

**GCSE
OCR**

Computer Science
J277

**Environmental
issues**

Unit 5
Impacts of
digital technology



PG ONLINE

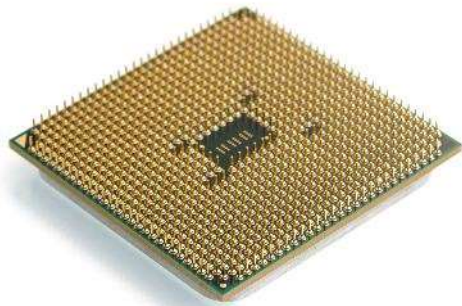
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Objectives

- 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



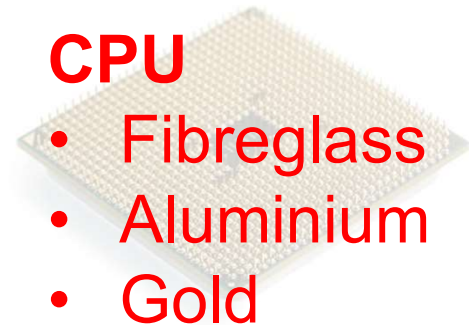
USB cable

- Copper
- Plastic



CPU

- Fibreglass
- Aluminium
- Gold



Heat sink

- Aluminium



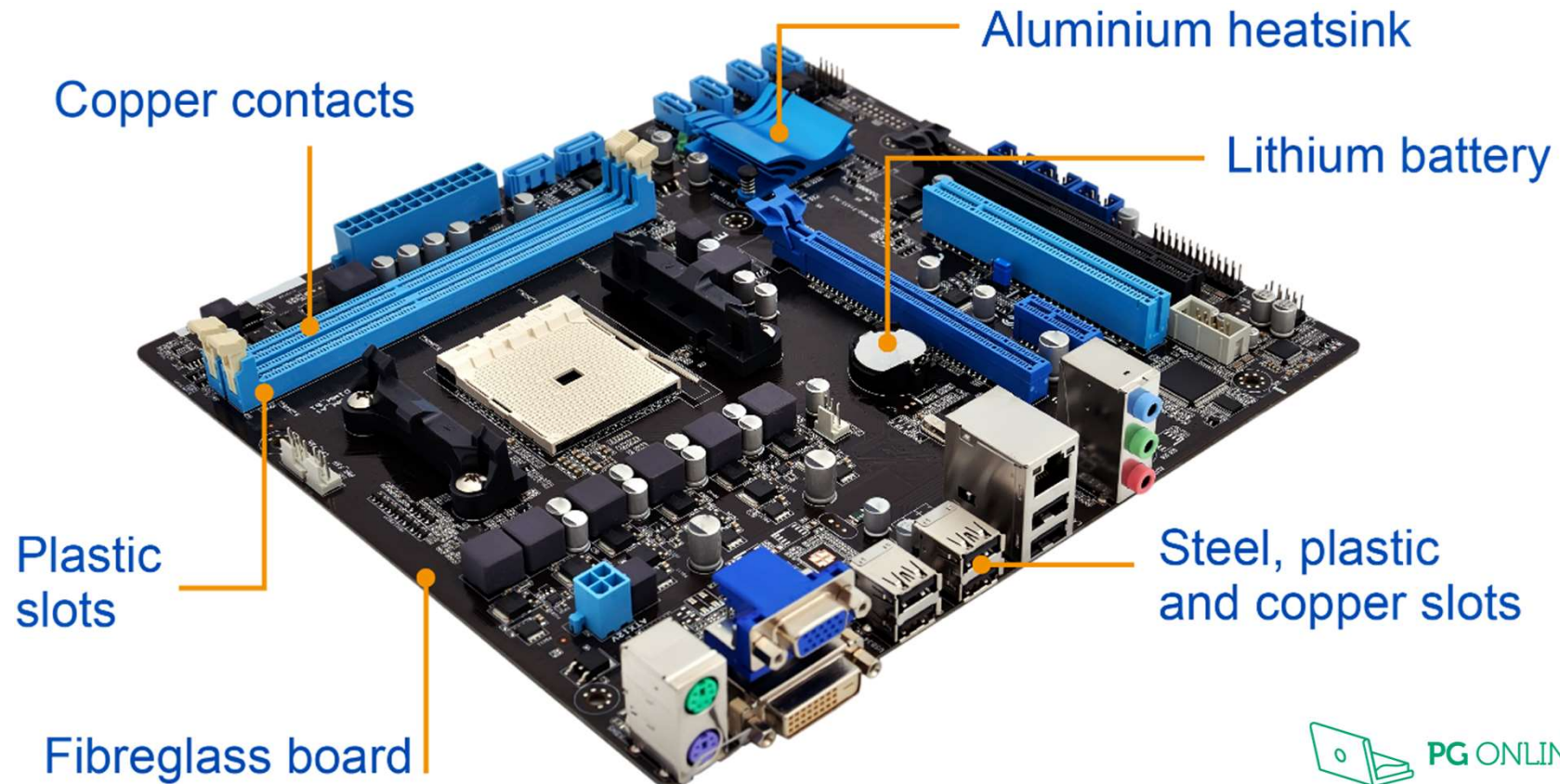
RAM

- Fibreglass
- Gold



Materials in one component

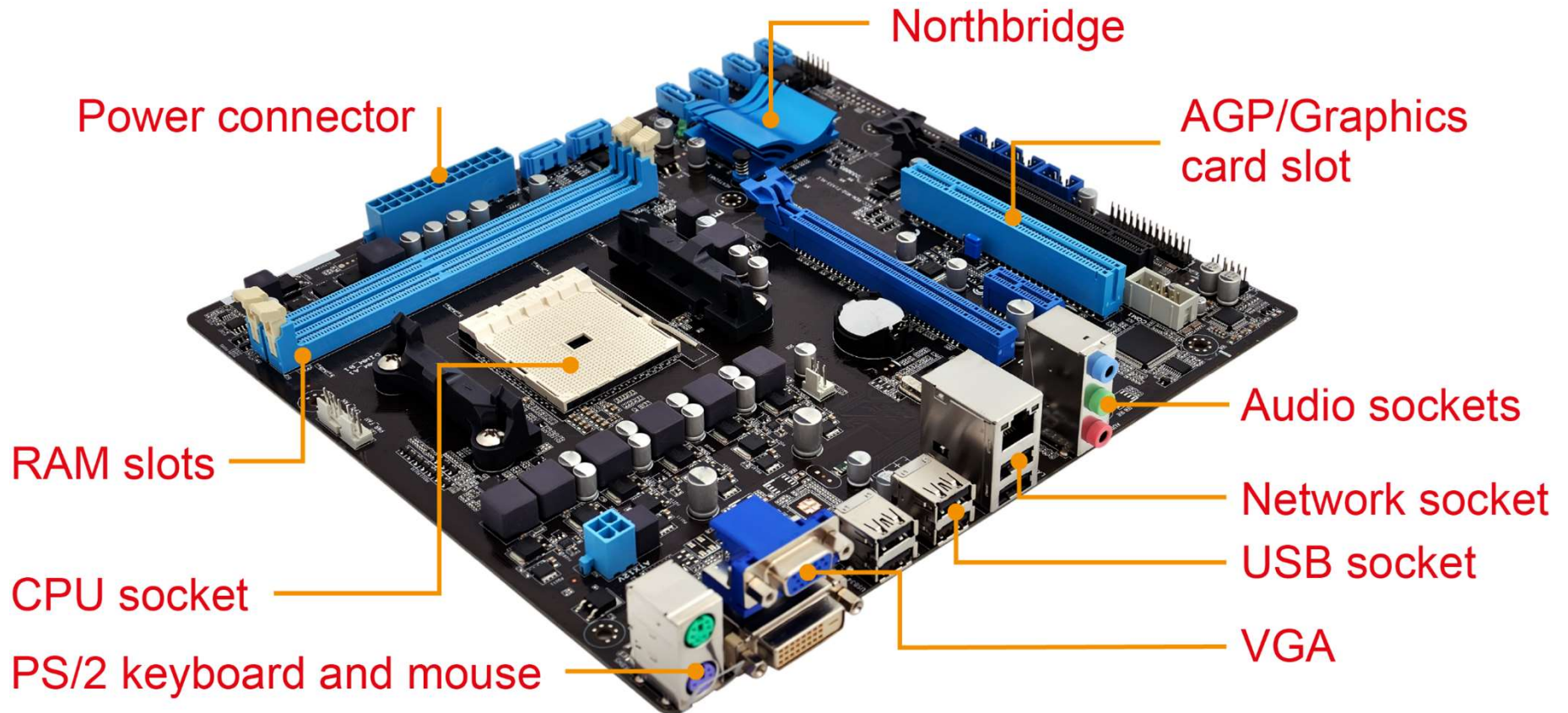
- Which computer component is shown here?
 - What is each socket or slot used for?



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?

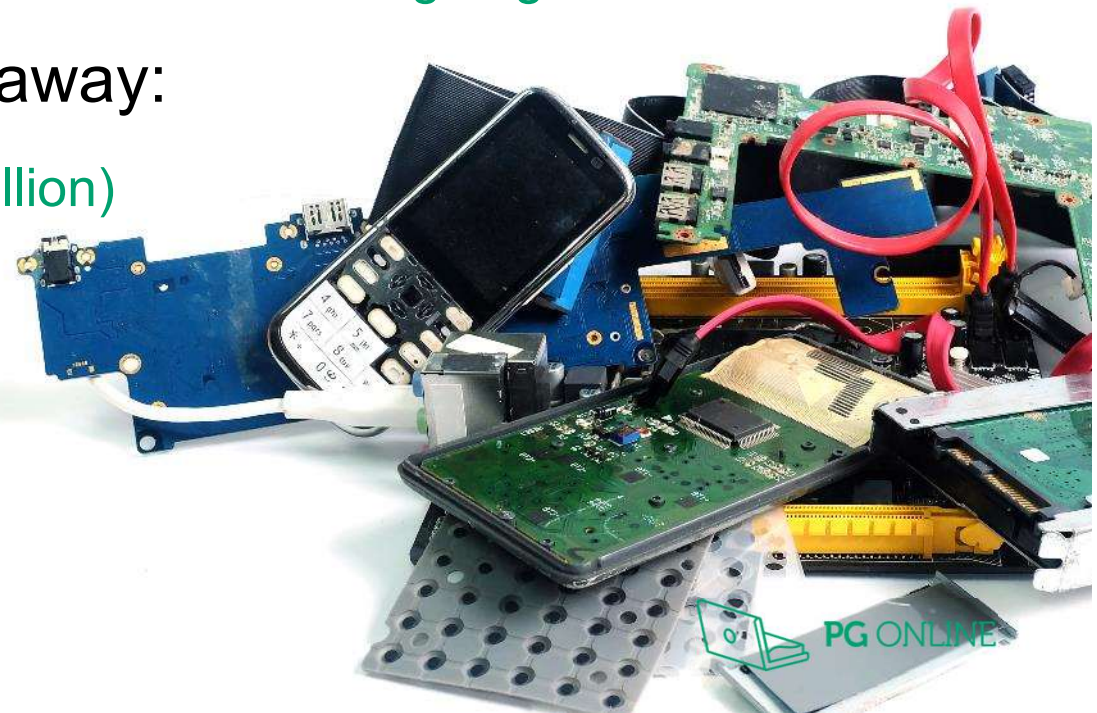
Worksheet 2

- 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?



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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