Electronic systems processing

Unit 2 · Energy, materials, systems and devices · matches the "Electronic systems processing" lesson slides (about 60 minutes)

Teacher notes for someone teaching this lesson without a Design and Technology background, including a cover or supply teacher standing in for the usual class teacher.

IF YOU ONLY DO ONE THING (RUSHED COVER LESSON)

If you only do one thing: make sure every pupil can say what "Sensor" means in their own words before the lesson ends. An input component that responds to light, heat, moisture or movement. Ask two or three pupils to explain it back to you - do not just ask "does that make sense?".

Key facts in plain language

These are the facts this lesson depends on. They are written in plain English, not subject jargon, so you can say them in your own words while you teach.

Sensor:
An input component that responds to light, heat, moisture or movement.

Thermistor:
A resistor whose resistance changes with temperature.

Microcontroller:
A small programmable computer on a chip used to process inputs and control outputs.

Timer:
A process that creates a delay before or during an output.

Counter:
A process that counts pulses, such as people passing a sensor.

Flowchart:
A diagram of the steps and decisions in a program.

Common misconceptions

Drawn from the wrong answers pupils pick in this lesson's own question bank, paired with the explanation that is already written for the right answer.

Pupils may think: "LDR" is correct.
Why it is wrong: the correct answer is "Thermistor". A thermistor changes resistance with temperature.

Pupils may think: "A switch that uses a magnet to turn a motor on" is correct.
Why it is wrong: the correct answer is "A programmable chip that controls outputs from inputs". Microcontrollers such as those in the BBC micro:bit can be programmed to make decisions.

Pupils may think: "It can drive large motors directly from its output pins" is correct.
Why it is wrong: the correct answer is "It can be reprogrammed to change what the product does". The same hardware can do new jobs just by changing the program.

Pupils may think: "Latch" is correct.
Why it is wrong: the correct answer is "Timer". A timer keeps the output on for a set time. A latch would stay on until it was reset.

Pupils may think: "An input or output" is correct.
Why it is wrong: the correct answer is "A decision (yes or no)". Diamonds are decisions with yes and no branches.

Talking points to follow the slide deck

The slide deck for this lesson follows the usual DT Classroom shape: a retrieval starter, then each key term below in turn, worked examples, exam-style practice, then an exit ticket. Use these lines as you reach each part - they are the same facts as above, just phrased as something you can say out loud.

When the deck reaches "Sensor": say — An input component that responds to light, heat, moisture or movement. Ask: "can someone give me an example?"

When the deck reaches "Thermistor": say — A resistor whose resistance changes with temperature. Ask: "can someone give me an example?"

When the deck reaches "Microcontroller": say — A small programmable computer on a chip used to process inputs and control outputs. Ask: "can someone give me an example?"

When the deck reaches "Timer": say — A process that creates a delay before or during an output. Ask: "can someone give me an example?"

When the deck reaches "Counter": say — A process that counts pulses, such as people passing a sensor. Ask: "can someone give me an example?"

When the deck reaches "Flowchart": say — A diagram of the steps and decisions in a program. Ask: "can someone give me an example?"

Worked answers to this lesson's questions

The same question bank used for this lesson's knowledge organiser self-check and worksheet exam practice. Use this page as the answer key, or cover the right-hand explanation and hand out the questions as a silent task (see the cover lesson box below).

1. Which component would sense the temperature in a greenhouse?

a) LDR, b) LED, c) Thermistor, d) Moisture sensor

Answer: c) Thermistor. A thermistor changes resistance with temperature.

2. What is a microcontroller?

a) A programmable chip that controls outputs from inputs, b) A switch that uses a magnet to turn a motor on, c) A component that stores charge to smooth out a power supply, d) A sensor that turns light levels into a voltage

Answer: a) A programmable chip that controls outputs from inputs. Microcontrollers such as those in the BBC micro:bit can be programmed to make decisions.

3. What is an advantage of a microcontroller over a fixed circuit?

a) It can drive large motors directly from its output pins, b) It removes the need for any input sensors, c) It needs no power supply to run its program, d) It can be reprogrammed to change what the product does

Answer: d) It can be reprogrammed to change what the product does. The same hardware can do new jobs just by changing the program.

4. A security light stays on for 2 minutes after movement. Which process is used?

a) Latch, b) Timer, c) Amplifier, d) Counter

Answer: b) Timer. A timer keeps the output on for a set time. A latch would stay on until it was reset.

5. In a flowchart, what does a diamond shape show?

a) An input or output, b) Start or end, c) A process step, d) A decision (yes or no)

Answer: d) A decision (yes or no). Diamonds are decisions with yes and no branches.

READY-TO-RUN COVER LESSON

Project the existing lesson slides as normal; read the key facts and talking points above before the lesson starts.

Low-prep silent task (needs no workshop tools or machinery): write or display the numbered questions above without the "Answer:" line, and have pupils answer them in silence on paper. Mark from the answers above at the end, or next lesson.

If the lesson plan calls for tools, machinery, heat or anything hands-on, do not run that part as a non-specialist cover teacher - set the silent task above instead and leave the practical for the subject teacher. See the general workshop safety guide in the Teachers hub.