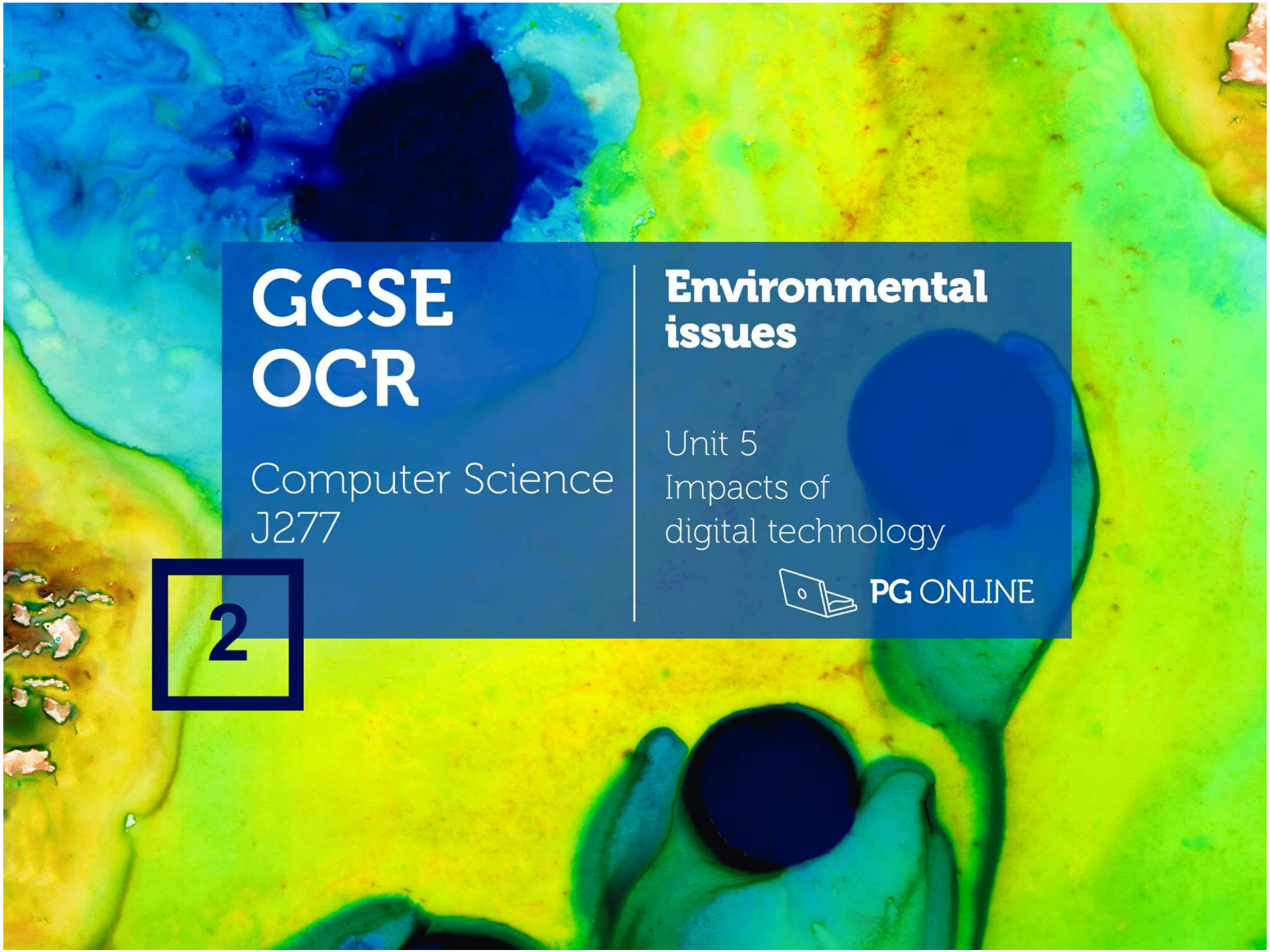
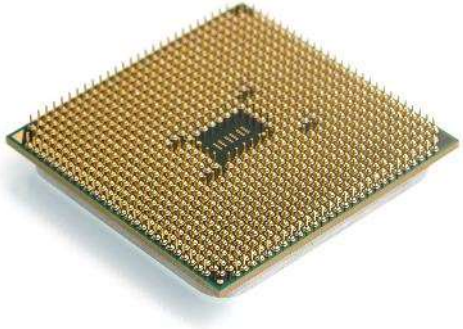

GCSE
OCR
Computer Science
J277
2
Environmental issues
Unit 5
Impacts of
digital technology
PG ONLINE

Objectives

- Discuss the impacts of digital technology on the environment including:
  - The impact of manufacture and disposal
  - The impact of upgrading or replacing
  - The impact of e-waste

Starter

- Name each of the computer components below
  - What raw materials are they each made from?



Starter

Answers

Hard disk

- Aluminium
- Steel
- Fibreglass
- Plastic

Gaming controller

- Plastic
- Rubber
- Lithium

USB cable

- Copper
- Plastic

CPU

- Fibreglass
- Aluminium
- Gold

Heat sink

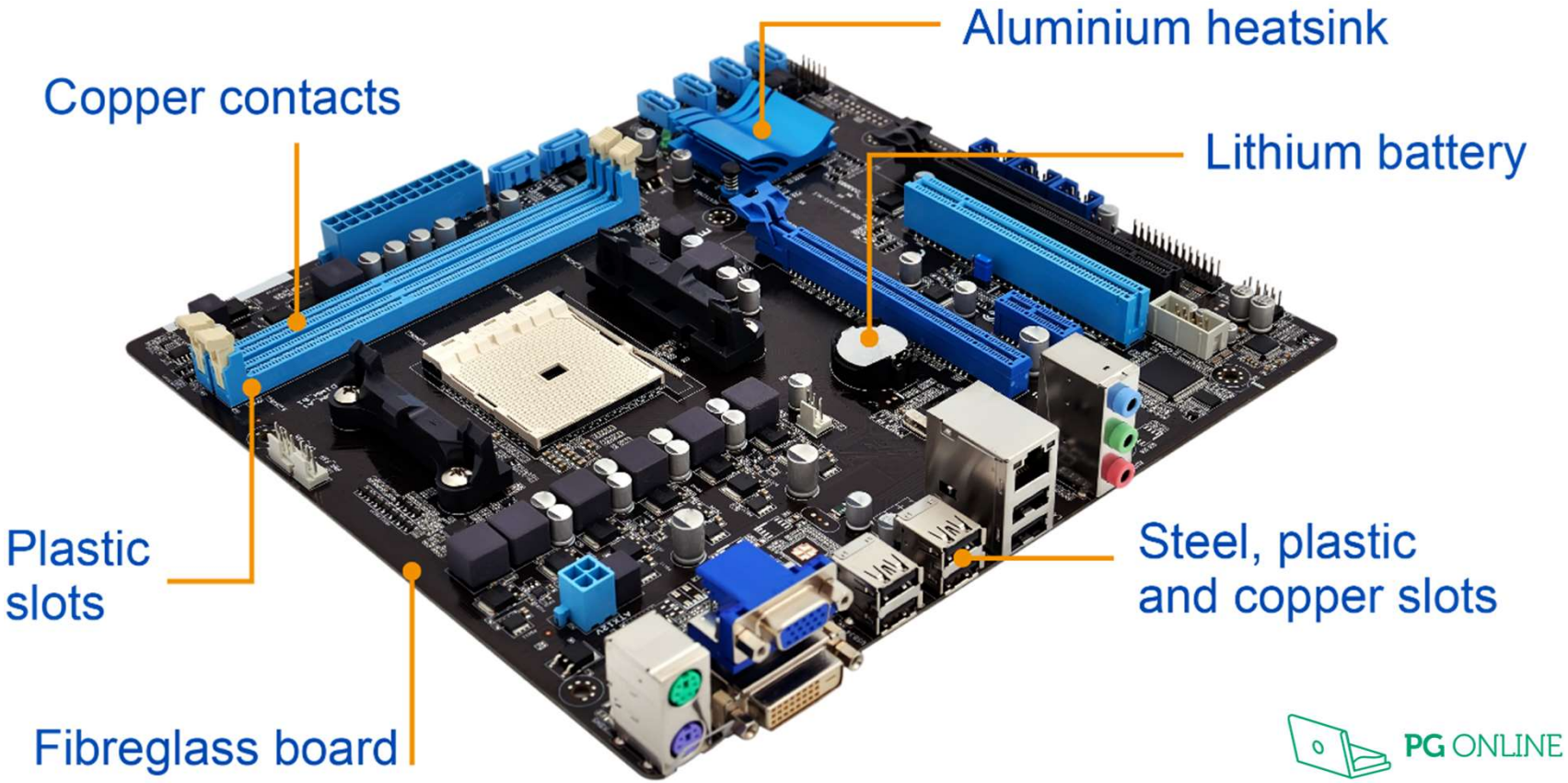
- Aluminium

RAM

- Fibreglass
- Gold

Materials in one component

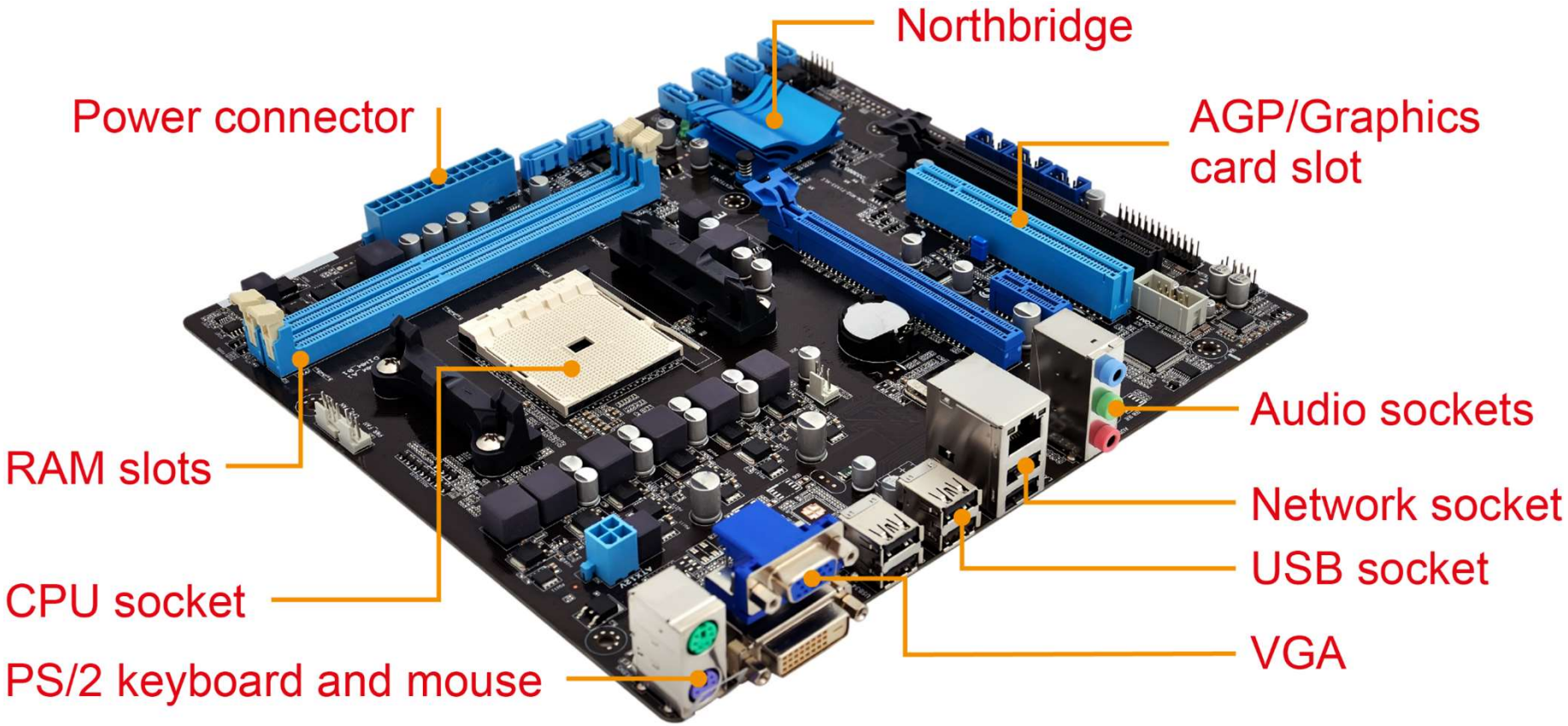
- Which computer component is shown here?
  - What is each socket or slot used for?



Materials in one component

Answers

- Computer socket uses



Worksheet 2

- Complete **Task 1** on **Worksheet 2**

Lifecycle of a smartphone

- Where do the computers or electronic devices come from before you buy them?
  - What journey does a smartphone make when it reaches the end of its life?

Lifecycle of a smartphone

Answers

1. Mining for raw materials
2. Manufacture
3. Purchase and use
4. Recycling centre
5. Reprocessing plant

Environmental damage

- Mining raw materials leads to contamination and erosion
  - Plastics damage the environment if not recycled
- Gas and coal are needed to power factories
  - Diesel is needed to transport raw materials, parts and the final product

Renewable vs Non-renewable

- Are each of the following materials, used to make electronics, renewable or non-renewable?
  - Plastic
  - Steel
  - Gold
  - Copper
  - Aluminium
  - Fibreglass
  - Diesel
  - Water

Type of material

Answers

• Plastic	Non-renewable
• Steel	Non-renewable
• Gold	Non-renewable
• Copper	Non-renewable
• Aluminium	Non-renewable
• Fiberglass	Non-renewable
• Diesel	Non-renewable
• Water	Renewable

Difficulties in recycling

- Watch the video on the explosive problem with recycling old electronics [5m06s]
  - What problems can lithium batteries cause when recycling?
  - Why is sealing batteries into devices a problem for the environment?

E-waste

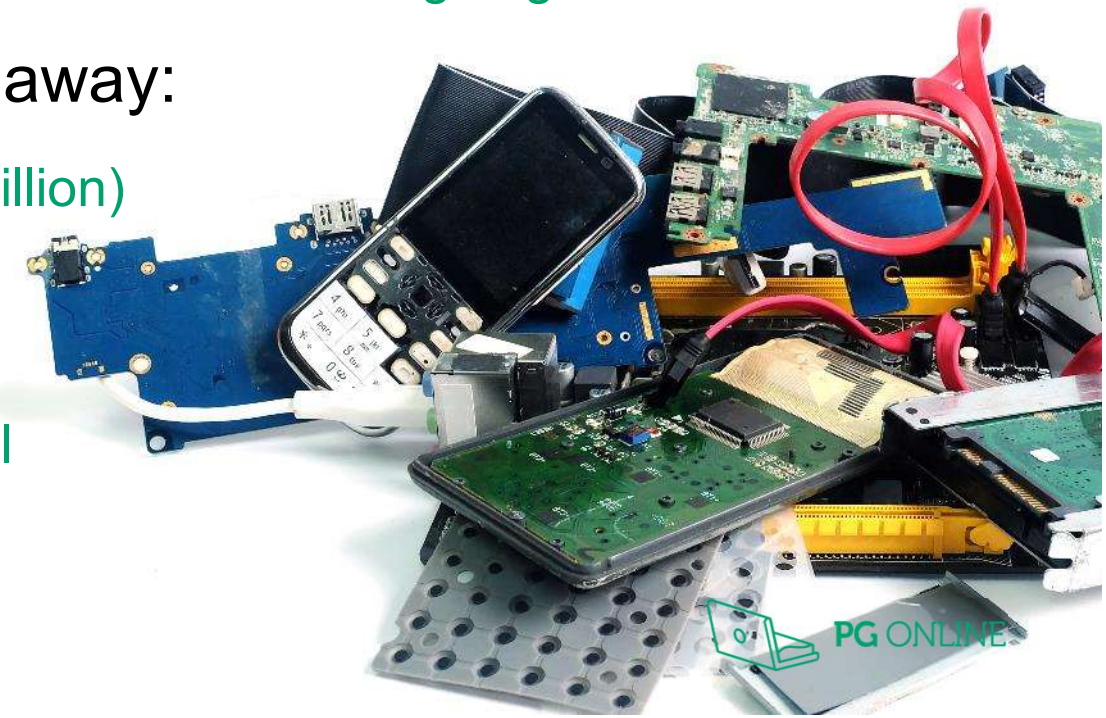
- The large scrap metal yard in Agbogbloshie, Ghana processes electronic waste
  - How are raw materials extracted?
  - How are people and the environment affected by e-waste?
  - How is e-waste recycling improving?

Worksheet 2

- Complete **Task 2** on **Worksheet 2**

What we throw away each year

- In the UK:
  - 1.6 million tonnes of e-waste is generated each year
  - 23% of electronics thrown away still work or need minor repair
  - Each mobile phone contains about 24mg of gold
- Worldwide we throw away:
  - 300 tons of gold (£9 billion)
  - 1000 tons of silver (£400 million)
  - 16 million tons of steel (£6.5 billion)



Case Study: Fairphone

- Fairphone was launched in 2013
- The modular phone is designed so that the user can replace the parts in it
- This means the phone lasts longer and creates less waste
  - What do you think the parts shown below do?

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Case Study: Fairphone

Answers

- Changeable parts for the phone

Battery

Vibration mechanism

Rear camera

Fairphone

- Designed for easy use and to be long lasting
  - Offers repair tutorials to increase how long the phone can work for
- Responsibly sourced materials
- Good working conditions for people who make the phone
  - Why may it be hard to sell large numbers of this type of phone?

Worksheet 2

- Complete **Task 3** on **Worksheet 2**

Plenary

- What are **three** impacts of e-waste on the environment?
  - What are **two** ways that these impacts could be reduced?

Plenary

- Impacts of e-waste on the environment:
  - Very harmful to humans and the environment if not processed correctly
  - Lithium batteries can catch fire and may be hard to recover
  - If components cost too much to recover they go to landfill
  - Mining materials damages the environment
- Ways to reduce the impact:
  - Make devices that can be fixed with modular components
  - Use removable batteries
  - Use modern recycling facilities

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