Chapter 16

Garbage in, Garbage out

Keywords : Hazardous, Trash, Landfill, Compost, Red-worm, Disposal

16.1 WASTE

When something is unwanted or no longer serves a purpose, it is termed as waste. Waste comes from us and through our activities. Waste may be solid, liquid or gaseous depending on the state of matter. What we throw out from our homes, schools, shops and offices is solid waste (garbage-rubbish trash). It can be a pack of purchased articles, wrapping material or even plastic containers. This is called Municipal solid waste or MSW.

What if the trash is not removed from our homes and surroundings? It will definitely harm us in a very bad manner. Now it is time for us to look into the problem.

The chapter will enable us to see if we can clean our surroundings and how? Let's us see:

The various kinds of waste are:

Wet Waste; Kitchen waste such as vegetables peels, remains of fruits and vegetables left over/ spoilt food, leaves , cut gram etc.

Dry waste: Scrapes of paper, plastic, metal glass, rubber, leather, bags etc.

Hazardous wastes: used battery, expired medicines, paints, insecticides etc.

Biomedical wastes: Soiled bandages, used needles, syringes, soiled instruments.

Construction wastes: Waste resulting from construction, repair or demolition of buildings, bricks, concrete, metal scrap etc. Since our concern is Our Surrounding. Let us take solid waste into consideration.

Activities Establishments	Wastes generated
1. Domestic	Vegetables and fruit peels, leftover food, paper, Plastic and other packaging material, glass, garden collections like dried leaves cut grass, medicines, containers.
2. Locally School:	Wastes swept from School in the from of paper. left over food, containers etc.

16.2 WHEN WASTE IS A-PROBLEM:

Wastes of all kinds are a problem when quantity and concentration are too much, it becomes a hazard. Waste when not managed properly it can become harmful to human health and can cause damage to the environment. This can happen when the waste - is not disposed properly.

Waste and Health

Waste generation leads to air, soil, surface and ground water pollution

-Solid waste takes up open space.

-Solid waste dumps attract flies, mice, etc which are health hazard. They cause disease.

Waste and Disposal

With industrialization and increasing consumers, the quantity of garbage has increased, and the nature of the garbage too has changed. Your School, your home present a picture in this regard.

Things to do in this direction

Primary collection and storage.

Why Waste Management;

Our convenience oriented life style not only consumes a great deal of natural resources but also wastes them, many resources are converted to products with very soft life spans. For example. Using petroleum to produce plastic materials and package materials to be discarded after only one use wastes. Valuable resources and adds to the solid waste.

Managing of such wastes is dire need of the time so that these do not cause environmental and health problems. But a simple solution is not handy. For it a variety of waste management practices are to be considered which are

Reduction at source

Reuse of products

Recycling of waste products;

Reducing, reusing, and recycling decrease both the demands on natural sources, as well as the rate at which they are consumed. Fewer resources are used, limited supplies are conserved and regeneration of renewable resources can occur.

Accordingly less waste is generated, less amount to be buried (decreasing water pollution), less trash to be burnt (decreasing air pollution). By reducing, reusing and recycling, we can help to conserve the earth and the life it supports for many generations to come.

Recycling of Paper

Recycling refers to the process by which material once used and discarded are used again to substitute for original material.

Most household/school trash/garbage is recyclable. Paper, plastic, metal can be reused . Recycling has several benefits-it reduces the amount of waste, amount off energy needed to make new products, reduces pollution.

Activity 1

Ask students to collect waste paper from old notebooks, used, unwanted stationary at home, old newspapers to prepare recycled paper. Encourage them to collect the waste paper from all possible places.

Do You Know

The average family dustbin contains 10% glass, 9% metals, 3% textiles, 4% plastics, 30% vegetable waste dust and other materials, 60% of which could be recycled.

Materials needed:

To be contributed by the students.

1. Large plastic Buckets/bowls/basins.
2. Wooden spoon.
3. A net-sieve.

Do You Know

For every tonn of waste paper collected and recycled, two trees are

Making the pulp:

Ask the students to remove any kind of pins, staples in the paper and tear the paper into small pieces. Place these pieces in the plastic container. Pour warm waster in the container such the water stands about 1cm above the paper layer. Allow it to soak for 3-4 days. Stir the mixture every day to help break the paper fibres down. See that the shredded paper suspended in the water looks like a soup. The soup is ready for use to make paper. Corn starch may be added to the mixture for smoothness and stability.

Making of paper

Now, spread the wet paste on the wire mesh fixed to the frame. Pat it gently to make the thickness of layer of the paste as uniform as possible. Wait till water drains off. If required spread an old cloth or a sheet of newspaper on the paste to let it soak up the extra water.

Now, carefully remove the layer of paste from the frame, spread it on a sheet of newspaper in the sun. Keep the corners of the newspaper sheet pressed by putting some weights so that these do not curl up.

You can add food colour, pieces of dry leaves or flower petals or pieces of coloured paper in the paste before spreading it. It would help you to get a recycled paper with beautiful patterns on it.

Can we recycle everything, just as we recycle paper?

16.3 DEALING WITH GARBAGE

Safai karamcharis collect the garbage in trucks and take it to a low lying open area, called a landfill (Fig. 16.1).

There the part of the garbage that can be reused is separated out from the one that cannot be used as such. Thus, the garbage has both useful and non-useful

Fig 16.1 *A land fill*

components. The non-useful component is separated out. It is then spread over the landfill and then covered with a layer of soil. Once the landfill is completely full, it is usually converted into a park or a play ground. For the next 20 years or so, no building is constructed on it. To deal with some of the useful components of garbage, compost making areas are developed near the landfill. What is compost? Let us learn about it, from the following activity.

Activity 2

Collect the garbage from your house before it is thrown into the dustbin. Separate it into two groups, so that they have:

Group 1: Garbage from the kitchen — like fruit and vegetable peels, egg shells, waste food, tea leaves. Include newspapers, dry leaves and paper bags in this group.

Group 2: Pieces of cloth, polythene bags, broken glass, aluminium wrappers, nails, old shoes and broken toys.

Now divide the contents of each group into two separate heaps. Label them as A, B, C and D. Put one heap from Group 1 and one heap from Group 2 into two separate plastic bags. Tie the mouth of these two bags tightly. Put all the four heaps in separate pits and cover them with soil (Fig. 16.2). You can also use four pots to bury these garbage heaps.

Fig 16.2 *Putting garbage heaps in pits*

Remove the soil after four days and observe the changes in the garbage. A black colour and no foul smell indicates that rotting of garbage is complete. Put the heaps again in the pits and cover with the soil. Observe again after every two days and note your observations as suggested. Did the garbage?

(i) rot completely and not smell?

(ii) rot only partially?

(iii) rot almost completely, but still smells bad?

(iv) not change at all?

Garbage in which heap was seen to rot and which did not?

Enter options (i), (ii), (iii) or (iv) in the columns of Table 16.1 based on your observations. If you make any other observations, do not forget to write all these down in your notebook. Do not remove and burn the garbage that did not rot.

Table 16.1 What has happened to the garbage heaps?

Garbage heap	After 4 days	After 6 days	After 2 weeks	After 4 weeks
A				
B				
C				
D				

If the garbage was found to rot completely and did not smell, mix it in the soil where you sow your favourite plants. This would provide nutrients to the plants.

You must have observed from this activity that some things in the garbage rot. They form manure which is used for the plants. The rotting and conversion of some materials into manure is called 'composting'.

Fig 16.3 *Burning of leaves produce harmful gases*

In some cities and towns municipalities provide separate dustbins for collecting two kinds of garbage. Usually one is coloured blue and the other green. The blue bin is for materials that can be used again — such as plastics, metals and glass. Did you notice that these are the materials that do not rot in the garbage heaps? The green bins are for collecting kitchen and other plant or animal wastes. You may have noticed that this type of wastes rot completely when buried in the soil. Do you see why it is necessary for us to separate waste into two groups as we did in Activity 2, before we throw it?

Have you noticed garbage heaps of dried leaves on the roadside? Most of the time these are burnt (Fig. 16.3). Farmers too often burn the husk, dried leaves and part of crop plants in their fields after harvesting. Burning of these, produces smoke and gases that are harmful to our health. We should try to stop such practices. These wastes could be converted into useful compost.

16.4 VERMICOMPOSTING

We can be friends of plants by supplying them with compost. We will also be very good friends to ourselves by making compost.

Talking of friends, do you know that earthworms are called farmer's friend? Let us find out how a type of earthworm called redworm is used for composting. This method of preparing

compost with the help of redworms is called vermicomposting. We can try to make manure by vermicomposting at school.

Activity 3

Let us dig a pit (about 30 cm deep) or keep a wooden box at a place, which is neither too hot nor too cold. What about a place which does not get direct sunlight? Let us now make a comfortable home for our redworms in the pit or the box.

Spread a net or chicken mesh at the bottom of the pit or the box. You can also spread 1 or 2 cm thick layer of sand as an alternative. Now, spread some vegetable wastes including peels of fruits over this layer of sand.

Fig 16.4 *Redworms*

One can also use green leaves, pieces of dried stalks of plants, husk or pieces of newspaper or carboard to spread over the layer of sand. However, shiny or plastic coated paper should not be used for this purpose. Dried animal dung could also be used as a spread over sand or wire mesh.

Fig 16.5 *Food for redworms*

Sprinkle some water to make this layer wet. Take care not to use excess of water. Do not press the layer of waste. Keep this layer loose so that it has sufficient air and moisture.

Now, your pit is ready to welcome the redworms. Buy some redworms and put them in your pit (Fig. 16.4). Cover them loosely with a gunny bag or an old sheet of cloth or a layer of grass.

Fig 16.6 *Vermicomposting*

Your redworms need food. You can give them vegetable and fruit wastes, coffee and tea remains and weeds from the fields or garden (Fig. 16.5). It might be a good idea to bury this food about 2-3 cm inside the pit. Do not use wastes that may contain salt, pickles, oil, vinegar, meat and milk preparations as food for your redworms. If you put these things in the pit, disease-causing small organisms start growing in the pit. Once in a few days, gently mix and move the top layers of your pit.

Redworms do not have teeth. They have a structure called 'gizzard', which helps them in grinding their food. Powdered egg shells or sea shells could be mixed with the wastes. This would help redworms in grinding their food. A redworm can eat food equal to its own weight, in a day.

Redworms do not survive in very hot or very cold surroundings. They also need moisture around them. If you take good care of your worms, in a month's time their number will double.

Observe the contents of the pit carefully after 3-4 weeks. Do you now see loose, soil-like material in the pit? Your vermicompost is ready (Fig. 16.6).

Put some wastes as food in one corner of the pit. Most of the worms will shift towards this part of the pit, vacating the other part. Remove the compost from the vacated part and dry it in the sun for a few hours. Your vermicompost is ready for use!

The part left in the pit has most of the worms in it. You can use these for preparing more compost or share them with another user.

Use this excellent vermicompost in your pots, gardens or fields. Is this not like getting the 'best out of waste'? Those of you who have agricultural fields can try vermicomposting in large pits. You can save a lot of money that is spent on buying expensive chemical fertilizers and manure from the market.

16.5 THINK AND THROW

How much of garbage do you think, is thrown out by each house everyday? You can make an estimate by using a bucket as a measure. Use a 5-10 litre bucket to collect the garbage from your home for a few days. In how many days does the bucket become full? You know the number of members in your family. If you find out the population of your city or town, can you now estimate the number of buckets of garbage that may be generated in a day in your city or town? We are generating mountains of garbage everyday, isn't it (Fig. 16.7)?

Fig 16.7 *Neigbourhood garbage dump*

16.6 PLASTICS – BOON OR A CURSE?

Some kind of plastics can be recycled, but, not all of them. Did you notice that polythene bags and some plastics did not rot in Activity 1? You might now easily understand why polythene bags create a big problem in garbage disposal.

It may be a little difficult to imagine our life without plastics. Shall we list a few things we use that are made of plastics? Toys, shoes, bags, pens, combs, tooth brushes, buckets, bottles, and water pipes — the list is very long. Can you name a few parts of a bus, car, radio, television, refrigerator and a scooter that are made of plastics?

The use of plastics in itself might not create so much of a problem. Problems arise when we use plastics excessively and are ignorant about ways of disposing their waste. This is what is happening all around us! We might even be acting irresponsibly, knowing well about its harmful effects.

We often use plastic bags to store cooked food items. Sometimes these bags may not be suitable for keeping eatables. Consuming food packed in such plastic bags could be harmful to our health. Many a time shopkeepers use plastic bags that have been used earlier for some other purpose. Sometimes bags collected by rag pickers are also used after washing them. Use of such recycled plastic bags to keep food items could be harmfull for our health. For storing eatables we must insist on use of plastic bags that are approved for such a use.

All kind of plastics give out harmful gases, upon heating or burning. These gases may cause many health problems, including cancer, in humans. The government has also laid down guidelines for recycling of plastics.

You must have noticed that people often fill garbage in plastic bags and then throw it away. When stray animals look for food in these bags, they end up swallowing these. Sometimes, they die due to this.

The plastic bags thrown away carelessly on roads and other places get into drains and the sewer system. As a result, drains get choked and the water spills on the roads. During heavy rains, it might even create a flood like situation. There is a lot of harm that too much use of plastics can do!

What can we do to minimise over use of plastics and deal with garbage?

1. We make a minimum use of plastic bags. We re-use the bags whenever it is possible to do so without any adverse affects.
2. We insist shopkeepers use paper bags. We carry a cloth or a jute bag when we go out for shopping.
3. We do not use plastic bags to store eatables.
4. We do not throw plastic bags here and there, after use.
5. We never burn plastic bags and other plastic items.
6. We do not put garbage in plastic bags and throw it away.
7. We use vermicomposting at home and deal with our kitchen waste usefully.
8. We recycle paper.
9. We use both sides of the paper to write. We use a slate for rough work. We use blank sheets of paper left in our notebooks for rough work.
10. We make our family, friends and others to follow proper practices for disposing different kinds of wastes.

The most important point to know and think about is that — more garbage we generate, more difficult it will be to get rid of it.

What You have Learnt

- Landfill is an area where the garbage collected from a city or town is dumped. The area is later converted into a park.
- Converting plant and animal waste including that from kitchen, into manure, is called composting.
- The method of making compost from kitchen garbage using redworms is called vermicomposting.
- Paper can be recycled to get useful products.
- Plastics cannot be converted into less harmful substances by the process of composting.
- We need to generate less waste and find ways of dealing with the increasing amount of garbage in our surroundings.

Exercises

1. a. Which kind of garbage is not converted into compost by the redworms?

   b. Have you seen any other organism besides redworms, in your pit? If yes, try to find out their names. Draw pictures of these.

2. Discuss:

   a. Is garbage disposal the responsibility only of the govemment?

   b. Is it possible to reduce the problems relating to disposal of garbage?

3. a. What do you do with the left over food at home?

   b. If you and your friends are given the choice of eating in a plastic plate or a banana leaf platter at a party, which one would you prefer and why?

4. a. Collect pieces of different kinds of paper. Find out which of these can be recycled.

   b. With the help of a lens look at the pieces of paper you collected for the above question. Do you see any difference in the material of recycled paper and a new sheet of paper?

5. a. Collect different kinds of packaging material. What was the purpose for which each one was used? Discuss in groups.
   b. Give an example in which packaging could have been reduced?
   c. Write a story on how packaging increases the amount of garbage.
6. Do you think it is better to use compost instead of chemical fertilisers? Why?

ACTIVITIES FOR DEALING WITH GARBAGE

1. Collect old and discarded objects and material like glass bottles, plastic bottles, coconut husk, wool, bed sheets, greeting cards and any other thing. Can you make something useful out of these, instead of throwing them? Try.
2. Prepare a detailed project report on compost making activity you did in school.

MATTER OF CONCERN!

1. In autumn lots of leaves are burnt in cities and towns. Some of the gases produced by burning leaves are similar to the gases released by the vehicles moving on the roads.
2. Instead of burning, if we make compost from these leaves, we can reduce the use of chemical fertilizers.
3. The green areas which should have fresh air, actually become full of harmful gases due to burning of leaves.
4. If you find any one is burning the leaves bring it to notice of municipal authorities or write to newspapers about it.
5. Generate social pressure against burning of leaves. Ensure that fallen leaves are not burnt but used for making compost.
6. Write to the 'Tree Authority' of your city or state to declare burning of leaves as an offence.

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