



सत्यमेव जयते



LIFE
Lifestyle for
Environment

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Sacred Sites of India**

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E-WASTE

What is E-Waste?

E-waste (electronic waste) refers to discarded electrical or electronic devices. These include products that are broken, outdated, or no longer useful.

Examples:

- Mobile phones
- Computers and laptops
- TVs
- Refrigerators
- Washing machines
- Batteries
- Printers
- Chargers and cables



Where does E-Waste come from?

1. Large Household Appliances

Refrigerators

Air conditioners

Washing machines



2. Small Household Appliances

Toasters

Vacuum cleaners

Electric irons



3. IT and Communication Devices

Smartphones

Laptops

Tablets

Routers



4. Consumer Electronics

TVs

Cameras

Audio systems

5. Lighting Equipment

LED bulbs

Fluorescent lamps

6. Medical Devices

ECG machines

Thermometers

7. Batteries and Electrical Tools

Power banks

Lithium-ion batteries

Drills

Why is E-Waste increasing?

Main reasons:

- Rapid technology upgrades
- Short product life cycles
- Consumer demand for newer gadgets
- Cheap electronics
- Lack of repair culture

Example:

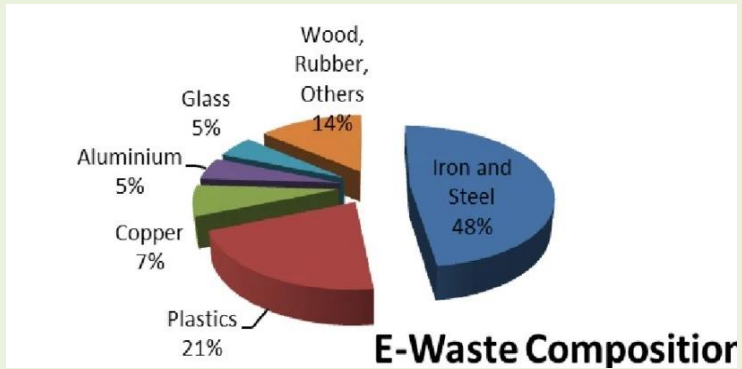
People replace smartphones every 2–3 years even if they work.



<https://www.researchgate.net/profile/Saurabh-Kumar-176/publication/315713269/figure/fig1/AS:477883589238785@1490947734100/Growth-of-E-waste-in-India.png>

Components Found in E-Waste

E-waste contains both valuable and hazardous materials.



<https://www.researchgate.net/profile/Lamiaa-Abdallah-3/publication/344187925/figure/fig1/AS:934103595622401@1599719060955/E-Waste-composition-by-percentage.png>

1. Valuable Materials

- Gold
- Silver
- Copper
- Aluminum
- Palladium

2. Common hazardous materials of E-Waste constituents and effects on human health

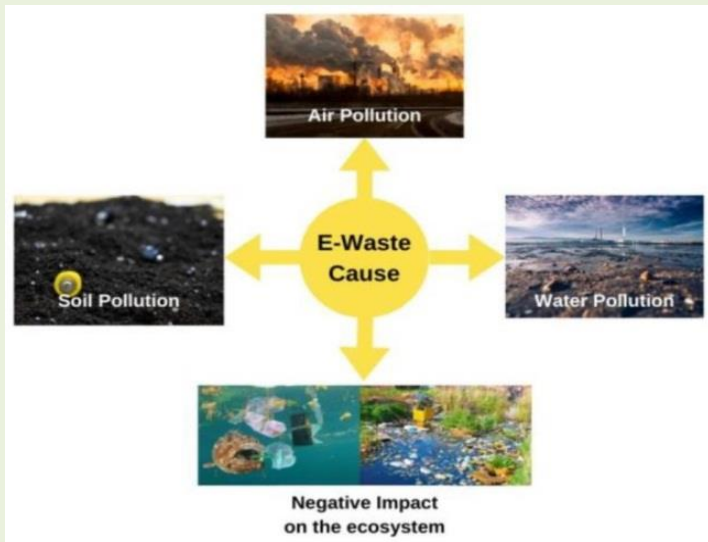
e-toxin	Source of e-toxin	Health effects
Arsenic	Microchip (used in the form of gallium arsenide)	Arsenic is a known carcinogen (cancer-causing substance)
Brominated Flame Retardants	Used in electronic products as a means for reducing flammability	Polybrominated Diphenylethers (PBDE) might act as hormone disrupters. Research has revealed that levels of PBDEs in human breast milk are doubling every five years and this has prompted concern because of the effect of these chemicals on the young
Cadmium	Printed circuit boards, Nickel-cadmium battery, and Semiconductors	Cadmium and its compounds accumulate in the human body, in particular in kidneys. It is adsorbed through respiration but is also taken up with food. Cadmium can easily be accumulated in amounts that cause symptoms of poisoning.
Chromium	Used for corrosion protection in steel	Chromium can easily pass through membranes of cells and is easily

		absorbed producing various toxic effects within the cells. It causes strong allergic reactions even in small concentrations. Asthmatic bronchitis is another allergic reaction linked to chromium. Chromium may also cause DNA damage.
Cobalt	Lithium ion battery (in mobiles)	Cobalt fume and dust is an irritant to lungs if inhaled, and cobalt is a possible human carcinogen
Copper	Electronic circuitry	Copper is a required human nutrient and is not a significant health concern. In high doses it can cause respiratory and intestinal irritation, and in very high doses it can cause liver and kidney damage.
Halogens	Electronic circuitry	These substances are of concern because of the possibility that halogenated organic compounds such as dioxins and furans may be created and released.
Lead	Cathode-ray tubes and Solders	Can cause damage to the central and peripheral

	(Each cathode-ray tube can contain five pounds of lead or more)	nervous systems, circulatory system and kidneys in humans. Damage to a child's brain development has also been noted.
Mercury	Batteries and Switches	Methylated mercury causes chronic damage to the brain.
Polyvinyl chloride	Cables insulation and coating	When burnt it produces highly toxic dioxins.

Effects of E-Waste

1. Environmental Effects



<https://www.mdpi.com/2076-3417/15/8/4350>

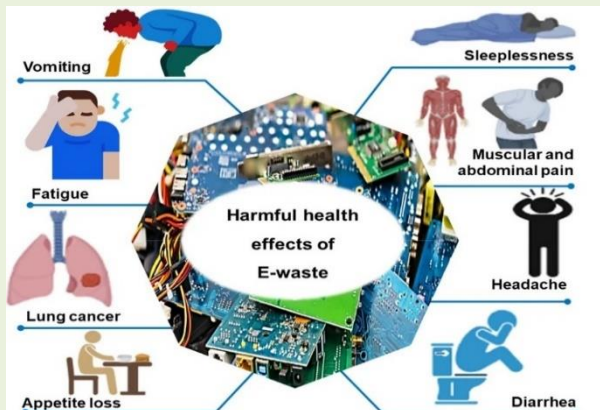
- a. Soil Pollution
 - Toxic metals leak into soil from landfills.
- b. Water Pollution
 - Chemicals contaminate groundwater and rivers.
- c. Air Pollution
 - Burning wires and plastics releases poisonous gases.
- d. Climate Impact
 - Improper recycling releases greenhouse gases.

2. Health Effects

People working in unsafe recycling areas may suffer from:

- Breathing problems
- Skin diseases
- Kidney damage
- Nervous system disorders
- Cancer risks

Children are especially vulnerable.



https://www.researchgate.net/figure/Harmful-health-effects-of-e-waste_fig5_371445217

E-Waste Recycling Process

Step 1: Collection

- Devices are collected from homes, offices, and industries.

Step 2: Sorting

- Items are separated by type.

Step 3: Dismantling

- Reusable parts are removed manually.

Step 4: Shredding

- Machines break devices into smaller pieces.

Step 5: Material Recovery

- Metals, plastics, and glass are extracted.

Step 6: Safe Disposal

- Hazardous waste is treated carefully.



https://www.researchgate.net/figure/Process-of-recycling-E-waste_fig2_383043187

Benefits of Recycling E-Waste

- Conserves natural resources
- Reduces pollution
- Saves energy
- Creates jobs
- Recovers precious metals
- Reduces landfill waste

Example: Recovering gold from old electronics is often cheaper than mining new gold.

E-Waste Management Methods

1. Reduce

- Buy only necessary electronics.

2. Reuse

- Donate or repair old devices.

3. Recycle

- Use certified recycling centres.

4. Refurbish

- Upgrade and resell electronics.

5. Producer Responsibility

- Manufacturers collect old products.

How Individuals Can Help

You can:

- Extend device lifespan
- Repair before replacing
- Donate working electronics
- Recycle responsibly
- Avoid throwing batteries in regular trash
- Use manufacturer take-back programs

E-waste is both a challenge and an opportunity. Proper recycling protects human health, reduces pollution, and recovers valuable materials. Responsible production, consumption, and disposal are essential for a sustainable future.

