

# Year 8 Independent Learning Project (ILP)



Subject: **Maths**

Date for the completion of this project: **Monday 3<sup>rd</sup> October 2016**

ILP Title: **Electricity in the home**

<b>In this project you will learn:</b> <ul style="list-style-type: none"><li>To use both mental and written multiplication and division in real life problem solving.</li></ul>	<b>Time you should spend on this project:</b>  No more than 6 hours
<b>At the end of this project you should:</b> <ul style="list-style-type: none"><li>Have answered all questions and shown your working out.</li><li>Checked your answers using a calculator.</li><li>Hand your completed activities to your maths teacher.</li></ul>	
<b>You should break down your time in the following way:</b> Task 1 – 1.5 hours Task 2 – 1.5 hours Task 3 – 1.5 hours, including spending some time observing which lights get used in your house and how long they are on for. Ask your family to estimate how long they think lights are left on for. <i>Extension – Create a poster with newspaper clippings of advertisements for energy saving products in the house. (1.5 hours)</i>	
<b>Weblinks you should use to help you with this task:</b> <a href="http://www.mymaths.co.uk">www.mymaths.co.uk</a> : search 1243 for help with value for money calculations, search 1025 for help with multiplying double digits.	
<b>Other resources and ideas which may help you could be:</b> Look through newspapers to find advertisements for new home insulation, double glazing and solar panels. How many different suppliers and products can you find? What deals do they offer? Cut these out and make a poster (Extension)	
<b>Your work will be assessed by:</b> <ul style="list-style-type: none"><li>Your maths teacher will provide a written or verbal comment on the tasks you have completed.</li></ul>	
<b>The key words to learn in this project are:</b> kWh (kilowatt hours); cavity wall; insulation; lagging; ground based heat pump; draught proofing	
<b>Your parents may be able to help you by:</b> <ul style="list-style-type: none"><li>Test you on the definitions of key words and explain them if needed.</li><li>Checking spelling.</li><li>Talking to you about energy use in your house and showing you the energy bills.</li><li>Save newspapers (Telford Journal) to find advertisements for the extension task.</li><li>Ensure you complete all tasks.</li></ul>	



## Case study 1: Energy in the home

With headlines like these, many people are looking at alternative forms of energy and other ways of saving energy in their homes.

**ELECTRICITY PRICE SHOCK!**

**Oil cost hits new high**

**Gas price explodes**

### Task 1

- Look at all the green labels. Work out how long it would take for the savings to repay the cost of installing the item.
- Which things do you think are most cost effective?
  - Which are not so cost effective?
- Would the length of time you are going to live in the same house alter your decisions?

### Solar power

Save up to 70% on your yearly hot water bill. Save money on your electricity bill forever. Cut your CO<sub>2</sub> emissions. Use an everlasting **FREE** source of energy!

### Solar water heating

Cost £5000  
Save £100 per year

### Small wind generator

Cost £5000  
Save £250 per year

### Loft insulation

Cost £350  
Save £200 per year

### Lagging hot water tank

Cost £20  
Save £50 per year

### Efficient A rated boiler

Cost £2000  
Save £150 per year

### New heating controls

Cost £150  
Save £50 per year

### Ground based heat pump

Cost £12000  
Save £800 per year

### Double glazing

Cost £3500  
Save £100 per year

### Draught proofing

Cost £120  
Save £50 per year

### Solar panels

Cost £6000 per panel  
Save £120 per panel per year

### Cavity wall insulation

Cost £350  
Save £200 per year

### Energy efficient light bulbs

### Task 2

An average house in the UK uses around 3300 kWh of electricity in a year.

A typical solar panel will generate 825 kWh per year. The costs and saving are shown below

- How many solar panels would a house need to meet all of its electricity demands?
- What would be the total cost of fitting these solar panels?
- How long would it take to make a saving on having solar panels fitted?

### Task 3

A **standard** light bulb can last up to 1000 hours switched on.

A typical **energy efficient** bulb can last up to 15000 hours.

- Think about a light bulb in your house.
  - How many hours would it be switched on per day on average?
  - Estimate how many hours it would be switched on per year.
- How long would this bulb last
  - if it is energy-efficient
  - if it is standard?
- In reality, an energy-efficient bulb might typically last for only 40% of this time. Using your answer to **b**, estimate how long in years a typical energy-efficient bulb might last.