Your notes

GCSE Design and Technology: revision notes

Systems approach to designing

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Systems

- A **system** takes an **input**, **processes** it, and produces an output. Designers use block diagrams to show this.
- Example: a night light. **Input**: a light sensor detects darkness. **Process**: a **microcontroller** decides to switch on. Output: an LED lights up.

Inputs

- Light sensors (such as **light-dependent resistors**) detect light levels.
- Temperature sensors (such as **thermistors**) detect heat.
- Pressure sensors detect force, such as in a pressure mat.
- Switches (push, toggle, reed, tilt and micro switches) are simple **inputs** that turn a circuit on or off.

Processes and outputs

- Programmable components, such as **microcontrollers** (PICs), can be programmed to make decisions, count, time and control **outputs**. They reduce the number of components needed and can be reprogrammed.
- **Outputs** include buzzers and speakers (sound), lamps and LEDs (light), and motors (movement).
- LEDs are efficient, long lasting and come in many colours. Buzzers are cheap and simple for alarms.

Why designers use systems

- Breaking a product into **input**, **process** and **output** makes complex products easier to design and to fix.
- Programmable components make products smarter, such as a thermostat that switches heating on at set times.

Key terms

System	A set of parts that takes an input, processes it, and gives an output.
Input	The part of a system that detects a change, such as a sensor.
Process	The part of a system that decides what to do.
Output	The part of a system that does something, such as a buzzer.
Microcontroller	A programmable chip that controls a system.
Light-dependent resistor	A sensor whose resistance changes with light level.
Thermistor	A sensor whose resistance changes with temperature.
LED	A light-emitting diode: an efficient light output.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. What are the three stages of a system?
2. Which is an input device?
3. Which is an output device?
4. What does a thermistor detect?
5. What does a light-dependent resistor detect?
6. What is a microcontroller?
7. What is an advantage of using a microcontroller?
8. In a burglar alarm, what is the pressure mat?

Answers

1. Input, process, output
2. A light sensor
3. A buzzer
4. Temperature
5. Light levels
6. A programmable chip that controls a system
7. It can be reprogrammed and reduces the number of components
8. An input

What to do next

Practise 10 questions on this topic

Try 4 exam questions, with mark schemes

Read the lesson, one step at a time

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