

<b>TOPIC 2.16:</b>	<b>Energy</b> (Learning outcomes by syllabus reference: OP17, OP20, OP21 and part OP15)
<b>HOW MANY LESSONS?</b>	2 – 3 lessons

<b>KEYWORDS / TERMS TO BE TAUGHT</b>			
Energy	Sound Energy	Chemical Energy	Light Energy
Heat Energy	Electrical Energy	Magnetic Energy	Work
Joules	Kinetic Energy	Potential Energy	Conservation
Law	Vibrations	Solar Energy	

<b>KEY CONCEPTS IN THE LESSON (OBJECTIVES)</b>		
<i>What students <b>must</b> know or be able to do</i>	<i>What students <b>should</b> know or be able to do</i>	<i>What students <b>could</b> know or be able to do</i>
<p>To be able to identify different forms of energy</p> <p>To be able to carry out simple experiments to show energy conversions</p> <p>To be able to give examples of energy conversion from everyday experience</p>	<p>To be able to write down the Law of Conservation of Energy</p> <p>Reinforcement: To be able to write up experiments in a systematic way and draw valid conclusions from experiment results</p>	<p>To find out more about energy</p> <p>To be aware of how everyday energy conversions can be made more efficient</p> <p>To relate energy conversions to nutrition and respiration in living things</p>
<b>SEQUENCE OF LESSON</b>		

1. Introduce the concept of energy. Seek level of prior knowledge of class. Allow students to relate personal experiences of energy usage. This could be facilitated by using the *Energy Introduction* PowerPoint and encouraging student input during the presentation.
2. Students carry out experiments in groups to show energy conversions. Discussion of key vocabulary, results and conclusions. For resources, guidance and support related to facilitating student experiments and investigations, see [www.juniorscience.ie](http://www.juniorscience.ie)
3. Students record results and write up experiment as they are doing the practical work through the use of text and/or pictures.
4. Review – whole class discussion/dissemination of ideas/extra information. Possibility of using *Energy Quiz* PowerPoint to facilitate student understanding.
5. Further class work/homework – see *Energy Worksheet*. Devise extension activities as required.

**1. DIFFERENTIATE BY CONTENT (In what ways can I vary the content of what I am teaching?)**

*(A) Complexity of content: (concrete, symbolic, abstract)*

<i>Concrete</i>	<i>Symbolic</i>	<i>Abstract</i>
Real materials associated with energy usage and energy conversion, e.g. bulbs, switches, Crooke's radiometer, batteries, solar cells, electrical leads, etc. Bunsen burner to explore fuel conversions	Circuit symbols for various apparatus and circuit drawings Newspaper articles/ personal experiences relating to energy usage Illustrations, images of energy conversions	The Law of Conservation of Energy What is a law in science? How do we know about energy conversions throughout the universe? Significance of energy conversions in our daily lives

*(B) Variety of resources*

As listed above. Also potential use of the Internet and/or school or community library for further exploration of material related to energy and energy conversions

*(C) Variety of learning environments*

Classroom, school laboratory, computer room/library in school (as indicated above)

Visit to a power station

## **2. DIFFERENTIATE BY PROCESS (How will I teach the lesson?)**

Sequence of lesson as laid out above

- Introduction – using concrete or symbolic material or a general class discussion
- Teacher may demonstrate use of apparatus to the class, emphasising safety.
- Divide class into groups. Assist the students, as required, to plan, carry out the experiment, record results and draw conclusions as appropriate. Enable students to extend their thinking and language use.
- Possible use of *Energy Quiz* PowerPoint to facilitate discussion

**3. DIFFERENTIATE BY OUTCOME / PRODUCT**  
**(How will the student demonstrate understanding?)**

See *Worksheets*, *Classroom Activities* and *Experiments* sections of this resource pack.

- Students may use a template from the *Experiments* section to assist them with the write-up.
- Whole class review work completed at end of class.
- Homework: *Energy Worksheet* if not used for class work. Specify time to be allocated to this work at home.

**FINALLY - ANY OTHER POSSIBILITIES FOR THIS LESSON?**

- '*Exploring Energy*' – A practical resource for teachers from Sustainable Energy Ireland
- Collage of scenes showing energy usage
- Dramatisation, e.g. possible use of role play to emphasise the impact of energy conversions on energy efficiency and energy loss
- Other written activities, e.g. a log of the different forms of energy encountered by students in one day
- Visit to a power station
- Cross-curricular links: Geography, CSPE
- Internet search for material on acids and bases
- Suggested Internet links include [www.bbc.co.uk/schools](http://www.bbc.co.uk/schools), [www.juniorscience.ie](http://www.juniorscience.ie), [www.scoilnet.ie](http://www.scoilnet.ie), [www.skool.ie](http://www.skool.ie) and <http://classroom.jc-schools.net/sci-units/energy.htm>
- For advice on enhancing curricular access through the use of mobile ICT, see [www.laptopsinitiative.ie](http://www.laptopsinitiative.ie)