

**sequence overview**

**Electric fields**

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# Background



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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.

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

# Electric fields (overview)

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## Activity: magnetic fields



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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.



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*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.

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*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.

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*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.

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

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