



Gleniffer High School



Physics Skills

Paper 1

National 4/5

1. The recommended daily allowances of fat, fibre and sugar for an adult are given in the following table.

<i>Substance</i>	<i>Recommended daily allowance</i> (g)
fat	25
fibre	30
sugar	5

A portion of yogurt contains 2.5g of fat.

Calculate the percentage of the recommended daily allowance of fat that is contained in a portion of yogurt.

2. Read the following passage.

Some famous **diamonds** have been found in different **countries**. Each diamond has a different **weight** measured in carats.

The Kohinoor diamond, from India, has a weight of 105.60 carats. The Millenium Star diamond has a weight of 203.04 carats and was found in Congo. The Centenary diamond weighs 273.85 carats and the Cullinan diamond, the largest ever found, weighs 530.20 carats. Both the Centenary and Cullinan diamonds were found in South Africa.



Present the information in the passage in a table with three suitable headings.

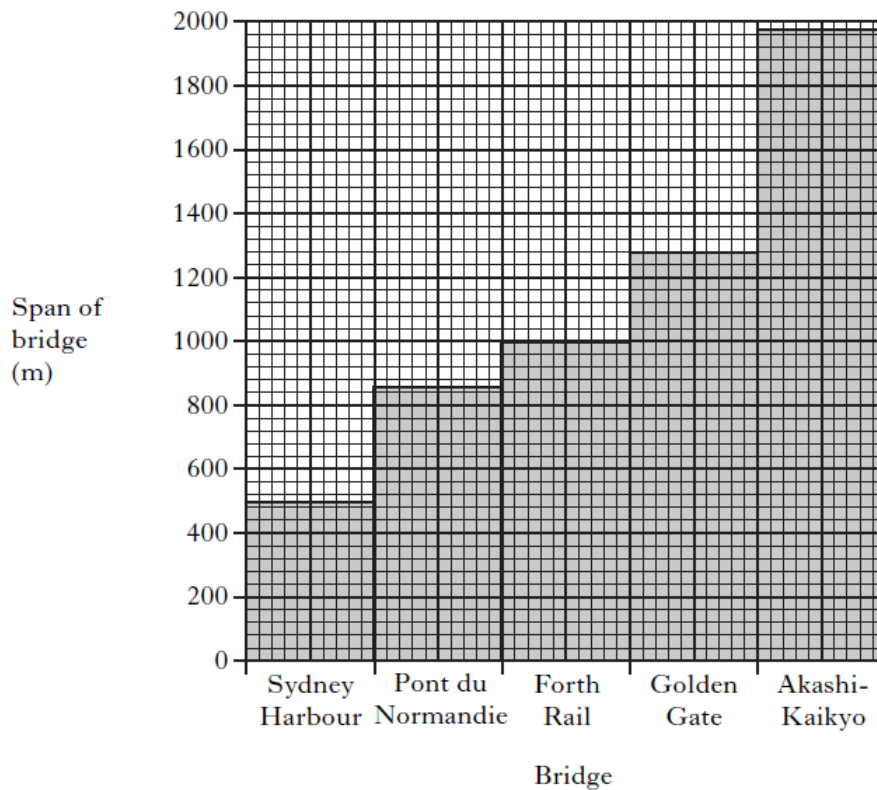
3. Mrs Shepherd is installing new lighting in her hall.
She buys two lights costing £45 each and three switches costing £14 each.
Calculate the **total** cost of installing the new lighting.

4. The table below shows information about some famous bridges.

<i>Bridge</i>	<i>Type</i>	<i>Country</i>	<i>Total length (m)</i>
Sydney Harbour	arch	Australia	1149
Pont du Normandie	cable-stayed	France	2143
Forth Rail	cantilever	Scotland	2529
Golden Gate	suspension	America	2737
Akashi-Kaikyo	suspension	Japan	3911

The span of a bridge is the distance between its support towers.

The following bar graph below shows the span of each bridge.



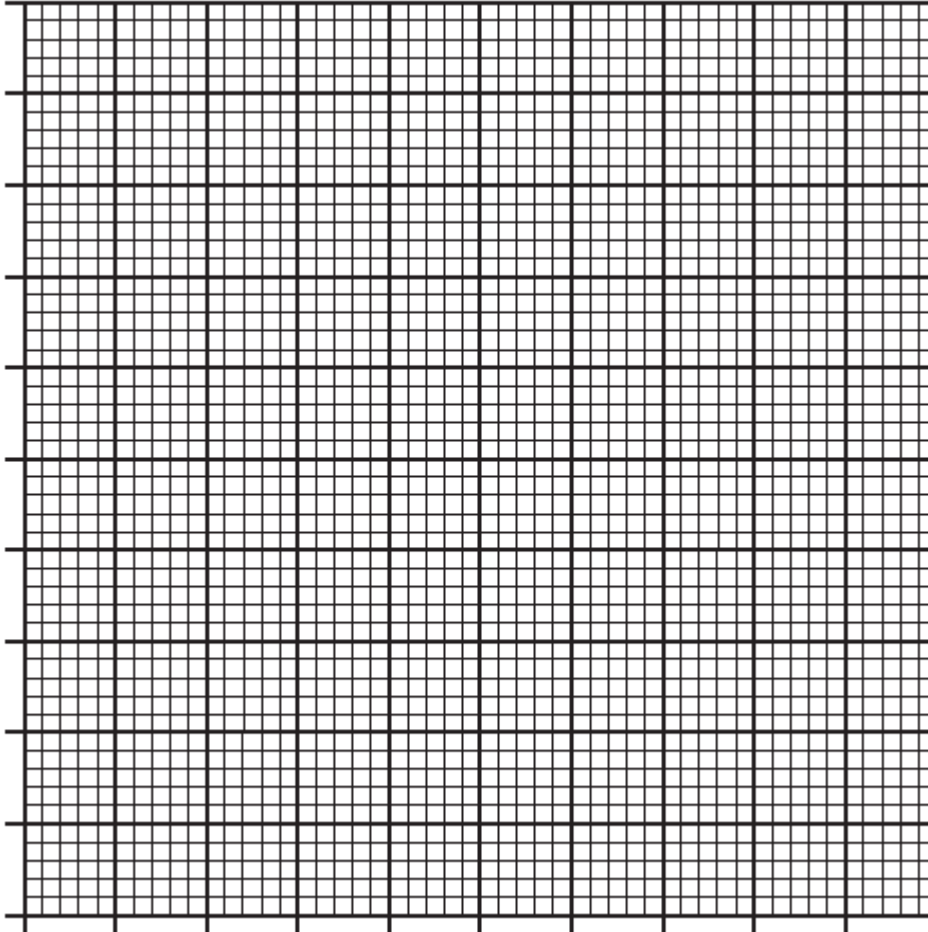
Use the table and the bar graph to answer the following questions.

- In which country is the longest bridge?
- What is the span of the cantilever bridge?
- What is the total length of the bridge with a span of 500m?
- What conclusion can be drawn about the total length and span of these bridges?

5. The table below shows the percentage of heat lost from different parts of a house.

<i>Part of house</i>	<i>Percentage of heat lost (%)</i>
Roof	25
Walls and Floor	45
Windows	20
Door	10

a) Present the information in the table as a bar graph.

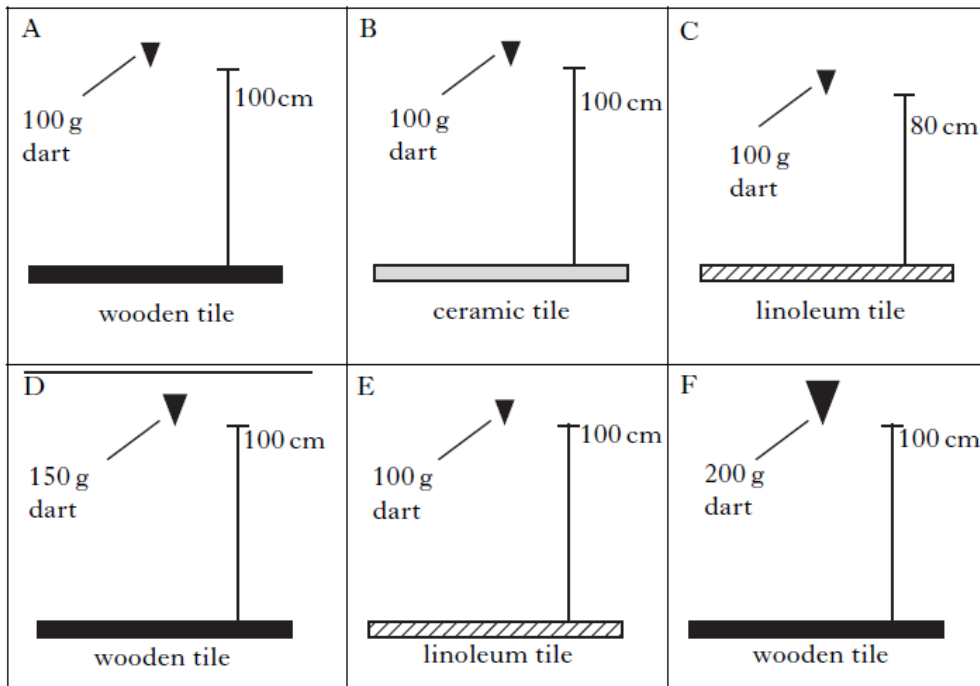


b) In one second, the heat lost from a house is 10,000J. Calculate how much of this heat is lost through the roof.

6. Jared was investigating the hardness of different floor tiles.

He set up the following experiments.

He dropped a steel dart from a certain height and measured the size of the mark which was made.



a) Which **two** experiments should Jared compare to find out if a wooden tile is harder than a linoleum tile?

b) Jared compared the results of experiments A, D and F. What was he trying to find out?

7. Dylan investigated how much energy was used to heat the water for his bath. His results are shown below.

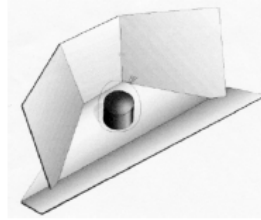
<i>Volume of water</i> (litres)	<i>Temperature of bath water</i> (°C)	<i>Energy used</i> (MJ)
100	35	14.6
100	40	16.7
100	45	18.8
200	35	29.2
200	40	33.4
200	45	37.6

a) Draw **two** conclusions from these results.

b) Predict the amount of energy used to heat 200 litres of water to a temperature of 43°C.

8. Use the information in the passage below to answer the following questions.

Half of the world's population uses wood fires to cook food. When natural disasters occur, large numbers of people are moved into temporary refugee camps. In order to protect the local environment, refugees are not allowed to collect firewood from outside the camp. They must rely on limited wood supplies being provided by aid workers.



In one aid project, refugees were provided with solar cookers instead of firewood. Solar cookers use heat from the sun as their source of energy. Constructed from shiny, foil-covered cardboard, the cookers fold flat and are easy to transport. They are reliable and simple to operate.

To use a solar cooker, a black pot containing the food is placed inside a large plastic bag. The bag is then placed in the centre of the solar cooker. The shiny surface of the cooker reflects the sun's rays onto the pot. The pot heats up and the plastic bag traps this heat, cooking the food. After ten days use, the bags must be replaced as they become too brittle. Rather than wasting the plastic, the refugees recycle the bags to make baskets, mats and rope.

The solar cooker can also be used to treat drinking water. When water reaches 100 °C, disease-causing parasites are killed. This makes the water safe to drink.

a) Why are refugees not allowed to collect firewood from outside the camp?

b) Solar cookers do not use firewood. State **two** advantages of refugees using solar cookers.

c) How does the plastic bag help to cook the food?

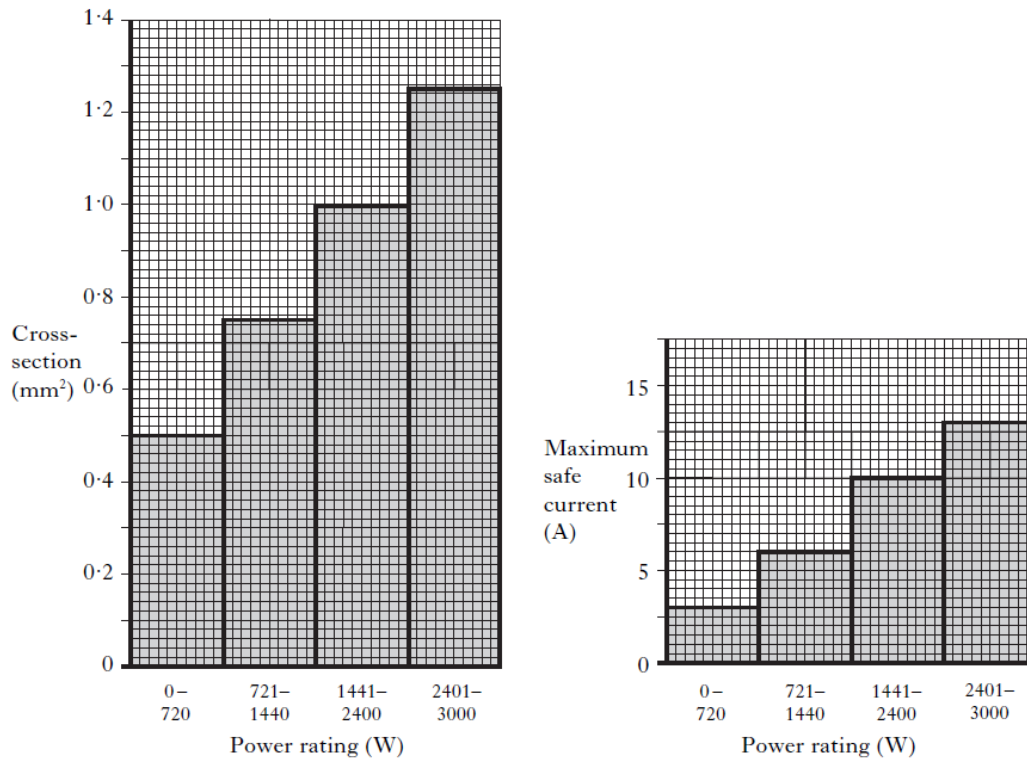
d) Why does heating water to 100°C make it safe to drink?

9. An investigation was carried out to find out if blood pressure changes with age. Each measurement of blood pressure has an upper and lower value. Three men, aged 24, 26 and 28, each had their blood pressure measured.

<i>Age</i> (years)	<i>Blood pressure</i> (mm Hg)	
	upper value	lower value
24	120	80
26	115	85
28	116	82

The investigation was fair but could be improved to make the results more reliable. Suggest **two** improvements that could be made to the investigation.

10. Different electrical appliances need different types of cable. Cables have different cross-sections and can carry different maximum safe currents. The graphs below show the cross-section and maximum safe current for cables with different power ratings.



The table below shows the power rating of some appliances.

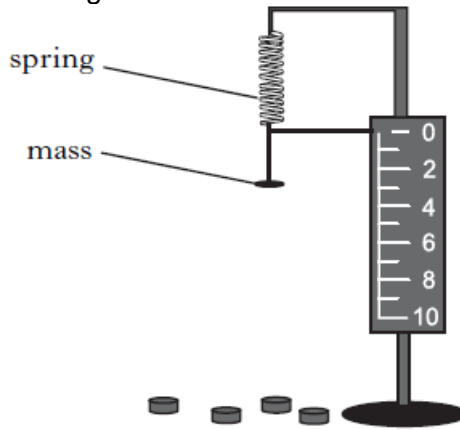
<i>Appliance</i>	<i>Power rating (W)</i>
Food mixer	600
Hairdryer	1000
Kettle	2000
Heater	2500

- a) Draw **two** conclusions from the graphs.

Use the graphs and table to answer the following questions.

- b) What is the cross-section for the cable of a heater?
- c) What is the maximum safe current for the cable of a hairdryer?
- d) Would a 3A or a 13A fuse be used in the food mixer? Explain your answer.

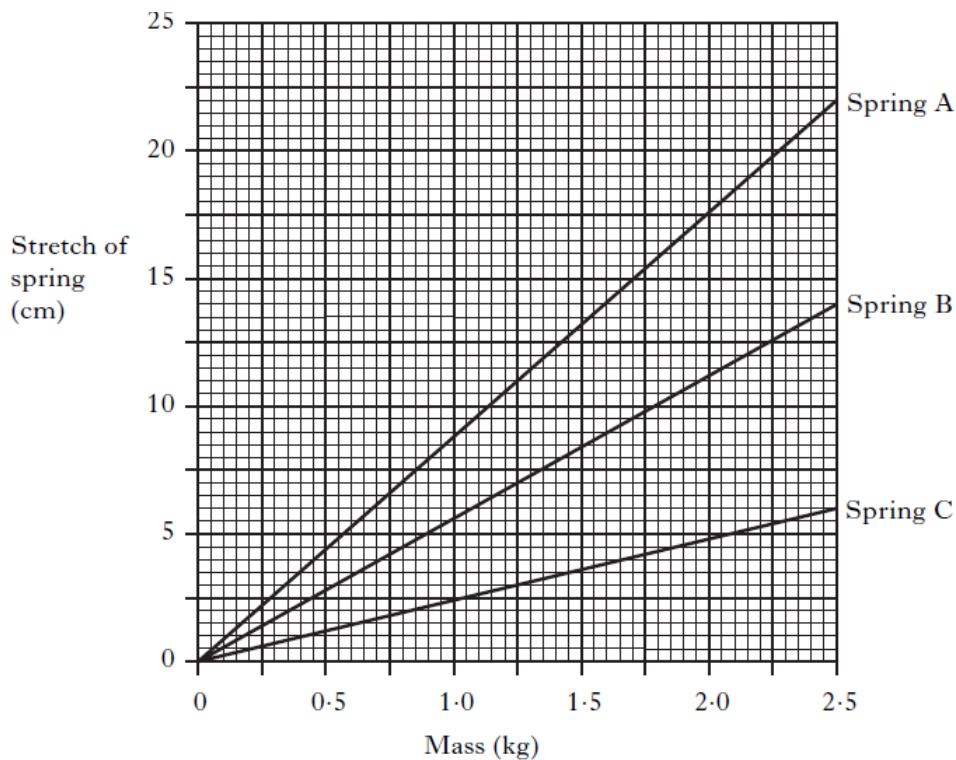
11. A spring stretches when a mass is hung on it. The stretch of three springs was tested using the apparatus shown in the diagram.



The width of each spring is shown in the table.

<i>Spring</i>	<i>Width (cm)</i>
A	0.5
B	1.5
C	2.5

The results are shown in the graph below.



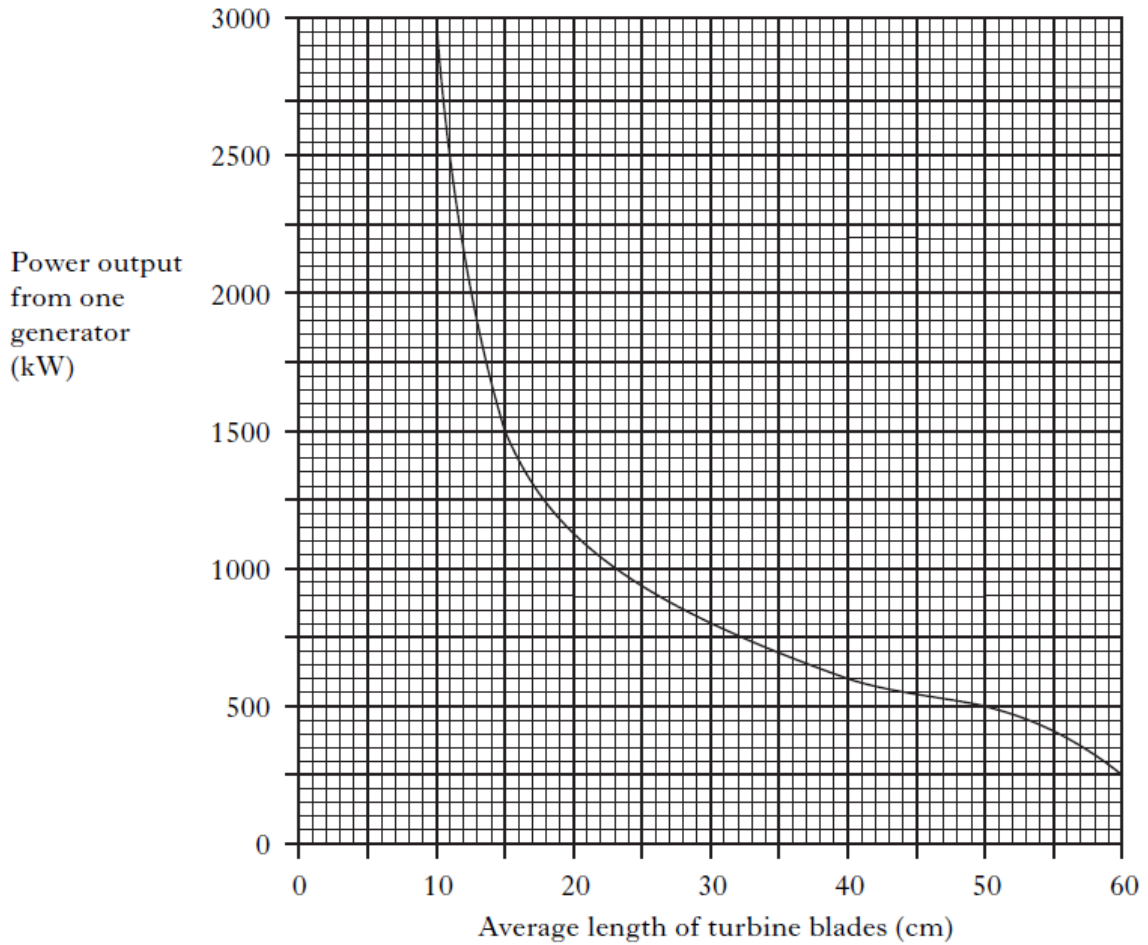
Use the graph and the table to answer the questions below.

- a) Draw **two** conclusions from the information.

- b) What mass must be hung from a spring with a width of 0.5cm to make it stretch by 15cm?

- c) Another spring has a width of 2.0cm. Predict the stretch of this spring when a 1.0kg mass is hung on it.

12. In a power station, turbines turn a generator. The graph shows how the power output from the generator varies with the average length of the turbine blades.



- a) If the turbine blades have an average length of 50cm, how many generators are needed to produce a power of 20 000kW?

- b) Calculate the percentage **decrease** in power output from a generator if the average length of the turbine blades is increased from 15cm to 40cm?