




### Components

	NAME	DESCRIPTION	AUDIENCE
	<i>Drawing fields</i> teachers guide	This provides the teacher with suggestions for teaching strategies, discussion points and how to use the learning object and worksheet.	teachers
	<i>Field explorer</i> learning object	Students select from alternative charge/plate patterns and drop positive test charges onto the screen to discover the underlying force pattern.	students
	<i>Field pattern diagrams</i> worksheet	This worksheet accompanies the learning object, <i>Field explorer</i> . Students complete prepared diagrams of charge/plate arrangements to reinforce the learning object activity. Rules for field patterns are explained.	students

### Purpose

To explain to students how fields surround charged particles, plates and conducting wires.

### Outcomes

Students will be able to:

- explain that all electrical charges are surrounded by an electrical field,
- explain that field lines indicate the direction of an electric field,
- observe that electric field lines are drawn so that the magnitude of the electric field is proportional to the number of lines crossing a unit area, and
- understand that field lines start on positive charges and end on negative charges, and the number starting or ending is proportional to the magnitude of the charge.

### Activity summary

ACTIVITY	POSSIBLE STRATEGY
Students use the learning object, <i>Field explorer</i> , to develop rules for fields.	students work individually or teacher demonstrates
The worksheet, <i>Field pattern diagrams</i> , may be used by students to record rules for fields, and practise drawing lines of force to represent electric fields. Rules for establishing force field patterns are explained.	students work individually or in pairs

### Teacher notes

Students can work in small groups around a computer screen or the teacher may demonstrate the learning object to the whole class.

When using the learning object, note that field force lines commence and finish at the surface of the charge or plate. Field lines do not enter the charge or plate.

### Technical requirements

The learning object requires a browser with Adobe Flash plugin (version 9 or later).

The teachers guide and worksheet require Adobe Reader (version 5 or later), which is a free download from [www.adobe.com](http://www.adobe.com). The worksheet is also provided in Microsoft Word format.

## Associated SPICE resources

*Electric fields 2: Drawing fields* may be used with related SPICE resources to address the broader topic of electric fields.

DESCRIPTION	LEARNING PURPOSE
<p><i>Electric fields (sequence overview)</i></p> <p>This learning pathway shows how a number of SPICE resources can be combined to teach the topic of electric fields.</p>	
<p>The sequence overview for <i>Electric fields</i> contains a suggested <b>Engage</b> activity suitable for use at this point.</p>	<b>Engage</b>
<p><i>Electric fields 1: Exploring fields</i></p> <p>Students explore properties of electric fields through a laboratory experiment.</p>	<b>Explore</b>
<p><i>Electric fields 2: Drawing fields</i></p> <p>An interactive learning object shows the pattern of field lines around different arrangements of charged particles and plates.</p>	<b>Explain</b>
<p><i>Electric fields 3: Properties of fields</i></p> <p>A theoretical physicist explains current thoughts on the nature of fields.</p>	<b>Elaborate</b>

## Acknowledgements

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

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