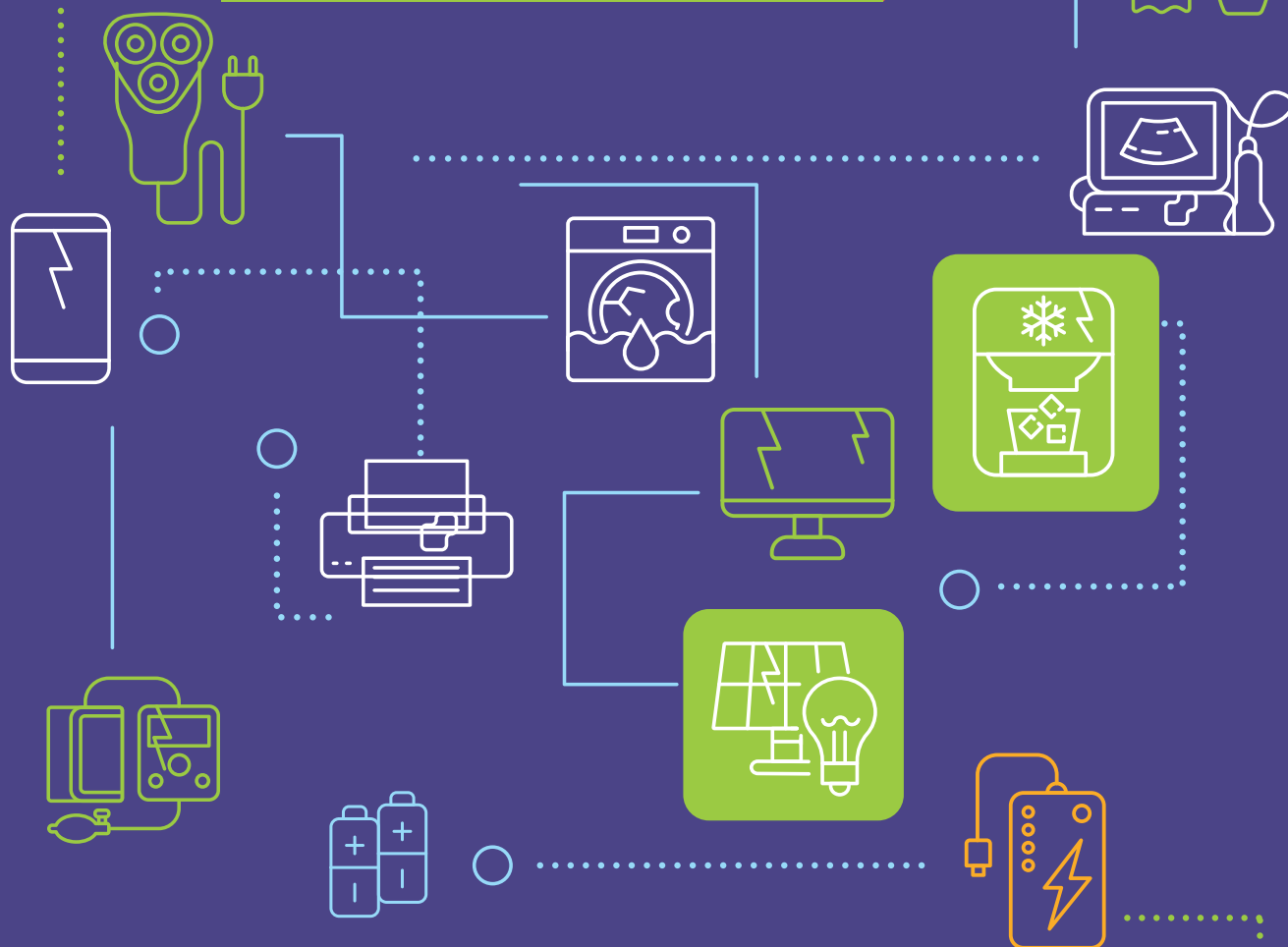


NAVIGATING THE E-WASTE CHALLENGE

YOUTH
ECO
SUMMIT

HANDBOOK FOR YOUTH



इलेक्ट्रॉनिक्स एवं
सूचना प्रौद्योगिकी मंत्रालय
MINISTRY OF
ELECTRONICS AND
INFORMATION TECHNOLOGY



Bajaj
FOUNDATION

NAVIGATING THE E-WASTE CHALLENGE

HANDBOOK FOR YOUTH



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INTRODUCTION

As the world becomes increasingly interconnected through digital technologies, electronic devices are indispensable to modern life. However, this digital revolution has a hidden cost—electronic waste, or e-waste, has emerged as one of the fastest-growing waste streams globally. The production and disposal of electronics, from smartphones to computers, not only consume valuable resources but also pose significant environmental and health risks. Improperly managed e-waste contaminates soil, water, and air, and exposes communities to toxic substances like lead and mercury. As the demand for electronic devices grows, so too does the need to address the mounting e-waste challenge. This handbook, **Navigating the E-Waste Challenge**, is designed to empower young people to become active participants in the global movement for responsible e-waste management. The young people are at the forefront of the sustainability movement, and their engagement in addressing e-waste is critical. As the future custodians of the planet, their actions can influence change at both the local and global levels. Whether through community awareness campaigns, participating in recycling programs, or advocating for stronger e-waste regulations, youth have the power to drive significant progress in this domain. Through practical tips, case studies, and actionable strategies, this handbook empowers youth to take meaningful steps in managing e-waste, promoting sustainability, and protecting our environment for future generations.

Bajaj Foundation has long been committed to fostering environmental sustainability and empowering communities. Through its various initiatives, the Foundation supports programs that address critical issues such as e-waste, and this handbook is a part of that ongoing effort. By providing resources, conducting workshops, and facilitating collaborations between stakeholders, Bajaj Foundation aims to create lasting impact in the realm of e-waste management, with youth at the center of these efforts.

FOREWORD

At **TECNO**, we believe in the power of youth to drive a sustainable future. Youth Eco Summit 2025, Future Green Leaders: Powering an E-Waste Revolution, perfectly aligns with our mission of innovation and environmental responsibility.

E-waste is one of the fastest-growing global challenges. As a proud partner, TECNO is committed to action—promoting recycling, developing eco-friendly packaging, and designing long-lasting devices. In 2024-25, we responsibly managed 200 MT of e-waste, reinforcing our dedication to sustainability.

Beyond our products, we are fostering global change by supporting recycling initiatives and reducing waste in production. With passionate young leaders and partners like **UNICEF**, **YuWaah** and **WWF India**, we can shape a greener, smarter world—together.

ARIJEET TALAPATRA
CEO, TECNO INDIA

”



FOUNDERS NOTE

Youth Eco Summit 2025 is more than just an event—it's an attempt to join forces with 2,336 schools from 35 cities to power an e-waste revolution.

This year's theme, Future Green Leaders: Powering an E-Waste Revolution, highlights one of the most pressing environmental challenges of our time. E-waste is growing at an alarming rate, but through innovation, awareness, and action, we can turn this crisis into an opportunity for a greener, more sustainable future.

This eBook is a reflection of the ideas, solutions, and commitments shaping the path ahead. The solutions presented here prove that the youth are ready to lead.

With the support of partners, we are building a global community dedicated to sustainability.

Together, let's take action, inspire change, and create a legacy for future generations.

PANKAJ BAJAJ
FOUNDER & DIRECTOR, BAJAJ FOUNDATION

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INTRODUCTION TO

E-WASTE



WHAT IS

E-WASTE?



- E-waste, or electronic waste, refers to **electronic products that are no longer in use or have reached the end of their life cycle**. These items are either discarded, stored unused, or awaiting disposal.
- E-waste **includes all forms of used electronics**, such as mobile phones, computers, televisions, refrigerators, and even electric toothbrushes.
- The rapid pace of technological advancements and consumer habits of frequently upgrading devices have contributed to the growing volume of e-waste.
- Some e-waste is valuable and recyclable, while a significant portion contains hazardous materials that require proper handling to avoid environmental damage.



TYPES OF

E-WASTE



CONSUMER ELECTRONICS

Everyday gadgets like **mobile phones, laptops, desktop computers, tablets, televisions, gaming consoles, and digital cameras**. These devices are most commonly associated with e-waste, as they are frequently upgraded and replaced.

LIFESPAN: Typically 2-10 years, depending on usage and technological advancements.

OFFICE AND IT EQUIPMENT

Devices typically used in workplaces, such as **printers, scanners, fax machines, photocopiers, and servers**. Office environments generate a large amount of e-waste due to routine upgrades and replacements.

LIFESPAN: 3-7 years.

HOUSEHOLD APPLIANCES

This includes both small and large appliances. Examples of small appliances are **microwave ovens, toasters, and electric kettles**. Large appliances include **refrigerators, air conditioners, washing machines, and dishwashers**. The e-waste from household appliances tends to be heavier and often contains hazardous materials, especially in older models.

LIFESPAN: 7-15 years.

MEDICAL DEVICES

Non-reusable medical equipment such as **digital thermometers, blood pressure monitors, and diagnostic tools**. With technological innovation in healthcare, medical devices frequently contribute to the e-waste stream.

LIFESPAN: Varies depending on the device.

INDUSTRIAL ELECTRONICS

Specialized equipment such as **large machinery, heavy-duty power tools, and devices used in manufacturing or construction**. These items contribute to industrial e-waste, which often requires specialized handling and recycling processes due to their size and complexity. It also includes **solar panels**.

LIFESPAN: Longer than consumer products but highly variable.

COMPOSITION AND MATERIALS IN E-WASTE

E-waste is made up of a complex mixture of materials, many of which are valuable, while **others are hazardous and need to be managed carefully:**

METALS

PRECIOUS METALS:

E-waste contains small but significant amounts of precious metals like gold, silver, platinum, and palladium, which are commonly used in circuit boards and connectors.

COMMON METALS:

Copper, aluminum, and steel are widely used in wiring, casings, and components, making them valuable for recycling. Recovering these metals helps reduce the need for mining and lowers environmental impact.

PLASTIC

Plastics are used extensively in the construction of electronic devices for casings, insulation, and components. Although they can be recycled, they often contain additives or chemicals (such as brominated flame retardants) that complicate the recycling process and may pose health risks.

GLASS

Glass is commonly found in screens and monitors, particularly in older devices with cathode-ray tubes (CRT). CRT glass can contain lead, making it hazardous if not disposed of properly. However, newer devices use LCD or LED technology, which presents different recycling challenges.

HAZARDOUS SUBSTANCES

LEAD:

Found in CRTs, batteries, and circuit boards, it can cause neurological damage and developmental issues.

MERCURY:

Used in lighting, thermostats, and older batteries, mercury is highly toxic to humans and wildlife.

CADMIUM:

Often found in batteries and some semiconductors, cadmium is carcinogenic and can lead to environmental contamination if e-waste is not processed correctly.

BROMINATED FLAME RETARDANTS:

These chemicals are added to plastics to reduce fire risk, but they are persistent in the environment and pose health risks during disposal and recycling.



HOUSEHOLDS:

Outdated or broken electronic gadgets and appliances such as smartphones, TVs, and kitchen equipment.

1.

BUSINESSES AND OFFICES:

Obsolete or redundant office equipment, including desktop computers, servers, printers, and copiers.

2.

SOURCE OF

E-WASTE

3.

MANUFACTURING INDUSTRY:

Electronic components discarded during the production process, as well as defective or damaged products.

4.

HEALTHCARE FACILITIES

Outdated medical and diagnostic equipment, such as X-ray machines, ECG monitors, and other electronic medical devices.

5.

RETAILERS AND DISTRIBUTORS:

Unsold or returned electronic goods that are no longer marketable or in working condition.



CHALLENGES IN

E-WASTE

MANAGEMENT

HIGH RECYCLING COSTS:

- Advanced technologies are required to safely and efficiently extract valuable materials from e-waste.
- Labor and operational costs in developed recycling processes are often expensive.

LACK OF CONSUMER AWARENESS:

- Many consumers are unaware of how to properly dispose of electronic devices, leading to e-waste ending up in landfills.
- Public education on recycling and take-back programs is insufficient in many regions.

HAZARDOUS MATERIALS:

- E-waste contains toxic substances such as lead, mercury, and cadmium that require specialized handling to prevent environmental contamination.
- Hazardous materials can cause serious health issues, including respiratory problems and cancers.

INFORMAL RECYCLING SECTORS:

- In many countries, informal recycling workers extract materials using unsafe methods (e.g., burning wires to obtain copper), releasing toxins into the environment.
- These sectors operate without regulation, posing significant risks to both workers and the environment.

ILLEGAL EXPORT AND DUMPING:

- E-waste is often illegally shipped to developing countries where regulations are lax, exacerbating environmental and health problems.



QUIZ

EXERCISE 1



MUTIPLE CHOICE QUESTIONS

01.

WHAT IS E-WASTE?

- A Discarded plastic bottles
- B Old or unused electronic devices and appliances
- C Recyclable paper products
- D Food waste

02.

WHICH OF THE FOLLOWING IS NOT CONSIDERED A TYPE OF E-WASTE?

- A Old mobile phones
- B Refrigerators
- C Solar panels
- D Plastic bags

03.

WHICH MATERIAL IS COMMONLY FOUND IN E-WASTE?

- A Paper
- B Lead
- C Wood
- D Wool

04.

WHICH OF THESE IS CONSIDERED HAZARDOUS IN E-WASTE?

- A Copper
- B Gold
- C Mercury
- D Aluminum

05.

WHICH TYPE OF FACILITY IS A MAJOR SOURCE OF E-WASTE?

- A Cafes
- B Healthcare facilities
- C Parks
- D Sports arenas

06.

WHAT IS ONE MAJOR CHALLENGE IN MANAGING E-WASTE?

- A High cost and complexity of recycling
- B Lack of electronics
- C Surplus of recycling centers
- D Cheap recycling methods

07.

WHY IS ILLEGAL DUMPING OF E-WASTE A PROBLEM?

- A It leads to more e-waste jobs
- B It causes environmental and health risks
- C It makes electronics cheaper
- D It reduces recycling efforts

TRUE OR FALSE:

08.

CONSUMER ELECTRONICS LIKE PHONES AND TABLETS ARE A MAJOR CATEGORY OF E-WASTE.

A TRUE

B FALSE

09.

E-WASTE DOES NOT CONTAIN ANY HAZARDOUS SUBSTANCES.

A TRUE

B FALSE

10.

BUSINESSES CONTRIBUTE TO E-WASTE THROUGH OUTDATED OFFICE EQUIPMENT.

A TRUE

B FALSE

REFLECTION QUESTIONS

?

WHAT SURPRISED YOU THE MOST ABOUT E-WASTE?

?

HOW CAN WE AS INDIVIDUALS HELP REDUCE E-WASTE IN OUR DAILY LIVES?

?

WHAT INITIATIVES CAN SCHOOLS IMPLEMENT TO PROMOTE E-WASTE RECYCLING?

IMPACTS OF E-WASTE





IMPACT OF

E-WASTE

ON PEOPLE



EDUCATIONAL DISRUPTION:

Communities affected by e-waste pollution often struggle with health crises that can disrupt education. Children and adolescents may face frequent absences from school due to illness or caregiving responsibilities.

SOCIAL AND ECONOMIC IMPACTS:

Vulnerable communities, especially in developing countries, often bear the burden of e-waste mismanagement. Lack of formal recycling infrastructure forces them to work in unsafe environments, perpetuating poverty and poor health outcomes.

IMPACT OF

E-WASTE

ON ENVIRONMENT

SOIL AND WATER CONTAMINATION:

- Toxic substances from e-waste can leach into the soil, contaminating groundwater and agricultural land.
- Heavy metals like lead and mercury can persist in the environment, causing long-term damage.

AIR POLLUTION:

- Open burning of e-waste releases harmful dioxins and furans into the air.
- Improper incineration processes can lead to the release of toxic gases and particulate matter.

IMPACT ON WILDLIFE:

- Contaminated water sources can harm aquatic life and disrupt ecosystems.
- Wildlife can ingest small fragments of e-waste, leading to poisoning and death.
- Habitats may be destroyed by illegal dumping practices, leading to loss of biodiversity.



IMPACT OF

E-WASTE

ON HEALTH



TOXIC EXPOSURE:

- Workers in informal recycling sectors are exposed to hazardous chemicals without adequate protection.
- Prolonged exposure to heavy metals can lead to neurological damage, respiratory issues, and cancer.

CHRONIC HEALTH ISSUES:

- Communities living near e-waste dumping sites often suffer from chronic conditions like asthma, skin diseases, and developmental issues in children.
- Long-term exposure can result in kidney damage, lung disease, and reproductive health problems.

QUIZ

EXERCISE 2



MUTIPLE CHOICE QUESTIONS

01.

WHICH OF THE FOLLOWING IS A CONSEQUENCE OF THE OPEN BURNING OF E-WASTE?

- A Improved air quality
- B Release of harmful dioxins and furans
- C Increased biodiversity
- D Decreased soil contamination

02.

WHAT CHRONIC HEALTH ISSUE IS NOT COMMONLY REPORTED IN COMMUNITIES NEAR E-WASTE DUMPING SITES?

- A Asthma
- B Skin diseases
- C Increased athletic performance
- D Developmental issues in children

03.

WHAT IS NOT RELEASED INTO THE AIR AT TIME OF OPEN BURNING OF E-WASTE?

- A Clean air
- B Harmful dioxins and furans
- C Oxygen
- D Water vapor

04.

WHICH OF THE FOLLOWING COMMUNITIES IS MOST LIKELY TO BE AFFECTED BY E-WASTE MISMANAGEMENT?

- A Wealthy urban areas
- B Developed countries
- C Vulnerable communities in developing countries
- D Rich suburban neighborhoods

E-WASTE

**POLICIES IN INDIA AND
E-WASTE STAKEHOLDERS**



NATIONAL

LEGISLATIONS

AND POLICIES

1.

E-WASTE (MANAGEMENT) RULES, 2011 (AMENDED IN 2016, 2018, 2023):

This landmark regulation was introduced to regulate the disposal and recycling of e-waste. It lays down the responsibilities for producers, manufacturers, recyclers, and consumers. The amendments made in 2016 expanded the scope of EPR and introduced stricter regulations on how e-waste is handled.

2.

HAZARDOUS AND OTHER WASTES (MANAGEMENT AND TRANSBOUNDARY MOVEMENT) RULES, 2016:

These rules govern the import/export of hazardous e-waste and aim to restrict illegal dumping in India from other nations.

3.

THE PLASTIC WASTE MANAGEMENT RULES, 2016:

Though primarily focused on plastics, this policy affects electronics containing plastic components, ensuring proper segregation and recycling.

4.

EXTENDED PRODUCER RESPONSIBILITY (EPR):

A central feature of the E-Waste Management Rules, EPR makes producers responsible for the collection, recycling, and disposal of e-waste generated from the products they manufacture or sell.

5.

BATTERIES WASTE MANAGEMENT RULES, 2022:

This regulation addresses the proper disposal and recycling of batteries, which are often part of electronic devices, thus overlapping with e-waste regulations.

6.

CIRCULAR ECONOMY IN E-WASTE MANAGEMENT 2023:

As part of India's mission towards a circular economy, this policy focuses on recycling, reusing, and recovering resources from e-waste, minimizing the need for raw materials and reducing environmental impact.

ROLE OF DIFFERENT STAKEHOLDERS



1.

GOVERNMENT AGENCIES:

- The MoEF&CC oversees policy formulation and monitoring compliance.
- The Central Pollution Control Board (CPCB) ensures implementation of e-waste regulations and sets standards for disposal and recycling.

2.

PRODUCERS AND MANUFACTURERS:

- Producers are obligated to manage e-waste through the principle of Extended Producer Responsibility (EPR).
- They must collect a certain percentage of their products at the end of life.

3.

RECYCLERS AND DISMANTLERS:

- Authorized facilities handle e-waste in environmentally safe ways by extracting reusable materials and ensuring hazardous substances are disposed of properly.

4.

BULK CONSUMERS:

- Individuals and institutions (like businesses) must return end-of-life products to authorized collection centers and avoid informal recycling networks.
- Institutions, including businesses, schools, and government agencies, have a greater responsibility due to the larger volumes of e-waste they generate.

5.

REFURBISHERS:

- Refurbishers play an important role by extending the life of electronic products. They repair or upgrade devices, reselling them to reduce the pressure on recycling and disposal facilities.
- Refurbishment helps reduce the amount of e-waste generated and promotes a circular economy.

ROLE OF THE

FORMAL SECTOR

The formal sector includes government-regulated entities such as licensed recyclers, dismantlers, refurbishers, and collection centers. These entities operate under strict environmental guidelines to manage e-waste responsibly. Their roles include:

1.

Safe dismantling and recycling of e-waste, ensuring no harmful emissions are released into the environment.

2.

Resource recovery, where valuable metals like gold, silver, copper, and rare earth elements are extracted from electronic components.

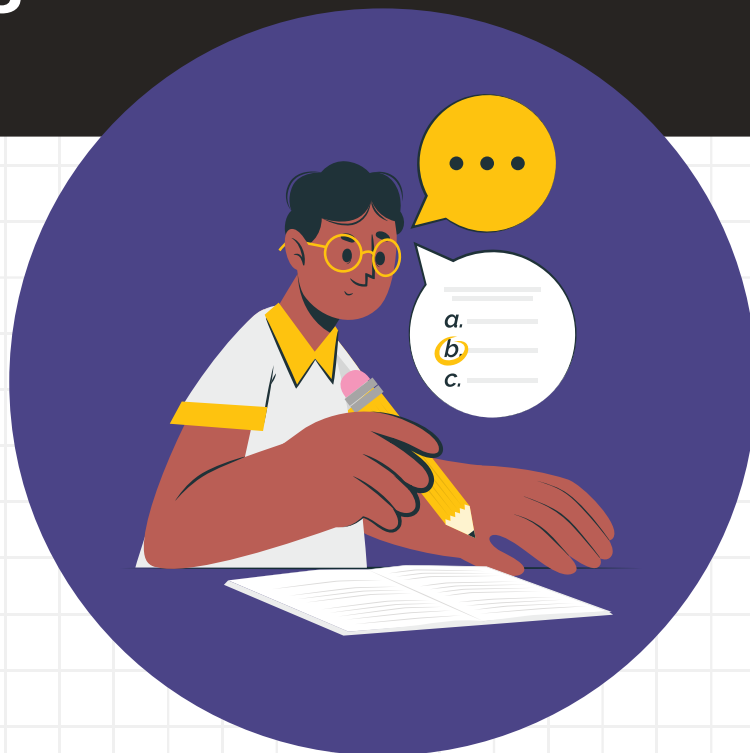
3.

Collaboration with producers to meet their EPR obligations, offering recycling services and ensuring traceability of collected e-waste.



QUIZ

EXERCISE 3



MUTIPLE CHOICE QUESTIONS

01.

WHAT YEAR WAS THE E-WASTE (MANAGEMENT) RULES FIRST INTRODUCED IN INDIA?

- A 2008
- B 2011
- C 2014
- D 2016

02.

WHAT IS THE ROLE OF PRODUCERS UNDER EXTENDED PRODUCER RESPONSIBILITY (EPR)?

- A Safely dismantling electronic products
- B Collecting a certain percentage of their products at the end of their life
- C Importing e-waste for recycling
- D Monitoring compliance with e-waste policies

03.

WHICH STAKEHOLDER IS RESPONSIBLE FOR RETURNING END-OF-LIFE PRODUCTS TO AUTHORIZED COLLECTION CENTERS?

- A Recyclers
- B Bulk consumers
- C Refurbishers
- D Manufacturers

04.

WHO IS RESPONSIBLE FOR OVERSEEING THE FORMULATION OF E-WASTE MANAGEMENT POLICIES IN INDIA?

- A Central Pollution Control Board (CPCB)
- B Ministry of Environment, Forest, and Climate Change (MoEF&CC)
- C State Pollution Control Board
- D Producers

PRACTICAL STEPS FOR

E-WASTE

MANAGEMENT



HOW TO MANAGE E-WASTE?



ROUTINE MAINTENANCE:

Keep devices clean by dusting, cooling, and performing regular checks on software performance. This can prevent malfunctions and increase their life.

BASIC REPAIRS:

Learn simple repair skills like changing batteries, replacing screens, or upgrading memory. Choose authorized or trusted repair services for more complex problems.

OPT FOR LONGEVITY/EXTENDED LIFE PLANS:

Choose electronics designed with longer life spans, made from durable materials, and built for repairability.

MODULAR DESIGNS:

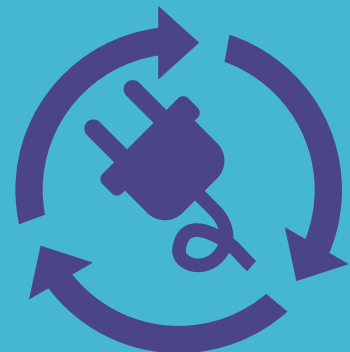
Select products that allow for easy upgrades or replacement of components (e.g., RAM, storage) rather than discarding the entire device.

AVOID LOCAL KABARIWALAS:

The informal recycling sector can result in unsafe disposal methods that harm both workers and the environment. Always opt for certified recyclers.

REGULAR UPDATES:

Keep your devices up-to-date with software patches and firmware upgrades to maintain performance and security.



SMART DISPOSAL

PRACTICES

E-WASTE COLLECTION CENTERS:

Look for verified e-waste drop-off locations in your city or at major electronics retailers, where you can recycle your old devices safely.

DONATE USABLE ELECTRONICS:

If the device is still functional, consider donating it to local schools, charities, or low-income families who might benefit.

REFURBISHMENT:

If a device is no longer functioning as expected, consider refurbishing it. Many companies offer refurbishment services to make old devices run like new again.

CHOOSE CERTIFIED RECYCLERS:

Ensure that recyclers are certified by CPCB, which guarantee responsible disposal and proper handling of hazardous substances.



QUIZ

EXERCISE 4



MUTIPLE CHOICE QUESTIONS

01.

WHERE SHOULD YOU TAKE OLD ELECTRONICS TO ENSURE THEY ARE PROPERLY RECYCLED?

- A General trash bins
- B E-waste collection points
- C Leave them in storage forever
- D Burn them

02.

WHAT IS ONE WAY TO EXTEND THE LIFESPAN OF ELECTRONICS?

- A Store in a hot, humid place
- B Never clean the device
- C Regularly update software and firmware

03.

WHAT SHOULD YOU DO WHEN YOUR ELECTRONICS MALFUNCTION?

- A Throw them away immediately
- B Try basic repair or seek professional help
- C Buy a new one

04.

WHERE CAN YOU FIND CERTIFIED E-WASTE RECYCLERS?

- A Online or by contacting local recycling centers
- B In the electronics store where you bought your device
- C Anywhere that accepts general waste

05.

WHY IS IT IMPORTANT TO DONATE OR RECYCLE ELECTRONICS PROPERLY?

- A To reduce landfill waste and prevent pollution
- B To make more space for new devices
- C To avoid e-waste fines

06.

MATCH THE FOLLOWING

A	To avoid e-waste fines	1	Locations for collection of old electronics
B	E-waste collection points	2	Process of providing new look to old device
C	Refurbishment	3	Locations for properly recycling old electronics



ANSWERS

FOR E-WASTE QUIZS

EXERCISE 1

1. B. 2. D. 3. B. 4. C. 5. B. 6. A. 7. B.
8. TRUE 9. FALSE 10. TRUE

EXERCISE 2

1. B. 2. C. 3. A. 4. C.

EXERCISE 3

1. B. 2. B. 3. B. 4. B.

EXERCISE 4

1. B. 2. C. 3. B. 4. A. 5. A. 6. A:3 | B:1 | C:2

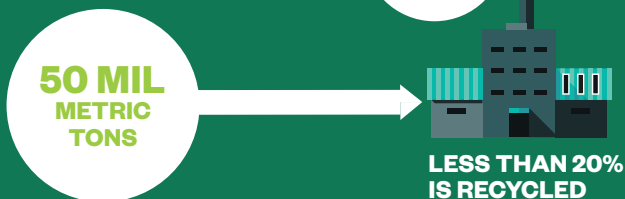
DID YOU

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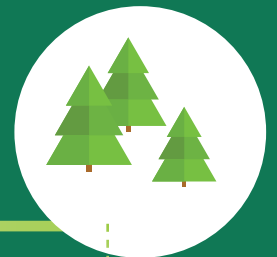
E-WASTE GROWTH:

The world generates over 50 million metric tons of e-waste annually, and less than 20% of it is recycled formally.



TOXIC COMPONENTS:

E-waste contains hazardous materials such as lead, mercury, and cadmium, which can leach into the soil and water, **causing serious environmental damage.**



RARE EARTH METALS:

Electronics contain valuable rare earth metals, which are finite resources. Recycling can help recover these materials for reuse.

RIGHT TO REPAIR MOVEMENT:

Consumers are pushing for laws that support their right to repair devices instead of being forced to buy new ones, promoting sustainability and reducing e-waste.

