

Success in Design and Technology



Study Guide: Design and Technology

Lower Secondary • Upper Secondary

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9 ELECTRONICS

Electronics in Everyday Lives

Ever since the invention of the electric light over 140 years ago, electricity has had a major impact on the way we live our lives. Can you explain one impact for each of the following products?

<p>Electric Train</p> 	<p>Mobile phone</p> 	<p>Television</p> 
_____	_____	_____
_____	_____	_____
_____	_____	_____

The **function** of an electronic product (what it does) is achieved using components such as transistors, resistors and capacitors. The components are connected on a **printed circuit board (PCB)**. An **integrated circuit (IC)** is a small 'chip' containing a microscopic circuit in layers of silicon.



Printed Circuit Board (PCB)



An Integrated Circuit (IC)

New technology usually benefits society in positive ways but there can also be negative effects. Drones, for example, are very helpful in search and rescue situations but improper use can be a social nuisance and a danger to aircraft.



Explain one **benefit** and one **drawback** for:

Social media
Benefit _____
Drawback _____

Electronic banking
Benefit _____
Drawback _____

Power Supplies and Electric Power

All electric and electronic products need power to make them work. Electric power can be produced in different ways.

MAINS POWER

Many electric products used in our homes, schools and factories require mains power. Mains power is generated at large power stations and distributed to our homes through a network of overhead and underground cables. Power stations typically use **fossil fuels** such as natural gas, oil or coal to generate electricity. Burning fossil fuels releases gases into the air that contribute to **global warming**.



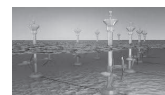
Renewable energy sources such as the sun, wind and the tides are becoming more widely used for generating electricity.



Energy from the wind



Energy from the sun



Energy from the tides

Advantages of using renewable energy sources

- no harmful gases released into the environment
- the sources are sustainable (will not run out)
- they are readily available - they do not have to be mined

Disadvantages of using renewable energy sources

- only works when the source of energy is available, e.g. when the sun is shining or the wind is blowing
- setup costs can be high
- not suitable for all locations

Question

Research and explain the advantages and disadvantages of owning an electric car rather than a petrol or diesel car.

Advantages _____

Disadvantages _____

BATTERIES

Batteries come in all shapes and sizes, from miniature button cells for watches and calculators to large power packs for starting the engines of jumbo jets. Modern **lithium batteries** store much more energy than batteries of the past and are rechargeable, which means less waste.



Electric cars use lithium-ion and lithium polymer batteries

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