teachers guide

Geothermal energy 7: The geothermal alternative

Components

	NAME	DESCRIPTION	AUDIENCE
	*The geothermal alternative* teachers guide	The guide describes how a case study and worksheet can be used by students to reinforce concepts of specific and latent heat.	teachers
	*Cooling the campus* worksheet	Students analyse a proposal to air-condition a university campus using geothermal energy.	students
	*How cool is your pool?* worksheet	Students analyse data on heat losses from a swimming pool.	students
	*Swimming pool model* spreadsheet	This spreadsheet contains data that model heat losses from a heated swimming pool, over a year, at two different times of day.	students

Purpose

To provide opportunities for students to apply the concepts of specific heat, latent heat, energy supply and loss to case studies involving geothermal energy.

Outcomes

Students:

- understand scientists use a variety of strategies to solve problems that involve energy transfer systems;
- analyse and manipulate data in relation to real world problems; and
- use concepts of specific heat, latent heat and the mathematical relationships $Q = m\,c\,\Delta T$ and $Q = m\,L$ to solve problems.

Activity summary

ACTIVITY	POSSIBLE STRATEGY
Case study: students read and complete the worksheet, *Cooling the campus*.	teacher-led discussion student activity as individuals or pairs
Students read and complete the worksheet, *How cool is your pool*, with the aid of an Excel spreadsheet where possible.	student activity as individuals or pairs

Technical requirements

The guide and worksheets require Adobe Reader, which is a free download from adobe.com. The worksheets are also provided in Microsoft Word format. Data for the worksheet, *How cool is your pool?*, is also provided in Microsoft Excel format.

Associated SPICE resources

Geothermal energy 7: The geothermal alternative may be used in conjunction with related SPICE resources to investigate specific heat and latent heat.

DESCRIPTION	LEARNING PURPOSE
Geothermal energy (overview) This learning pathway shows how a number of SPICE resources can be combined to assist with teaching the topics of specific heat and latent heat.	
Geothermal energy 1: Heat beneath your feet A video engages student interest in recent developments and future possibilities for the use of geothermal energy.	Engage
Geothermal energy 2: Specific heat capacity Students investigate the specific heat capacity of water in laboratory and problem-solving activities.	Explore
Geothermal energy 3: Heating a pool Students' understanding of specific heat is developed through data analysis in the context of heating swimming pools using geothermal energy.	Explain
Geothermal energy 4: Sustainable energy sources Students reinforce and deepen their understanding of specific heat and geothermal energy through problem-solving activities.	Elaborate
Geothermal energy 5: Latent heat Students investigate latent heat through practical and problem-solving activities.	Explore
Geothermal energy 6: Using geothermal energy Students use an interactive learning object to develop an understanding of how latent heat is used in a number of devices.	Explain
Geothermal energy 7: The geothermal alternative Students use concepts developed throughout this sequence to analyse two case studies that involve use of geothermal energy.	Elaborate

Acknowledgements

Designed and developed by the Centre for Learning Technology, The University of Western Australia. Production team: Leanne Bartoll, Alwyn Evans, Bob Fitzpatrick, Dan Hutton, Emma Pointon, Gary Thomas and Michael Wheatley, with thanks to Pauline Charman, Jenny Gull, Wendy Sanderson and Charmaine White.

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