Science lesson plan form: Level 2 and 3 example

# Science lesson plan form: Level 2 &3 Example

These do not need to correlate exactly with each outcome. A particular activity might be relevant to more than one of the outcomes.

All the outcomes should be covered, however, in your assessment plans.

Essential to try all practical activities in advance – especially if the apparatus is unfamiliar and even if you think you know what to do!

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| Class: 8 ZY | Date of lesson: Thurs 10th Sept | Preparation notes:  Test practical in advance – see technician. Order apparatus for Wednesday lunchtime. |
| Lesson title: Energy saving Light bulbs | Number in class: 26 |
| Location: G9 | Attainment range of pupils: L3-7 |
| Length of lesson: 1 hour | Usual teacher: Ms H. Grainger |

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| Content Learning Objective(s)  Most electrical devices are very inefficient  Skills / nature of science Learning Objective(s)  [scientific process and/or cross-curricular  skill]Considering alternatives raises other difficult issues. Considering the difference between evidence and opinion. | Learning Outcomes (LOs) (inc. skills /; nature of science)  All: Draw an energy transfer diagram for a light bulb. Distinguish between opinion and evidence, using evidence to support an argument.  Most: Calculate the %efficiency of a light bulb. Identify a lack of balance in the presentation of evidence.  Some: Explain how information/evidence from various sources can be manipulated in order to influence interpretation. | Assessment plans  Questioning during the class discussion  Starter activity  Observations during the activity and individual questioning  Work in excerise books  Homework. | |
| Cross-curricular skills/literacy/numeracy  Students are asked to present an argument, with evidence to support their points. Need to read and understand the evidence they are given.  % calculations  The content objective should reflect the context. You should always have an objective related to skills or the nature of science **and** a content objective. | Links to curriculum / specification  1.1a Identify a range of scientific data and other evidence to back an argument  1.1b Describe the benefits and drawbacks of some scientific developments  1.2a Exploring how the creative applicationof scientific ideas can bring about technological developments and changes in the way people think and behave.  Use these to direct your questioning and make sure that you get the most out of each activity. | |
| Prior teaching  Energy cannot be created or destroyed only converted from one form into another  Simple energy transfer diagrams  Using fossil fuels to produce electricity produces greenhouse gases. | Central scientific idea(s):  In a light bulb electrical energy is converted into light and heat. Normal bulbs are only 5% efficient.  % efficiency = useful energy out x 100  Energy in | Key vocabulary  Efficiency incandescent light bulb  Energy transfer low energy light bulb  Filament  Fluorescent light | |
| Concept of highest demand  Calculating the efficency and assessing the relative significance of different points in building an argument | Activities for high-attainers  Extend starter by calculating the cost of running a light bulb. Let them work out how to calculate the efficiency of a light bulb.  Write at greater length about why they hold a certain opinion. | SEN/Support  Robert, Lucy, Karen – will need support with reading  Work in MA groups | |
| Possible misconceptions  That light bulbs are more efficient than they actually are. | Resources  Practical demo – sample light bulbs, thermonmeters, stand/clamps. Mercury in a sealed tube  newspaper articles/ UPD8 activity.  List of groups to be displayed for the activity | Risks and safety precautions  Light bulbs get very hot  Mercury in sealed tube. Don’t let them handle in case it is dropped – show to groups individually. | |
| Focus for evaluation and feedback (related to targets)  Effectiveness of the group work | Evaluation evidence to be collected  Observe the groups carefully | Homework  Daily express article. Write down three points that the article makes. Write a brief response – (at least 3 sentences) | |

Homework is a good assessment tool, but you will need to stick to the school policy and make sure that you follow it up effectively i.e give feedback and employ a system for people you haven’t done it.

Higher attainers don’t just need more activities at the same level. They need activites that are more conceptually demanding. A good strategy sometimes is to withhold information and get them to work out how to do something for themselves.

Try and anticipate which parts of the activities particular pupils will find difficult and deploy your LSA’s accordingly.

How they enter might be determined by the school, but a good general strategy is to establish order, to greet them properly and to tell them something about what they will be doing.

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| Time | | | Pupil activity | Teacher activity | Notes | |
| General admin | | 5 | Line up outside in an orderly fashion  Enter the room – sit in seating plan  Bags on the rack, books, writing equipment, homework diaries out | Greet the class outside  Supervise orderly entrance  Rough paper already available on each table | Reinforce seating plan | |
| Lesson starter | | 5 | Watch video clip  Work out how many light bulbs they have in their house.  Extension: Use data on the board to work out the efficiency of a light bulb  Make sure you know who to target for your extension activity and plan the details! | Introduce lesson – play video clip  <http://video.nationalgeographic.com/video/player/environment/going-green-environment/conservation-in-action/this-bulb-ngv.html>  Students to work out the number of lightbulbs in their house. Extension: prompt Kim, Ahmed, Howard Susie, Jack to use the info on the board. | On board – data to work out the efficiency of a light bulb and the cost, and lesson objectives.  (Light bulb running for an hour uses 216kJ of energy and produces 10.8 kJ of light energy)  Daytime electricity 29.17p per kWhour. How much does it cost to run a 60watt bulb for 2 hours? All the bulbs in the house for 2 hours? | |
| Lesson core  This is can be a good way to run a class discussion and helps you to make smooth transitions. | 10  School policy might be to write these down. You will need to discuss this with your mentor. Sometimes it is a settling tool, but it can take ages! If they do write them down, make them short!  20  10 | | Pupils round the front – class discussion, listening, contributing.  Watching demo. Get pupils to help and appoint a scribe on the board.  Pupils move into assigned groups. (Robert, Lucy and karen with Robert’s LSA)  Sort cards into ‘good news’ and ‘bad news’  Assign a number for each one.  Come to a group decision with reasons.  Class discussion  Writing. Instructions on the board.  [www.upd8.org](http://www.upd8.org) has many activities that address HSW. You need to choose carefully, however, and not be tempted to use them too much! | Gather pupils round the front. Explain the lesson objectives. Purpose of this session is to reinforce the key science and introduce the issue.  Ask questions to find out what pupils already know/ reinforce science behind a light bulb. Get volunteer to draw a energy transfer diagram on the board.  Demo – show that filament bulb and measure the temperature at a certain distance from it.  Explain how a filament light bulb works (link to space topic – filament glows white hot – colour of stars tells us their temperature and age).  Introduce fluorescent light bulbs. Repeat demo. They give out less heat. Must be better. More efficient (20% rather than 5%). Therefore use less electricity and reduce greenhouse gases.  It is a good idea to plan out key questions in advance  EU are going to ban normal light bulbs as they use much less energy. But it is not as simple as that! Display pages from UPD8. Emphasise the problem and explain activity  After about 20 mins, stop work. Ask each group for their opinion and why.  Plan the instructions you need to give carefully. Try to avoid copying – make them think! | | How many light bulbs do you think you have in your house?  What type of bulbs – filament/fluorescent/spot lights/halogen? Are the all the same?  Does anyone have low energy bulbs? Explore what they think of them.  Tungsten wire gets hot – glows white hot. Bulb filled with Argon. Why?  Tube filled with mercury vapour which gives out UV light when electricity is supplied. This causes a coating on the glass to give out visible light. Do they know anything about mercury? Try and elicit the fact that it is poisonous  Go round the groups – probe understanding.  Concentrate on AF3 – why have they given certain arguments a higher rating than others?  List on board of what they need to write:   * Energy transfer diagram for a light bulb * A sentence to explain why low energy is better * A sentence to explain the problems * Their opinion on whether normal light bulbs should be banned and why. |
| Final plenary | 10 | | Class discussion  Final video clip to extend knowledge of low energy light bulbs.  Write down homework. | Metacognition. What did you think at the start? What do you think now? In what way has your opinion changed? Which argument was the most convincing out of all the ones you have heard?  <http://ban-the-bulb.blogspot.com/> | | Homework on a sheet article + instructions. |

A good chance to reinforce the LO. By making it structured but open-ended, differentiation will be by outcome.

This is a chance to develop higher-order thinking skills. Get them to justify their opinions using evidence from the upd8 activity. The emphasis is on which arguments are the most convincing and why.