Name:
Science Class:
Teacher:
Hand in day:

Y7 Science
Term 1: Homework Booklet
Physics

	Hand in Date	Parents Signature
Energy		
Homework 1		
Homework 2		
Homework 3		
Homework 4		

Y7 Energy Homework 1

Read the information below and answer the questions on the next page.

Energy Units
Energy changes are measured in joules (J) or kilojoules (kJ). **1000 J = 1kJ**

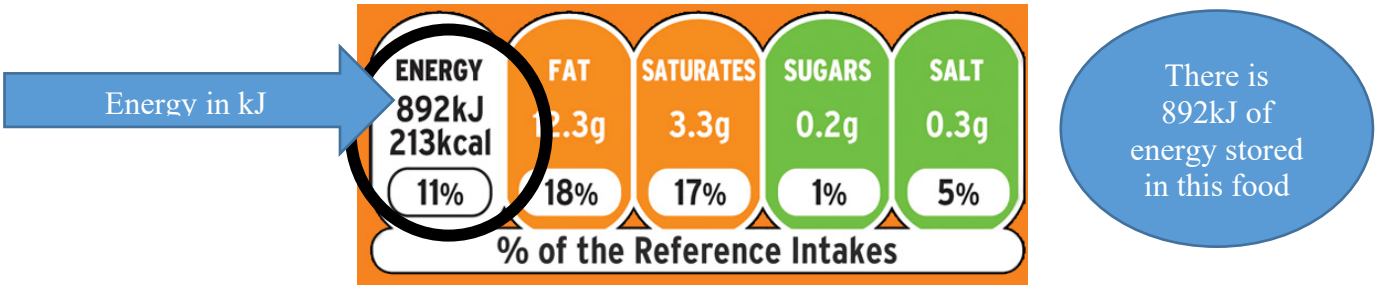
To convert from J to kJ, divide by 1000.

Example: Convert 3000J into kilojoules.
3000J ÷ 1000 = 3kJ

To convert from kJ to J, times by 1000.

Example: Convert 2kJ into joules.
2kJ x 1000 = 2000J

Energy in food – Food Labels
Energy stored in food can be released by combustion (burning) or by respiration in our cells. The labels on packets of food show how much energy is available from the food.



The amount of energy stored in food may be shown in a unit called the calorie (kcal), as in the photograph. However, the scientific unit for energy is the joule, which has the symbol J.

A lot of energy is stored in most foods, so food labels usually show kJ (kilojoules) instead of J.

The table shows the typical amount of energy available from 100 g of several different foods. The larger the number, the more energy is available.

Food	Energy in kJ per 100 g
Apple	140
Egg omelette	690
Bread	1080
Cheese	1360
Chocolate cake	1920
Potato crisps	2240

Questions

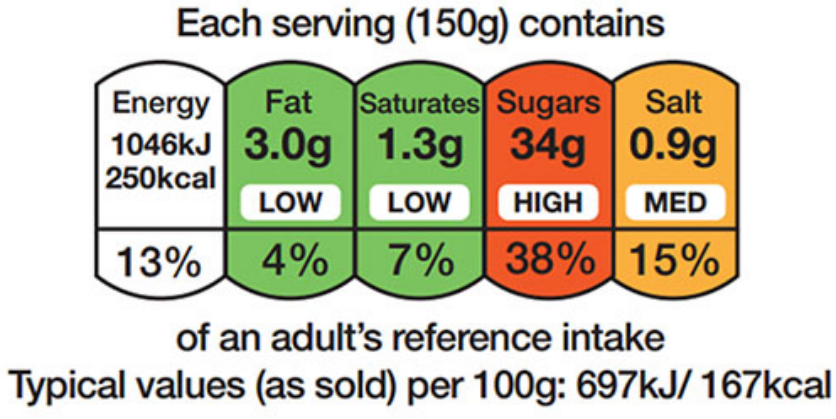
1. **What unit is used to measure energy changes?**

2. **What is 3000J in kJ?**

3. **What is 2kJ in Joules?**

4. **Name two ways the energy stored in food can be released.**

5. **How much energy in kJ is stored in 150g of this food?**



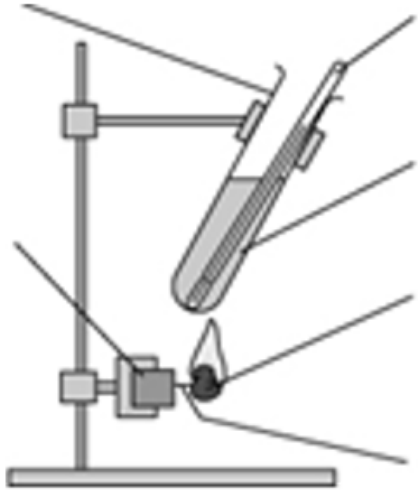
6. **Why do food labels show energy in kilojoules instead of joules?**

7. **How many kJ are there in 100g of an egg omelette?**

8. **How many kJ are there in 200g of cheese?**

Energy in food experiment

Equipment : Label the equipment



Example Results

Food	Temperature at the beginning (°C)	Temperature at the end (°C)	Temperature difference (°C)
salted peanuts	19	31	
cashew nuts	20	33	
raisins	21	27	

Calculate the temperature change for each type of food above using:
Temperature change = temperature at the end – temperature at the beginning

Conclusion
When the food is burned, the _____ energy store in the food is transferred to the _____energy store in the water making it hotter.

The food that gave the highest temperature change was _____, this means it stored the most _____energy.

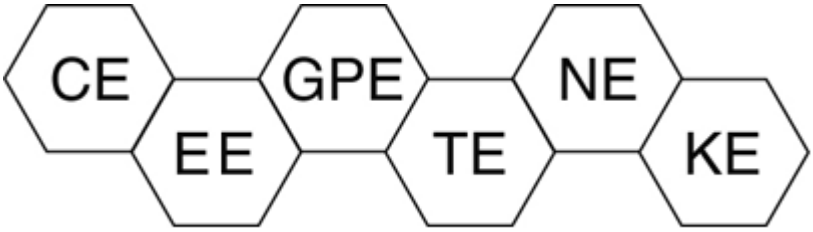
Y7 Energy Homework 2

Task 2 : Complete the table on energy stores and learn the definitions for next lesson

Energy Stores	Definition	example
Magnetic		
Thermal		
Chemical		
Kinetic		
Electrostatic		
Elastic		
Gravitational		
Nuclear		

Answer the questions below about each type of energy store.

Energy can be stored in different ways. All the energy is the same, but we sometimes give it names to help us to remember the way in which it is stored.



a What CE describes the way energy is stored in a sandwich?

_____

b What EE describes the way energy is stored in a stretched spring?

_____

c What GPE describes the way energy is stored in a person on a diving board?

_____

d What TE describes the way energy is stored in a pan of boiling water?

_____

e What NE describes the way energy is stored inside atoms?

_____

f What KE describes the way energy is stored in a moving cricket ball?

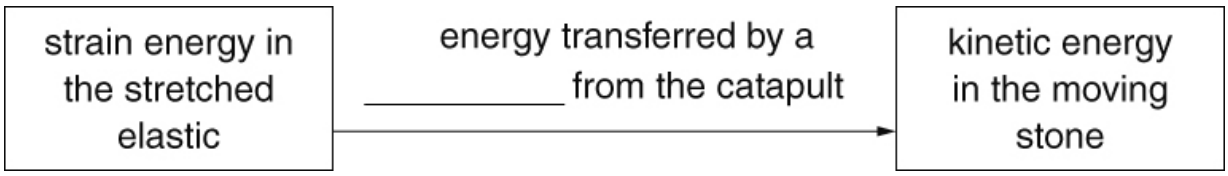
_____

Y7 Energy Homework 3

electricity	force	heating
light	sound	

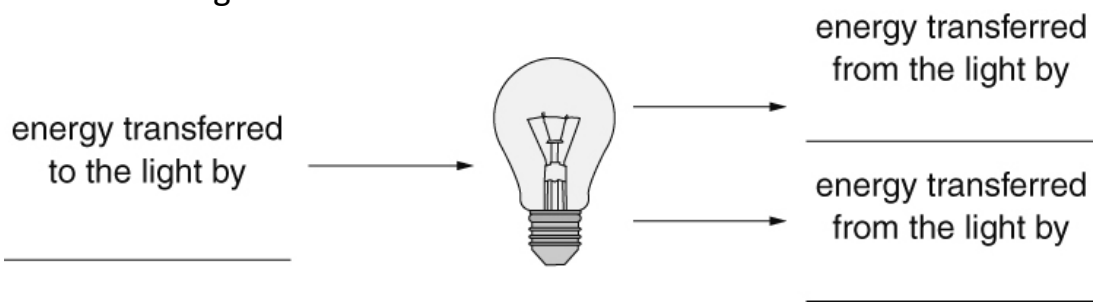
Fill in the gaps in the flow charts using words from the box. You can use some words once, more than once or not at all.

a You fire a stone from a catapult.



b You switch on the radio.

c You switch on a light.



Y7 Energy Homework 4

Learn the definition for energy dissipation, the equations for efficiency and percentage efficiency, and make sure you can perform calculations, including correct units with your answer.

Energy Conservation
Energy cannot be created or destroyed, just transferred from one store to another.

Energy Dissipation
Any energy that is not transferred to useful energy stores is said to be dissipated (or wasted) because it is lost to the surroundings.
Once dissipated, energy can no longer be stored usefully as the energy has spread out.
Energy is usually lost by heating up the surroundings.

Energy Efficiency
Devices are designed to waste as little energy as possible. This means that as much of the input energy as possible should be transferred into useful energy stores.
How good a device is at transferring energy input to useful energy output is called efficiency.
A very efficient device will waste very little of its input energy.
A very inefficient device will waste most of its input energy.

$$\textit{Efficiency} = \frac{useful\ output\ energy}{total\ input\ energy}$$

$$\textit{Percentage Efficiency} = \frac{useful\ output\ energy}{total\ input\ energy}\ x100\%$$

Energy changes are measured in joules (J) or kilojoules (kJ).
There are no units for efficiency.

Example: The energy supplied to a light bulb is 200J. A total of 40J of this is usefully transferred as light. How efficient is the light bulb?

$$\textit{Efficiency} = \frac{useful\ output\ energy}{total\ input\ energy} = \frac{40J}{200J} = 0.2$$

$$\textit{Percentage Efficiency} = \frac{useful\ output\ energy}{total\ input\ energy}\ x100 = \frac{40J}{200J}\ x100 = 0.2 \times 100 = 20\%$$

Complete the questions on efficiency

Q1.

The drawings below show what happens to the energy supplied to four appliances.

kettle

98% of the energy is used to heat the water

2% of the energy is wasted

light bulb

_____**%** of the energy is transferred as light

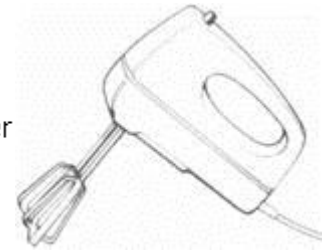
95% of the energy is wasted

radio

50% of the energy is transferred as sound

50% of the energy is wasted

mixer



40% of the energy is used to move the whisks

_____**%** of the energy is wasted

(a) (i) What percentage of energy of the light bulb is given out as light?
Write your answer on the line by the light bulb.

1 mark

(ii) What percentage of energy is wasted by the mixer?
Write your answer in the box by the mixer.

1 mark

(iii) Complete the sentence below.

Parts of the mixer become hot because some of the electrical energy is changed into ..... energy which is wasted.

1 mark

(b) Energy is wasted as sound in many appliances.
Which appliance in the drawings produces sound which is **not** wasted?

.....

1 mark

(c) In which of the appliances is the highest percentage of energy wasted?

.....

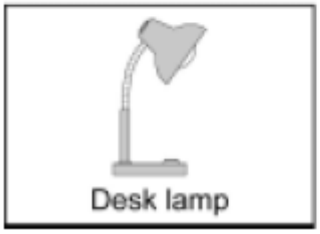
1 mark
Maximum 5 marks

Q2.

(a) The diagrams in **List A** show three electrical appliances. Each appliance is designed to transfer electrical energy.

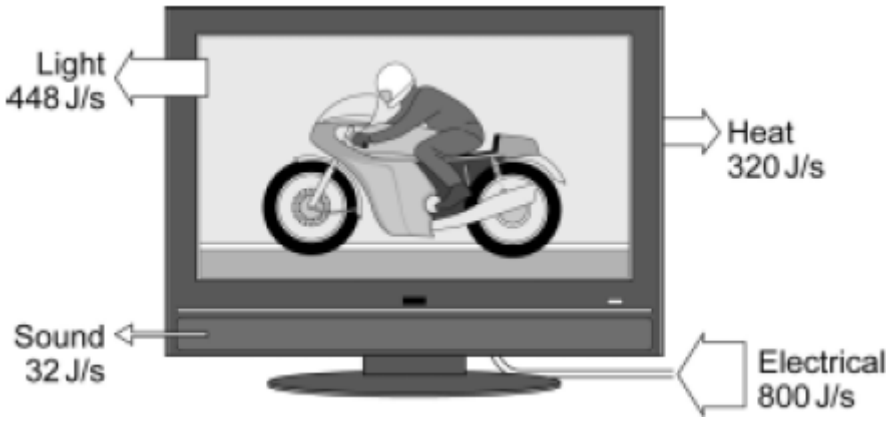
Draw **one** straight line from each appliance in **List A** to the useful output energy produced by that appliance in **List B**.

Draw only **three** lines.

List A **Appliance**	**List B** **Useful energy output**
	Light
	Sound
	Electrical
	Kinetic

(3)

(b) The diagram shows the energy transfers produced by a TV.



(i) Which are the useful energy outputs?

.....

.....

(1)

(ii) Use the information in the diagram to calculate the efficiency of the TV.

Write down the equation you use, and then show clearly how you work out your answer.

.....

.....

Efficiency = ...

(2)

(iii) What eventually happens to the useful energy transferred by the TV?

.....

.....

(1)

(Total 7 marks)