CHAPTER

5 Best Out Of Waste

Eco cubs play an important role in creating environmental awareness amongst the future generation. Eco clubs in schools are the means by which students can be empowered to participate and take up meaningful environmental activities and projects.

Many programmes and projects are formed and combined together to make a frame work of Eco club. Preparation of Eco-friendly product out of waste material forms an important part of Eco club. As it enables us to make the useless things more useful.

PREPARATION OF ECO-FRIENDLY MATERIAL USING WASTE MATERIAL

Recycling and reusing the valuable waste material can result in development of fantastic and usable products. Rather than putting these waste materials into the landfills, various innovative and creative ideas can be put together to being something new and useful.

OBJECTIVES

Before, we start with any program, certain aims/ objective need to be formulated so as to conduct successful programmes. Some of such objectives are listed below.

- To develop the ability to think and organize the thinking to create something useful.
- To indulge the students into a extracurricular activity with exclusive tool i.e. waste material.
- To explore the environmental concepts and actions which are beyond the curriculum & syllabus.
- To make our vision and outlook broader about the nature & society.
- To control the harmful effects of waste on our environment.

HOW TO ACHIEVE THE OBJECTIVES

In order to achieve the objectives it is necessary to formulate certain programmes and follow- up has to be done efficiently.

- Create awareness among students to use the waste products in best possible manes.
- Various things can be put to different uses.
- More of awareness and efforts combined together to make variety of products.

Advantages /uses:-

- Helps in generating the awareness and building the attitude to take up activities in real would.
- Controlling the amount of waste send into landfills.
- Enables the students to give this creativity & innovation a shape.
- Reduces the destruction of forest & other eco – system.
- Helping the society and nation in conserving our nature.
- Keeping our planet a much safer place for coming generation.
- Developing the sense of using ecosystem.

VARIOUS WASTE MATERIAL USED FOR MAKING USEFUL PRODUCTS

- Old Newspaper
- Notebooks and chart paper
- Cardboard and book cover
- Paper plates, spoons and disposable glass
- Pens and refills
- Old CDs and DVDs
- Toothpicks and matchsticks
- Dry stem of plants and trees
- Mango seeds
- Seeds of various fruits
- Old curtains & table covers
- Used foil paper
- Jute rope
- Plastic bottles
- Strings and sequences, etc.

Along with these a large number of products are also being used which are somehow felt to be useless.

LIST OF ITEMS THAT CAN BE MADE USING WASTE

A large number of products can be made using waste products. Some of such products and items are listed below.

1. Paper bags
2. Puppets
    - Envelope puppets
    - Finger puppets
    - Stick puppets
3. Puzzles and games
4. Mat from cloth
5. Mat from paper
6. Paper Mache

- Jewelry
- Toys
- Puppets
- Wall decorations
- Decorative items, etc.

7. Foil paper art
8. Wall decoration using
   - Matchsticks
   - Toothpicks, string & sequences
   - Paper and charts, etc
9. Jewelry using
   - Paper
   - Paper mache
   - Old beads and string, etc.
10. Paper Glass toys
11. Flower vase using
   - Jute rope
   - Old plastic Bottles etc.
12. Magic board
13. Kandeel using
   - Charts
   - Card Boards
   - Sequences & strings etc.
14. Animals using
   - Mango seeds
   - Chikoo seeds
   - Walnut shells
   - Pistachio shells etc
15. Face masks using –
   - Paper mache
   - Charts
   - Paper plates etc
16. Wall Hanging using
   - newspaper
   - Jute Rope
   - card board
17. Folders and files using
   - Old cloth
   - Card boards, etc.
18. Pen stands using
   - CDs & DVDs
19. Flowers using
   - Cloth
   - Sponge
   - Tissue paper
   - Toffee wrappers, etc.
20. Stuff toys using

- Cloth
- Cotton
- Sponge, etc.

CLASSIFICATION OF PRODUCTS

CLASS	PRODUCTS MADE OUT OF WASTE
1 – 2	Wall decorations using sequence, strings, pens, wools, etc
	Paper mache toys, etc.
3 – 5	Paper mache toys
	Flower making
	Wall hangings
	Face masks
	Foil paper art, etc.
6 – 8	Mat using newspaper
	Mat using cloth
	Jewelry with paper mache
	Paper bags, etc.
9 – 10	Puzzles & Games
	Puppets
	Paper glass/cup toys
	Paper plate craft
	Files and folders
	Stuff toys, etc.
11 - 12	Paper coiling
	Jute work
	Plastic bottle craft
	Paper mache
	Wall decoration
	All of above From (1 to 10)

OUTCOME OF THE ACTIVITIES TAKEN UP

- Optimum use of waste material.
- Minimum harm in atmosphere.
- Reduction in cutting of trees for paper.
- Development of innovation & creativity.
- Development of aesthetic appreciation.
- Clean & beautified surroundings.
- Development of ability to create, develop and present in form of an object.
- Protection of nature and atmosphere.
- Lost cost material can be made use waste.

SOME OF THE IMAGE OF PRODUCTS MADE OUT OF WASTE

Envelope puppet (Material used: Chart paper, Colours, Fevicol, Book cover, etc.)

Paper bag (Material used: Old calendars, Newspaper, Rough cloth, Strings, Fevicol, etc.)

Wall decoration (Material used: Old bangles, Pens, Refills, Strings, Sand, Ribbon, etc.)

Wall decoration (Material used: Sequences, Shells, Strings, Mirrors, etc.)

Flower (Material used: Ice cream sticks, cotton, buttons, paper, paper plates, etc.)

Paper Cup Baby (Material used: Glass/cup, Ball, Colours, Paper, Buttons, etc.)

Stuff toys (Material used: Rough/old cloth, cotton, needle,string, etc.)

Foil paper craft (Material used: Foil paper, chart, paper, glue, etc.)

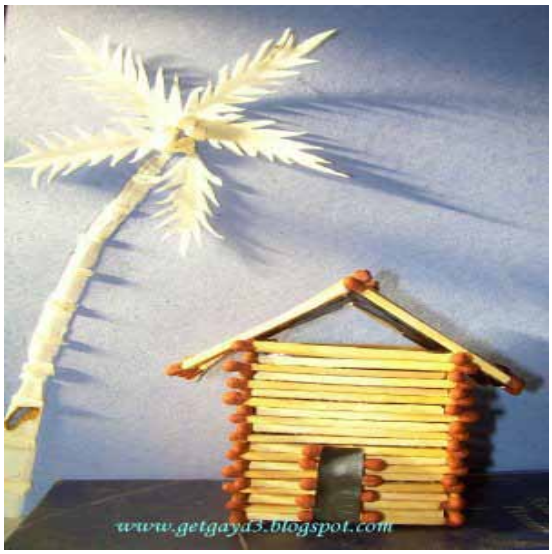
Craft using seeds (Material used: Mango seed, Bamboo sticks, Dried plants, etc.)

Flower (Material used: Spring, Wool, Bamboo, Stick, paper (green) etc.)

Dry stem plants (Material used: Dry stem, sponge, toffee wrappers, string, plastic bottle or glass bottle, etc.)

Wall hanging (Material used: Tooth picks, chart or board, sequences, wool or rope or string, etc.)

Rangoli (Material used: Chart paper, board, sequences, ribbons, match sticks, strings, etc.)



Wall decoration (Material used: Chart paper or board, thermocol plate/glass, match sticks, etc.)

Wall decoration (Material used: Board, match sticks, fevicol etc.)

Paper Mache Products

Toys (Material used: Paper mache, colours, etc.)

Bowl (Material used: Paper mache, colours, etc.)

Making paper mache toys

Wall decoration (Material used: Board, paper mache, etc.)

Turtle (Material used: Paper mache, colours, etc.)

Paper carnations (Material used: Tissue paper, sticks, fevicol, green paper or tape, strings etc.)

Bottle and rope art (Material used: Old plastic bottles, jute rope, fevicol, etc.)

Ball using circles (Material used: Chart paper, fevicol, etc.)

Wall hanging (Material used: Chart paper, fevicol, scissors, etc.)

CHAPTER

6 ENVIRONMENTAL ETHICS AND LEGAL ASPECTS

Environmental ethics believe in the ethical relationship between human beings and the natural environment. Just as human beings are a part of the society, living beings are also a part of it. When we talk about the philosophical principle that guides our life, we often ignore the fact that even plants and animals are a part of our lives. They are an integral part of the environment and hence have a right to be considered a part of the human life. Thus, it is clear that they should also be associated with our guiding principles as well as our moral and ethical values.

What is Environmental Ethics?

We are cutting down forests for making our homes. We are continuing with an excessive consumption of natural resources. Their excessive use is resulting in their depletion, risking the life of our future generations. Is this ethical? This is the issue that environmental ethics takes up.

Thus human beings are disturbing the balance in the nature. The harm we, as human beings, are causing to the nature, is coming back to us by resulting in a polluted environment. The depletion of natural resources is endangering our future generations. The imbalance in nature that we have caused is going to disrupt our life as well. But environmental ethics brings about the fact that all the life forms on Earth have a right to live. By destroying the nature, we are depriving these life forms of their right to live. We are going against the true ethical and moral values by disturbing the balance in nature. We are being unethical in treating the plant and animal life forms, which coexist in society.

- Is it important for us to preserve nature for the future generation? If so, are we even making an effort to do that?
- Is the human race alone important on this earth? If not, then aren't our actions proving otherwise?

- What would happen if animals, plants and other species are destroyed. Would we be affected?
- Are our future generations entitled to a clean and green environment? Do they even have a right?
- Is it right for us to be responsible for the extinction of certain species only for the sake of our consumption and greed?
- Is it our moral right to be clearing forests for the sake of human consumption?
- In spite of knowing that gasoline run vehicles lead to the destruction of natural resources, is it right for us to continue manufacturing and using them? Can we not use alternate natural resources?
- Are the guidelines which are drawn to protect the environment and nature any effective? What is causing their failure?
- What is environmental pollution and pollution of the air, soil and water doing to the world?
- If you ask yourself any of these above mentioned questions, you'll know what the solutions are. But is that enough?

Environmental ethics is definitely just not a fancy term which is added into the dictionary of environmental words but is going to get results. It is the generation of today who can make clean, non-polluted and healthy environment of tomorrow provided they are guided in the right direction. So, let us inculcate some ethical environmental values in them for a better tomorrow. Have we the right to take all the Earth's resources for our own use?

NO! Then why are we doing so? Let us first understand what can happen if our resources are not judiciously used?

1. Ecological balance will be disturbed.

2. Survival of the human race will be seriously affected.

What can we as responsible citizen's of India do in order to save the earth's resources?

The student's will give answer to this question

You could tell them short instances in story way form so that they realise the importance of our resources. For example: A girl is taking bath with the shower on. She is applying soap and singing in real masti. Her mother is repeatedly telling her from outside to close the shower otherwise the water will finish, but the girl is so busy entertaining herself with the latest melodies that she is not listening to her mother and suddenly water finishes. She shouts!!!!! She has soap all over her body. She dose'nt know what to do. She now curses herself for not closing the shower when it was not required and realises the importance of water.

And do you know after this incidence the girl started preaching her mother how to save water. She told her mother that the washings of the pulses, rice and vegetables could be used for watering the plants. Similarly, the water of the washing machine could be used for cleaning the floor/ tiles.

Another story to inculcate in students that using electricity judiciously can not only bring down the electricity bill, but can also save you from frequent power cuts. When there is a power cut and the generator is on your elders tell you to sit in one room with minimum of the lights, fans and other gadgets to be used so that the generator lasts for long, as one does not know for how long the power cut is. Think, if you switch off the lights, fans and other gadgets when not in use then won't you be saving electricity? Like the generator, the electricity too will last for a longer duration and a time will come when you will not require a generator at all.

By these short stories you will at least make the students think how to save our natural resources particularly water and light which are the two major resources required in our daily life.

ADOPT A PLANT

ACTIVITY: In a small pot each student will be asked either to sow seeds of some simple vegetables like tomato, chillies or they can take a sapling of some ornamental plants, they can even take sapling of

tulsi plant or curry patta. Now they will be asked to look after their own plant till the time they pass out from the school. The plant can then be given them as their farewell gift.
Evaluation: Periodical evaluation for each student in the class can be done monthly by the class teacher. The most healthy plant can also be rewarded by a gift.

CLEAN YOUR ENVIRONMENT

ACTIVITY: Every classroom and the part of the corridor in front of their classroom has to be kept neat and clean. This will be the responsibility of all the student's of one class.
The principal or its representative can take a round at the end of the day and the student's of neat and clean classroom along with the neat corridor can be rewarded by some small gift-----may be toffees, pencil, eraser, etc. and the dirtiest classroom students can be fined (may be asked to bring one pencil, eraser, scale etc which can be given as reward to the one that has won the prize.
Evaluation: The student's can be evaluated on the basis of:

- Neat and clean classroom
- Neat and clean corridor
- Tables and chair properly arranged

Most of you have pets at home. Where do you take them for their nature's call. On the road? But when you are going to school early in the morning you must have seen the faeces of these pets on the road and you were just about to step on it or may be sometime in a hurry you must have stepped on it. What feeling do you get? You curse the society. Have you ever thought that you are also a party to it? Now what you can do? You could suggest your RWA (Resident's Welfare Association) to select a small park which is already there at the extreme end of the society. If the park is not there a small pit can be dug in one corner of the society and can be marked as pet's toilet. Pets should be taken there only for the nature's call. In some days you will realise that the pet will also go to that place only for easing out. You could ask your society sweeper to clean the place once in a day by accumulating all the faeces in one corner. Soon the faeces will decay and become manure which can be used in the society park.

We often crib about water logging especially during the rainy season and curse the government's inefficiency. But are we not responsible? Do we not throw our waste all around without realising that it can block the sever lines. Are we not constructing houses by cutting down our natural greenery without giving a thought whether our land can withstand it or not. You all love to go to a park on a holiday. Think where will you go if most of the parks are cut for residential / commercial purposes.

SAVE PAPER, SAVE TREE AND SAVE THE ENVIRONMENT

We all use paper but most of the time we throw the waste paper in the dustbin. We tear off the envelopes of our electricity, water other bills and throw them in the dustbin. Don't you think we are doing wrong? Do you know where do we get our paper from? YES! You are right. Paper is made from the wood. So, we are cutting a large number of trees to make paper. You also know that trees are very important for a clean and healthy environment and thus it becomes necessary for you to use the paper judiciously. Recycling of the paper is the need of the hour.

ACTIVITY: Select five children in your neighbourhood studying in different classes from class 6^{th} to 10^{th} and ask them the following questions:

1. Do they use full page, half page, single side, both sides of their notebooks?
2. What do they do with the pages left in their notebooks after the session is over?
3. Do they use these empty pages for rough work?
4. What do they do with their old note books? Throw it in the dustbin, give it to the kabadiwallah or burn it?

Record your data in a tabular form. What conclusion do you draw from this?

If these children are not using the paper judiciously, explain them how they are disturbing the natural environment and that their own doing can harm their own future.

Do you know what all you can make with the waste paper?

1. Carry bags
2. Cards
3. Wall hangings and many more articles

ACTIVITY: Ask the students to make best out of waste paper and you could arrange for an exhibition and prizes can be given to the 1st -3rd best articles made out of waste paper.

EVALUATION: Student can be evaluated on neatness of the article, whether the article has actually been made from the waste paper and the innovative idea.

MAKE YOUR OWN COMPOST

- Collect the biodegradable waste in one corner of the school
- The students of each class will be asked to throw the biodegradable wastes in a dustbin kept outside their class.
- At the end of the day one student (every day the student will change and in this way there will be involvement of the whole class) will throw this waste in the large pit made in one corner of the school.
- In this way all the biodegradable waste of the school will be collected in this pit.
- You can select two small corners of your school. Fill one at a time. For two months use one pit and then throw your biodegradable waste in the other pit. Cover the first pit containing the biodegradable waste with soil and leave it for two months. Make sure you keep the soil moist.
- After some time you will see that all the biodegradable waste has been converted into manure.
- This manure can now be used in your school gardens.

You can make your own compost at home also in a pot. Put the used tea leaves, egg shell or any other biodegradable vegetable waste in this pot and cover it with atleast 15cm. of soil. Make sure you keep the soil moist.

And in this way you you have not only made your own compost, but also have saved the environment from pollution.

SANITATION AND HYGIENE

The need of the hour is to make the people aware they have a great role to play in keeping their surroundings neat and clean and that their participation is essential in the management of garbage in their neighbourhood. Why always curse the MCD? If we can keep our house spick and span then why not our surroundings?

ACTIVITY: Each student will be asked to do a survey of atleast 5 families in their neighbourhood and the following questions can be included in the survey sheet.

1. Is there any accumulation of garbage in and around your society/house?
2. Who all are responsible for dumping the garbage in the neighbourhood? The people of the society/house or street sweepers or any other person. Who throws your garbage and where?
3. Is there a municipal corporation dustbin?

4. If yes, then who comes to collect the garbage and how frequently? Twice a day, once a day or once in two days or only when repeatedly complaints are sent to the MCD.

The student will record the observations in a tabular form.

CONCLUSION: Who is responsible for dirting the environment?

1. The students will be asked to write ways of educating their neighbours on proper disposal of garbage.

2. The children of their society can take out a rally with placards and shouting slogans educating the society on hygiene and sanitation. This is our place. We live here. Keep the place neat and clean.

EVALUATION:

1. Did the students complete their survey on time?
2. The different ways that they have suggested for educating their neighbours for disposal of garbage.
3. Neatness and presentation of their survey data.
4. Put three dustbins for disposing off your waste outside your classroom and also in your house. Paint one with red colour, 2nd with green colour and third with blue colour.
5. In the red dustbin throw your non-biodegradable waste, in blue recycled waste like paper etc. and in the green dustbin put bio-degradable waste.
6. The biodegradable waste can be put in a pit for making of the compost, recycled waste to be given for recycling (there are green peace people who collect this, including the newspaper from your doorstep), and only the non-biodegradable waste should be thrown in the municipal corporation dustbin.

ACTIVITY:

BIODEGRADABLE DUSTBIN (GREEN)	NON-BIODEGRADABLE DUSTBIN (BLUE)	RECYCLED DUSTBIN (BLUE)

1. Record the waste of your house for a particular day in the above table.
2. Record your observation for seven consecutive days.

What did your mother do with the respective waste?

Were you successful in segregating the household waste?

EVALUATION:

- Was the student able to segregate the waste correctly?
- Presentation of his/her work.
- Neatness
- Was the work done on time?

ACTIVITY: Role play: The student to be given some topics and asked to enact in the assembly. In this way the entire school will be educated on the environmental ethics. The topic can be chosen from any of the questions written in the beginning of this topic.

- Inter class/ inter school debate/extempore :
- Some of the topics for debate:
    1. Should the paper be recycled?
    2. Should we think of the present and use our natural resources?
    3. Any other topic-----help in choosing the topic can be taken from the questions given in the first part of the topic.

CHAPTER

7 DISASTER MANAGEMENT

India has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions. Floods, droughts, cyclones, earthquakes and landslides have been a recurrent phenomena. Apart from natural calamities, accidental disasters have been frequent for one or the other reasons. Terrorist attack with bomb explosion in different parts of country, stampede in schools, religious places and other crowded areas are hard evidence of the fact that our country needs a better disaster management approach. If we could remember a few of them are:

- **Dec. 4, 1981—** Forty-five people, most of them schoolchildren, were killed when panicked sightseers stampeded down the narrow staircase of the Qutb Minar, in New Delhi.
- **Sept. 10, 2009** five girls were killed and 27 other students injured, five of them critically, in a stampede triggered by rumours of a short circuit in the Government Senior Secondary School in Khajuri Khas at around 9 am following the rumours.

People's attitude in our country towards this issue is *'I was not involved in this disaster, I am safe, and thus I can worry when it will affect me'*. This callous attitude is not going to solve the problem. Disaster management occupies an important place in this country's policy framework as it is the poor and the under-privileged who are worst affected on account of calamities/disasters. Not just our city but the entire country lacks the proper disaster management skills or approach. When an earthquake comes,

people just rush out of their buildings without stopping to think that they might cause stampede which may take more lives that the actual disaster.

Objectives of the chapter

- To have a basic understanding of various concepts used in Disaster Management, like Disaster, Hazard, Vulnerability and Disaster Management Cycle.
- To explain various types of disasters.
- To have a better understanding of natural hazards, disasters and their management.

INTRODUCTION TO DISASTER MANAGEMENT

Over the past decade, the number of natural and manmade disasters has climbed inexorably. Drought and famine have proved to be the deadliest disasters globally, followed by flood, technological disaster, earthquake, windstorm, extreme temperature and others. In India, 59 per cent of the land mass is susceptible to seismic hazard; 5 per cent of the total geographical area is prone to floods; 8 per cent of the total landmass is prone to cyclones; 70 per cent of the total cultivable area is vulnerable to drought. Apart from this the hilly regions are vulnerable to avalanches/ landslides/hailstorms/cloudbursts. Apart from the natural hazards, we need to know about the other manmade hazards which are frequent and cause huge damage to life and property. It is therefore important that we are aware of how to cope with their effects. We have seen the huge loss to life, property and infrastructure a disaster can cause but let us understand what is a disaster, what are the factors that lead to it and its impact.

What is a Disaster ?

The term disaster owes its origin to the French word "**Desastre**" which is a combination of two words **'des'** meaning bad and **'aster'** meaning star. Thus the term refers to **'Bad or Evil star'**. A disaster can be defined as *"A serious disruption in the functioning of the community or a society causing wide spread material, economic, social or environmental losses which exceed the ability of the affected society to cope using its own resources"*. A disaster is a result from the combination of hazard, vulnerability and insufficient capacity or measures to reduce the potential chances of risk. A disaster happens when a hazard impacts on the vulnerable population and causes damage, casualties and disruption. Any hazard – flood, earthquake or cyclone which is a triggering event along with greater vulnerability (inadequate access to resources, sick and old people, lack of awareness etc) would lead to disaster causing greater loss to life and property. For example; an earthquake in an uninhabited desert cannot be considered a disaster, no matter how strong the intensities produced It is disastrous only when it affects people, their properties and activities. Thus, disaster occurs only when hazards and vulnerability meet. But it is also to be noted that with greater capacity of individual/community and environment to face these disasters, the impact of a hazard reduces. Therefore, we need to understand the three major components namely **hazard, vulnerability and capacity** with suitableexamples to have a basic understanding ofdisaster management.

What is a Hazard & How is it classified?

Hazard may be defined as "a dangerous condition or event, that threat or have the potential for causing injury to life or damage to property or the environment." The word 'hazard' owes its origin to the word 'hasard' in old French and 'az-zahr' in Arabic meaning 'chance' or 'luck'. Hazards can be grouped into two broad categories namely natural and manmade.

1. **Natural hazards** are hazards which are caused because of natural phenomena (hazards with meteorological, geological or even biological origin). Examples of natural hazards are cyclones, tsunamis, earthquake and volcanic eruption which are exclusively of natural origin. Landslides, floods, drought, fires are socio-natural hazards since their causes are both natural and man made. For example flooding may be caused because of heavy rains, landslide or blocking of drains with human waste.
2. **Manmade hazards** are hazards which are due to human negligence. Manmade hazards are associated with industries or energy generation facilities and include explosions, leakage of toxic waste, pollution, dam failure, wars or civil strife etc.

What is vulnerability ?

Vulnerability may be defined as "The extent to which a community, structure, services or geographic area is likely to be damaged or disrupted by the impact of particular hazard, on account of their nature, construction and proximity to hazardous terrains or a disaster prone area." In simple terms is the potential for loss to an individual, community or place because of a disaster, which is affected by geographical as well as social conditions. People living in an area may be vulnerable to more than one disaster. For instance, a coastal area may face floods and cyclones frequently, while being located in an earthquake zone. Such an area is called a 'multi-hazard' zone. Our country is divided into various zones based upon the vulnerability of the area to various disasters. When these zonesoverlap, we have a multi-hazard zone.

What is Disaster Management Cycle?

Disaster Risk Management includes sum total of all activities, programmes and measures which can be taken up before, during and after a disaster with the purpose to avoid a disaster, reduce its impact or recover from its losses. The three key stages of activities that are taken up within disaster risk management are:

Before a disaster (pre-disaster):

Activities taken to reduce human and property losses caused by a potential hazard. For example carrying out awareness campaigns, strengthening the existing weak structures, preparation of the disaster management plans at household and community level etc. Such risk reduction measures taken under this stage are termed as mitigation and preparedness activities.

During a disaster (disaster occurrence):

Initiatives taken to ensure that the needs and provisions of victims are met and suffering is minimized. Activities taken under this stage are called emergency response activities.

After a disaster (post-disaster):

Initiatives taken in response to a disaster with a purpose to achieve early recovery and rehabilitation of affected communities, immediately after a disaster strikes. These are called as response and recovery activities. Disaster Risk Reduction can take place in the following ways:

1. **Preparedness**
   This protective process embraces measures which enable governments, communities and individuals to respond rapidly to disaster situations to cope with them effectively. Preparedness includes the formulation of viable emergency plans, the development of warning systems, the maintenance of inventories and the training of personnel. It may also embrace search and rescue measures as

well as evacuation plans for areas that may be at risk from a recurring disaster.
Preparedness therefore encompasses those measures taken before a disaster event which are aimed at minimising loss of life, disruption of critical services, and damage when the disaster occurs.

2. **Mitigation**
Mitigation embraces measures taken to reduce both the effect of the hazard and the vulnerable conditions to it in order to reduce the scale of a future disaster. Therefore mitigation activities can be focused on the hazard itself or the elements exposed to the threat. Examples of mitigation measures which are hazard specific include water management in drought prone areas, relocating people away from the hazard prone areas and by strengthening structures to reduce damage when a hazard occurs. In addition to these physical measures, mitigation should also aim at reducing the economic and social vulnerabilities of potential disasters

Conclusion

'Prevention is better that cure', educating the people about small things like how to evacuate, where are the safety exits, where to assemble during disasters is certainly much better than having the paramedics search the disaster affected area for dead bodies. What needs to be understood here is that a little education and awareness goes as far as saving a life or two. There is already a legislation which takes care of institutionalization of disaster management (Disaster Management Act, 2005).

There are various ways to achieve a great improvement in the way we look at 'disasters', some of them are:

1. Making it compulsory for every institution or building to have an evacuation plan. Conducting mock drills at least once a month.
2. Disaster Management courses in schools should be more practical in nature and nor theoretical. Making students 'learn' what to do during disasters for examination purposes is not going to help them when an actual disaster strikes.
3. Local authorities should mark disaster sensitive areas and alert the locals to take all the necessary steps to prevent getting affected.
4. Since technology and internet have become a great tool for self education these days, the websites for NDA needs to be improved to make them more interactive and educative.
5. India as a nation needs to inculcate a culture where disaster management becomes a habit. Our approach regarding putting off such things for future or until they affect us directly can someday cost loss of many lives. Being prepared and cautious is any day better than being full of regret.

FIRST AID

INTRODUCTION

First aid is the immediate treatment given to the victim of an accident or sudden illness before medical help is obtained. First aid has been practiced ever since the beginning of humanity. Learning first aid is the responsibility of every citizen.

Mahatma Gandhi was a great supporter of the cause of First Aid, and led a band of dedicated volunteers in 1906 during the time of the Zulu Rebellion and earlier in 1899 during the Boer war.

OBJECTIVE

First aid is an important skill. It is important for every person to know the simple methods of first aid for some of the common ailments. By following some of the guidelines one can save life of many people by giving these initial remedies until the professional medical aid arrives.

In an emergency there's no time to read manuals or instructions. If one has memorised some of the immediate medical help, it will help in emergencies by reacting quickly and efficiently.

Learning objectives

After reading this module we will be able to:

1. Provide pre-medical help to the victims of an accident or sudden illness
2. Make our own first aid box and maintain it
3. Develop basic skills to provide immediate help in emergent medical situations

1. **BLEEDING:** While playing, you or your friend must have fallen down and got hurt and bleeding may have occurred from the injured area. You may have panicked because the bleeding was not stopping. The immediate medical help that you can give to stop bleeding is as follows:
   - ♦ Raise the injured part (this will reduce the flow of blood from the injured part). If required, lay the victim down and raise the injured part.
   - ♦ Stop the bleeding by applying pressure with a clean cloth (preferably an absorbent cloth). If the cloth is not there then the pressure can be applied with your fingers to stop the bleeding.
   - ♦ If the blood soaks through the cloth, then apply a second bandage. Do not remove the first cloth as it will disturb the clotting which has already taken place.
   - ♦ Once the bleeding has stopped, clean the wound gently with soap and water to remove the dirt and apply a mild antiseptic.

APPLY FIRM PRESSURE TO THE WOUND UNTIL THE BLEEDING STOPS

http://www.wikihow.com/Stop-Bleeding

2. **NOSE BLEEDING**: During the hot summer months, due to the intense heat sometimes you or your friend's nose may have suddenly started bleeding. The first and foremost thing for you is to remain calm. If it is your friend, ask her/ him to remain calm and then follow the self-care home treatment given below.
   - ♦ Sit down and lean forward
   - ♦ Using your thumb & index finger, squeeze soft part of nose
   - ♦ This part is between end of nose and the bridge of nose
   - ♦ Continue holding till bleeding stops. Do not stop in-between
   - ♦ If bleeding continues, hold for another 10 minutes
   - ♦ Divert the attention of the patient
   - ♦ Avoid picking, blowing or rubbing nose for 2 days
   - ♦ Place an ice pack on the bridge of nose

3. **CUTS AND GRAZES:** It is very common and each one of us must have got cuts at some stage in our life either while playing or while working in the kitchen or while sharpening a pencil with a knife or a blade. Here are some simple tips for you to follow under these circumstances.
   - ♦ Clean the cut area using a cotton swab or gauze.
   - ♦ Apply a mild antiseptic.
   - ♦ Tetanus injection may be required if the cut is caused by a rusty or dirty object.
   - ♦ For small cuts, cover it by band aid (surgical tape).

4. **BRUISES:** Bruises are caused when a fall or a blow causes bleeding in the tissues beneath the skin.

   Caution: Don't fight with blows with your friends
   - ♦ Place a plastic bag containing some ice on the bruise for 20-30minutes. You can put crystals of ice in a zigloc bag and seal it to make a ice pack. The cold reduces the flow of blood to the bruised area, thus limiting the bleeding into the skin. It also reduces the size of the bruise.

5. **BURNS:** Be careful while doing an experiment in the lab or while working in the kitchen on a gas stove/ gas burner. On Diwali festival be extra careful while burning crackers. Always have some elderly person with you while burning crackers on Diwali.
   - ♦ In case of minor burns (first degree burns- damages only the outer layer of the skin), cool the burn by dipping the burnt area in cold water or holding it under cold water for 10-15 minutes.
   - ♦ Gently dry and cover the burnt area loosely with a clean, dry gauze to prevent infection.
   - ♦ In case of second degree burns, remove all clothing, jewellery etc. from the burnt area unless it is sticking to the skin. Pour cold water over the affected area for 10-15 minutes. Gently blot the area dry (do not rub as rubbing may break the blisters thus subjecting it to infection). Lightly cover the entire area with a clean dry dressing. Raise the burnt area (arm or leg) to reduce swelling and immediately consult a doctor.
   - ♦ In case of third degree burns, immediately rush the patient to a doctor. Do not wash with cold water or apply meditation to the burn. Just place clean, dry cloths over the burnt area.
   - ♦ In case of burn with acid, use large quantity of water to wash off the acid and then wash with an alkali and treat as for ordinary burn.
   - ♦ In case of burn with strong alkali, wash with water and apply vinegar or boric acid solution. Apply a burn ointment.
   - ♦ If the patient has burn on the face, keep checking to make sure the patient is not suffering from breathing problem.
   - ♦ Never put butter or greasy ointment on a burn. They seal heat into the wound and may cause infection. Also never use ice directly on the burn. Putting ice directly on the burn can cause frost bite further damaging the skin.

6. **FOREIGN BODY IN THE EYE OR EAR:** It is quite common and everyone of us must have faced some dust particles getting into our eyes. What should we do then? Here are some easy home care remedies for you:
   - ♦ Never rub the eye.
   - ♦ Wash the eye with clean water.
   - ♦ In case of chemicals that have splashed into the eye, quickly wash out the chemicals by holding the victims face under the running water for at least 10-15minutes. Care should be taken that the chemical is not washed over the uninjured eye (tilt the head with the injured side downward).
   - ♦ Cover the eye with a clean pad and consult a doctor.

7. **FRACTURES AND DISLOCATIONS:** If you feel there is a dislocation or fracture, then:
   - ♦ Make the patient comfortable. Move the patient as little as possible (movement may displace the broken bones).
   - ♦ Give support to the injured part. For example: the fractured arm should be supported against the body with a sling or bandage.
   - ♦ For the dislocation, do not try to force back a dislocated joint by yourself. Apply a splint to the joint to keep it from moving. Try to keep the joint elevated to slow the blood flow to the area and immediately consult a doctor.

8. **INSECT BITES AND STINGS:** A honey bee or wasp enters your classroom and stings you, then don't panic, just follow these home care remedies.
   - ♦ Insects, spiders and scorpions are capable of causing very painful reactions. They can be dangerous but are rarely fatal. Sometimes they may cause allergic reaction. Remove the sting by scraping it using tweezers or a straight edged object.

- Wash the area with soap and water.
- Apply cotton or gauze soaked in ammonia solution or washing soda.
- Apply ice to reduce pain and swelling.
- Take the patient to a doctor.

9. ANIMAL BITE (PETS /WILD ANIMALS):

- Wash the wound with soap and running water.
- Apply an antiseptic ointment and rush to a doctor for medical aid. Tetanus booster may be required.

CAUTION: Don't go too near a stray dog. Don't disturb a pet when the pet is having food.

10. SNAKE BITE: First identify whether the bite is of a poisonous snake or a non- poisonous snake. In case the bite is of a poisonous snake then give the following immediate medical help:

- Tie a piece of cloth above the wound to check the blood circulation and spread of venom into the body.
- Cut open the wound made by the snake's teeth with a sharp knife or razor blade.
- Suck the blood out with a tube or mouth and immobilize the affected area with splints.
- Immediately take the victim to a doctor for medical treatment (you should do this only with required precautions).

11. Food POISONING: Food poisoning can be caused if you eat open food from road side food stall or you eat cut fruits from the road side vendor or drink juice from an unhygienic juice stall.

- In case of food poisoning induce vomiting by giving a large quantity of a solution of common salt, or a solution of soda or by putting fingers in the throat. If the patient's head is kept in the downward direction, then it will help in vomiting.
- Take the victim to the nearest hospital.

12. ARTIFICIAL RESPIRATION:

- Artificial respiration is a life-saving method used to restore breathing to a person whose breathing has stopped.
- Tilt the head back and lift up the chin.
- Pinch the nostrils shut with two fingers to prevent leakage of air.
- Take a deep breath out and put your mouth over the victim's mouth and breathe slowly into the patient's mouth. Repeat this twice.
- Check if the chest rises as you breathe into the patient. If it does, then enough air is being blown in.
- If there is no response, hold the head back further and lift the chin and repeat the procedure until the person starts breathing.
- Take the person to the nearest doctor.

Take a deep breath and put your mouth over the victim's mouth and breathe out slowly into patient's mouth. Repeat this process.

13. **HEART ATTACK:**
    - Immediately lay the person in a horizontal position and encourage the victim to relax. Prevent any unnecessary stress and avoid movement.
    - Allow plenty of fresh air to come.
    - Loosen the person's clothing.
    - In case the person's physician has advised any medicine for heart attack, then immediately give the medicine and call for the doctor.
    - Meanwhile follow the advice given by the doctor over the phone.

14. **UNCONSCIOUSNESS:** A person may become unconscious because of intense heat, epilepsy or if the person is empty stomach for a long time. Here are some immediate remedies that you can give to the patient:
    - Prevent overcrowding around the victim to ensure fresh air.
    - Lay down the victim with head lowered and legs elevated.
    - Loosen any tight clothing.
    - Apply cool, damp cloth to the face and neck and allow fresh air to come.
    - Keep the patient lying down for at least ten minutes after recovery
    - Do not give anything to drink unless fully revived.

15. **ELECTRIC SHOCK:**
    - Electric shock can cause unconsciousness, or stop breathing. First aid cannot be given unless the victim is separated from the electric current.
    - Immediately turn off the electricity.
    - In case you are not able to turn off the electricity, stand on the dry insulating material such as rubber mat, or a thick pile of newspaper. With a wooden stick or a wooden chair, push the victim's body away from the electrical appliance. **Never touch the victim.**
    - If the person becomes unconscious or stops breathing then follow the instructions given before.
    - Call for a doctor/ rush the victim to a nearby hospital.

16. **DROWNING:**
    - Make the victim lie down with head lower than the chest/rest of the body to reduce the risk of inhaling vomit.
    - The person should be kept warm by rubbing on the palm.
    - Turn the victim upside down and press his/ her back so that he vomits out water from the lungs.
    - Give artificial respiration till the victim starts breathing on his or her own again or till medical advice arrives.
    - If the victim starts coughing or spurting again from mouth and nose, then turn the victim on their side. This will remove the water from the lungs.
    - Once the victim starts breathing naturally, keep him or her warm and call for the doctor/ take the victim to a nearby hospital.

CAUTION: Never enter a swimming pool alone. Always go with a trainer or with someone who knows swimming.

First aid box

The eco-club teacher should keep a first-aid box in her/ his cupboard. She should also train all the eco club members how to use the various first aids.

CONTENTS OF FIRST AID BOX

1.	SMALL COTTON ROLL	1
2.	GAUZE BANDAGES (different sizes)	3
3.	DISPOSABLE GAUZE BANDAGES (different sizes)	3
4.	CREPE BANDAGE	1
5.	SAVLON/DETTOL (small bottle)	1
6.	POVIDONE IODINE OINTMENT	1 TUBE
7.	BETADINE SOLUTION	1 BOTTLE
8.	THERMOMETER	1
9.	SMALL SCISSORS	1
10.	CROCIN/PARACITAMOL TABLETS/ DIEGIENE TABLETS/PUDHINHARA TABLETS	6
11.	SMALL STEEL BOWL	1
12.	ASPIRIN TABLETS	50
13.	JOHNSON'S BAND AID TAPE STRIPS	25
	OR MICROPORE TAPE	1
14.	HAND SANITIZER	1
15.	CALAMINE LOTION	1
16.	BURNOL/SILVER SULPHADIAZINE TUBE	1 tube
17.	TRIANGULAR BANDAGES	2
18.	STERILE GLOVES PAIR	1

ACTIVITY 1

Your friend was jumping the hurdles during the games period and suddenly misses her rhythm and falls down. She bruised her elbow and got a cut on her knee. What immediate medical care would you give to your friend?

ACTIVITY 2

Your mother was cutting vegetables and was distracted by a serial on the television and suddenly cut her finger. Blood started coming out. You were sitting next to her. What will you immediately do?

ACTIVITY 3

In the laboratory, while working with concentrated sulphuric acid it suddenly fell on your hands. What immediate medical care will you take?

ACTIVITY 4

You were making Maggie at home, your finger got burnt, what will you do?

ACTIVITY 5

Your friend had not eaten any breakfast. She was playing in the playground in the hot summer month and suddenly she fell unconscious. What immediate medical care will you give to your friend?

ACTIVITY 6

You see a person falling down on the road as his motorbike skids. You rush towards him and you think that the pain and agony of the person is because of a dislocated bone or maybe a fracture of his right leg bone. What medical care will you immediately give to the victim before taking him to a doctor.

REFERENCES

- Home Science Teaching-A New Perspective Teacher's Manual For Classes VI-X

  State Council Of Educational Research And Training

  Varun Marg, Defence Colony, New Delhi 110024

CHAPTER

8 GREEN SCHOOL CAMPUS

To achieve the objective of creating environmental awareness amongst the future generation**,** the Ministry of Environment and Education has been implementing several schemes and programmes. One of such measures is eco clubs. Eco-clubs are environment clubs which are formed in various educational institutes, started in 1998 with 100 schools in Delhi. Eco Clubs play an important role in creating environmental awareness amongst the future generation. 2000 Eco-Clubs have been established in Government, Aided, Private, Public Schools and Colleges of NCT of Delhi.

Now the Department of Environment provides a grant of Rs. 20, 000 to each eco-club on annual basis for undertaking various eco- friendly activities. The major activities carried out by these eco-clubs include tree plantations, clean drives, awareness programmes like quiz, essay-writing competitions, nature trails etc. The perceptions of the teachers reveal that the status of environmental education is not much encouraging. A lot has to be done with respect to curricula, development of teaching-learning material, modes of transaction, co-curricular activities, and providing reinforcement for attainment of the objectives of environmental education. **.** The Green Team is the heart of the Green Schools process, both organizing and directing activities at the school. Consisting of the stakeholders of the school environment - students, teachers, custodians, facilities managers, parents and school board members - the Green Team is democratic and can often be run by the students themselves. Whatever the type of school or age group, student involvement in the committee is essential. This group can be charged with coordinating many of the greening activities, making recommendations to relevant school decision-makers, and facilitating communication among -- and actions by -- the whole school community. Use our tips for starting your Green Team.

1) **Adopt an Environmental Vision Statement or Planet Pledge:** Each school produces its own vision statement, setting out what the students and/or school community are striving to achieve. The Environmental Vision Statement or Planet Pledge is displayed in various places within the

school and is recognized by the students and other school community members as a statement of beliefs and intents. This statement is often in the words of students, and can be an inspiring classroom, art, or school-wide assembly project. Such statements can also be accompanied by a resolution from the school board, Parent Teacher Association, the Green Team, or other school bodies (see the sample school board resolution and sample policies on our Take Action page). Use our Four Pillars Graphic to help you understand and define the key components of a Green School.

2) **Conduct a School Environmental Survey or Audit:** To identify priorities for action, begin with conducting a review of your school's environmental impact. Students are involved in this work at every step, from assessing the level of waste from school lunch, to checking the building for inefficiencies such as leaky taps, or electrical equipment left on overnight. The school and the Green Team can work with local organizations, businesses, or other resource people or experts during the review. Take the "How Green is Your School Quiz" and see how you rate. Find other examples of environmental surveys and audit tools on our Resources page, under Curricula. We've also got lots of ideas and resources on our Curriculum Ideas for Hands-On Audits page. These audits can be fun and really help educate the school community about the health and environmental impacts of the school.

3) **Create A Green School Action Plan:** Use the results of your environmental survey or audit to identify priorities of the key areas where you want to make change and create an action plan. It is important to set realistic and achievable targets to improve environmental performance at the school so kids and adults can take pride in tangible accomplishments in the short term. And it is important to set long-term, inspiring and challenging targets to move beyond the status quo and foster greater environmental improvements. The action plan could involve and promote, for example, a school recycling program; eco-friendly, non-toxic cleaning materials; carpooling; energy conservation like turning off lights, computer monitors and printers; or a school garden. See the "sample school board resolution" and "Steps Forward" on our Take Action page for examples of policy resolutions, and specific action items under a range of environmental and health topics. Download a sample worksheet (Word doc) to help create a one-year work plan.

4) **Monitor and Evaluate Progress:** The Green Team, students, or other school community members can assist with monitoring and evaluating progress on the priorities in the action plan. This could involve conducting an annual environmental audit to monitor levels of waste, recycling, energy use, purchases of environmentally-preferable products, and financial savings and/or costs. Use these ecological footprint tools combined with our resources on school audits. The information from the monitoring is needed to ensure that progress towards the goals and targets is made and that the action plan is modified, if necessary. It also ensures that environmental education is an ongoing process in the school, since students can be responsible for the annual audits. The basic data collected over time can show the waste, pollution, and energy avoided - big motivators for people to continue the efforts.

5) **Integrate Greening into the Curriculum:** Greening activities can be integrated into existing curricula in science, art, humanities, math, language arts, or electives. Using the school as a hands-on laboratory offers opportunities for real-world problem-solving. Students can undertake study of themes such as energy, water, forests, toxic pollution, and waste. The whole school should be involved in practical initiatives - for example, saving water, recycling materials and saving energy. Outdoor education and time spent in nature locally - whether the schoolyard, a park, or a field trip - is a critical component of a hands-on, place-based, experiential education. Where environmental education is not part of the regular curriculum, recommendations can be made by the Green Team as to how these themes can be incorporated. See our Teach Stewardship and Resources pages for a Sustainable Curricula Directory, examples of environmental curricula, on-line quizzes, and other

teaching and learning resources, including reviews of books and other media with environmental themes. No need to reinvent the wheel - there are loads of existing curricula you can use!

6) **Inform, Involve, and Celebrate! :** Honour, celebrating, and communicating about achievements are critical components of a Green School! Greening programs can often unify the whole school and strengthen community relations. Your school might consider partnering with external organizations from the community to benefit from their experience and expertise. In some schools, environmental consultants have offered to take part in the environmental review process. Many local government agencies and utilities offer free advice on energy, recycling, and hazardous waste management. Schools should also consider the wider community when preparing action plans - for example, schools could offer to be the local recycling point or to be a drop-off for Community Supported Agriculture boxes. Some schools get involved with clean-up or habitat restoration at nearby parks or share their experiences in other ways. A communication and publicity program keeps the school and the community informed of progress through classroom displays, school assemblies, newsletters, or other press coverage. Communicating is key to spreading success and inspiring more actions. Annual Earth Day celebrations - organized around April 20 - can offer an opportunity to showcase actions taken by the school and bring together the school and wider community.

The number of studies has also been carried out to reflect upon the role of eco club students in creating environment awareness. Case study from the eco club of presentation convent school in Delhi (2006) showed the effective use of three R's- reduce, recycle. reuse , it is recycling waste paper generated in school started with small recycling paper machine in the school they have move on to recycling machine which can load 10 kg in one operation. Eco club students recycled paper once a week and generated around 100 chart papers from 10 kg of paper waste. So in order to familiarize students with linkage between education and environment; and how healthy living conditions in schools can be enhanced, a project on Green School Programme was initiated at DIET Daryaganj with collaboration from Centre for Science and Environment (CSE) is a public interest research and advocacy organization based in New Delhi. Through in this project pupil teachers were trained to use Green School Manuals prepared by CSE in assessing environment of their schools during School Experience Programme, which would lead to betterment in environmental conditions. The study reflected that status of eco club in schools was on the average. Majority of the sampled schools were involved in number of activities related to environment such as plantation, rain water harvesting but not all. As suggestion mentioned by the teachers training on eco clubs need to be increased and involvement of NGOs with school was also strengthened. Moreover encouragement among stakeholder need to be emphasized as the participation by schools in environmental programmes at different level was low. Over and all there seems to be lack of planning and organization. The structure of eco club in schools need to reorganize as respondents reported that eco club should not be responsibility of eco club in charge only but each and every personnel in school should be include in it. In future following more environment activities can be conducted to make school green

1. **Lighting:**

   Switch to CFLs: Ask school to switch all light bulbs to CFLs. CFLs provide the same light as incandescent but use less energy and last longer. Switching to CFLs is one of the easiest ways to reduce your campus footprint and save money. Check out these CFL facts from Energy Star:

   - Install **occupancy sensor lights** that turn on and off automatically based on room activity.
   - Ask your school to order "Turn off Lights" **switch decals** as a friendly reminder to turn lights off on your way out.
   - *Use compact fluorescent light bulbs* .This is a good bit of advice for those students, teachers and school staff members who are living or working in school campus. These bulbs might be

slightly more expensive than regular ones, but will decrease your energy intake, last longer and ultimately save you money. Lamp light is a lot more pleasant and environmentally efficient than overhead dorm lighting.

2. **Go tray less:** Join several schools in going tray less at dining halls in an effort to conserve water and reduce food waste. Need to get food to go? Ask if your school provides reusable to-go boxes, and if not, bring your own.
3. **Natural cleaning products:** Encourage your school to purchase and use environmentally-friendly cleaning products. These Enzymatic Cleaners from Green Irene are safe for both you and your students, and the environment. Seventh Generation products are also a great choice.
   - ♦ Ask residence halls to keep a **supply** of environmentally- friendly cleaning products at the front desk so students can sign them out as needed.
   - ♦ Keep environmentally-friendly detergent in campus laundry rooms. **Bonus Points:** Keep drying racks in laundry rooms to encourage air drying, or set up a residence hall air drying rack rental system.
   - ♦ Check out Ithaca College's Green Cleaning Commitment.
4. **Recycle:** Your school can significantly reduce its footprint by supplying recycled products and offering recycling options.
   - ♦ Ask computer labs and administrative offices to use recycled paper.
     a. Advertise Eco Font and **double sided printing** options on computer screen backgrounds! Teachers and students both usually don't mind if they read papers that are printed using both sides of the paper. This is a huge way to save on paper. Also, to save ink, use the low quality settings on items that don't need to look too nice or that are just text. Lastly, think about what you're printing out. If you can show someone the website on a screen, do it. You don't need to print it out.
   - ♦ Buy recycled napkins for dining halls and recycled toilet paper for campus facilities. We're not telling you to eat cleaner, but we're telling you to not overdo it in good restaurants. Generally, a lot of fast food and take out is eaten by students, which means a lot of napkins get grabbed on the way out. Limit the amount you grab!
   - ♦ Set up **recycling stations** at residence halls where residents can drop off light bulbs, batteries, paper, aluminum, cardboard, and glass to be recycled. Supply residents with in-room recycling bins to make it easier for them.
   - ♦ Hold an e-waste day where residents and even community members can drop off electronic wastes to be recycled.
5. **Walk, bike, and limit the use of your car:** Most campuses, especially those that are trying to become a more eco-friendly campus, have pretty good public transit. Walking or cycling will not only help make your campus and nearby region a green area, but will help you avoid the pollution. If you must drive, try to find others who need to as well, and carpool to save emissions**.** Starting a bike or car share program on campus is a great way to get students, faculty, and employees to use a clean, efficient mode of transportation.
6. **Install water-filtration fountains:** Decrease your school's footprint by installing more water fountains on campus to encourage less plastic water bottle use.
   - ♦ You can order customized reusable water bottles with your school logo through the campaign.
   - ♦ Carry a water bottle. Not only will this save the environment by decreasing the amount of plastic waste on your campus, but will also help keep you hydrated and your metabolism high. A water bottle can be refilled at any water fountain and can easily be drank in class or while riding a bike, car, train or bus.

7. **Energy Efficiency:** Let your school know that it can save money while helping the environment by using more energy-efficient appliances.
   - ♦ Tackle Vampire Energy by providing **power strips** to residents and administrative offices.
   - ♦ Encourage your school to buy energy-efficient **appliances** for residence halls, dining halls, and campus offices. Hamilton College received Energy Star certification for two of its residence halls.
   - ♦ Installing energy-efficient **hand dryers** saves both energy and paper waste.
8. **Conserve Water:**
   - ♦ **Install dual-flush toilets:** Boston University installed dual-flush toilets on campus to help conserve water. Check out their dual-flush toilet information and facts on their sustainability website.
   - ♦ Ask Housing to provide dorm bathrooms with **shower timers**. Read how 16 students at Seattle University save over 1,000 gallons of water a week by using shower times here.
   - ♦ Install **low-flow shower heads** in showers to conserve water.
9. **Vacations and Break**
   - ♦ **Email students** a few days before break to remind them to turn lights off, unplug appliances, and to turn down thermostats before leaving for break.
   - ♦ Ask campus facilities and operations to decrease building energy use by going into "**break mode**
   - ♦ Make a website or Face book group that students can ask for and offer **carpool** rides.
10. **Go Paperless:**
    a. Save trees, energy, and money by going paperless!
    b. Ask to submit assignments through e-mail and if they don't mind posting assignments and readings online.
    c. Encourage clubs and groups to advertise on white boards instead of posting flyers.
    d. Use refillable binders instead of notebooks. This is a simple way to save waste. Whenever the session is done you can take out your notes, staple and save, then use the binder for the next session.
    e. If you really want to take an extra step to make your campus greener, Increase use of laptop/ desktop/tablet etc. to take and compile notes.
    f. The amount of paper student goes through per year is insane; between class notes, scrap copies, term papers, student newspapers, graphs and pictures printed out plus countless other random items add up. We know that these things can't be avoided, but the way you handle the use of all the paper can really help create a better green campus. Look for recycling bins by garbage bins, dorms, restaurants and classrooms.
11. **Buy recycled goods as much as possible.**
    - ♦ Paper, cleaning products and water are products that can be purchased as a recycled good. They're slightly more expensive than the normal products, but it's worth it to make a green campus.
    - ♦ *Buy used clothing.* Usually thought of as something to do to save money, it is also good for the environment! Recycling clothes minimizes the use of resources to make clothing and puts a dent in the problem of worldwide sweatshops

Its not only during the period of eco club or environment education when you devote significant classroom time to exploring issues of environmental awareness and stewardship. Whether you teach biology, history, or language arts, the Web is a rich and ever-growing resource, with curriculum ideas for integrating environmental issues into lesson plans. But where to begin? That will be your decision, but we'll help you get started. We've compiled a cross section of seven activities and projects in detail and

with ideas for every grade level. Some can be completed within a few class periods and others require more time, but all are sure to get your students -- and you -- thinking about what can be done to preserve our school campus, colony, district, state, country and in turn increasingly fragile planet.

Vermicomposting

Welcome to this lesson on Vermicomposting or worm composting.

- We will cover the characteristic and differences in the garden variety worms and the Red Wigglers.
- Reproduction and life cycle.
- Small medium and large scale worm bin/digesters, other type of worm operations and equipment.
- Talk about the uses of castings. And lastly we will set up a small bin.
- Later we are going to introduce some worms into to curing pile at UNC.
  The process of utilizing worms and microorganisms to consume/convert organic wastes into nutrient-rich humus like material is known as vermicomposting. Actually it is worm castings or worm poop!
- Utilizing earth worms and microorganisms to convert organic waste into a nutrient-rich humus like material known as vermicompost (worm castings)
- *Eisenia fetida*, commonly called 'Red Wiggler', 'Manure Worm' or 'Tiger Worm'.

Characteristics of garden worms

Knight crawler or dew worm (*Lumbricus terrestris*).
~ Not a composter.
~ Garden variety worm are soil- dwelling species that tunnel & borrow.
~ Do not consume large volumes of organic material.
~ Will not reproduce well while being confined.
~ Live several feet below surface.
~ Feed on the surface at night.
~ Require cool (45 F or 7.2 º C) temperature.

COCOON

VERMICOMPOSTING HOME MADE

VERMI-REPRODUCTION

A worm is sexually mature when they develop that band about 1/4 - 1/3 the distance back from the head. This band is called the clitellum's and it contains the reproduction organs. Worms are asexual (do not need a partner)but as a rule they do use a partner. What happens is that the worms find each other, then crawl facing each other and line up the clitellum's side by side. They each excrete a mucus like substance that encompasses them both. They both will then exchange both egg and sperm into this material. After the exchange has taken place, the worms then separate and the mucus like material then starts to harden. The worms then crawl out of this material, which creates a cocoon. This cocoon is a fertilized egg sac. 3-6 weeks after being deposited in the bedding, 1 – 7 worms can hatch. Within 6 weeks of hatching those worms are capable of reproducing. Limiting factors on population growth are food source, temperature, pH, moisture and living area. Pretty much the same parameters as a adult.

Home made version – drill a few holes for air and drainage

Works, inexpensive – a better way would be to drill 2" holes and use 2" soffet vents.

CAN – O – WORMS

WORM FRIENDLY BIN

MIDSCALE VERMICOMPOSTING

MIDSCALE VERMICOMPOSTING

Windrow Beds **Utilization of Worm Casting**

Above ground bin that could be easily insulated and green house heater cables installed to maintain a comfortable environment for the worms. Manual and labour intensive to harvest.

Vermicycle, Tarboro, NC 15000 LBS/Day Hog Manure

Raw Material

- Pit with PVC sheet or brick and cement tank or wooden boxes to house earthworms.
- Coconut fiber, rice husk, sugar cane bagasse, saw dust, chopped rice/wheat straw, cow dung, green foliage, vegetable remnants, discarded parts of fruits, droppings of animals

Process

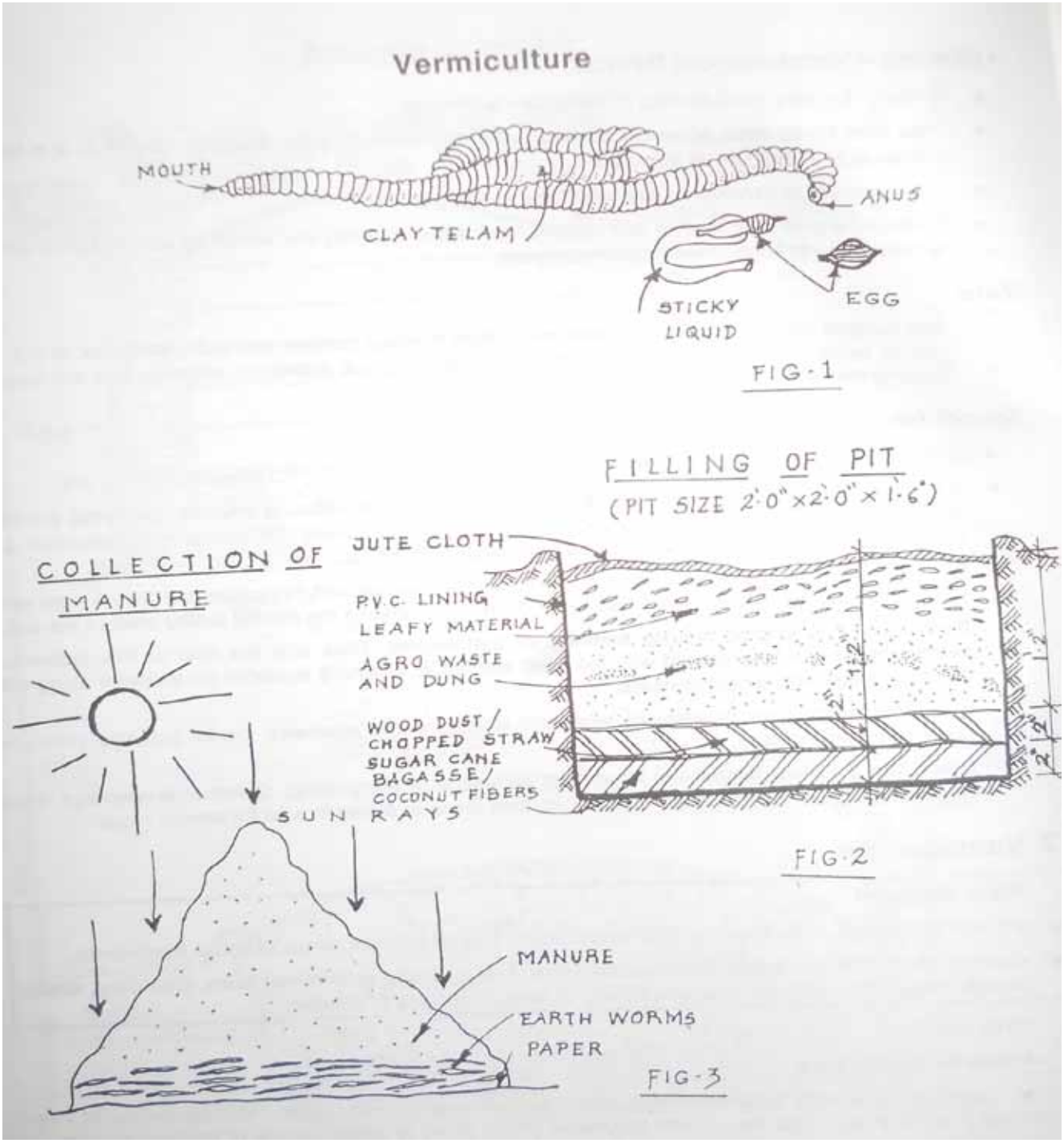
- Select a place away from direct heat,strong sunlight and incessant rains.
- Dig a pit measuring 2 feet x 2feet x 2feet. Line the pit with polythene(PVC) sheet to arrest the escape of the earthworms.(brick and cement tank or wooden boxes can also be used).
- The pit is systematically filled with four layers of waste. First layer i.e., bottom of the pit is filled up to 2 inches with coconut fiber/husk or sugarcane bagasse. Second layer is 2 inches thick, consisting of saw dust/chopped rice/wheat straw.
- Dampen the bed by sprinkling water. Third layer is the earthworm food, this includes an admixture of cow dung, green foliage, vegetable remnants, discarded parts of fruits, dropping of horses, pigs, sheep or biogas slurry, human excreta, paper or scrap of cardboards etc.
- This feed should be spread till a height of 6 to 8 inches.
- Release about 100 earthworms on the top of the waste bed without hurting them.
- These earthworms will start penetrating to the bottom.
- Once all these earthworms disappear, cover the surface with jute bags and keep them wet by sprinkling water in a judicious way.
- The jute may be turned upside down thrice in the first week, twice in the second week and only once in the third and following weeks, without causing any disruption to the top layer.
- Water and heat inside the tank assist the organic matter to decay and the earthworms to proliferate, both occurring simultaneously.
- By 4 to 5 weeks, the heat inside the pit will start reducing and will come down to 15-18 **º C)**.
- When it does not appear warm when felt by hands, that means that the manure is ready for use.
- From one tank, 50 Kg of manure is produced.
- Spread a plastic paper on the ground and empty the contents of the tank slowly in sunlight making

a pyramid like heap.

- Let this heap remain in direct sunlight for about half an hour, which will induce the earthworms to penetrate deep and reach the bottom. Now the upper layers of organic manure can be lifted slowly.
- Later the earthworms at the bottom may be separated form one another and deposited in the re-filled tank.

Precautions

- Rubber, metal, brass pieces are disliked by the earthworms.
- Salt, chilly ginger, soap or soap water as well as insecticides destroy the earthworms; hence all these things ought to be avoided.
- Be careful of rodents, insects, birds etc. which feed on the earthworms.



Castings Utilization

Used in potting soil blend (10% max.).

Used to inoculate soils with beneficial microbes.

Excellent source of beneficial bacteria, fungi, nematodes for compost tea brewing.

Sales potential - $ 16 per pound (2 oz pouch) / $ 320 – 800 Pound tote

Herbal garden

Aims of this activity:

- Sustainable management of Medicinal and Aromatic Plants (MAP) for plant based drug industries and Traditional Health Practitioners
- Conservation of biodiversity
- Promoting the MAP as a rural livelihood package
- Popularizing the traditional medicine as a creditable and safe health programme so as to integrate with primary healthcare

Objectives:

- Sensitize students about importance of medicinal plants
- Develop skills in students to maintain gardens
- Involve community in garden development
- Learning and sharing

History of medicinal plants/herbs in India

- Plant based medicine is ancient (Ayurveda, Unani, Siddha, Homeo).
- Self reliance medical care system
- Usage in modern & traditional system of medicine

Pre-requisites at school level for setting up a herbal garden

- Presence of compound wall
- Water facility throughout the year
- Ownership of land by school
- Land area in the school of the size 1/10 of hectare (1000 sq.mt) for developing herbal gardens

- Willingness of the school to develop a herbal garden

***Mentha piperata* (Peppermint)**

- Leaves are used.
- Peppermint oil is largely used as a flavouring agent for confectionery as well as toothpastes and mouthwashes.
- The historical use is for easing intestinal cramping, reducing gas production and generally soothing intestinal irritation.
- Has the ability to reduce pain and tension.

***Ocimum basilicum*(Marua Basil)**

- Grown for their ornamental foliage as well as their culinary usage.
- Helpful in boosting immune system of our body.

Bryophyllum calycinum

- Leaves
- Magic leaf prevents ulcer.
- Has the effect of dissolving kidney stones.
- Practice is to cleanse the leaves and eat them every morning for 40 days to dissolve stones.

***Catharanthus roseus*(Sadabahar)**

- Whole plant.
- Used to treat diabetes in Europe.
- Juice from leaves used to treat wasp stings.
- In Hawaii, the plant is boiled to make a poultice to stop bleeding.
- In China , used as astringent, diuretic & cough remedy.
- In S. America used as homemade remedy to ease lung congestion and inflammation of sore throats.

***Cympopogon citratus* (Lemon Grass)**

- Leaves
- Used as insect repellant and carminative.
- Used against coughing, asthma, bladder disorders and headaches.
- Used in herbal teas and confectionery.
- Its oil is widely used as a fragrance in perfumes and cosmetics.

Costus Ingneus

- Leaves
- Its extracts have up to 300 times the sweetness of sugar.
- Its sweet taste has a slower onset and longer duration than that of sugar.
- Is being administered to diabetics to lower the blood glucose level.

***Adhatoda vasica* (Vasaka)**

- Leaves, Flowers and bark.
- Used in mucolytic and expectorant drugs.
- Leaf extract used for treatment of bronchitis and asthma.
- It relieves cough and breathlessness.
- Gives relief in pyorrhoea and in bleeding gums.

***Urginea indica* (Van Pyaj)**

- Root
- Used as a diuretic.
- Frequently employed in dropsy.
- Used against bronchitis .
- Used in combination with other stimulating expectorants.

***Ocimum americanum* (American tulsi)**

- Leaves
- Used as mosquito repellant.
- Leaves made into paste with condiments and eaten raw.
- Boosts immune system.

Plantago psyllium (Isabgol)

- Used since prehistoric times as herbal remedies.
- The herb is astringent, anti-toxic, antimicrobial, anti-inflammatory, anti-histamine &diuretic.
- Externally, a poultice of leaves is useful for insect bites.
- *P. psyllium* seed useful for constipation, irritable bowel syndrome.
- Plantain seed husks expand and become mucilaginous when wet, which is used in laxative.

Elettaria (Cardamom)

- Used to break up kidney stones and gall stones.
- Was used as antidote for both snake and scorpion venom.
- Also used as a spice and as an ingredient in traditional medicine in systems of the traditional Chinese medicine in China, in Ayurveda in India.
- Green cardamom is broadly used in South Asia to treat infections in teeth and gums, to prevent & treat throat troubles, congestion of the lungs , inflammation of eyelids & digestive disorders.

Trachyspermum copticum

- It is also traditionally known as a digestive aid, a relief for abdominal discomfort due to indigestion & also used as an antiseptic.
- In southern parts of India, dry ajwain seeds are powdered and soaked in milk, which is then filtered and fed to babies. Many assume it relieves colic in babies, and for children it also improves digestion and appetite.
- In the northern part of India, it is often consumed after a heavy meal.

Bixa orellana

- It has long been used by American Indians to make body paint, especially for the lips, which is the origin of the plant's nickname, **lipstick tree.**
- It has a distinct flavor of its own, it can be used to
- color & flavor rice instead of the expensive saffron.

Benefits of Herbal Garden

- **Students**
  - ♦ Awareness & low cost school first aid
  - ♦ Conservation practices
  - ♦ Waste management
- **Community**
  - ♦ Farmers awareness
  - ♦ Conservation of local species

WASTE MANAGEMENT

What is waste Management

- Waste management is the collection, transport, processing or disposal, managing and monitoring of waste materials.
- The term usually relates to materials produced by human activity, and is generally undertaken to reduce their effect on health, the environment or aesthetics.

Methods of disposal

- **Landfill:** Disposing of waste in a landfill involves burying the waste, and this remains a common practice in most countries.
- **Incineration:** Incineration is a disposal method in which solid organic wastes are subjected to combustion so as to convert them into residue and gaseous products.

REASONS FOR IMPROPER MANAGEMENT OF WASTE

- Lack of planning for waste management while planning townships
- Lack of proper institutional set up for waste management, planning and designing in urban local bodies
- Lack of technically trained manpower and funds.
- Lack of community involvement
- Lack of expertise and exposure to city waste management using modern techniques / best

practices
- Lack of awareness creation mechanism
- Lack of Management Information Systems

RECOMMENDED APPROACHES TO WASTE MANAGEMENT

1. Possible Waste Management Options :
   (a) Waste Minimisation
   (b) Material Recycling
   (c) Waste Processing (Resource Recovery)
   (d) Waste Transformation
   (e) Sanitary Landfilling – Limited land availability is a constraint in Metro cities.
2. Processing / Treatment should be :
   (i) Technically sound
   (ii) Financially viable
   (iii) Eco-friendly / Environmental friendly
   (iv) Easy to operate & maintain by local community
   (v) Long term sustainability

RECOMMENDED APPROACHES TO WASTE PROCESSING & DISPOSAL

I WEALTH FROM WASTE (PROCESSING OF ORGANIC WASTE)
   (A) WASTE TO COMPOST
      (i) AEROBIC / ANAEROBIC COMPOSTING
      (ii) VERMI-COMPOSTING
   (B) WASTE TO ENERGY
      (i) REFUSE DERIVED FUEL (RDF) / PELLETIZATION
      (ii) BIO-METHANATION

II RECYCLING OF WASTE

III SANITARY LANDFILLING

IV TREATMENT OF BIO-MEDICAL WASTE SEPARATELY

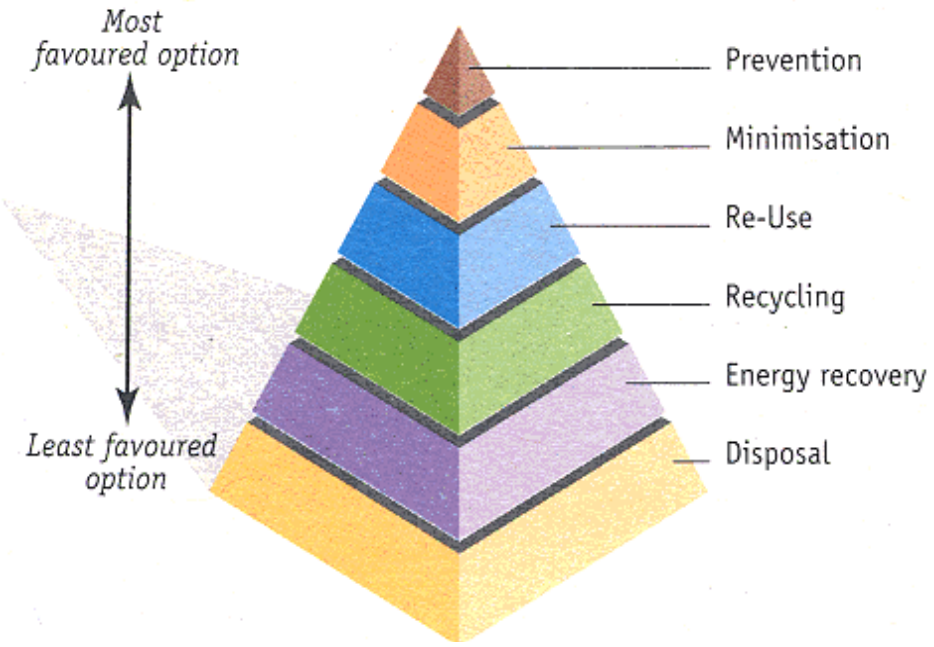
REDUCE :
- Do not buy products with excessive amounts of packaging.
- Buy fresh foods rather than canned foods.
- Reduce energy and water use.
- Turn off taps, fans and lights when not in use.

REUSE :
- Reuse scrap paper
- Reuse old tin cans, e.g., for storage or decorative purposes.

RECYCLE :
- Segregate garbage into biodegradable(Green bins), recyclable(Blue bins) and Non biodegradable/ Hazardous(Black bins).

DISPOSE :
- Dispose off the garbage properly using different types of bins provided.

WASTE MANAGEMENT HIERARCHY



MUSHROOM CULTIVATION

What is Mushroom :

- Mushrooms neither belong to the plants nor to animals.
- They belong to a separate group of organisms called fungi.
- They lack the usual green matter , grow on dead and decaying organic materials.
- The fruiting body umbrella like or various other shapes, size and colour.
- Mushrooms are known for their nutritive and medicinal value.

Mushrooms for health :

- Mushrooms, are called ‘white vegetables’ or ‘boneless vegetarian meat’
- Mushrooms are quite nutritious and possess many medicinal properties.
- High availability of lysine and tryptophan amino acids usually absent in cereals.

- Ideal food for patients suffering from hypertension, diabetes and obesity.
- Mushrooms a good source of protein 15 % to 30 % protein of their dry mass.
- Achieve great health benefits in regulation of blood cholesterol, immune system boost and anti-tumor, anti-cancer properties

Mushroom Production & Types :

- World 5,00,000 laks ton/ year
- India 40-42,000 ton/ year
- Types of Mushroom
- Button Mushroom (*Agaricus bisporus*)
- Dhingri / Oyster (*Pleuorotus spp*)
- Paddy straw (*Volvariella volvacea*)
- Milky Mushroom (*Calocybe indica*)


Pleurotus on block

Cultivation Season in North India :

- October to March ------- White Button
- May to Mid August--------Paddy straw
- Mid August to mid April---- Dhingri
- February to April ---------- Milky Mushroom

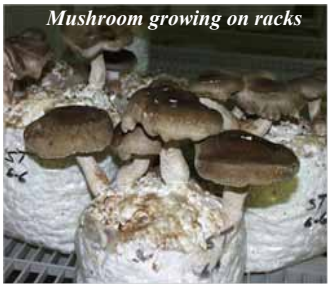
Properties of Mushrooms :

- Rich proteins, less fat, less carbohydrate and salts.
- Rich in fiber and Have high Vitamin B12 and folic acid content uncommon in vegetables.
- High lysine and amino acids usually absent in cereals.
- Ideal food for patients suffering from hypertension, diabetes and obesity.


Pleurotus flabellatus (PinkOyster)

Substrates for *Pleurotus spp*. :

- *Agaricus* compost
- Rice straw
- Wheat straw
- Maize stalks & cobs
- Paper
- Hardwood logs, chips and sawdust
- Seed hulls
- Broadleaf "straw"
- Cotton wastes
- Coffee consumer-growing wastes


Mushroom growing on racks


Mushroom on Polythene bag

Cultivation Method :

- Cut the straw 3-5 cm
- Soak overnight in water
- Drain out Excess water next day
- Add @ 7gm bavastin/100Lit water+ 125ml formaldehyde before soaking in water
- Or Steam 2 Hrs (Eliminates sugars,
- removes the waxy layer, helps decomposition and growth ,free of competing organisms


Dry mushrooms

Spawning & Filling

- Add 2-6% spawn in wet paddy straw
- Fill in perforated 40x30 cm black polythene up to 2/3 capacity
- Incubate in dark humid, well aerated room with 22-25°C , 80-85% RH for 10-15 days
- The area should be completely clean to avoid contamination.
- The substrate moisture should be around 75%).

Incubation :

- During the first 24 hours, the mushrooms grow little while adapting to the medium.
- Increased growth starts about 48 hours after seeding,depending on ambient conditions.
- During this vegetative state of the mushroom, the temperature has to be between 22 and 26ºC.
- Optimally, the incubation period should not exceed 17 to 22 days.

For Production :

- Cut open polythene & place one feet away on perforated racks fruiting structures appear in a few (five) days.
- When this happens, the humidity and temperature conditions will have to be 90 – 95 RH and 24 - 26ºC, respectively.

Harvest :

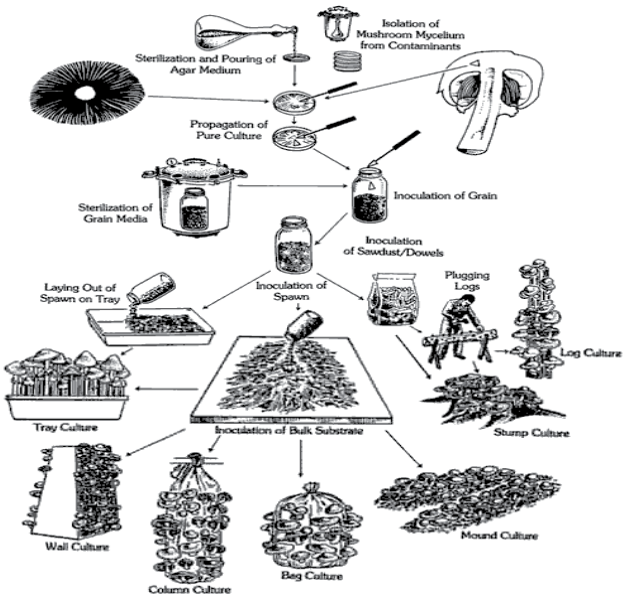
- Cut the crop when fully developed, leaves twisting from the margin
- Cut larger ones first, leaving the smaller for later.
- The bodies are removed by cutting the base of the stalk with a clean, sharp blade.
- 4 - 6 days after harvesting, the next sprouts begin to appear. 15 kg substrate may produce 3 to 4 harvests; 80% production obtained during first two harvests. (1.5Kg Dry Straw = 6kg Wet straw) --- 1 Kg Yield Fresh


P. Corpoque


Block on Racks (Perforated)


King Oyster (P. erhengii)


Pearl Oyster



Rainwater Harvesting

What is Rainwater harvesting?
It is the process of collecting and storing water for future productive use.
Rainwater harvesting is the accumulating and storing, of rainwater for reuse, before it reaches the aquifer. It has been used to provide drinking water, water for livestock, water for irrigation, as well as other typical uses given to water.

What is rooftop rainwater harvesting?
Since it is quite easy to collect rainwater falling on roofs, rooftop rainwater harvesting is the process of collecting rainwater falling on rooftops in a tank or sump for future productive use.

Why rooftop rainwater harvesting in schools?
Many schools presently do not have a reliable source of water for drinking and other use.

The school rooftop rainwater harvesting system seeks to provide a source of water for all purpose such as toilet flushing, cooking, washing hands and feet before eating and after toilet use, hygiene and finally if the rainwater is treated well for drinking purpose.

This is especially important in areas where there is Fluoride, Nitrate, Iron or salt in the groundwater and therefore it is unfit for consumption. In these places the rainwater harvesting tank can provide mineral free water for consumption.

Rainwater collected from the roofs of houses, tents and local institutions can make an important contribution to the availability of drinking water. It can supplement the sub soil water level and increase urban greenery.

How much rainwater can be collected?
This depends on the rooftop area, the size of the tank and the rainfall at that place. For example in a place where it rains 500 mm and the roof area is 100 square meters, the rainwater falling on the roof is 50,000 liters. Some amount of it will be absorbed by the roof and some amount will be lost in the collection process. If we assume 80% can be collected then 40,000 liters of rainwater is available for collection.

Depending on the size of the rainwater tank and the distribution of rainfall even a 3000 liter tank may be sufficient to collect all this 40,000 liters of rainwater. We must however keep on using the rainwater in the tank and not wait for summer to use it.

By painting an information board , and keeping a small rain gauge in the school, a good school can involve students in monitoring rainfall, total rain in a year, water collected in the rainwater tank and teach them how to ensure good maintenance of the system.

SYSTEM COMPONENTS

What are the parts of the roof top rainwater harvesting system?

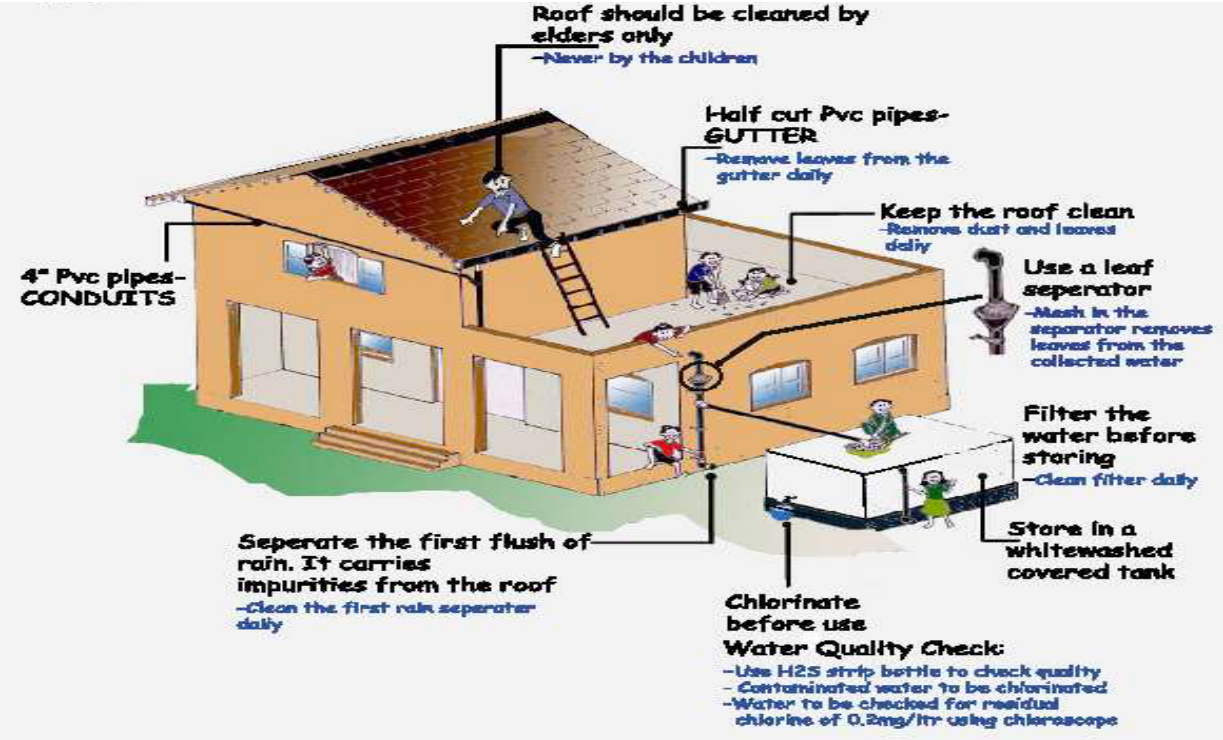
ROOF – The existing roof is made use of to collect rainwater. Since rainwater is pure as it falls from the sky it is necessary that the roof be kept clean for it to remain pure when it is collected. This means the roof will need to be swept and cleaned daily during the rainy season.

This should be carefully done by an adult (never by children unless it is accessible and safe) equipped with the necessary implements such as a ladder, broom and a brush if necessary.

Some schools will have shady trees to cover the roof. However leaves falling from the roof will cause

blockage in the gutters and pipes. The leaves can also colour the water and cause it to decompose and smell. Therefore, roofs should invariably be completely cleaned of all leaves, dust, bird droppings etc. using a broom. Water should only be used if necessary as most times a dry sweeping with a broom will be enough.

When cleaning the roof with water be careful to keep the first rain separator open so as not to allow the dirt to come into the filter and the tank.



PVC GUTTERS: The gutters of PVC collect the rainwater from the roof and transfer it to the filter. On sloping roofs, PVC gutters can pick up leaves, dust, small twigs and other organic matter. The gutters need to be cleaned regularly at least weekly once. During the rainy season the PVC gutters should be inspected and cleaned daily.The gutters are fixed to the roof or to the walls with clamps. The clamps hold the gutter or pipes to the wall or to the roof firmly and allow small slope in the system to enable water to flow in one direction.

A clean PVC gutter to catch every drop of rain

The clamps sometimes may come off due to various reasons. The clamps should be fixed immediately whenever it is seen to be loose or when it has come off.

At all times the PVC gutters or pipes should slope in the direction of the storage tank and not away from it. The PVC gutters should always have an end cap at the end where rainwater begins to flow in the direction of the tank.

DOWNPIPES: PVC down pipes brings the water from the rainwater gutters or pipes vertically down. They should invariably be clamped firmly to the wall and should never be loosely fixed. Always check that the down pipe is firmly fixed and if necessary replace or tighten the clamp whenever necessary.

End cap for the gutter

FIRST RAIN SEPARATOR: The first rain separator or a washout pipe as it is called, has a valve or an end cap to allow the first little amount of rainwater to be collected separately. This has most of the dust and dirt in it. The first rain separator also is used when the roof is being cleaned or when rainwater is NOT to be collected.

First rain separator with end cap on the wall

It is important to ensure that the first rain separator is always kept in the closed position and never left open. After every rain it should be opened carefully and the waste water allowed to flow out. The pipe should then be cleaned and the valve or the end cap closed.

Sometimes the first rain separator can get jammed due to the dirt or dust in it. In such a situation the valve or the end cap should be carefully replaced by a good plumber.

LEAF TRAP: Where the roof of a school has lots of leaves falling from a tree or trees a conical leaf trap can be placed in the vertical down pipe. This has a mesh on top. The mesh prevents small leaves, twigs and other material from entering the pipe and blocking it or choking the filter. The material collected on the leaf trap if any must be removed at regular intervals and daily during the rainy season.

FILTER: A gravel, sand and 'netlon' mesh filter is designed and placed on top of the storage tank. This filter is very important in keeping the rainwater in the storage tank clean. It removes silt, dust, leaves and other organic matter from entering the storage tank.

A good filter with mesh and gravel on top

The filter media should be cleaned daily after every rainfall event. Clogged filters prevent rainwater from easily entering the storage tank and the filter may overflow. The sand or gravel media should be taken out and washed before it is replaced in the filter.

STORAGE TANK: The rainwater **storage tank** collects all the filtered rainwater and keeps it for future use. The storage tank is made above the ground and on a platform. It can also be an underground sump in some cases.

The tank is invariably painted white on the outside. This is done to keep the water inside cool and prevent the growth of bacteria. Every year the tank must be white washed neatly.

Rainwater storage tank

The tank also will be sealed from the top either with concrete slabs or any local stone. It must be ensured that the top cover is permanent and always fully covered. This will prevent the growth of algae or bacteria in the tank. In no case should it be opened. If there are small cracks in the joints they should be sealed with cement mortar immediately. Mosquitoes and dust should never be allowed in to the stored rainwater tank.

The tank should also be completely water tight. If there is any leak in the tank or even dampness, the problem should be addressed immediately with the help of a trained engineer.

OVERFLOW PIPE: The storage tank will have an overflow pipe from the top of the tank. In case of heavy rain, the overflow pipe will allow the excess rain water to be safely disposed of without causing any flooding. The size of the overflow pipe should be the same as that of the inlet pipe. It will have a mesh at the bottom to prevent rats, squirrels and cockroach from coming in.

Overflow pipe with mesh

The mesh should be checked weekly and if torn or open should be repaired or replaced immediately. It should also be ensured that the overflow water is drained away effectively to a pit, plant or storm water drain and not allowed to cause flooding.

TAP: A tap is provided in every tank to draw the rainwater out. Sometimes a tank can have more than one tap. Invariably it is found that children play with the pipe outlet or the tap and it is damaged. Children should be taught not to stand on the pipe or to play with the tap. A broken tap will result in the entire system going to waste as all the collected rainwater will flow out.

A tap and a drain out pipe firmly anchored to tank

If there is no tap on the tank or if it is broken, no rainwater will be collected in the tank when it rains. Ownership of the system should be created and the taps taken care of and inspected daily.

If there is any leak in the tap, that too should be taken care of by replacing the washer or by getting a good plumber to repair it immediately.

Where the taps are located the area will be cemented to drain out any waste water from the site. This drain out water will be lead into a pit or a plant whichever is available.

WATER QUALITY CHECK: If the roof, the gutter, the first rain separator and the filter is kept clean, the collected rainwater will be crystal clear. This is an indication that good maintenance is being followed.

If the water is however dirty in colour or it smells bad, then it means that the system is not being kept clean.

Even if the water is clear and does not smell still it must be checked for micro-biological contamination. The checking should daily for the first one month and then weekly if the water is clear and not foul smelling. For this one must use a H2S strip test bottle. Wash your hands thoroughly with soap. With clean hands the sealed bottle should be opened. From the tap in the rainwater storage tank fill the bottle to the mark provided.

Close the cap tightly. Bring the bottle back to a safe place in a room. Observe for 24 to 48 hours. If the water turns black in the bottle then it is micro-biologically contaminated and requires treatment before being used for drinking. If the water colour stays brown, then the water is fit for drinking.

H2S strip test bottle: If the water turns black in the bottle then it is micro-biologically contaminated.

WATER QUALITY TREATMENT: Though rainwater as it falls from the clouds is very pure, it does pick up dirt, dust and bacteria once it falls on the roof. It is very necessary to therefore check the quality of the water before using it for consumption.

Once it is established that the rainwater is not micro-biologically contaminated it can then be consumed directly. However if the H2S strip test suggests that water has bacteria in it, it must then be treated before it can be used for drinking.

The method suggested for treating for bacteria is chlorination. Liquid chlorine or chlorine tablets are available for treatment of water. Depending on the volume of the rainwater in the tank, chlorine needs to be added to disinfect the water. Chlorination should be carried out every time there is rain and a fresh infusion of water into the tank.

Using a chloroscope, residual chlorine of 0.20 mg/litre should be established before the water is used for drinking.

Another form of deactivating bacteria and making water fit for consumption is called SODIS – **So**lar **dis**infection of water. In this method, rainwater is kept in a PET bottle or a glass bottle in the sun for 6 hours. One side of the bottle is painted black.

Solar disinfection or SODIS using a bottle painted half black

The black surface is kept on the ground. With a combination of UV disinfection and infra red heat sterilization the water becomes fit for consumption. In cloudy weather the bottles need to be kept in the sun longer.

Rainwater Harvesting Project at RPVV, Surajmal Vihar, Delhi

BOTTLE PLANTS

Given the stale air circulating in most urban homes, indoor plants have difficulty flourishing unless they're plied with bushloads of TLC. A terrarium (which is a glass container used to grow and display plants) allows us to go slow on the intense personalized attention by creating a growth environment that requires very little care. Closed terrariums, happy in their humidity filled surroundings, actually thrive on neglect. They need nothing from the outside world except a little indirect sunlight. The plants transpire moisture through their leaves, which then condenses on the glass, and flows back to the soil. This 'rain effect' allows the terrarium to go for weeks without watering. Plants like money plant, spider plant, wandering jews, syngonium, cacti and succulents make for great terrarium residents. Exotic plants like ivy and nana can also go into these bottled gardens. But remember, the thumb rule for the selection of the plant is that it should be slow-growing.

Step – 1

First get together all the ingredients, so to speak. You will require an untinted glass bottle, bowl or aquarium tank as well as a glass, stopper or lid to seal the garden (avoid using corks as they absorb water, depriving the plants of moisture); gravel chips, soil, small stones, brick pieces, sand, charcoal and leaf mould or manure. Small rocks, stone figurines and shells do well as accessories.

Step – 2

Line the bottom of the container, that is about one inch or one-fifth of the container, with pea-sized gravel (the kind used in aquariums work well). This ensures that there is ample drainage for water. Place shells or coloured stones before introducing the gravel if you wish to beautify the piece.

Step - 3

Create a thin layer of charcoal (about one - fourth of an inch) above the gravel base. Charcoal purifies the air inside the container. The amount of charcoal you put in depends on the size of the glass container you are using. A small jar will require just two to three small pieces of charcoal whereas a large jar will require anything from five to six big pieces.

Step - 4

Sterilize the soil beforehand by drying it under the sun and weeding out unwanted roots. Mix some compost manure with the soil in equal proportions and fill about one-fifth of the container with this mix. If you want, you can even moisten the soil mix and then bake it for 20 minutes.

Step - 5

Select the plant which is to be grown. Ideally, it should be of non-flowering variety, adaptive to moist atmosphere and have a slow growth rate. Also remember to match the size of the fully grown plant to the size of the container.

Step - 6

Spray water sparingly so as to just wet the soil. Don't water too much. Cover the container with the lid and place it where it can get bright but indirect light. Don't put it under direct sunlight as this will increase the temperature inside the container. If the inside walls of the container (whatever the size) become foggy, remove the lid till the condensed water droplets evaporate. For the final touch, add coloured gravel, shells or marbles.

PAPER RECYCLING

Recycling paper is important for many reasons. Our energy supply and space are not unlimited, so recycling paper increases the sustainability of both these and many other important aspects of our environmental impact.

Resource Conservation

One of the primary reasons to recycle paper is to conserve resources. The primary product used to make paper is wood pulp. Recycling paper reduces the amount of wood pulp needed, and that in turn, reduces the number of trees that are cut down. Trees are a vital part of a balanced ecosystem. Although many paper manufacturers own land specifically for tree farming and replace cut trees with seedlings for future use, tree growth is very slow. Additionally, there is energy used and pollution created by cutting and transporting the trees to the mill.

Landfill Space

Although there is debate regarding whether or not we're running out of landfill space, there's little argument about the main component in our landfills: paper. Every tonne of paper takes more than 3.3 cubic yards of landfill space. According to the Environmental Protection Agency (EPA), forty percent of landfills' content is paper. And the proportion of paper in landfills has remained steady over the decades despite the rise of computers and the Internet. Although paper breaks down much easier than plastics and other forms of waste, it does not decompose very readily when compacting in a landfill.

Incineration Reduction

Besides saving landfill space, when people recycle paper, there's reduced need for trash incineration. Some municipalities burn trash rather than storing it in landfills. By diverting paper out of the trash stream, there is less to burn, so there's less need for incinerators and less ash output and air pollution.

Energy Conservation

Manufacturing paper from recycled paper fiber requires less energy than making paper from virgin wood pulp. In fact, making recycled paper is estimated to use 60 to 70 percent less energy, and the paper industry is the third largest user of energy in the U.S. In addition to saving energy, recycled paper manufacturing uses about 50 percent less water than its virgin counterpart and significantly reduces water pollution in the process as well.

It's Versatile

People should recycle paper because there's a wide range of products that can be created from recycled paper. Although paper fibers cannot be recycled indefinitely, like glass and aluminum, it is possible to recycle paper fibers about six or seven times. Each time paper is recycled, it becomes a lesser grade but is still a useful product. By the end of the fibers' usefulness, they can be made into pressboard, tissue or even insulation.

Reduces Global Warming

In today's world the importance of recycling is becoming greater of a concern both for the general public and also to the economy. Recycling has become a major issue as scientific research has been suggesting for years that the earth is being depleted too fast to sustain a healthy balance. The earth's natural resources are being consumed at a rate that reinforces the idea that we are living for today and

the future generations will be paying for the consequences. Recycling along with reducing consumption is our best means to counter the damage we have been doing to the earth for centuries. The importance of recycling is now held in such a high regard even famous people are taking up the plight. We have to educate the world on the effects of global warming, how we can reduce the causes of global warming. A major part reducing the warming is how we can recycle much of what we use instead of turning it into unusable waste. Recycling is incredibly important as a means to reduce poisonous emissions into the atmosphere and also to spare our natural resources.

The various steps in the process of Paper Recycling are:

STEP 1

Waste paper torn and soaked in water

- *Waste paper is torn into small pieces and kept in a large tub.*
- *They are soaked in water for two hours.*
- *Fenugreek seeds (Methi seeds) can be soaked along with the paper to increase the strength of recycled paper.*

STEP 2

This is an electrically powered mini-beater or a hydrapulper. Pulp is made ready in this hydrapulper for making paper

HydraPulper

- The soaked paper is put into the hydrapulper along with soaked fenugreek seeds.
- Water is poured into the
- hydrapulper.
- The lid is closed.
- It is switched on and run for
- 20-30 minutes.
- This pulp is well beaten and smooth.
- We can add colours to this pulp and beat it for a few seconds.

STEP 3

This is a univat with a unique deckle and mould frame system.

Univat is filled with water and the deckle and mould frame system is slowly immersed in water.

The paper pulp is transferred to the deckle and mould frame, mixed thoroughly with water and lifted slowly. The quantity of pulp transferred depends on the thickness of the paper required.

STEP 4

A wooden board is placed on a table. A piece of thin cotton wet cloth is neatly spread on the board without any wrinkles.

The frame is carefully lifted and turned over the cloth. At least ten sheets can be stacked on top of each other separated by the thin cotton cloth.

Another wooden board is placed on this stack of sheets and pressed to squeeze out excess water.

STEP 5

This is a manual screw press. It is used to squeeze out water from the recycled paper sheets.

The stack of sheets along with the two wooden boards, one at the top and one at the bottom of the papers is placed in the screw press. It is rotated like a screw till most of the water is squeezed from the paper.

STEP 6

After squeezing out excess water by the screw press, the sheets of papers are separated and dried in the Sun.

The dry paper is peeled out from the cotton cloth the next day and straightened with a calendaring machine or a hot iron.

After this the paper is ready for use or sale.

WEALTH FROM WASTE

Saving paper is saving trees. It takes **17** fully grown trees to make **one tonne of paper**.

If each child saves **one sheet** of paper a day, then **40,000 trees** are saved per year by the students of **Delhi** alone.

Recycling paper is an endeavour not only towards saving precious paper but also towards **saving energy**, **water**, **chemicals** utilised in paper making and **reducing garbage.**

Recycling of paper creates widespread awareness in individuals of how they can **save our environment**. Each one of us can turn waste paper and cotton rags into useful and valuable products. At the same time it **eliminates pollution**.

It is the **best gift** we can give to **Mother Earth**.

PRODUCTS MADE FROM RECYCLED PAPER

Paper Bags

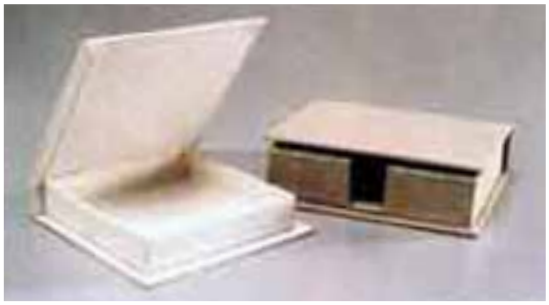
Pencil Stand and Gift Box

File Covers

Lamp Shade

Paper Flowers

Photo Frame



Slip Pad Box

ANNEXURES

DEPARTMENT OF ENVIRONMENT, GOVT. OF NCT OF DELHI,

6th, Level C-Wing, Delhi Secretariat, I.P.Estate, New Delhi-02
Tele Ph. no. 23392032
E-mail: ecoclub_delhigovt@yahoo.com.

F.9 (3)/Ec/Env/2012-13/ **Dated:-29-8-12**

Dear Principal,

It is suggested that you may take up the following actions to ensure proper utilization of grant.

1. Plantation/Greening Drive: Plantation in the campus and nearby areas. (Free saplings are available in the 14 nurseries of the Forest Department).
2. Conservation of water through Rainwater harvesting.
3. Action Oriented programme by different NGO's namely:
   a) **Deeksha**- Herbal Garden, Mr. Tripat Parmar(011- 26912358, 46584340)
   b) **Development Alternative** – For paper Recycling Machine, Samir Gera ()
   c) **Nature Foundation** –For saving of sparrow houses, Mr. Rakesh Khatri(011- 32326909)
   d) **Indian Pollution Control Association(IPCA)**- For Tendrella or Garbyhog project, Mr. Ashish Jain (011- 42207478)
   e) **National Center of Fungal Taxonomy** – For Mushrooms Cultivation, Dr.P.N. Chowdhary (011- 25836498)
   f) **Society for Environment & Development** –For Vermicomposting, Dr. Lalit Mohan (011- 22479505)
   g) **Centre for Science and Environment**- For Green House programme, Ms.Sunita Narain(011- 29955124)
   h) **Chintan-**For Waste Picker, Ms.Bharti Chaturvedi(011-46574171/2)
4. Promotion of the various campaigns of Department of Environment namely:-
   a) Say No to Crackers.
   b) Anti-Littering and Anti-Plastic Bags.
   c) Clean Yamuna.
   d) Khelo Holi Naturally.
   e) Visit to Asola Wildlife Sanctuary (26042010)
   f) Visit to Yamuna Biodiversity Park (27616569)
   g) Visit to Nature Trail at CM house & Rashtrapati Bhawan.
   h) Aravali Bio Diversity Park, Mr.Hasan (65422990)
   i) Activity of Wildlife Society of the college.
   j) Visit to Garhi Mandu Forest area
   k) Visit to Bhatti mines
5. Taking up any other fun activity related to Environment.

Kindly acknowledge receipt of the same in the enclosed format. Also you are requested to send an utilization certificate (GFR-19A) along with the activities carried out by end of the current financial year i.e. March, 2012.

Yours Sincerely
(Dr. B. C. Sabata)
Sr. Scientific Officer (Env.)

Eco-Club Grant 2012-13

DEPARTMENT OF ENVIRONMENT , GOVT. OF NATIONAL CAPITAL TERRITORY OF DELHI
6Th Level, C – Wing, Delhi Secretariat , I P Estate, New Delhi 110002
Phone: 23392032 , Fax : 23392029
Email **: ecoclub_delhigovt@yahoo.com** Web:http://www.environment.delhigovt.nic.in

To
Dr. B.C. Sabata
Senior Scientific Officer

1	School I D provided by Education Dept. GNCT of Delhi	:	
2	Name of the School/College/Institution	:	
3	Address / Phone / Fax	:	
4	Name of the Principal/Director/V P/H M	:	
5	Email of the School/College/Institution		
6	Education District and Zone (Schools only)	:	
7	Member of Eco-Club since	:	
8	Whether Annual Report/Utilization Certificate submitted for 2011 – 12	:	
9	Name of the Eco-Club In-charge with Ph. (Mob. & Off) & email	:	
PARTICULARS OF BANK ACCOUNT FOR ECS			
1)	Name of the A /c holder	:	
2)	a) Bank Name & Address b) Account No./Acc.Type	: :	
3)	RTGS / NIFT Code	:	
4)	9 digit code (MICR)	:	
5)	Copy of cancelled cheque may be attached	:	

PRE-RECEIPT

Received Rs. 20,000/- (Rupee Twenty Thousand only) as a token grant for Eco-Club during 2012-13 from the Department of Environment, Govt. of NCT of Delhi. Also, certify that the grant received during 2011-12 has been fully utilized.

Signature of the Principal / Head of the Institution with seal

Date:

GFR 19-A
[See rule 212 (1)]

Form of Utilization Certificate
(ECO-Club Grant of Rs. 20000/-)

S.No.	Letter No. and date	Amount
1.	F.9(1)/Eco/Env/11-12/	20000/-
	Total	20000/-

Certified that out of Rs.20000/- of grants-in-aid sanctioned during the year 11-12 in favour of _____ School under this Ministry/Department Letter No. given in the margin and Rs. ------ on account of unspent balance of the previous year, a sum of Rs.20000/- has been utilized for the purpose of Eco-Club activities for which it was sanctioned and that the balance of Rs. ------ remaining unutilized at the end of the year has been surrendered to Government (vide No------- dated------)will be adjusted towards the grants-in-aid payable during the next year ____------

2. Certified that I have satisfied myself that the conditions on which the grants-in-aid was sanctioned have been duly fulfilled/are being fulfilled and that I have exercised the following checks to see that the money was actually utilized for the purpose for the purpose for which it was sanctioned.

Signature of the Principal

Date_____

Department of Environment, Government of NCT of Delhi
Level 6, C – Wing, Delhi Secretariat, I.P. Estate,
New Delhi – 110002
Tele: 23392032
Email: ecoclub_delhigovt@yahoo.com

F.9/Ec/Env/2012-13/2331 Dated: 25/6/12

To,
The Principal,

Dear Sir/Madam,

As you are aware, the Department of Environment, Govt. of NCT of Delhi has a plan scheme called Eco-Clubs in schools and colleges of Delhi to sensitize the students on environmental issues. Under the scheme, Department of Environment provides an annual grant of Rs.10, 000/-to each school & college for every year. It gives me immense pleasure to inform you that the Govt. of NCT of Delhi has increased the grant from Rs.10, 000/- to Rs.20, 000/- from this current financial year i.e., 2012-13.

Please find attached herewith the format, which may be dully filled and submitted within 31st July, 2012 so that the grant can be released as soon as possible. The undersigned may be contacted for further details.

Yours Sincerely,

25/6/12

(Dr. B.C. Sabata)
Sr. Sci. Officer

Encl-
1. Eco-club Format