A Batteries

- Batteries are a product comprised of heavy metals and other elements that make things 'portable'. Some of these toxic heavy metals include nickel cadmium, alkaline, mercury, nickel metal hydride and lead acid.
- Batteries may produce the following potential problems or hazards:
  - They pollute the lakes and streams as the metals vaporize into the air when burned.
  - They contribute to heavy metals that potentially may leach from solid waste landfills.
  - They expose the environment and water to lead and acid.
  - They may cause burns or danger to eyes and skin.
- Batteries eventually leak into the environment and end up in the food chain, causing serious health risks to humans and animals.
- Heavy metals often leach into the soil and contaminate the ground water. They may also contaminate plants which will be eaten by animals and humans.
- The consequences of lead-acid batteries (most often used in cars, computers and toys), are the most frightening. Lead-sulphuric acid easily reacts with other chemicals, resulting in a release of hydrogen that is extremely flammable. Sulphuric acid also chemically attacks materials and living tissues. If it is burned, lead is likely to remain in the ash and to be released in the air.
- Some heavy metals, including copper, zinc and chromium, are required by our body in small amounts, but can be toxic in larger doses. Mild symptoms of too many traces of heavy metals can be coughing, headaches and vomiting. Children are the most highly affected by the metals, with effects such as damage to their central nervous system, reduced growth and development, and perhaps even mental retardation. Other health effects include cancer, organ damage and, in extreme cases, death.
- The demands for batteries are increasing with the use of new technologies.
- Batteries in India are mostly single use, 'use and throw'.
- Opportunities for recycling or proper disposal don't seem to be provided in this area.

Tips regarding the use of batteries:

- Don't use more batteries than necessary. That way we can reduce the number of batteries in our garbage.
- If suited to the task, buy hand-operated items that function without batteries.
- Look for batteries that have less mercury and heavy metals.
- Consider rechargeable batteries for some needs, but remember that they also contain heavy metals.
- Turn off any battery-operated appliances when not in use.
- Remove batteries from appliances if they are not going to be used for a long time.
- Do not mix old batteries with new ones. When old and new batteries are mixed, leaking or rupturing could occur, possibly resulting in injury or property damage.
- Do not throw batteries into a fire, it may cause them to explode.
- Do not open battery casings.

B Plastic

1. Definitions

- A substance or chemical is *biodegradable* if it can be changed back to a harmless natural state by the action of bacteria and will therefore not damage the environment.
- Paper, glass, plastic, etc. is often put through a process so that it can be used again. This is called *recycling.*

2. General information

- Plastics are made from non-renewable resources such as crude oil, gas and coal.
- Most kinds of plastic are **non**-biodegradable. They can last in the environment for up to 1'000 years.
- Landscapes littered with plastic are hazardous to wildlife and visually unattractive. Because plastic lasts so long, every year the number of plastic bags (and other plastic waste) littering the environment increases.
- When oil, gas and coal are used to produce plastic, they emit dangerous greenhouse gases. The burning of plastics also creates emissions of toxic gases, dioxins and heavy metals. Greenhouse gases contribute to worldwide climate change. Scientists predict that such climate change will impact on all our lives, especially in the fields of agriculture and health.
- Most kinds of plastic can be recycled.
- Burning was once believed to be an effective method for making garbage disappear. Unfortunately, instead of making it disappear, burning creates more toxic waste that poses a significant threat to public health and environment. New substances are created, and many of these substances are more toxic than the original waste.

3. Example: PVC

- PVC (polyvinyl chloride), often called 'vinyl', is the second most used plastic in the world.
- Of all the plastics, PVC is the most environmentally damaging. It requires hazardous chemicals for production, releases harmful substances when burned and creates toxic wastes.
- Currently less than 1 percent of PVC is recycled. The majority of collected PVC is 'down-cycled' (used to manufacture products of inferior quality).
- Unfortunately, PVC production is increasing, particularly in Asia and Central and South America, despite the fact that safer, more feasible alternatives currently exist for almost all PVC products.
- PVC is widely used for building materials (such as cables, window frames, doors, walls, etc.), for consumer articles (such as credit cards, imitation leather, garden furniture, toys, folders, pens, shampoo bottles, packaging, etc.) and thousands of other products.
- PVC is one of the world's largest dioxin sources. Dioxins are created when PVC plastic is burned (dioxins: see 4.).

4. Dioxins

- Dioxins are environmental pollutants sometimes referred to as the most toxic compounds made by mankind. A principle source of dioxins are various burning processes (such as burning plastic), but also natural events such as wild fires and volcanic eruptions.
- Dioxins are sent into the atmosphere where they become attached to particles and fall back to earth. Then they are taken up by fish and other animals, where they get

concentrated and stored in fat before eventually ending up in our food. People are exposed to them mostly from eating meat and fish rich in fat.

- Dioxins and other pollutants not only accumulate in animals, but also in and on food crops. This is most harmful to our health on crops where the edible portion is above the ground, such as leafy vegetables.
- Once emitted into the environment, dioxins can travel vast distances via air and ocean currents.
- Leftover ash (after burning, for instance, plastic) is extremely toxic.
- Each of us already carries a certain body burden of dioxins regardless of how and what we eat.

5. Health hazards

- Smoke from burning waste contains very small particles that can be breathed deep into the lungs. Once trapped in the lungs, these particles can cause cell damage.
- Exposure to dioxin (see 4.) can cause *chloracne*, a severe form of skin disease, as well as reproductive and developmental effects, liver damage, suppression of the immune system, diabetes and cancer.
- Even during small house fires considerable amounts of dioxin can form. This can lead to life threatening lung damage.
- Inhaling dioxin or being exposed to its fumes can be deadly.
- People who are exposed to air pollutants (e.g. near places where waste is burned) can experience eye and nose irritation, breathing difficulty, coughing and headaches. People with heart disease, asthma or other respiratory diseases are especially sensitive to air pollutants.
- Increased cancer rates, respiratory ailments, reproductive abnormalities and other health effects have been observed among people living near waste-burning facilities.
- Cancer, birth defects and other health effects are also known to occur at very low exposures to many of the metals and other pollutants released by waste-burning facilities.

6. Impact on wildlife

- It is estimated that plastic kills up to 1 million sea birds, 100’000 sea mammals and countless fish each year.
- Turtles, dolphins and whales can choke or starve to death by confusing plastic bags with jellyfish and eating them.
- The habitat of many animals in India (and in other parts of the world) is shrinking. Therefore, these animals are often forced to seek food elsewhere. They enter villages to forage garbage dumps for food. Waste such as glass and plastic can seriously hurt or even kill them. Large amounts of plastic (and other garbage) have been found in stomachs of cows, elephants, leopards, etc.
- Pollutants from our garbage, such as chemicals, dioxins and metals have been found in many animals. The amount of these pollutants in the animals’ bodies increases as they move up the food chain and they can be passed to the offspring.

7. Situation in India

- Plastic is also recycled in India. It should and could be collected in an appropriate manner and taken back to plastic factories.
- The governments of different Indian states have started to raise awareness for the problem among the people in order to prevent misuse of plastic and, thereby, to reduce plastic.
- Several cities in India have banned black plastic bags because of their toxicity. In fact, entire Indian states like Himachal Pradesh and Sikkim, which depend on tourism for

revenue, strictly enforce bans on plastic bags and even fine shopkeepers if any are found on their premises.

- 'Plastic-free' towns such as Dharamsala and Ooty set examples for how to tackle the problem in an effective manner. One day, Sera may also become 'plastic-free'…

8. What we can do

- Check how plastic can be collected and sent back to factories. Provide containers where plastic can be segregated from other garbage.
- Reuse plastic bottles and refill them where treated and clean drinking water is available.
- If you're buying only a couple of items, consider carrying them without plastic bag.
- Use bags which are not made of plastic. If you use plastic bags, reuse them instead of throwing them away.
- Always carry your own bags while shopping.
- While shopping, put more things into one bag.
- Avoid double bagging.
- Eat your outside food in a restaurant instead of taking home plastic 'parcels'.
- Buy in bulk. Buying lots of smaller packs generates more waste. Bulk purchasing saves money, too.
- Opt for brands that have less packaging.
- Don't burn your garbage as you will be exposed to dangerous toxic fumes!
- **Share your knowledge about the garbage problem with fellow monks, friends and family. That way we can raise awareness and improve the situation considerably!**

We can all contribute to protect the lives of all beings and our environment!