E-Waste: Discussions, Solutions & Actions

Bringing Sustainability into the classroom



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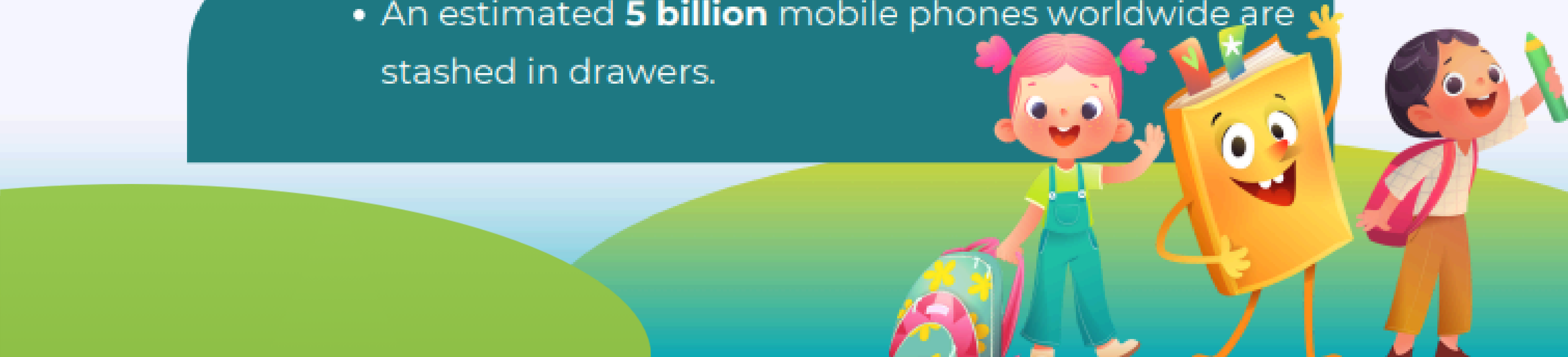


INTRODUCTION TO E-WASTE

E-waste includes any discarded electrical or electronic equipment, encompassing both working and broken items thrown into garbage or rejected during manufacturing and repair. Anything running on electricity, electronics, or batteries becomes e-waste once non-functional.

DID YOU KNOW?

- **3rd Largest Generator:** India generates over **1.6 million** tonnes of e-waste annually.
- **Informal Dominance:** Over **90%** of India's e-waste is handled by the informal sector using unsafe methods.
- **Recycling Gap:** Less than **35%** is processed through formal, CPCB-authorized recyclers.
- An estimated **5 billion** mobile phones worldwide are stashed in drawers.



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How much do you know about E-Waste?

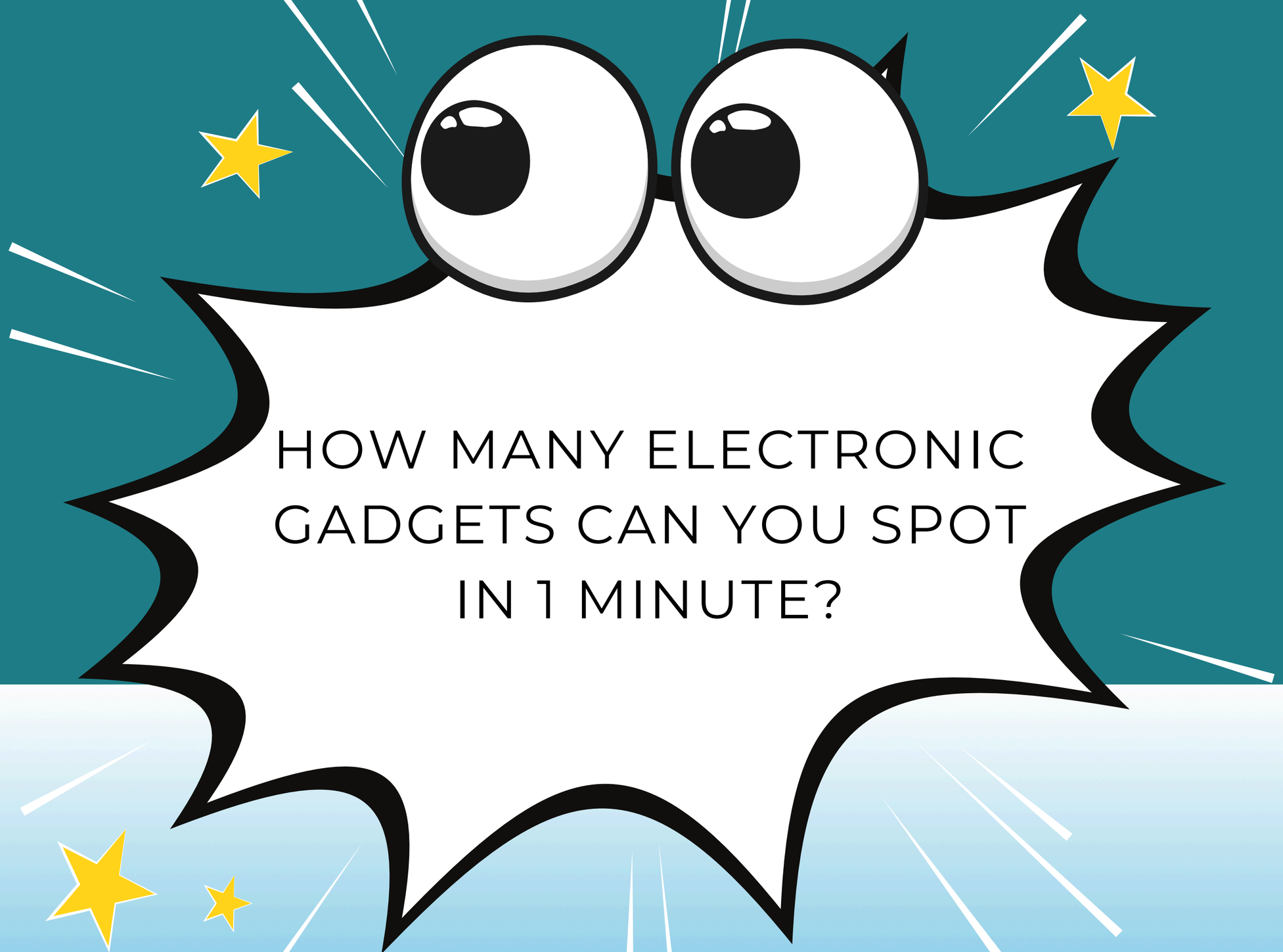
LET’S FIND OUT!





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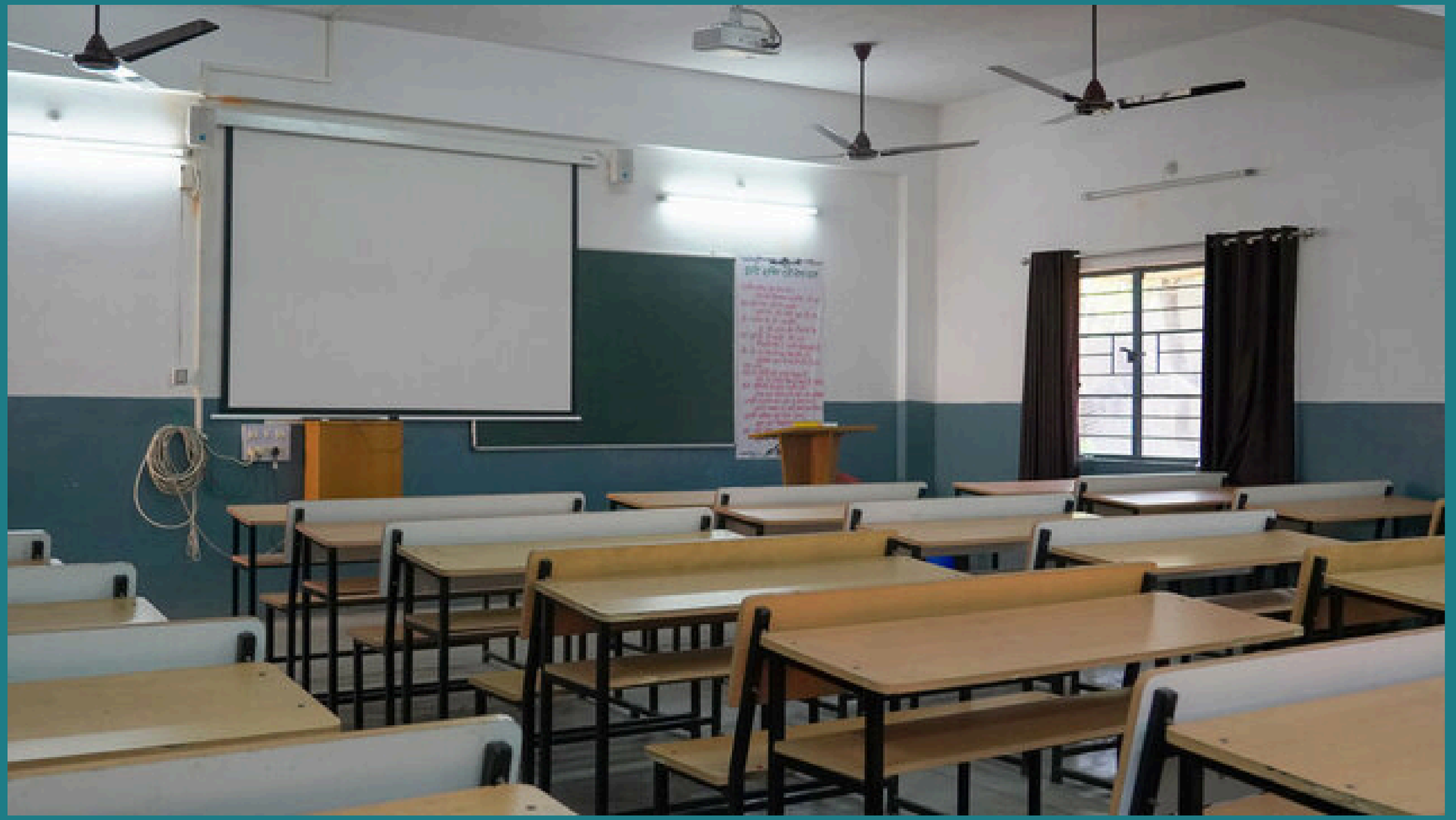


HOW MANY ELECTRONIC GADGETS CAN YOU SPOT IN 1 MINUTE?

ROOM 1



ROOM 2



E-Waste Classification New Rules

CAT 1

IT & Telecom Equipment

Computers, laptops, printers, microphones, mainframes & phones.

CAT 2

Consumer Electronics

Televisions, cameras, audio equipment & consumer electronic displays.

CAT 3

Large & Small Appliances

Refrigerators, washing machines, microwaves, air-coolers & household electronics.

CAT 4

Electrical & Electronic Tools

Drills, saws, soldering irons & electronic hand tools (excl. large stationary).

CAT 5

Toys, Leisure & Sports

Video games, electronic trains, non-inflate consoles & sports tech equipment.

CAT 6

Medical Equipment

Cardiology, laboratory devices, radiotherapy & diagnostic equipment.

CAT 7

Solar PV Modules & Panels

Solar photo-voltaic panels, modules, and solar cell assemblies.

Total Items Covered: **108 specific items** classified under E-Waste Rules, 2022.

Schedule I Compliance

E-WASTE OR NOT?



1



2



3



4

E-WASTE OR NOT?



5



6



7



8



Laptop



Desktop Computer

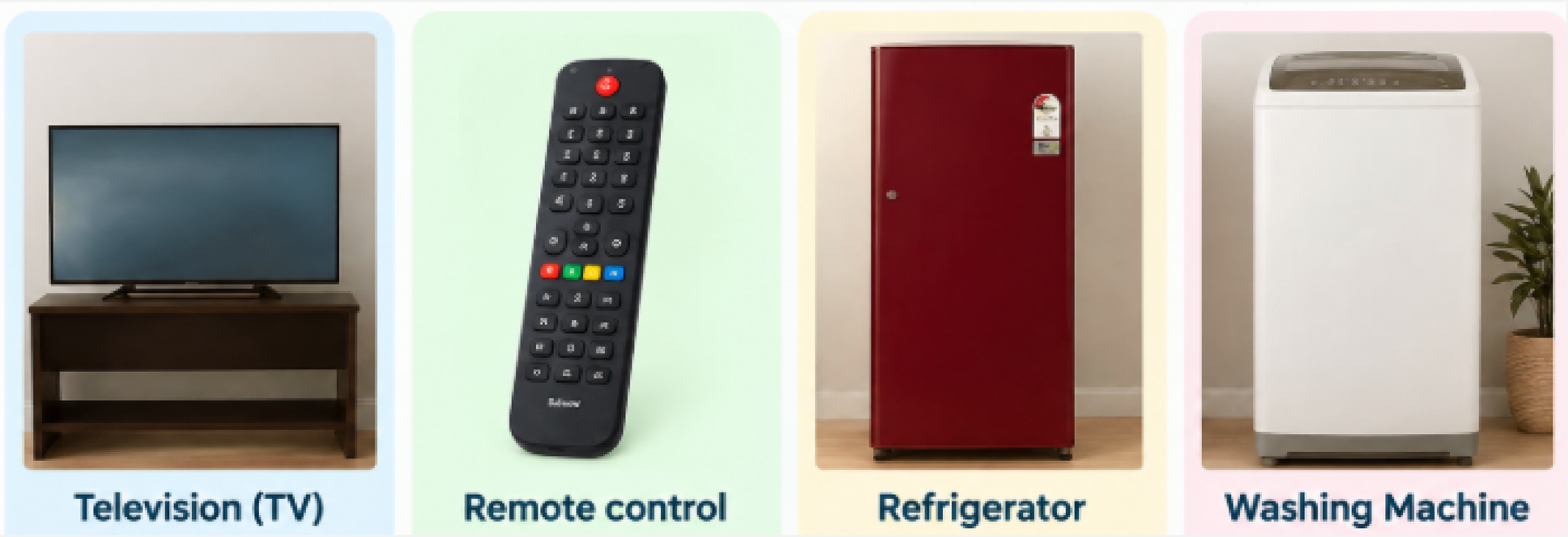


Mobile Phones



Chargers

ITEW- Information Technology & Telecommunication Equipment



CEEW- Consumer Electrical & Electronics and Photovoltaic Panels

LSEEW- Large & Small Electrical and Electronic Equipment



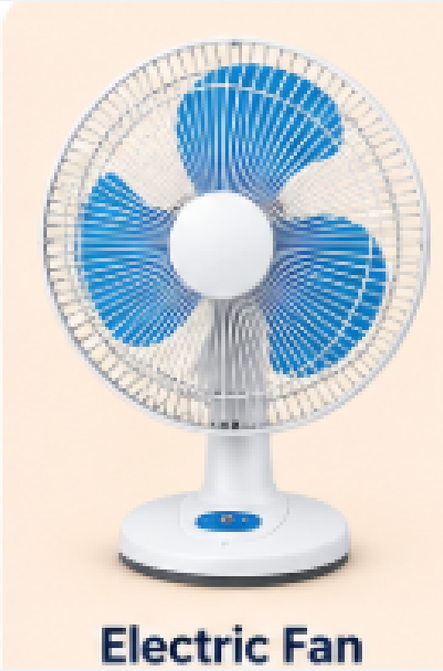
Microwave Oven



Mixer Grinder



Electric Iron



Electric Fan



Drill



Saw



Soldering Iron

EETW- Electrical & Electronic Tools



Video Game Console



Electronic Toy



Fitness Tracker

TLSEW- Toys, Leisure & Sports Equipment



Patient Monitor



Laboratory Equipment



Dialysis Equipment

MDW- Medical Devices excluding all implanted and infected products



Solar PV Modules & Panels

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SCHOOL-CENTRIC E-WASTE

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Common examples from the 7 categories under the E-Waste (Management) Rules, 2022

1 ITEW
Information Technology & Telecommunication Equipment



- Desktop computers
- Laptops / tablets
- Printers (inkjet/laser)
- Photocopiers
- Telephones / intercoms
- Wi-Fi routers / network devices

2 CEEW
Consumer Electrical & Electronics and Photovoltaic Panels



- Televisions
- Fans
- LED / tube lights
- Water coolers
- Solar panels (if installed in school)

3 LSEEW
Large & Small Electrical & Electronic Equipment



- Electric kettles
- Microwave ovens
- Water heaters (geyser)
- Irons
- Other small electrical appliances used in school (e.g. toasters)

4 EETW
Electrical & Electronic Tools



- Electric drills
- Soldering equipment
- Glue guns
- Sewing machines
- Other electrical tools used in workshops / vocational labs

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SCHOOL-CENTRIC E-WASTE

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Common examples from the 7 categories under the E-Waste (Management) Rules, 2022

5 TLSEW
Toys, Leisure & Sports Equipment



- Electronic toys
- Calculators
- Electronic sports equipment (e.g. stopwatch, fitness devices)

6 MDW
Medical Devices



- Electronic health-monitoring devices (e.g. BP monitor, thermometer)
- Diagnostic equipment (e.g. glucometer)
- Other electrical medical equipment used in school infirmary / health room

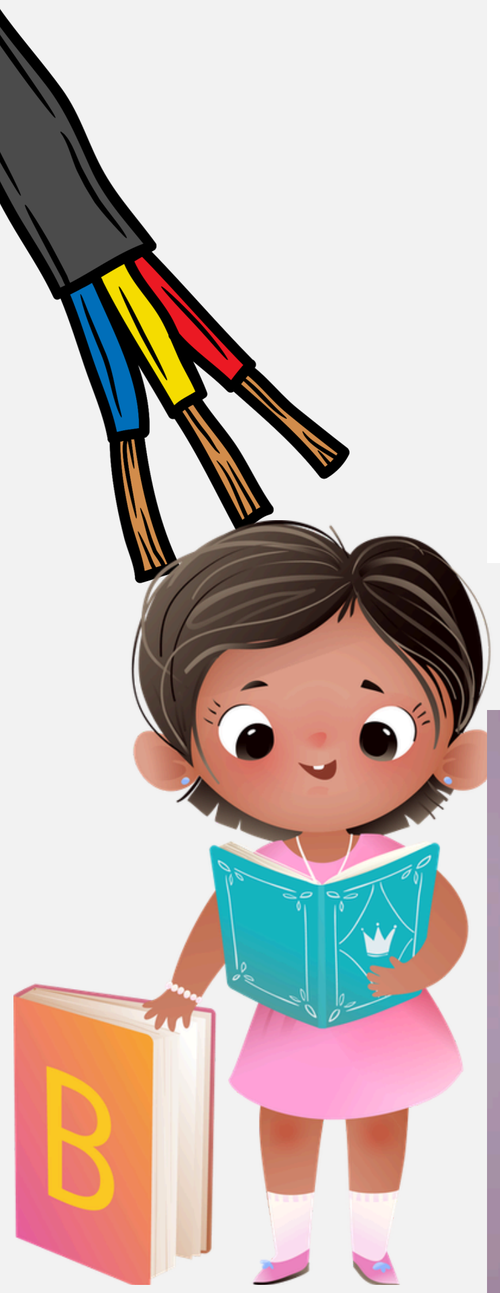
7 LIW
Laboratory Instruments

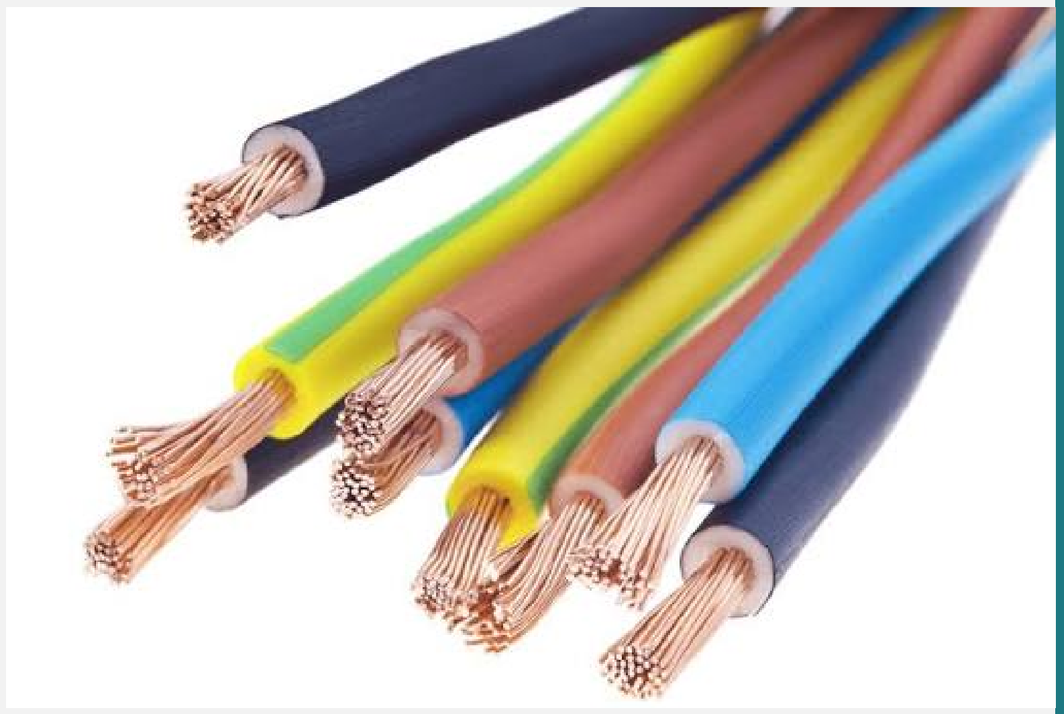


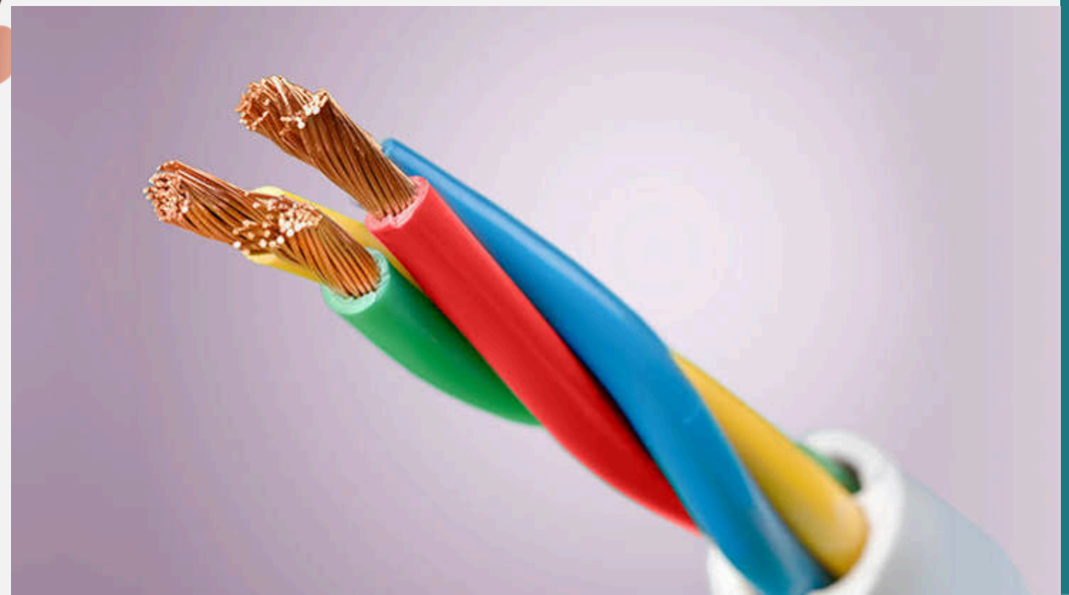
- Microscopes
- Digital balances
- pH meters and other testing equipment
- Other laboratory instruments with electrical or electronic components

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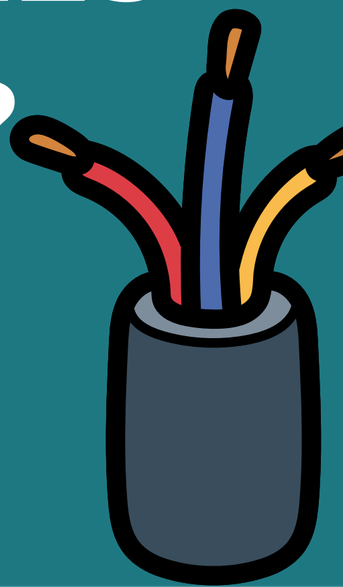
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IS EVERYTHING WITH WIRES E-WASTE?



IS EVERYTHING WITH WIRES E-WASTE?

If it runs on electricity, electronics, or batteries, it is e-waste once non-functional.

Everyday Examples (Wires + Electronics):

- Old phone chargers, aux cables, smart wearables, electronic toys.

Battery-Integrated E-Waste (High Hazard):

- TWS earbuds, power banks, electric toothbrushes, laptops.



Smart Watch



Power Bank

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LIFE CYCLE OF AN ELECTRONIC GADGET



USAGE

Electronic gadget is actively used for its intended purpose, marking the primary phase of its lifecycle and determining its overall effectiveness and value.

MAINTENANCE

Regular care and repair of an electronic gadget to ensure it remains functional and prolongs its useful life.

OBSOLESCENCE

When an electronic gadget becomes outdated or no longer useful, marking a key point in its lifecycle that often leads to its disposal or recycling.

DISPOSAL

The final stage is disposal, where the gadget is either recycled to recover valuable materials or thrown away, potentially causing e- waste.

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EVER WONDERED WHAT IS INSIDE THE GADGETS THAT YOU USE EVERYDAY?

THERE IS GOLD IN YOUR GADGETS

Urban Mining Potential: 1 tonne of smartphones contains up to 100x more gold than 1 tonne of raw gold ore.

The Math (Per 1 kg of Mobile Phones):

- Yields approx. 0.2 to 0.35 grams of Gold.
- Contains approx. 140g Copper, 3.1g Silver, and trace amounts of Palladium.



Mobile Phones

1 KG MOBILE

↓

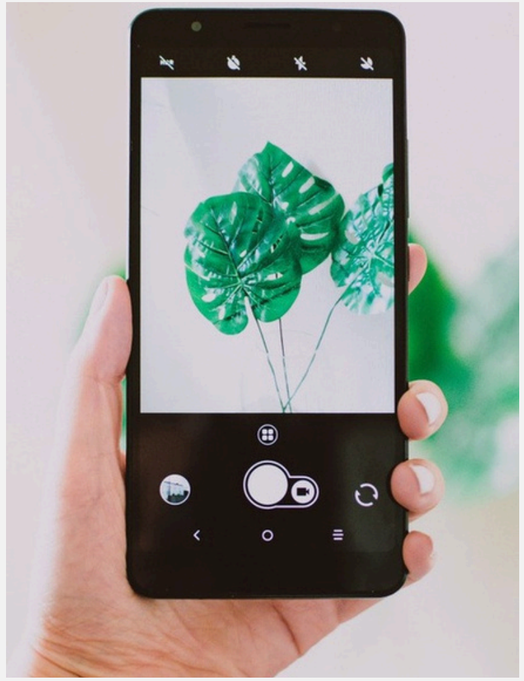
0.2 to 0.35g GOLD



Gold Recovered

HIDDEN COMPONENTS OF MOBILE PHON

Copper (Cu)
& Tin (Sn)
Lithium (Li) &
Cobalt (Co)
Indium (In)
Antimony (Sb)

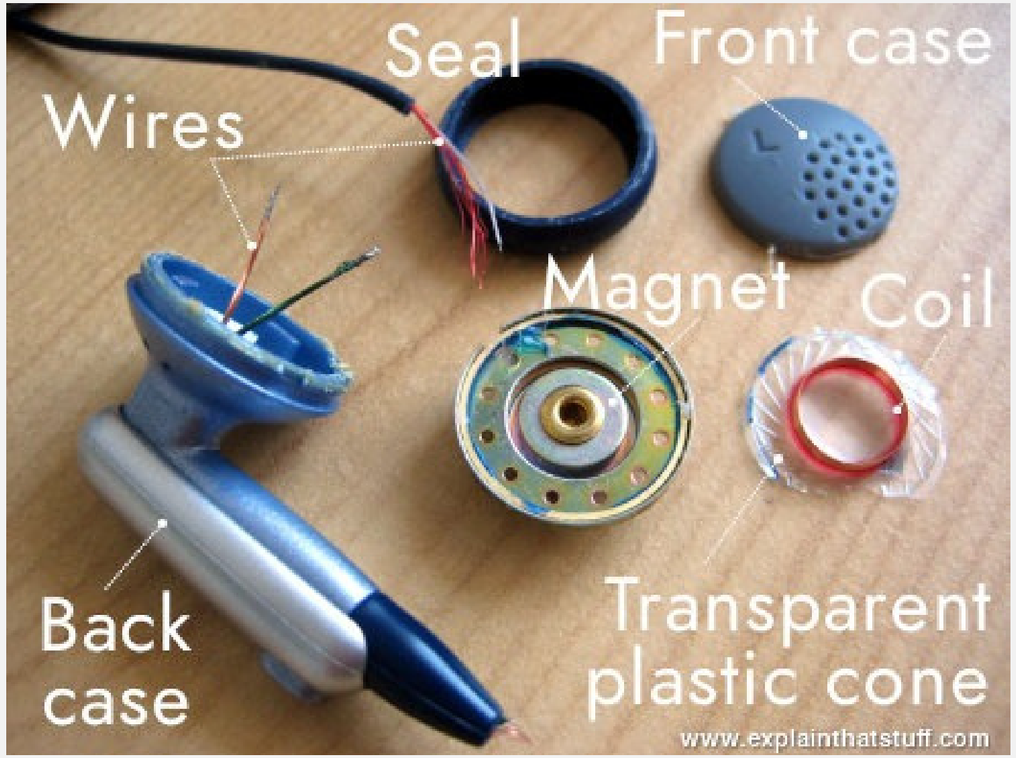


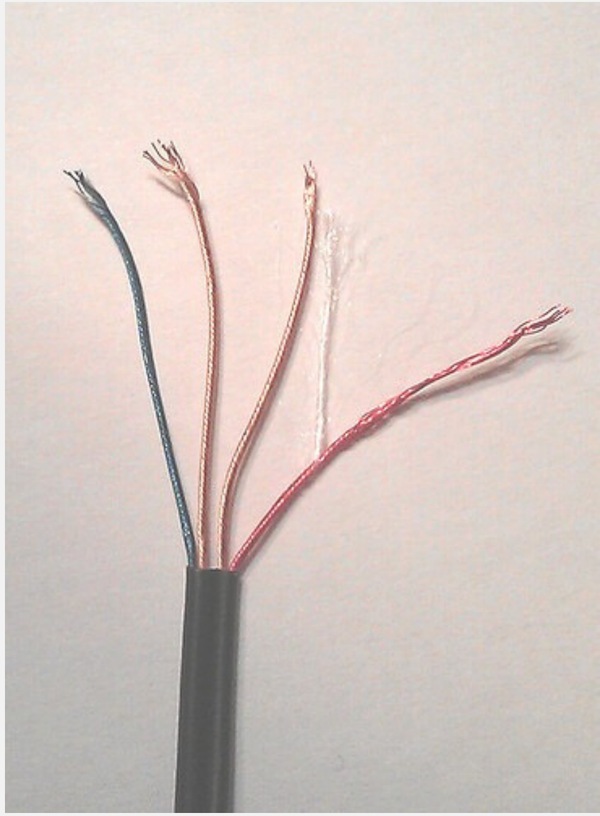


Silver (Ag) Gold (Au) Palladium (Pd)

HIDDEN COMPONENTS OF AN EARPHONE







Precious Metal Recovery from 100kg E-Waste

Copper	Around 13 kg (13%)
Silver	300–400 g (0.30–0.40%)
Gold	30–40 g (0.03–0.04%))
Palladium	14 g (0.014%)

JOURNEY OF OUR WASTE

IRRESPONSIBLE DISPOSAL

Leads to pollution and harm



Land Pollution
(Contaminates soil and land)



Air Pollution
(Releases toxic fumes and gases)



Water Pollution
(Contaminates rivers, lakes and groundwater)

Pollution harms our environment, health and future generations.



Waste

RESPONSIBLE DISPOSAL

Leads to recycling and a cleaner, healthier planet



E-waste Centre



Recycling Unit



Resource recovery



A cleaner and healthier planet

Conserves resources and builds a sustainable future.



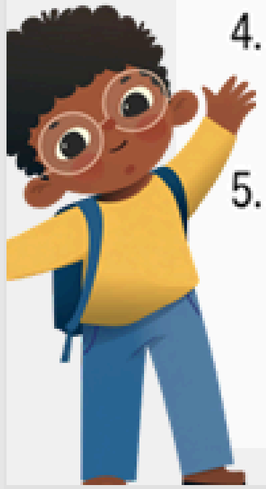
JOURNEY OF OUR WASTE

JOURNEY OF WASTE - BAD VERSION (Informal Sector)

1. Collection → Unorganised scrap pickers
2. Processing → Acid baths, open burning of cables
3. Environmental Impact → Lead/cadmium leaches into soil & groundwater
4. Health Hazards → Toxic fumes cause severe respiratory/neurological damage
5. Carbon Footprint → Massive carbon emissions + toxic air pollution

JOURNEY OF WASTE - GOOD VERSION (Formal Recyclers)

1. Collection → CPCB Authorised Recyclers / Producer Take-back
2. Processing → Automated shredding, magnetic & air separation
3. Environmental Impact → Zero land contamination; closed-loop chemical extraction
4. Health Hazards → Worker safety protocols (PPE, air scrubbers, zero discharge)
5. Carbon Footprint → Significant reduction in CO_2 equivalent emissions



CHOOSE RESPONSIBLE RECYCLING

JOURNEY OF OUR WASTE

JOURNEY OF WASTE - BAD VERSION (Informal Sector)



JOURNEY OF WASTE - GOOD VERSION (Formal Recyclers)

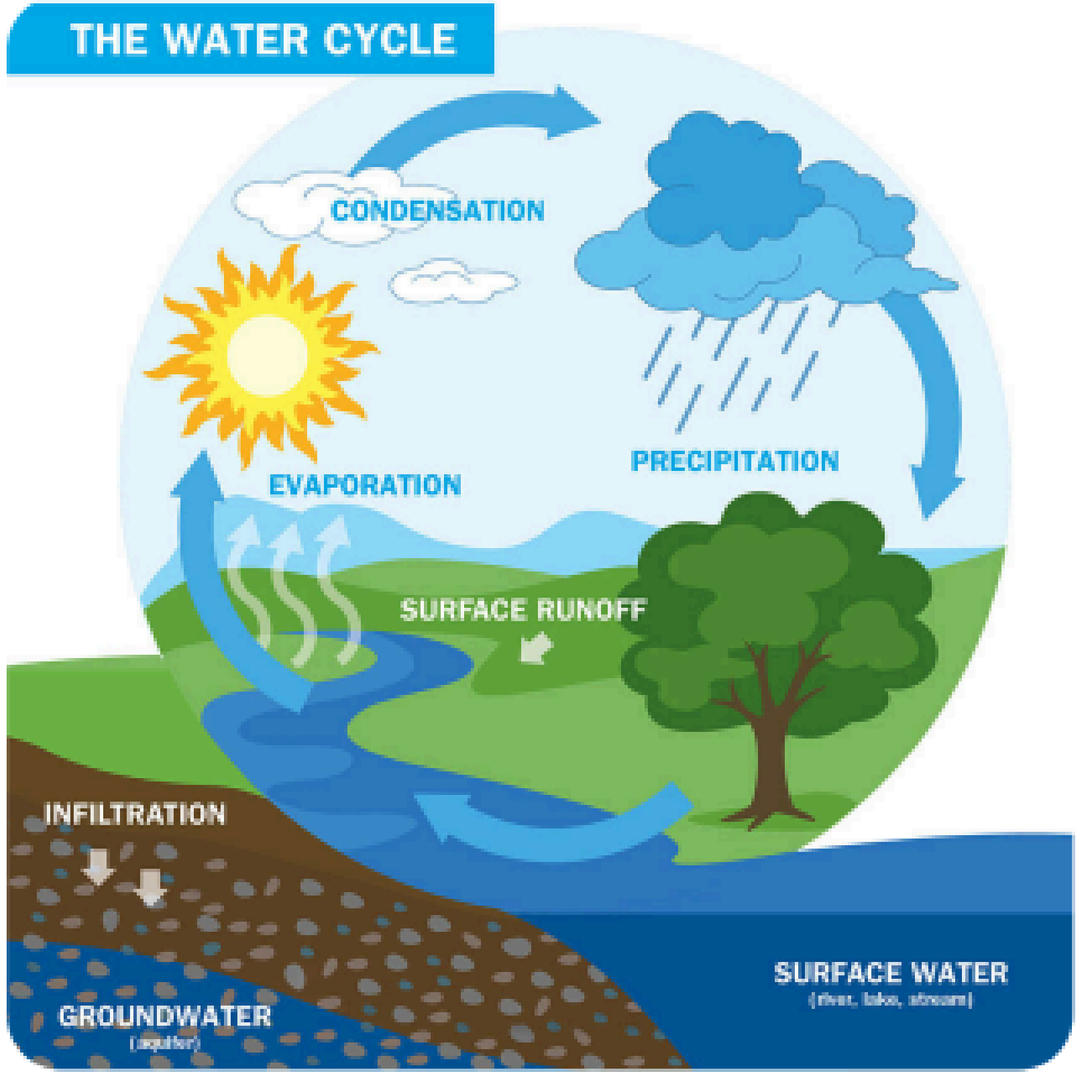




CHOOSE RESPONSIBLE RECYCLING

Circular Economy





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THE CIRCULAR ECONOMY
GIVES E-WASTE A NEW LIFE

From old devices to new possibilities.

1 Design for longer life
Durable, repairable and upgradable electronics.



2 Use responsibly
Take care, maintain and use for a longer time.



3 Repair & Reuse
Fix, refurbish or Donate to extend life.



4 Collect responsibly
Send to authorised e-waste collection centres.



5 Recycle & recover materials
Recover valuable materials like metals, plastics and glass.



6 New products
Recovered materials are used to make new electronics and other products.



CIRCULAR ECONOMY
Keep resources in use for a better tomorrow.

WHY IT MATTERS?

- Conserves natural resources
- Reduces pollution and carbon emissions
- Creates green jobs and supports a greener economy
- A healthier environment for current and future generations

Small Actions, Big Impact.

IDENTIFYING E-WASTE ACROSS SCHOOL & HOME

- **Computer Lab:** CRT monitors, obsolete CPUs, broken mice, swollen UPS batteries, damaged cables.
- **Staff Room & Admin:** Discarded printers, toner cartridges, old landlines, broken projectors, old AC units.
- **Science Labs:** Blown transformers, multimeter units, circuit boards, electronic testing meters.
- **Activity Rooms:** Defective PA systems, broken microphones, old electric keyboards.
- **Home E-Waste Drives:** Dead smartphones, unused chargers, power banks, and small appliances brought from home by students.



REPAIR & REUSE: BEFORE IT BECOMES WASTE

1 REDUCE	**Take care of school and personal devices.**
2 REPAIR	**Use competent repair support for repairable faults.**
3 REUSE	**Redeploy working devices within the school where appropriate.**
4 RECYCLE	**Send non-repairable end-of-life items through the proper recycling channel.**

RECYCLING IS ESSENTIAL BUT ITS THE LAST RESORT



SEGREGATION

Sorting by Category: Grouping items like large appliances (refrigerators, washing machines), small IT gear (phones, laptops), screens, and lamps.

Isolating Hazardous Parts: Pulling out toxic components, such as lead-lined glass, mercury switches, and lithium or cadmium batteries, before general processing.

Separating Reusables: Identifying working or easily repairable devices for refurbishment instead of tearing them down.



EASY IN-SCHOOL SEPARATION

Box A: Small electronics & IT equipment old, phones, tablets, computer mouce, keyboards, printed circuit boards, etc.

Box B: Cables & accessories, chargers, USB cables, adapters, headphones, power strips

Box C: Batteries & fragile (Special handling) Loose AA/AAA batteries, power banks, fused bulbs/ tube lights, screens

Goal is to store items safely using separate boxes or bags.



WHY SEGREGATION IS IMPORTANT

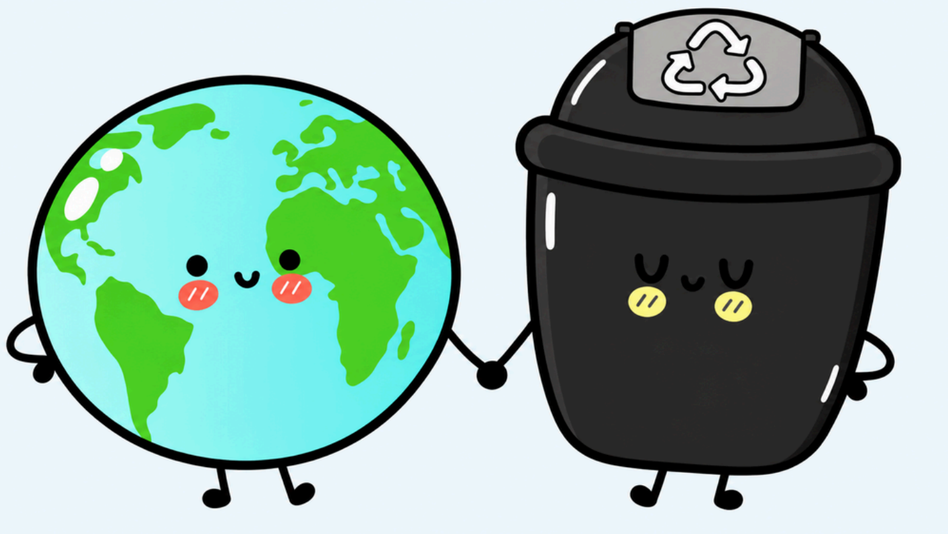
Prevents contamination: Keeps potentially harmful components away from general waste.

Improves recovery: Electronic products contain materials that can be recovered through proper recycling.

Enables safe handling: Separated e-waste can be stored and transported more responsibly.

Supports traceability: Schools can record what they collected and where it was sent.

Segregation is not the end of the process, it is the beginning of responsible e-waste management.



SAFE STORAGE, PACKAGING, IDENTIFY RECYCLERS & TRANSPORTATION

1. STORE (Dry & Covered)

- Indoor & well-ventilated area
- Keep items on a dry floor and in covered boxes
- Keep fragile glass/screens elevated and protected
- Use a locked/monitored location
- Keep younger students away
- Never open or dismantle devices

2. PACK (Prevent Breakage)

- Wrap fragile items (glass/screens)
- Bundle loose cables
- Tape battery terminals
- Seal boxes properly so items do not shift
- Clearly label boxes “E-WASTE FOR RECYCLING”

3. IDENTIFY AUTHORISED RECYCLERS

- Partner only with authorised/registered e-waste recyclers
- Verify recycler credentials
- Confirm collection process and schedule

4. TRANSPORT (Record Handover)

- **Use an appropriate authorised/registered channel.**
- Record date, quantity and items handed over
- Keep a copy of the pickup receipt from the recycler
- Ensure safe and secure loading

HOW TO IDENTIFY A RECYCLER



Step 1: Request Documentation

↓

Step 2: Verify CPCB / SPCB Authorisation Status

↓

Step 3: Check EPR Compliance & Certificate of Destruction Capabilities

↓

Step 4: Confirm Safe Transport & Battery Segregation Standards

↓

Final Selection: Partner with Authorised Recycler

RECYCLING & TRACEABILITY: CLOSE THE LOOP

COLLECT → SEGREGATE → STORE & RECORD → HAND OVER → RECYCLE

Maintain a Simple E-Waste Register

- Type of e-waste
- Quantity/number of items
- Date of collection/handover
- Name of agency/recycler

Keep Evidence of Responsible Handover

- Receipt/acknowledgement
- Photographs where required
- Recycler/collection details
- Campaign documentation

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MY PLEDGE AS AN E-WASTE CHAMPION

- Responsible Disposal: I will use authorized recycling facilities for e-waste.
- Conscious Use: I will maintain and repair my electronic devices to extend their lifespan.
- Eco-Friendly Choices: I will choose eco-friendly gadgets and switch off electronics when not in use.
- Support Sustainability: I will support brands that prioritize sustainability.
- Community Advocacy: I will promote 'Reduce, Reuse, Recycle' in my community.
- Educate Others: I will educate my peers about proper e-waste disposal.





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ANY QUESTIONS?
ASK AWAY!







THANK YOU!
JOIN THE E-WASTE REVOLUTION!