

Investigating series and parallel circuits

Teachers Notes - Lesson 4 - Slide 5

Task A: Creating a series circuit and a parallel circuit

A student driven, hands-on investigation to observe light bulbs connected in a series and parallel circuit. This lesson will explain and develop scientific explanations for observations.

Assessment

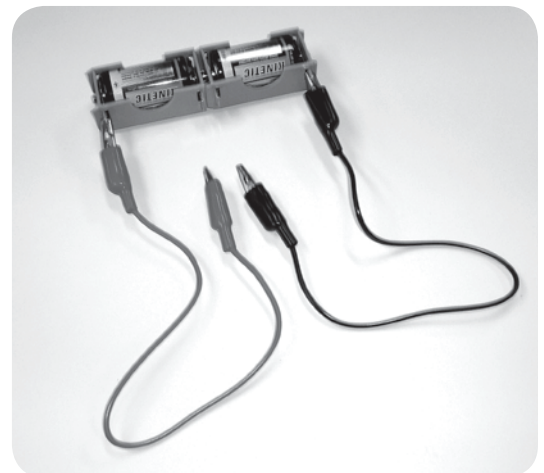
Formative assessment – monitoring students' learning and developing understanding via observation and providing feedback to extend learning.

Equipment

- Role badges used in Lesson 4
- Each team member's SciTech journal
- 2 x 1.5 volt battery
- 1 light bulb
- 2 connecting wires

Activity steps

- Review previous session about exploring electrical circuits, refer to word wall and KWL chart.
- Ask the students what they know about series circuits and parallel circuits.
- Ask students what they think these terms could mean and what these circuits would look like.
- Students discuss and share what they would like to find out about series and parallel circuits and add to KWL chart
- Divide the class into groups, assign roles (Chief Scientist, Safety Officer, Lab Technician, Science Journalist and Science Communicator) and hand out the role badges
- Ask Lab Technicians to collect equipment
- Students construct a closed circuit that includes 1 battery, 2 wires and a light bulb.
- Ask the students to place a dark coloured card behind the light bulb and observe its brightness.
- Students repeat step 1 using 2 batteries connected in series.
- Discuss with students what they observed and have students suggest explanations for their observations.
- Have students construct a closed circuit that includes 2 batteries set in parallel, 2 wires and a light bulb.
- Place a dark coloured card behind the light bulb and compare the brightness of the light bulb with the previous circuit.
- Ask students to place a third battery in parallel and compare the brightness of the light bulb.
- Discuss with the class:
 - Did the additional battery make the bulb glow brighter?
 - What do you think is happening to the flow of electrons in a series and parallel circuit?



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Task B: Investigating the voltage in a series circuit and a parallel circuit

A student driven, hands on investigation to determine the voltage in a series and parallel circuit. This lesson will explain and develop scientific explanations for observations.

Assessment

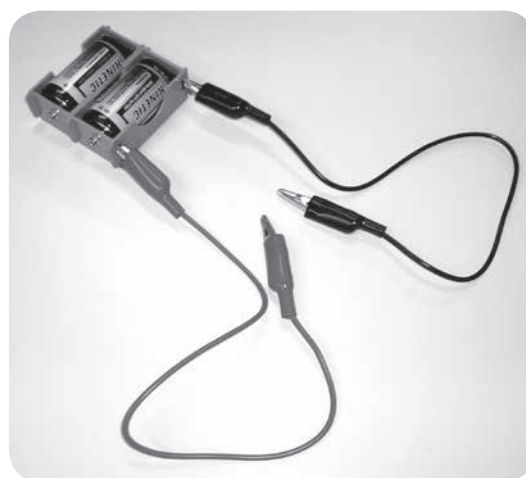
Formative assessment – monitoring students' learning and developing understanding via observation and providing feedback to extend learning.

Equipment

- Role badges used in Lesson 4
- Each team member's SciTech journal
- 2 x 1.5 volt battery
- Multimeter

Activity steps

- Review previous sessions (series and parallel circuits), refer to word wall and KWL chart.
- Ask the students what they know about the way electricity is measured.
- Introduce the term volts and discuss
- Explain and demonstrate the use of the multimeter to the students.
- Have the students predict whether increasing the number of batteries will increase the voltage.
- Ask the students to conduct an investigation to test their prediction
- Divide the class into groups, assign roles (Chief Scientist, Safety Officer, Lab Technician, Science Journalist and Science Communicator) and hand out the role badges



Type of circuit	Number of batteries	Multimeter reading (DCV)/(DCA)
		One battery
Series		Two batteries
		Three batteries
Parallel		Four batteries
		Five batteries

- Ask Lab Technicians to collect equipment
- Students reconstruct their series and parallel circuits, replacing the light bulb with the multimeter to complete the

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circuit.

- Students construct a table to record their observations in their SciTech Journals (sample below).
- Using a multimeter students measure record and compare the voltage and amps of each circuit.
- Students construct a graph using the collected data.
- Discuss with students what type of graph would best represent the data in a way that best addresses their prediction.
- What labels must they include on the X and Y axis?
- Once students have constructed their charts discuss the results and construct a statement summarising what they have learnt about batteries set in series and parallel circuits. Add the statements to the KWL chart and any new words should be added to the word wall.

Extension Activity

Ask students to predict what may happen to the brightness of 2 bulbs if they were placed in series.

Ask students to predict what may happen to the brightness of 2 bulbs if they were placed parallel.