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Renewable energy – is it just a lot of wind?

Lesson plan description

Students begin by discussing the world's energy needs and the impact that meeting them has on the environment. They then use interactive learning objects to gain background information on the use of wind power as an alternative to fossil fuels to help meet our energy needs.

Working in groups, students investigate an aspect of the use of wind power and consider the issues surrounding its use on both the local and global community. The teams present their findings and opinions in a three-minute presentation to the class.

Students consider the values that they can draw upon when considering environmental issues and the values implied when working in teams. They conclude by writing a letter to the Prime Minister arguing the case for or against the use of wind power based on the evidence they have collected and their values.

Year levels

Early Adolescence (12–15 years)

Duration

50 minutes

Explicit values focus

- Care and Compassion
- Doing Your Best
- Fair Go
- Freedom
- Honesty and Trustworthiness
- Integrity
- Respect
- Responsibility
- Understanding, Tolerance and Inclusion

Key learning areas

- English
- Science
- Studies of Society and Environment

Lesson plan

Getting started

As a class, have students brainstorm types of energy and then divide into groups to spend five minutes listing as many ways that each type of energy can be produced and decide if it is a renewable or non-renewable resource.

As a class, discuss the energy needs of societies in developed and non-developed countries and the impact these have on their local and world environment.

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Discovering

Have students access the 'Energy Quest' website at
http://energyquest.ca.gov/story/index.html or 'Energy Matters'
http://www.energymatters.com.au/faqs/renewable-energy-faq.php or 'Clean
Energy Council' website http://forteachersforstudents.com.au/CEC-
Education/students.php, and read through the information on renewable energy
and make notes.

Now have students access the 'Wind with Miller' website at
http://ele.aut.ac.ir/~wind/en/en/kids/index.htm and complete the interactive
'Crash Course' in wind energy to find out how wind turbines work. Ask students to
consider what they have learned from their crash course in wind power. Students
who finish this quickly can go on to the 'Turbine Simulator' activity to learn more
about wind turbines by following the 'How Does It Work' pathway to discover how
to install a wind turbine and what affects their performance.

Students re-form their groups and choose one of the 12 topics published by the
Australian Greenhouse Office and AusWEA: Australian Wind Energy Association at
http://www.w-wind.com.au/WindEnergyInformation_FactSheets.html and
download the associated fact sheet. Groups allocate different sections of the
paper to different members to read carefully in order to identify issues associated
with that particular aspect of wind farms, especially those affecting communities
living in the vicinity of wind farms. Groups record these issues in an 'issues
register'. (See Resource sheet 1).

When issues have been identified, groups collaborate to prepare a three-minute
presentation for the class outlining the issues they identified and ways of
lessening their impact.

Bringing it together

Groups make their presentations to the class and are assessed by their peers,
using the 'Peer assessment rubric' outlined in Resource sheet 2.
After the presentations have been made, groups discuss the values they
encountered and used in this lesson to complete the 'Values rubric' outlined in
Resource sheet 3.

Individually, students write a letter to the Prime Minister outlining their support or
opposition to the use of wind power, as a means of lowering greenhouse gas
emissions and include evidence supporting their case based on their system of
values.

Students finish the lesson by completing a self-evaluation of their performance in
the group using the 'Team performance rubric' outlined in Resource sheet 4.

Notes for teachers

This lesson could be extended to include Technology with the building of a wind
turbine. Plans for the construction of a wind turbine suitable as a group project by
older students are available from:
http://www.ecent.nl/servlet/supportBinaryFiles?referenceId=7&supportId=1658

References

Solar School http://das.ee.unsw.edu.au/~solar/index.html, University of NSW, 1998, Solar school – 'Renewable energy'. Retrieved 31 October 2006 from http://das.ee.unsw.edu.au/~solar/classrooms/3_1.html
Danish Wind Industry Association http://www.windpower.org/en/, 2001, 'Wind with Miller'. Retrieved 31 October 2006 from http://ele.aut.ac.ir/~wind/en/en/kids/index.htm
Australian Wind Energy Association, http://www.auswea.com.au/WIDP/index.htm, 2005, 'Fact Sheets and Information'. Retrieved 31 October 2006 from http://www.w-wind.com.au/WindEnergyInformation_FactSheets.html

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Resource sheet 1

Issues register

Issue	Who is affected?	How can effects be minimised?

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Peer assessment rubric

Tick the cell that best corresponds to the group's performance in each of the criteria listed

Group: _____

Topic: _____

	Orator	Professional	Acceptable	Amateur
Content	Many issues were identified and points were clearly made. The impact on the local and wider community was considered in depth and supported with evidence.	Issues were clearly identified. The impact on the local and wider community was considered.	Some issues were identified and their impact on the immediate community was considered.	Information was not clear and was not related to the topic. Impact on the community was not considered.
Creativity	Captured the audience's attention with original presentation of material. Used the unexpected to full advantage.	Some originality apparent. Good variety and blending of materials/media used to hold the audience attention.	Material presented with little originality or interpretation. Multimedia used to keep the interest of most of the audience.	Repetitive with little or no variety. Little imagination shown in the use of multimedia to hold audience attention.
Speaking skills	Poised, clear articulation, proper volume, steady rate, good posture and eye contact, enthusiasm, confidence.	Clear articulation but not as polished. Maintained eye contact.	Some mumbling, little eye contact, uneven pace, little or no expression.	Inaudible or too loud, no eye contact, rate too slow/fast. Speaker seemed uninterested and used monotone.
Audience response	Involved the audience in the presentation. Points made in a creative way. Held the audience's attention throughout.	Presented facts with some interesting 'twists'. Held the audience's attention most of the time.	Some related facts but went off the topic and lost the audience. Mostly presented facts with little or no imagination.	Incoherent. Audience lost interest and could not understand the point of the presentation.
Length of presentation	Within 30 seconds of allotted time.	Within 1 minute of allotted time.	Within 1½ minutes of allotted time.	Too long or too short.

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Resource sheet 3

Values rubric

Identify the values that you have used during this lesson and record them in the table.

Value	Description	We showed this when we …
Care and Compassion	Care for self and others.	
Doing Your Best	Seek to accomplish something worthy and admirable, try hard, pursue excellence.	
Fair Go	Pursue and protect the common good where all people are treated fairly for a just society.	
Freedom	Enjoy all the rights of Australian citizenship free from unnecessary control, and stand up for the rights of others	
Honesty and Trustworthiness	Be honest, sincere and seek the truth.	
Integrity	Act in accordance with principles of moral and ethical conduct, ensure consistency between words and deeds.	
Respect	Treat others with consideration and regard, respect another person's point of view.	
Responsibility	Be accountable for one's own actions, resolve differences in constructive, non-violent and peaceful ways, contribute to society and civic life, take care of the environment.	
Understanding, Tolerance and Inclusion	Be aware of others and their cultures, accept diversity within a democratic society, being included and including others.	

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Resource sheet 4

Team performance rubric

		★★★★	★★★	★★	★
Listening	I listened to my group's ideas and used their ideas to help generate new ideas (piggy-backing).				
Questioning	I asked questions of my group to help them decide what to do and to extend their thinking.				
Persuading	I exchanged ideas and tried to explain my thinking to my group.				
Respecting	I respected the opinions in my group. I encouraged new ideas and supported the efforts of others.				
Helping	I helped my group.				
Sharing	I shared the workload with my group. I made sure I shared my ideas and thinking. We shared the jobs.				
Participating	I contributed to the group assignment. I actively participated in the assignment.				