INVESTIGATING AND EVALUATING IDEAS

INVESTIGATING ALARMS, SWITCHES AND CIRCUITS

Photographs: Switches, Push switch, Toggle switch, Reed switch, Micro-switch, Slide switch, Circuit symbols
Videos: Security light, Shop bell, Light switch

Photocopiable pages: Alarms word list, How to make switches and circuits (CD-ROM only), Investigating switches, What is an alarm system? PAGES 72, 73

It is important that the children are able to explore and evaluate existing alarm products. This could be in the form of car alarms, personal alarms, the school alarm system and so on. They will also need an opportunity to explore and evaluate a range of switches. In addition to the resources provided here, the children could do further research using the internet, CD-ROMs and reference books to learn about alarms in their local environment.

Discussing the photographs

▶ Show the photograph 'Switches' and ask the children if they have seen any of these switches before. Encourage them to explain how any of them work or might be used.
▶ Look at the photographs of individual switches and identify how they work:
A push-to-make switch is an electrical switch that completes the circuit when pressed. When the pressure is removed the circuit is then broken. Common applications of push-to make-switches are door bells, key pads on calculators and money dispensers.
A toggle switch is an electrical switch that you move in one direction to complete the circuit and the other to break the circuit. Common applications are light switches and switches on electrical heaters.
A slide switch slides into position to complete the circuit. Slide switches can be used to complete more than one than one circuit (one at a time) or can be used with a motor to change the direction of movement created by completing the circuit so the power supplied to the motor is of either polarity, so the motor can spin in either direction. Common applications are on an MP3 player to allow you to scroll through the music files, or on travel alarm clocks to set the alarm.
A simple switch rotates into position to complete the circuit. A simple example can be made in the classroom using a paper clip.
A micro-switch is activated by the physical motion of a mechanical device such as a lever. When pressure is applied to the lever or button the switch completes the circuit. When pressure is removed the metal strip springs back to its original state. Common applications of micro-switches include computer mouse buttons and arcade game joysticks and buttons.
A reed switch is an electrical switch operated by an applied magnetic field. Common applications of reed switches are sensors for doors and windows where the magnet holds the reed away from the circuit so circuit is not complete.
▶ Use 'Circuit symbols' for reference when drawing and explaining circuits.

Discussing the videos

▶ Look at the video of the security light system working. Ask the children to identify what triggers the light to come on. Elicit that for the light to come on a switch needs to complete a circuit. Challenge the children to explain how this happens and to say what the purpose of the light is. (The light has a sensor, which sends a signal to connect the circuit when someone or something walks in front of it. In order to make a sensor that can detect a human being, the sensor must be sensitive to the temperature of a human body – about 36°C.
▶ Watch the video footage taken in a shop. A bell sounds when someone enters. Again, challenge the children to explain how this happens (standing on the doormat pushes a switch that connects the circuit) and to say what the purpose of the alarm is.
▶ Finally, watch the video clip of someone turning on a light. Discuss how this switch is different from the other two examples just looked at. Elicit that this switch works by turning it to connect the circuit but then there is also a resister: this gradually reduces the resistance in the circuit to make the light bright, and increases the resistance to make it dimmer.