

# AQA GCSE PHYSICS 1 (SCIENCE) 2007+ REVISION SHEET 2 of 7

## P1a.2 USING ENERGY

### What is meant by the efficient use of energy?

*Using skills, knowledge and understanding of how science works:*

- to describe the intended energy transfers/transformations and the main energy wastages that occur with a range of devices
- to calculate the efficiency of a device using:  $\text{efficiency} = \frac{\text{useful energy transferred by the device}}{\text{total energy supplied to the device}}$
- to evaluate the effectiveness and cost effectiveness of methods used to reduce energy consumption.

*Skills, knowledge and understanding of how science works set in the context of:*

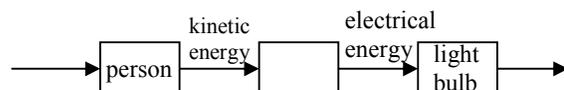
- Energy cannot be created or destroyed. It can only be transformed from one form to another form.
- When energy is transferred and/or transformed only part of it may be usefully transferred/transformed.
- Energy which is not transferred/transformed in a useful way is wasted.
- Both wasted energy and the energy which is usefully transferred/transformed are eventually transferred to their surroundings which become warmer.
- Energy becomes increasingly spread out and becomes increasingly more difficult to use for further energy transformations.
- The greater the percentage of the energy that is usefully transformed in a device, the more efficient the device is.

1. Give one example in each case of the following energy transfers:

- (a) electrical to light; (b) electrical to sound; (c) chemical to electrical; (d) heat (thermal) to chemical; (e) kinetic to gravitational potential; (f) elastic potential to kinetic; (g) nuclear to thermal (heat); (h) kinetic to thermal (heat); (i) chemical to kinetic

2. Copy out and complete the energy flow diagram shown below.

The diagram shows the energy transfers for a person riding a bicycle and using some of their energy to turn a dynamo that powers a light bulb.



3. Draw energy flow diagrams to describe the energy transfers taking place in:

- (a) an electric light bulb; (b) a water wheel; (c) a wood fire; (d) a battery powered radio; (e) a child jumping off a wall

4. Complete the following statement by inserting the missing words:

*Energy cannot be created or \_\_\_\_\_, it can only \_\_\_\_\_ form. This is known as the conservation of \_\_\_\_\_.*

5. In what ways is energy wasted in the transformations of Q3 (a), (b) and (d)?

6. What disadvantage occurs when energy spreads out as for example with heat energy?

7. Use the formula;  
percentage efficiency

$$= \frac{\text{useful work or useful energy output}}{\text{total energy supplied}} \times 100$$

to calculate the percentage efficiency of:

(a) an electric motor that requires 3000J of electrical energy in order to do 1500J of useful work.

(b) a light bulb that requires 6000J of electrical energy in order to produce 1200J of light.

(c) a car that requires 4000J of chemical energy from petrol in order to do 1000J of useful work.

8. A loudspeaker has a percentage efficiency of 40% when producing sound. If the speaker produces 160J of sound energy calculate:

- (a) the electrical energy supplied  
(b) the energy wasted

9. How are energy efficient light bulbs different from traditional filament ones?