen the burden on the primary sector. Several self-employment schemes and cottage industries like transport services, tailoring, leather works, etc. have good scope for generating employment opportunities.



## Methodology

Visit any local industry such as a rice mill, honey-collection centre, pot-making industry, brick kiln, small quarry, etc., in your area and find out the following:

1. Find out how many people are employed.
2. Do these Industries have the potential to grow and employ more people?
3. Talk to some employees of such local industries and find out:
  - (a) their income per month

- (b) whether their income is sufficient to support their family
- (c) do the industries are provided with minimum facilities.
4. Is there any provision for environment safety measures in their workplace?
  5. Is there any scope for self employment?

### Conclusion

Why do people migrate to the towns and cities?

Why there are slums in the towns and cities?

People migrate towns or cities for want of education, treatment and for earning.

India is basically agriculture country. All the agriculture related craftsmen lived in the villages. All used to get their daily earning through their work. But now the country is shifting from agriculture towards industrialization. Because of this more job opportunities are available in industrialized areas which are located in towns and cities. So more people are migrating to cities. If proper infrastructural facilities and training is available to the villages and proper connectivity to cities to sell their product are available, the migration will stop. Thereby the pressure on cities will come down. For this the villages should be made self sufficient. Procure information about there and prepare a plan to make villages equal to cities.

Conclude your study by writing a report on your findings. Suggest ways and means of improving the working conditions and employability.

### Follow-up

1. Find out the possible effects of some other local small-scale industries on the environment.
2. Why people migrate from place to place? Is there any families migrate from your village for employment? What about the position of remaining family members.
3. What facilities you are expected to establish in your habitation? What are the benefits for these facilities

## Plenty of water - still we are thirsty!

### Objective

To be sensitised about the monsoon and its relevance in our lives.



### Background

Water is essential for existence of life in any form. Water resources are depleting slowly and this is a major threat to living beings. The world today is debating a lot about water conservation and the need to protect water resources. Imbalance caused by excessive human activities in forest reserves and unprecedented development in terms of infrastructure and other activities affect the pattern of rainfall. Some regions get more rainfall during monsoon which affects normal life and also the existence of people and livestock. In 2006, the desert region of India, the Thar, experienced unusual rainfall that caused damage to people, property and livestock in the region.

### Methodology

1. Discuss with your elders or visit the meteorological office and collect information about the rainfall pattern in your area during the last ten years.
2. Find out whether there were floods or drought during that period.
3. Find out how it affected the lives of the people.

4. Analyse the rainfall patterns and the possible causes of excess or scanty rainfall during a particular year.

### Conclusion

Why there are famines? Why there are floods? Who is responsible for this? Do you accept if the pointer is towards you? Let us discuss this point.

We know that forest cover is necessary for proper rainfall. Forests will not allow the water to flow quickly, abstracting its flow. Water percolates, into, the soil and excess water is shed in the form of brooks, springs which finally join the rivers. If forests cutdown indiscriminately there is no obstruction for the flow of water. If, heavy rain fall is there heavy flow of water results in floods. All the water flows out quickly. Small amounts of water only percolates into the soil. So very little amount of water is added to the underground reserves. When the soil is not covered with forests the water in the subsoil quickly gets evaporated. It results in drying up of plants, increase in temperature. Now do you accept that man is responsible for famines and floods. To construct roads and buildings big trees more than fifty year old are also cutdown. Now a days tree transplanting technology is available. By using this technology we may transplant even big trees. But this is not familiar for all. The only solution for all environmental problems is planting trees.

Write a report on your study using pictures.

### Follow-up

1. Find out the reasons for floods in a city or big town.
2. Suggest measures to check it.
3. Why some people do not have drinking facilities eventhough they reside near rivers and streams. Give your reasons?



One fifth of India's population (200 million people) does not have access to safe drinking water and 600 million lack basic sanitation.

## Do we need zoos ?

### Objective

To become aware of the need to conserve animals.



### Background

Zoological gardens or zoos are places for conservation of animals, research and creating awareness amongst people about the animals kept there. In most cases, it is not possible for us to go and see animals in their natural habitats due to the dangers associated with it and prohibitions by the government. In some other cases, the animals are not found in our state/country. A zoo gives us an opportunity to see and learn about animals found in different places in the world. However, many of us assume that the zoo is meant for the entertainment and amusement of people, particularly children.



### Methodology

1. Collect necessary information about zoos and how the idea of setting up zoos emerged.
2. Identify some famous zoos in our country and find out why they are famous.
3. Visit a zoo and observe the behaviour pattern of animals and the conditions in which they are kept, and try to understand their problems.
4. Find out about the problems of keeping animals in a zoo from the caretaker /



authorities of the zoo.

5. Also find out the various research activities taken up in zoos.
6. Conduct an opinion survey on whether or not we need zoos and analyse it. Get the opinion of at least 50 people.

### Conclusion

How do you feel if you are accidentally trapped in your bathroom and nobody is there to open the door. Suppose someone else is enjoying your plight, what will be your feeling?

Don't you think this will be the same with wild animals also? If you keep the freedom loving animals in a cage, it will be inconvenient for them also.

The immediate question is, the same is done in a zoo also. Actually the zoos are to be called as animal conservation centres. When we visit a zoo we should not disturb the atmosphere there. We should throw the wastes and plastics in the waste bins only.

We should not disturb the animals and should not feed them.

Are you interested in protecting the wild animals? We can do it even without, maintaining a zoo. All the animals which live in and around our village, in our fields or, on the tree are wild animals. We can protect them just by allowing to grow a tree, by not felling a tree, by not killing an animal which is passing by.

It is our responsibility to protect the birds, snakes and other animals.

Write a report on the ideas gathered during the visit to the zoo and the opinions collected, and share them with the class.

### Follow-up

1. Conduct a debate in your school about animal rights from the point of view of zoos and national parks.
2. Conduct a debate in school on whether or not there should be zoos.



From a population of an estimated 1,00,000 in the nineteenth century the Earth's wild tiger population has fallen to around 5,000 to 7,000.

## Nature, culture, people and their relationships

### Objective

To develop respect for different cultures and traditions.



### Background

Educational aims include understanding of different cultures and people: their practices and beliefs to create a citizenry who learns to live together. People regard nature as divine and live harmoniously with it. This legacy, practice or value is inherited from generation to generation. But due to the diversity in topography people in different places, interact with nature in different ways. This in turn has an impact on their culture and traditions.

### Methodology

1. Collect views of people on man-nature relationship and beliefs/practices specific to your locality by using a structured interview technique.
2. Also collect information from other sources such as newspapers, magazines, television, the Internet, etc. about similar practices in other places/cultures.

### Conclusion

Our culture, tradition is intimately entwined with nature. We worship trees, animals, rivers. We worship them because

we feel that they are very important to us and to nature. We help the in poor and needy. The ‘Jatharas’, ‘Tirunallu’, ‘Samburalu’ and celebrations help to unite the people belonging to various trades and enhances the feeling of living together.

Because of these celebrations, the people in different trades are benefited. A celebration in our home like marriage is not possible without participation of people of different trades. This reminds us that we cannot live alone in the society.

But while performing such functions, festivals we are throwing wastes into the water bodies there by polluting them.

We have to take care of this. Let us be happy without spoiling nature.

Write a report highlighting how certain practices help in preserving the landscape/plants/ animals.

### Follow-up

1. Discuss in your class the diversity of cultures, festivals, etc. in different parts of our country.
2. Collect information on the festivals, practices, beliefs, stories, legends, etc. of the diverse people of India.
3. There are some families who follows some traditional practices in your village. Visit those families Collect information about their cultural practices and festivals. Prepare a report on it and display in your wall magazine.
4. What can we do to express our affection or concern towards plants and animals?
5. There are some festivals and Jatharas where people participate irrespective of religion. Do you think are they helpful to develop friendly environment among people write a note on them.

## Household Wastes

### Objective

1. To differentiate between biodegradable and non biodegradable substances.
2. To understand the need of separating household wastes appropriately.



### Background

Substances that are broken down by biological processes are said to be biodegradable and those which are not broken down in this manner are said to be non-biodegradable. Non - biodegradable substances may be inert and simply persist in the environment for a long time. Due to development, the quantity of non-biodegradable materials produced has increased substantially. Many municipal and civic agencies have already initiated steps for separation of biodegradable and non-biodegradable wastes at their source so that these may be disposed off safely. However, at the household level, it is not a common practice to segregate the wastes. Some of these wastes could be a source of toxic compounds which, in turn, may pollute soil and/or water bodies. Though the quantity of such wastes produced by households may not be evident, their potential to adversely affect the environment cannot be underestimated.

## Methodology

1. Collect waste materials from your home and make a list of them. This could include kitchen waste, spoilt food, vegetable peels, used tea leaves, milk packets, empty cartons, waste paper, empty medicine bottles and strips, bottle packs, torn clothes, broken footwear, etc.
2. Bury these materials in a pit or collect them in an old bucket/flowerpot and cover with at least 15 cm thickness of soil.
3. Keep the soil moist and observe the material underneath after fifteen days.
4. List the materials that have remained unchanged over that period.
5. Also list the materials which have changed their form and structure.

## Conclusion

First of all we must locate the place, where the trash is produced. We must maintain separate trash bags for both wet and dry trash. Like dry leaves, used papers, pens, shampoo sashes, polythene covers etc. It would become easy to recycle it, if it is separated beforehand.

Creating or producing trash means we are creating death trap itself. We must change our habits in order to generate less trash. We must replace steel in place of use and throw material. Dump the waste in a pit or a pot and sprinkle soil over it and cover it completely. Over a period of time it becomes manure compost. If we do not organise the trash in a proper manner it gets mixed with water and cause damage to the environment. Think over the steps in order to reduce the production of trash of your home.

Based on your study, prepare a report.

## Follow-up

1. Make compost for your own kitchen garden from the wastes produced in your home.
2. Use the library or the Internet to find out how long various non-biodegradable substances are expected to last in our environment.
3. These days, new types of plastics, which are said to be biodegradable, are available. Find out more about such materials and whether they do or do not harm the environment.
4. Find out in your locality whether there are separate dustbins for the disposal of biodegradable and non-biodegradable substances. If not, suggest to the authorities to provide separate bins.
5. Identify the situations where wastes are produced at your home or school? What measures you are going to follow to reduce this problem?

## The plight of ragpickers

### Objective

To develop concern for the health of ragpickers.



### Background

One of the urban and rural environmental problems is improper disposal of garbage in dumping areas. The garbage generated at homes, schools, markets, etc. is usually collected at garbage dumps and the municipality transports them to landfills or other appropriate places. Garbage dumps are mostly overflowing and infested by flies, cockroaches, rats, etc. which lead to spread of diseases. The ragpickers who collect materials from these dumps are therefore more vulnerable and prone to different diseases. Often they get injured by broken glass or dumped explosives.



### Methodology

1. Interview some ragpickers at a roadside disposal area.
2. Prepare a survey sheet and find out the following.
  - (a) Their names and age.
  - (b) The area they cover each day.
  - (c) Hours they spend in a day collecting waste.
  - (d) Types of waste they collect.
  - (e) Whether they take any protective

measure such as wearing gloves, masks, shoes, etc.

- (f) The .problems they face while collecting waste.
- (g) What they do with the waste they collect.
- (h) Whether they are suffering from any problem/ ailment.
- (i) Whether they visit a doctor when they have any ailment. If not, try to find out the reasons.

### Conclusion

Just imagine the condition if trash collectors do not collect regularly. Yes they are servicing us at the cost of thier lives. For examples a septic tank cleaner. It is our minimum responsibility to help them. We may provide them socks, gloves, which helps them to collect dry and wet trash. This segregation will help the trash collectors, rag pickers to do their work easily.

Based on the information collected by you, prepare a report about the waste collected by the ragpickers and the condition of their health.

### Follow-up

1. Initiate proper disposal of wastes in local markets.
2. Help the ragpickers by providing them with your used long boots, gloves, masks, etc.
3. How would you appreciate the service of the rag pickers or trash collectors, what activities you are going to follow to express your concern towards them.
4. All professions are equal. Do you agree with this statement? Why?

Hazardous waste also includes automotive fluids, beauty products (like nail polish remover), garden care products and mercury based items such as thermometers and tubelights.

## Water bodies in the neighbourhood

### Objective

1. To realise the importance of water bodies for human beings and animals.
2. To be sensitised to the causes and effects of water pollution.



### Background

In earlier times, human settlements were always located near water bodies such as lakes, ponds, rivers, etc. Even today it is so in many places. But for the past few decades, due to the increase in population and development in industrial and agricultural sectors, water bodies are increasingly getting polluted rendering the water unsuitable for human consumption and other use. Besides human beings, aquatic animals and other animals are also affected.



### Methodology

1. Document the name of the lake/river/tank/pond in your neighbourhood and find out the following.
  - (a) Is there any garbage dumped on the bank?
  - (b) Are there any industrial units near the site?
  - (c) Do the industries discharge their waste water into the site?
  - (d) Is this waste water treated or untreated?
  - (e) What is its colour and odour?



(f) Are there any sources of water contamination from adjacent agricultural land on which fertilizers and pesticides are used?

2. Observe if the lake/river/tank in your neighbourhood is unpolluted/ slightly polluted/ severely polluted by looking at the water and doing some simple tests, e.g. to find the pH of water, observing the water sample under a microscope for the presence of micro-organisms, etc. Also observe whether the water is turbid.
3. If there are fishermen near your locality, ask them if their income has been affected with water pollution.
4. Ask your elders whether the consumption pattern from the water bodies has changed over the years. If yes, try to find out the reasons.

### Conclusion

Water is the important source of our life. It is our responsibility to see that water should not get polluted. Let us identify the pollutants which pollute water from your house or from your street. Think of preventive measures to stop these pollutants enter in water. Discharge of sewage into water bodies is a hazardous condition to people who live particularly in slums because of these pollutants they suffer water born diseases. Leafy vegetables, fodder which are grown by using these polluted water became the carriers of heavy metals and toxics. These pollutants enter into animals. They also enter into human beings through milk. Discuss with your teacher about bio accumulation and bio magnification.

Based on the information collected and tests done, prepare a report on the water bodies in your neighbourhood.

### Follow-up

1. Suggest an action plan to reduce the level of pollution in the water body in and around your neighbourhood.
2. Find out India's three most polluted rivers/lakes. Mark them on a map of India and try to find out the reasons for their pollution.



## Impact assessment of developmental projects

### Objective

1. To become aware that developmental activities come with certain hazards besides many positive impacts.
2. To understand the need of impact assessment prior to implementation of developmental projects.
3. To develop a holistic approach towards any study.



### Background

Development in various fields is essential for a nation to progress. But it is also true that most of the developmental activities do have an adverse social, economic and environmental impact. If we look back, there are clear examples in human history of the tremendous impact of industrialisation on society and the environment. So it is always desirable that there be a clear idea of the possible impact of any developmental plan through proper assessment. This will ensure that development progresses/proceeds in a sustainable manner with minimal impact, both on the environment and on the society.



### Methodology

1. Find out if there is any proposal to build a dam in your district/ state.
2. If yes, collect the following information from various sources.
  - (a) Proposed site or location of the dam.

- (b) Estimated forest area to be cleared and fertile agricultural land to be destroyed. .
- (c) Local (endemic) flora/fauna that could be endangered due to habitat destruction.
- (d) Estimated number of people to be displaced and governmental plans for their rehabilitation.
- (e) Amount of electrical energy expected to be generated by the dam and other benefits to be received by the local people from the construction of the dam.
- (f) Earthquake zone of the proposed site.
- (g) Cost -effectiveness of the proposed work.
- (h) Similar kind of projects can be done on other proposed developmental projects such as construction of shopping malls, flyovers, hotels, tourist spots, SEZs (Special Economic Zones), etc.

### Conclusion

With the advent of development in all the fields there are adverse effects on the environment. Various kinds of animals and plants species will disappear when we construct a new project. Because of this bio-diversity is totally damaged. Similarly construction of multy storied buildings, bussiness malls, bridges, roads are also creating many environmental problems. But they are un avoidable. But the developmental activities should be eco friendly in nature. The slogan “Plant a new one before cutting down a tree” should be implemented. Think other ways to follow sustainable development .

Draw your own conclusion based on the information you have collected and find out if the pros of the proposed project outweigh the cons (pros and cons) or vice versa. Give your own suggestions in the report about possible solutions/alternatives that can be taken up for any possible harmful impact.

### Follow-up

1. Hold debates on how development activities lead to environment degradation and why people protest against it.
2. What programmes are implemented by the government in your village. How many of them are benifeted by these programmes? Why all of them are not setting benifit?

The proposed Sethusamudram shipping canal off the coast of Tamil Nadu will compel thousands of endangered Olive Ridley sea turtles that come to Orrisa every winter to nest, to change their migratory path, putting their lives at risk.

## Awareness about common ailments

### Objective

1. To become aware of the common ailments and diseases prevalent during certain periods of the year.
2. To understand the need to maintain community health.



### Background

Some diseases are common during a certain period or season. It is essential to understand the causes and symptoms of these diseases so that necessary preventive measures can be taken up to avoid contracting them.

### Methodology

1. Collect information from reliable sources about the outbreaks of different diseases during different seasons in the previous two years.
2. Select any season of the current year for your study. Collect data from about twenty families in your locality about the diseases they suffered from, if any.
3. Find out whether a certain disease is more prevalent during a particular season.
4. Compare your data with the previous year's disease trend.
5. Find out the preventive measures to be taken for different seasonal diseases.



## Conclusion

We all know that health is wealth. Diseases are generally caused by polluted air, food and water. Similarly seasonal changes are also reason for health problems. We must follow some precautionary measures like drinking boiled water, eating food when it is hot, washing hands which helps in protection from many diseases. We can conduct campaigns to prevent disease causing insects like mosquitoes and house flies. These measures must be taken to prevent transmission of diseases.

From your study, prepare a report on the prevalence of certain diseases in a particular season

## Follow-up

1. Share your observations at home and in the class.
2. Prepare a chart on seasonal diseases and precautionary measures, display it in your school.
3. What are the main reasons for health problems? What do you think?
4. What programmes you would like to conduct to explain the relationship between cleanliness and health.

## Disaster management

### Objective

1. To become alert about the causes and effects of natural disasters.
2. To be able to pro-actively contribute to rescue, relief and rehabilitation programmes.



### Background

Natural disasters such as earthquakes, cyclones, floods, tsunamies, etc. are phenomena that are beyond human control. Countries throughout the world are ravaged by different kinds of natural disasters. There is loss of life and property. Human awareness and preparedness are essential to face and deal with such disasters. Rescue measures, first aid, shelter, food, clothing, medicines and rehabilitation are some of the key issues that we all must be aware of.



### Methodology

1. Collect information about different kinds of natural disasters that have occurred in India in the last 10 years.
2. Collect information on the causes and effects of the disasters.
3. Find out about the awareness and preparedness of the people and the authorities.
4. Find out the rescue, relief and rehabilitation measures taken up after the disaster. Gather information on people's participation in these measures

and the assistance provided by the government and NGOs after the disaster.

### Conclusion

No one can stop natural calamities. Environment is being polluted when earth quakes, floods, Tsunami, etc., occurs. Not only humans but also animals are affected by dreadful diseases. In such situations one must be ready to give a helping hand in collection and distribution of the necessary things like food, clothing, medicine etc. Try to participate in such campaigns to create awareness about understanding precautionary measures during natural calamities.

Prepare a report about your study, highlighting the activities where children in the age group of 12 to 15 can participate in the mitigation efforts.

### Follow-up

1. Collect stories and experiences related to natural disasters and share them with your classmates.
2. Organise mock drills about any disaster in school.
3. Prepare a report on 'Hudud' cyclone that hit the Andhra Pradesh coastline, with regard to assistance by Government and NGOs before and after the cyclone.



The impact of the super cyclone that hit Orissa in 1999 claimed the lives of over 10,000 people and caused widespread devastation which was worsened by the large scale deforestation of mangrove forests along the coastline.

## Education for all - Everybody's concern

### Objective

1. To become aware of the need and importance of education for all sections of the society.
2. To become involved in spreading awareness about Education for All.



### Background

Education is the right of every child. It is our duty to make sure that every one gets basic education. Besides enhancing opportunities for employment, education makes people aware of their surroundings, and their rights as well as their duties as citizens of the country. It also gives them confidence and empowers them. The contribution of every individual in this direction is valuable, as it would help remove discriminations and contribute to the growth of the nation.



### Methodology

1. Visit a marketplace like a weekly bazaar, Santha, vegetable market, etc. Which is frequented by different kinds of people.
2. Talk to around twenty children up to the age of 14 -15 years.
3. Find out how many of them are literate or go to school. If they do, find out which class/grade they are in.
4. If there is any child who does not go to school find out the reason why?



## Conclusion

Environmental consciousness includes not only taking care of things with life but also making people aware of getting educated. So there is a need to provide education for all. Let us think what can we do for that. We may visit in holidays to slum areas to teach drop-out students, street children. Work as a volunteer in adult literacy centres. In addition to education make them conscious of the need of literacy which in turn helps them to know about health, agriculture, modern facilities politics etc. We must convince them to know the necessity of building a toilet, drinking boiled water and maintain neat and clean surroundings. All of them are eco friendly activities.

Based on your study, write a report highlighting the reasons why education is not available to all.

## Follow-up

1. Teach the children of your domestic help or people around you who are illiterate, to read and write.
2. As a play activity you can also teach how to use a cellular phone, computer, or read a thermometer, etc. to those who do not know how to use them.

## Let's keep our domestic environment healthy

### Objective

1. To develop understanding about domestic air pollution and its impact on health.
2. To identify measures through which the issue can be addressed.



### Background

There are large numbers of households where firewood, coal, etc. are used as fuel in kitchens/ cooking area.. Such areas are mostly congested and are without proper ventilation leading to accumulation of smoke and fumes. These are harmful to the eyes and to the respiratory tract.

### Methodology

1. Make a survey of some households/tea stalls/small eateries in/near your locality and find out the following.
  - (a) The types of fuel used for cooking.
  - (b) Do any of them use smokeless stove (Pogarani Poyee)?
  - (c) Ask the occupants/customers whether they feel any discomfort. Also ask them whether they suffer from permanent cough, running nose, asthma or any other disorder/ disease.
2. Find out from the doctor of the locality how many cases of disease/disorder of the eye or the respiratory tract he/she normally comes across in a year,



possibly due to continuous exposure to smoke or fume.

### Conclusion

Our surroundings are the mirror image for our health. One should keep his house, school, office clean and neat. If it is dirty, flies, mosquitoes, rats, insects like cockroches etc may be developed. So it is advisable to avoid this kind of situation. Our house should allow free flow of light and air. This helps in saving of power. Waste water should be used for kitchen garden. Some times we dispose our domestic waste on streets. Some times we use road sides as toilets. These are not good practices. Keeping clean means both inside and out side (Streets) of our house. Prepare and implement a plan to plant trees in your street. No one can dispose his trash on roads if they are clean and green.

Based on your study, prepare a report.

### Follow-up

1. Campaign in your locality for proper ventilation and the use of smokeless stove. (Poga rani Poyee)
2. To make your house neat and clean is the collective responsibility of your family members. If you think so what kind of responsibilities you want to take?
3. Plants and water are the main sources to make our house environment healthy. What would you do to implement them successfully?

One million people die in India each year form air and water pollution.

## Depletion of natural resources

### Objective

To study the impact of changing population on the depletion and degradation of the local natural resources.



### Background

Every human settlement is sustained by certain economic activities like agriculture, industry, various trades and services. Human beings also require the supply of essential resources such as water, clean air, energy, agricultural land, etc. for their sustenance. Due to changes in human population and other developments, the situation of local resources also changes - some are depleted and others degraded.



### Methodology

1. Choose a convenient human settlement (village/town) for your study, preferably where you live.
2. Collect information from elders / Panchayat/Block Development Office about the state of the population in the chosen area and find out the rate of growth/ decline in the last ten years (rough estimation).
3. Find out the source of income - farming (agriculture/ livestock rearing), labour or different trades such as tailoring, transport, etc.

4. List the main sources of water (tank/well/surface and groundwater), food supply, fuel (firewood/coal, etc.)
5. Find out the changes in the state of local resources. Gather information on whether there is any frequent scarcity of the resources noted above and whether the quality of these resources have improved or deteriorated.
5. Find out if there is any air pollution due to industries located in and around the settlement area.

### Conclusion

Scarcity of water and food, air pollution etc are the major problems of present generation . We use our natural resources unwisely and waste them at a maximum extent. Paddy growing fields are turned into fish ponds. Forest areas are converted into Special Economical Zones. We release enormous amounts of pollutants into our environment. Natural resources are for our needs. It is true, but we used them for our greed. Protecting and preserving natural resources is our primary responsibility. Rain water harvesting, Plantation, Power saving etc; should be part and parcel of our daily life.

Write a report on your findings and try to relate the availability of resources with changing human population.

### Follow-up

1. Spread awareness about the importance of conservation of natural resources.
2. Prepare a chart on conservation of natural resources and display it in your school.
3. If we want comfort, we must depend on natural resources. So to conserve natural resources what measures we should take?



## Conservation of water resources

### Objective

1. To know about water harvesting.
2. To learn the benefit of harvesting rain water.



### Background

We know that rainwater recharges the ground water and helps to maintain the flow of rivers. However, most of this water causes floods or just flows away. This is wasting of precious natural resource. To meet the needs of increasing population there is a pressure on ground water levels. So the rainwater can be used to recharge the ground water especially in the urban areas. During the rainy season, rain water can be collected in large tanks, cisterns, reservoirs, etc., for future use. This is referred to as rain water harvesting. There are different ways of harvesting rainwater. Now a days all most all of the house surroundings are covered with cement. We have no interest in planting trees. In addition to that we are cutting trees. All these factors causes to stop depletion of water. We dig more number of bore wells and waste water unwisely. So we must take care of water resources. We should select some technique to preserve our water resources.

## Methodology

1. Collect information about various techniques of rainwater harvesting from books, magazines, journals, organisations, and the internet.
2. Visit different localities of your village, town or city and get information about the year they started harvesting water. Money being spent in maintenance and amount of water harvested in one calendar year.

How they preserve water resources?

Since How many, years they following thes techniques?

How much amount they have spent?

From Where, did they purchase required material for this?

How much water they protect in one year? By measuring the water level in the wells.

In what way they utilise this water?

What are your suggestions to the groups who are going to implement these techniques?

## Conclusion

Protection of water resources means wise usage of water. We should repair leakages of taps immediatly. Remove and repair sediments and other obstacles to water flow in canals, water streams which flow towards tanks and lakes. We can preserve water resources by follwing various methods like rain water harvesting. Follw measures to improve ground water levels by digging soak pits etc. Construct soak pits in houses, schools, offices, bus stations where ever possible. We should save each rain drop to save our water resources. Some incentives may announced to house holders who save tap water in their houses. Conduct campaigns to develope awarness among people about the need and necessity of water saving measures.

Prepare a report on your findings and the benefits of rainwater harvesting.

## Follow-up

1. If water harvesting is not practised in your locality try to launch a campaign to initiate water harvesting. Make a poster for it.
2. Adopt suitable process to save water in your school or house.

Traditionally in Uganda and Sri Lanka for example, rainwater is collected from trees, using banana leaves or stems as temporary gutters, up to 200 litres may be collected from a large tree in a single storm.

## Fluorosis

### Objective

1. Know about the impact of fluorosis on our society.
2. Know about preventive measures and its implementation.



### Background

Fluorine (F) is an element. It belongs to 7<sup>th</sup> group of periodic table. Fluorine is the first halogen with atomic number 9. Atomic weight is 18.99g. Scheele explained about fluorine in 1771. In 1868 Moissan separated fluorine element from its ore. It is highly active element and so it occurs more than 55 compound forms in nature. It exists in three different states such as solid, liquid and gas. Fluorine occurs in liquid form in ground water, solid form in bed rock and gaseous form in pollutants produced by factories and industries. We know that excess amount of fluorine in water causes fluorosis. Nalgonda and Rangareddy districts of Telangana, Prakasham district of Andhra Pradesh are highly affected areas.

### Methodology

1. Form groups with five students in each group. Collect information about impact of Fluorosis on our society from different newspapers, magazines and prepare an essay on it.
2. Visit families and persons who are suffering with Fluorosis, and prepare a



report on problems faced by them in view of health and its impact on society.

3. Explain them to reduce its effects and how to eradicate this dangerous disease.

### Conclusion

People living in other countries where fluoride problems are higher than our state are not suffering from fluorosis. Why? Drinking water is not only the reason for this disease. The food that we eat, our economical status, physical work, malnutrition etc., are all the reasons for this.

There are lakhs of fluorosis affected persons in our state. This is not only the health problem but also an economic and social problem. People are not willing to leave their native villages. They want to stay there only. There is no (industrial, employment) development in those places. People from other places are also not willing to work in fluoride affected areas. People in these areas are not able to work because of this dangerous disease. That's why their contribution to national income is also reduced.

### Follow-up

1. Is protected drinking water available to them? Are they using bore well water? Are there any tanks? How are they? Are they clean? Observe those things in your or fluoride affected villages.
2. Because of digging deep bore wells, ground water levels are reduced day by day. So we dig more deeper than before. This is one major reason for fluorosis diseases.
3. Create awareness to take low cost nutritious food which contains millets (Ragulu, Jonnalalu) leafy vegetables (Thotakura, Puntikura, etc.).
4. Create awareness to supply food for children (every day) which contains Gingelly, Jaggery sweets, Guava fruits and milk.
5. Avoid taking tea which is prepared by using fluoride water.

When we dig more deep borewells, more fluoride is found in the water. The life of persons affected with fluoride will be very hard and they cannot work for their livelihood.

## Nature is a sacred place

### Objective

1. We should keep our nature, sacred and divine places clean.
2. To learn the benefit of harvesting rain water.



### Methodology

We believe in God. We pray at temple, mosque, church. We celebrate our festivals which reflect our religious principles. We have some beliefs so we treat those places as sacred and divine.

All our religions explain that we should respect our nature. Never try to harm our ponds, lakes, forests, rocks, birds, animals in nature. But nowadays these sacred places also are dumped with polythene covers and other rags. Those places become dirty and unhealthy. Most of the times we leave our food remains, plastic plates, covers etc. These waste materials spoil the divinity and fill the place with foul smell. Let's make a report on Do's and Don't's when we visit our sacred places.

### Conclusion

Whenever we visit any sacred place like temple or mosque. We should not leave waste material like paper plates etc. We should use a dustbin for this. If we throw them out, such material reaches water bodies and pollutes the water. Finally it affects the health of people who live in those areas. Sometime it will also affect the pilgrims like you.

We should not dump waste materials like plastic covers, bags, bottles, other Pooja Samagri near or in water bodies like rivers or tanks. These materials stop water flow and pollute them. We know this very well but we are not following it. Why? Today onwards we should take an Oath to do the ecofriendly activities only. If we continue this bad practice then no sacred places remain sacred in the future. We will have garbage dumping yards only.

Rivers like Moosi at Hyderabad, Thungabhadra at Kurnool, Godavari at Rajamundry, Krishna at Vijayawada are also in such danger. So we should protect our sacred places. That is our responsibility.