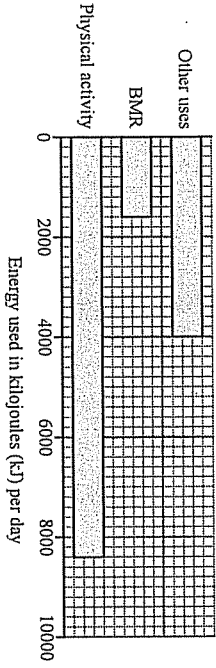


Diet and exercise

1. This question is about food and energy.
(a) Which person is likely to need the least amount of food?

Person	Amount of exercise	Temperature of country where person lives
1	high	warm
2	high	cold
3	low	warm
4	low	cold

The bar chart shows the amount of energy used by a teenager. BMR is the amount of energy needed to keep the teenager alive.



- (b) What is the total amount of energy used by the teenager in one day?
- 1600 kJ
 - 4000 kJ
 - 8400 kJ
 - 14 000 kJ
- (c) What is likely to happen if the same teenager takes in 17 000 kJ each day?
- The teenager would . . .
- gain mass.
 - gain height.
 - become fitter.
 - be hungry all the time.

2. In each part choose only one answer.

The table is from the label on a loaf of sliced bread.

Nutrition information	Guideline-daily amounts				
	Per 100 g	Per slice	Women	Men	Children (5–10 years)
energy (kJ)	2144	658	8500	10 500	7500
protein (g)	4.0	1.2	75	95	65
carbohydrate (g)	55.1	16.9	230	300	220
fat (g)	22.6	7.0	70	70	50
salt (g)	0.9	0.3	5	6	4

Other information
Keep an eye on your salt intake
Generally a low fat diet is good for you
If possible take 30 minutes of brisk exercise each day

- A For which food type is the guideline daily amount the same for men and women?
- carbohydrate
 - fat
 - protein
 - salt
- B A woman ate two slices of bread for breakfast.
What proportion of the daily guideline amount of fat did she eat?
- $\frac{1}{14}$
 - $\frac{1}{10}$
 - $\frac{1}{7}$
 - $\frac{1}{5}$

C Table 1 shows the amount of energy used for different levels of exercise.

Table 1

Level of exercise	Energy used in kilojoules per hour
light exercise	620
moderate exercise	1200
vigorous exercise	2760

Table 2 shows a person's weekly exercise routine.

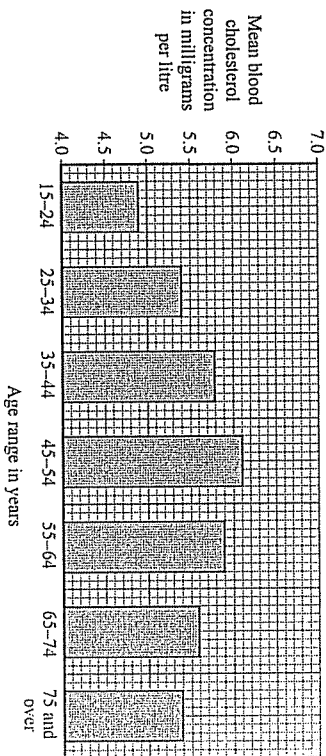
Table 2

Day of week	Type of exercise in minutes		
	Light	Moderate	Vigorous
Monday	20	20	20
Tuesday	30	30	20
Wednesday	30	30	20
Thursday	30	30	20
Friday	30	30	20
Saturday	30	30	20
Sunday	30	20	20

What is the total amount of energy used by this person on Tuesday and Wednesday together?

- 1 3460 kilojoules
 - 2 3660 kilojoules
 - 3 3760 kilojoules
 - 4 4580 kilojoules
- D The link between exercise and nutrients in food is . . .
- 1 the less exercise you take, the less energy you need.
 - 2 the less exercise you take, the more carbohydrate you need.
 - 3 the less exercise you take, the more protein you need.
 - 4 the more exercise you take, the less salt you need.

3. In each part choose only one answer.
A survey was carried out to measure the blood cholesterol concentrations in the blood of women of different ages. The women had been instructed not to eat for 12 hours before having their blood sample taken. The results are shown in the bar chart.

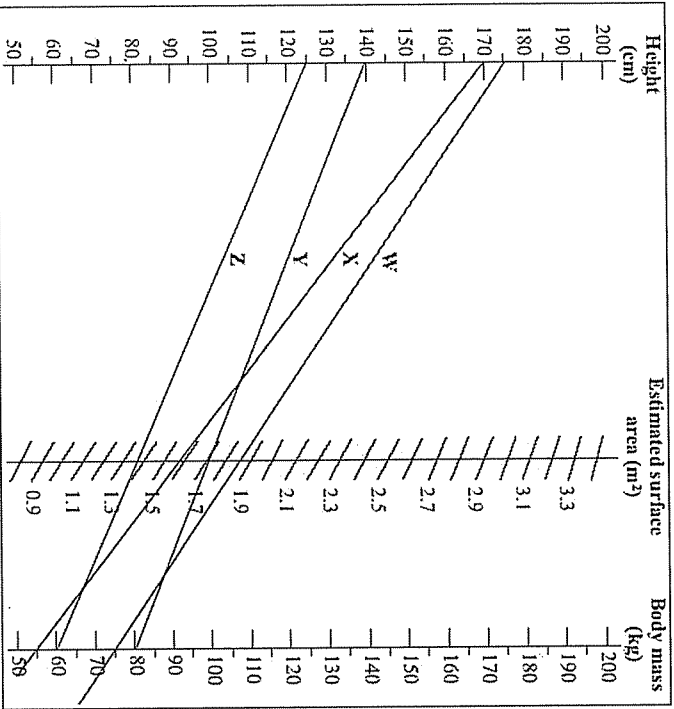


- A The concentration of cholesterol in the blood is . . .
- 1 a categorical variable.
 - 2 a continuous variable.
 - 3 a discrete variable.
 - 4 an ordered variable.
- B What is the difference in the mean concentration of cholesterol in the blood between a woman in the age range 25-34 and a woman in the age range 55-64?
- 1 0.4 milligrams per litre
 - 2 0.5 milligrams per litre
 - 3 0.6 milligrams per litre
 - 4 5.0 milligrams per litre
- C The women were instructed not to eat for 12 hours before the blood sample was taken. What is the reason for this?
- 1 It is risky taking blood samples when blood cholesterol concentrations are high.
 - 2 Blood samples can only be taken when all the cholesterol in food has been absorbed into the blood.
 - 3 All the cholesterol in the body will be excreted.
 - 4 To reduce any effects on the blood samples of food eaten recently.
- D Which one of the following would have been the best way to choose the women taking part in the trial?
- 1 ask randomly selected women whether they would like to take part in the trial
 - 2 record the data collected when women ask to have their cholesterol concentration measured
 - 3 send a questionnaire to every woman in a certain postal district
 - 4 secretly collect data from blood samples taken for other reasons

4. The surface area of an adult male can be estimated by using this nomogram.

A straight line is drawn from the man's height to his body mass. His surface area is then read off where the line crosses the surface area scale.

Data for four men, W, X, Y and Z, is plotted on the nomogram.



(a) The man with an estimated surface area of 1.71 m^2 is ...

- 1 W.
- 2 X.
- 3 Y.
- 4 Z.

(b) Why would this nomogram not give accurate results for a woman?

- 1 Women are generally shorter than men.
- 2 Women generally weigh less than men.
- 3 Women exercise more than men.
- 4 Women are generally a different shape from men.

(c) The actual surface area of a man depends mainly on ...

- 1 his body mass.
- 2 his height.
- 3 his body mass and his height.
- 4 factors other than his body mass and height.

(d) Man Z goes on a slimming programme.

Which of the following is likely to be affected by the programme?

- 1 his mass only
- 2 his height and his mass
- 3 his mass and his surface area
- 4 his height and his surface area

How our bodies defend themselves against infectious diseases

1. Our bodies defend themselves naturally against infections. We also use other methods to protect ourselves against infections and to relieve the symptoms of disease.

Match words, A, B, C and D, with the numbers 1 – 4 in the table.

- A antibiotics
- B painkillers
- C antibodies
- D vaccines

1	given to people to provide immunity
2	medicines that kill bacteria
3	produced by white blood cells
4	relieve symptoms of disease

2. Avian influenza (bird flu) is caused by a virus which was first identified in 1900. Recently there have been concerns that new strains of the virus may be able to infect humans.

Match words, A, B, C and D, with the numbers 1– 4 in the sentences.

- A antibiotics
- B natural selection
- C pandemic
- D resistance

Avian influenza cannot be treated with ... 1....

The influenza virus may develop ... 2... to the drugs used as a result of ... 3....

This may cause a ... 4... of the disease.

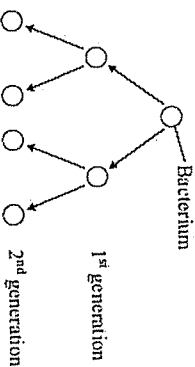
3. Some infections are caused by bacteria.

(a) Bacteria can change into strains that are resistant to a particular antibiotic.

What causes this change in a bacterium?

- 1 immunity
- 2 mutation
- 3 natural selection
- 4 reproduction

(b) The diagram shows how the number of bacteria in the body changes after infection.



In ideal conditions, the population of bacteria doubles every 20 minutes.

In ideal conditions, how many bacteria will there be in the body 2 hours after infection with a single bacterium?

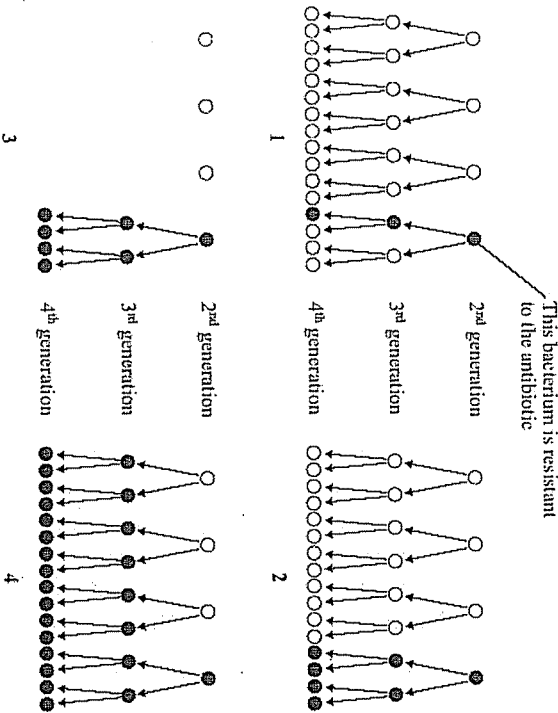
- 1 4
- 2 8
- 3 64
- 4 128

Progress check

Unit B1, B1.1.2

(c) One of the second generation of bacteria changes so that it is resistant to an antibiotic.

Which diagram shows the way in which the population of bacteria changes when this generation is treated with the antibiotic?



(d) The change in the proportions of non-resistant and resistant bacteria by the fourth generation is due to ...

- 1 genetic engineering.
- 2 mutation.
- 3 natural selection.
- 4 reproduction.

Progress check

Unit B1, B1.1.2

4. Vaccination helps to protect us from disease.

Vaccination may cause a reaction, such as a rash, in the person who is vaccinated.

The table shows the reported number of reactions to vaccination in the UK in one year.

Vaccine	Type of vaccination	Total number of reactions reported	Number of severe reactions
Measles	Single	414	61
Mumps	Single	54	19
Rubella	Single	685	100
MMR	Triple	20974	2586

(a) Which vaccine caused the highest proportion of severe reactions, when compared with the number of reactions reported?

- 1 measles
- 2 mumps
- 3 rubella
- 4 MMR

(b) To calculate the percentage of people who had reactions to the vaccines, you would also need to know ...

- 1 the number of vaccinations of each type given.
- 2 the age of each person vaccinated.
- 3 whether those people given one of the single vaccinations had previously been given one of the other single vaccinations.
- 4 the total population of the UK.

The table shows the percentage of children vaccinated against some diseases in the UK.

Year	Percentage of children vaccinated			
	Polio	Whooping cough	Flu	Measles, mumps, rubella (MMR)
1996 – 1997	96	94	95	92
1997 – 1998	96	94	95	91
1998 – 1999	95	94	95	88
1999 – 2000	95	94	94	88
2000 – 2001	94	94	94	87
2001 – 2002	94	93	93	84
2002 – 2003	93	93	93	82
2003 – 2004	94	93	93	80
2004 – 2005	93	93	93	81
2005 – 2006	94	94	94	84

- (c) For which disease was the percentage of children vaccinated most stable between 1996 and 2006?
- 1 polio
 - 2 whooping cough
 - 3 flu
 - 4 measles, mumps and rubella
- (d) It is important that the percentage of people in the population who have been vaccinated is high.
- This is because . . .
- 1 it reduces the chance of epidemics.
 - 2 fewer people may suffer side effects from the vaccine.
 - 3 there is less chance that resistant strains of pathogen will develop.
 - 4 antibodies will be produced quickly if the live pathogen is caught.

5. In 1970, Linus Pauling, a famous prize-winning scientist, said that high doses of vitamin C had stopped him from getting common colds. As a result, many people believed that taking vitamin C tablets could prevent them catching a cold. A research group looked at over 1000 people who took vitamin C tablets. It concluded that for the average person there was no advantage in taking extra vitamin C.

- (a) From the information given, it seems that many people believed that vitamin C could prevent a cold because of . . .
- 1 a proven causal link.
 - 2 scientific evidence.
 - 3 the status of the scientist.
 - 4 valid and reliable evidence.
- (b) Why did the research group want to include as many people as possible in the research?
- 1 to increase the chances of the conclusion being valid
 - 2 to increase the chances of the hypothesis being correct
 - 3 to reduce the number of anomalous results
 - 4 to reduce the need for placebos
- (c) Which of the following methods should be used by the research group to identify if a person has a cold?
- 1 ask people to report when they have sneezed five times in a day
 - 2 ask people to say when they have a cold
 - 3 have them examined by a doctor
 - 4 measure how deeply they can breathe
- (d) In a further study, 300 people were given vitamin C to find out if taking vitamin C stops you from getting a cold.
- People in group A were given regular small doses of vitamin C for five years.
 - People in group B were given one large dose of vitamin C each year for five years.
- People in group B were found to have a 66% lower chance of catching colds in the five year period than people in group A.
- The investigation could be criticised because . . .
- 1 a placebo was not included.
 - 2 it is not ethical to give people different doses of vitamin C.
 - 3 five years is too long to wait for results.
 - 4 a 66% lower chance is not significant.