Aim

The aim of the revision activity is to provide support for students who need to progress from *developing* to *secure* for the core National Curriculum statements.

The aim of the extension activity is to provide extension for students who have already achieved *secure*. The activity is also suitable for higher ability or older students in need of further *extension* work.

Revision activity notes

The revision activity asks students to work through a number of tasks to help them move towards demonstrating a secure grasp of key concepts from this chapter. Suggestions are given in the Teacher Handbook of how you can support students in making progress for each outcome.

Additional notes:

- The revision sheet should be appropriate for students achieving less than 61 % in the Checkpoint assessment.
- You can review students' answers to questions in the Checkpoint assessment in Kerboodle. You may decide not to cover all tasks in the revision sheet, based on students' performance on specific questions.
- An index of which task covers which outcome is given in the Teacher Handbook.
- Students should be given a chance to see some of the experiments discussed in the tasks as demonstrations or as mini-experiments to reinforce their understanding of key concepts.
- This sheet could also be used as a revision sheet for all students.

Revision activity answers

Task 1

1 Numbers in the 'order' column, from top to bottom: 1, 3, 2, 5, 6, 4

2 Like charges repel, unlike charges attract.

Task 2

Current: ammeter connected in series, amount of charge flowing per second

Potential difference: voltmeter connected in parallel, how much energy is transferred to the charge

Task 3

Left: series, only one route for current to flow (one loop)

Right: parallel, more than one route of current to flow (more than one loop)

Task 4

1 component, resistance, charges, ohms, Ω, Ω, V, A

2 Current is constant in a series circuit; the sum of potential difference (p.d.) of constituent circuit component is the same as the p.d. of the power supply.

3 Resistance = p.d. ÷ current = 1.5 V ÷ 0.5 A = 3.0 Ω

4 current = 0.5 A + 0.5 A = 1.0 A; p.d. = 3 V

5 Connecting wires are made from conductors. The resistance would be too high if insulators were used for significant current to flow.

6 The rating of a bulb is the maximum p.d. at which the bulb is supposed to work. If a 6 V bulb was placed in a circuit of p.d. = 10 V, the filament in the bulb would melt, thus breaking the circuit.

Task 5

1 Field lines drawn around the bar magnet and the Earth as in the student book.

2 A magnetic field is the space around a magnet where other magnetic materials feel a force. An electric field is the space around an electrical charge where other charged objects feel a force.

3 Repel; like poles repel, unlike poles attract.

4 Make an electromagnet by winding a coil of wire around an iron core and connecting the coil to a power supple so a current flows.

5 Any two from: more turns in the coil, increasing current, using an iron core.

6 An electromagnet allows cars to be picked up when the electromagnet is switched on, and released when the electromagnet is switched off.
The bell works when the switched is pressed and the circuit is complete. Current flows through the wire, making an electromagnet. The electromagnet attracts the hammer, hitting the bell.

Task 6

Numbers in the 'order' column, from top to bottom: 1, 5, 3, 2, 4

Extension activity notes

Students produce a leaflet for primary-school children called 'Circuits at home'. They can work individually or in pairs, to present detailed descriptions of some of the circuits used in different situations around the home.

Additional notes:

- It is recommended that this activity is only given to students achieving 61 % or more in the Checkpoint assessment.
- Students will use their literacy skills to explain key concepts involving series and parallel circuits to a primary-school audience.
- This activity could also be used as extension material for older students, as a recap on series and parallel circuits.

Extension marking guidance

The diagrams in the leaflet should include circuit diagrams that are drawn using correct circuit symbols. Although the actual circuits in specific pieces of equipment may use different components and arrangements, students should be credited if they provide a circuit that does what is asked for, even if it seems clumsy.

- The hair dryer circuit should include three branches, two branches each containing a motor (to move the air) with their own switch, and a third branch with a heater and its own switch. Switches are needed on each branch so that each component can be controlled independently.
- The stair lights can be solved using two connected in parallel (to make a two-way switch) with the bulb in the series part of the circuit. One switch of the two-way switch can then be positioned at the top of the stairs, and the other switch at the bottom.
- The car needs four parallel branches: one branch contains two headlights and two backlights in series with its own switch, two branches (one for each indicator) with one bulb and a switch, and a final branch for the brake lights, also with its own switch. Challenge students to add more components to their circuit, for example, the car radio or heater system. In each case, they should describe what the effect of their changes is on current and potential difference.

Students should also justify why a series/parallel circuit was chosen in each case, and give the current and p.d. rules for series and parallel circuits.