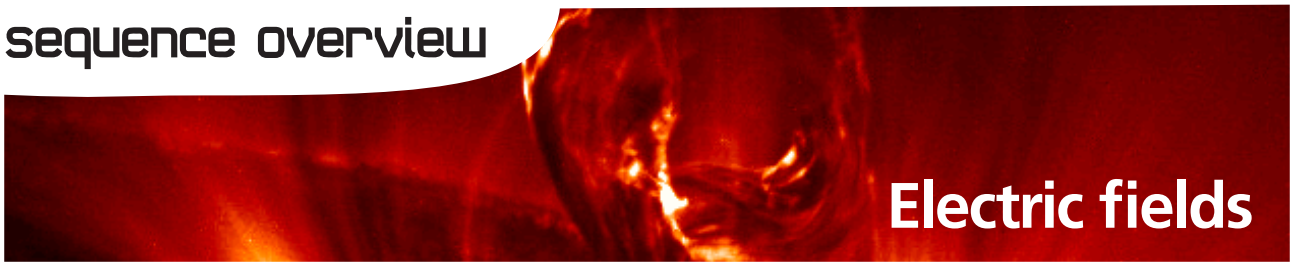
sequence overview



Electric fields

ENGAGE → EXPLORE → EXPLAIN → ELABORATE

Background

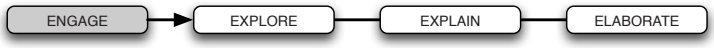
Four SPICE sequences may be drawn together into a learning pathway for students to develop their understanding of electricity. This pathway deals with concepts associated with electric fields. It is structured around a constructivist model, based on the 5-Es that are interwoven throughout the sequence, where teachers can:

- **Engage** students' interest and minds in the concept of fields, through 'free play' with magnets, as an introduction to electric fields;
- provide opportunities for students to **Explore** electric fields by performing an experiment;
- **Explain** how field diagrams are drawn through use of an interactive learning object;
- **Elaborate** on concepts about fields by listening to explanations from a theoretical physicist; and
- **Evaluate** students' progress throughout the pathway.

Information on the second sequence, *Electric fields*, can be found in this overview. Information on *Static electricity*, *Current electricity* and *Elecrical energy* can be found in the overviews for these sequences.

STATIC ELECTRICITY	ELECTRIC FIELDS	CURRENT ELECTRICITY	ELECTRICAL ENERGY
This sequence consists of the SPICE resources:	This sequence consists of the SPICE resources:	This sequence consists of the SPICE resources:	This sequence consists of the SPICE resources:
Static electricity 1: Lightning **Engage**	*Electric fields 1: Exploring fields* **Explore**	*Current electricity 1: Electronic hearing* **Engage**	*Electrical energy 1: Electrical hazards* **Engage**
Static electricity 2: Exploring electrostatics **Explore**	*Electric fields 2: Drawing fields* **Explain**	*Current electricity 2: Circuits* **Explore**	*Electrical energy 2: Electrical safety* **Explore**
Static electricity 3: Explaining electrostatics **Explain**	*Electric fields 3: Properties of fields* **Elaborate**	*Current electricity 3: Batteries and cells* **Explore**	*Electrical energy 3: Measuring electricity* **Explore**
Static electricity 4: Electrostatics in action **Elaborate**		*Current electricity 4: Modelling electricity* **Explain**	*Electrical energy 4: Electricity account* **Explain**
		Current electricity 5: Circuit rules **Explain**	
		Current electricity 6: Bioelectricity **Elaborate**	

Electric fields (overview)



Activity: magnetic fields

The purpose of this activity is for students to:

- consider how bodies carrying a charge can be affected at a distance from other bodies.

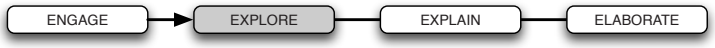
The activity:

Start with a teacher-led discussion about magnets and their ability to produce attractive and repulsion effects even at a distance.

Students then engage in 'free play' with magnets to experiment with a field that has characteristics similar to an electric field. Students should observe phenomena that occur when magnets are brought close to one another. Students may be asked to duplicate similar effects with electrostatically-charged objects.

Students should arrive at the idea that forces can act at a distance, and that forces can be both attractive or repulsive. Similarities may be drawn between magnetic and electrical forces and fields.

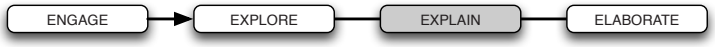
After their experiments students can report their findings to the class. Reference to similarities between magnetic and electrical fields may be revealed in a teacher-led discussion.



Electric fields 1: Exploring fields

Exploring fields comprises a teachers guide and student worksheet.

Students perform an experiment, using seeds and oil, to visualise an electric field. See the teachers guide for detailed information on the purpose and use of this resource.



Electric fields 2: Drawing fields

Drawing fields comprises a teachers guide, interactive learning object and student worksheet.

Students use an interactive learning object to observe field patterns for different charge/plate combinations. The worksheet may be used to record their observations. See the teachers guide for detailed information on the purpose and use of this resource.

Electric fields 3: Properties of fields

Properties of fields comprises a teachers guide and video.

Students view a video presented by a theoretical physicist who explains the nature of fields. See the teachers guide for detailed information on the purpose and use of this resource.

Acknowledgements

Thanks to Professor Ian McArthur (School of Physics, The University of Western Australia).

Designed and developed by the Centre for Learning Technology, The University of Western Australia. Production team: Leanne Bartoll, Emma Donnelly, Alwyn Evans, Bob Fitzpatrick, Trevor Hutchison, Paul Ricketts, Gary Thomas, Jodie Ween and Michael Wheatley, with thanks to Roger Dickinson, Jenny Gull and Wendy Sanderson.

Banner image: Filament erupting during a solar flare, seen at EUV wavelengths that show both emission and absorption (the filament has both). TRACE/NASA.

SPICE resources and copyright

Web: spice.wa.edu.au
Email: spice@uwa.edu.au
Phone: (08) 6488 3917

Centre for Learning Technology (M016)
The University of Western Australia
35 Stirling Highway
Crawley WA 6009