



KS3 Science

Microorganisms

Mark Scheme

Time available: 43 minutes

Marks available: 62 marks

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Mark schemes

1.

- (a) (i) • fewer bacteria
accept 'bacteria have nowhere to breed'
or *'there are no bacteria'*
or *'bacteria cannot live'*
answers that just repeat
or restate the leaflet are insufficient
- less acid (is produced)
accept 'there is no acid' or 'no acid is produced'
accept, for two marks, 'there are less bacteria producing acid'

2 (L6)

(ii) any **one** from

- it neutralises acid
accept 'to make the acid neutral'
'the alkali cancels out the acid' is insufficient
- it raises the pH of the mouth
accept 'it makes the mouth less acid'
'it reacts with the acid' is insufficient
*do **not** accept 'alkali gets rid of plaque or kills bacteria'*
references to brushing are insufficient

1 (L6)

(b) any **one** from

- it would show how effective brushing is in removing plaque
accept 'to see the effect'
'how clean their teeth have become' is insufficient
- to compare the amount of plaque before and after
accept 'to compare teeth before and after'
'to show how much plaque there is on the teeth' is insufficient
- to see how much plaque is removed
accept 'to see if there was a change in the amount of plaque or red'
'so they can see when the plaque is gone or removed' is insufficient
*do **not** accept 'to see how much decay is removed'*

1 (L6)

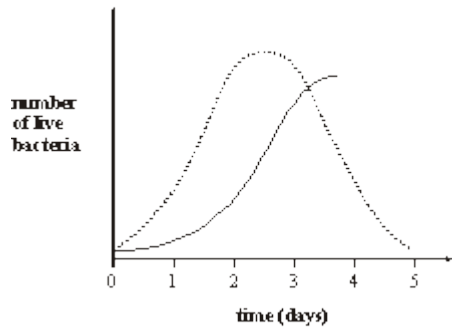
- (c) (i) any **one** from
- it is more precise
'more reliable' is insufficient
 - it is a better estimate
accept 'more accurate'
'accurate or precise' is insufficient
 - to see exactly how much
*accept 'there are more squares fully shaded
so you do not have to count as many fractions'*
'to see more clearly or more easily' is insufficient
'it is more detailed' is insufficient
- 1 (L6)
- (ii) • a number from 13 to 17 inclusive
- 1 (L6)

[6]

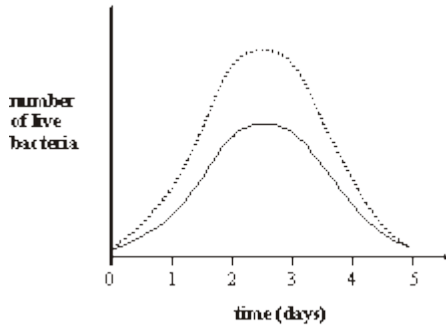
2.

- (a) (i) any **one** from
- the pH is too low
'the milk goes off' is insufficient
 - it is too acidic
accept 'acid is killing the bacteria'
'the bacteria were dying' is insufficient
accept 'the bacteria could be poisoned'
accept 'not enough nutrients or sugar'
'there is no sugar left' is insufficient
- 1 (L7)
- (ii) the pH was still decreasing on day 5
accept 'it was going down'
*do **not** accept 'it has not reached 0'*
accept 'the acidity was increasing'
'it has not reached the bottom of the graph' is insufficient
'the line continues' is insufficient
- 1 (L7)
- (b) (i) • a line that starts at pH 6.5 and then falls
- 1 (L6)
- a response that decreases less than 3.5 over 5 days
- 1 (L6)

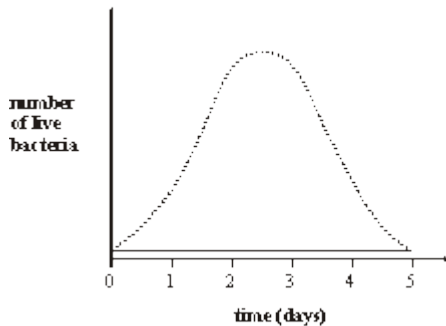
- (ii) a graph that indicates that the number of bacteria increases more slowly, starting at same point



accept a lower graph over the same line



*the line must be below the dotted line for the first 2.5 days
do **not** accept a horizontal line above the x axis as shown below*



1 (L7)

[5]

3.

- (a) any **one** from

- the effect of temperature on the amount dough expanded
*accept 'the best temperature for dough to rise'
do **not** accept 'the effect of temperature on how quickly dough rises'
accept 'the best temperature at which the **yeast** works'*
- the effect of temperature on volume
'does heat affect the volume of the dough' is insufficient

1 (L6)

- (b) (i) any **one** from
- left it for 30 minutes
accept 'length of time'
 - used the same starting volume **or** mass of dough
accept 'used same amount of dough'
'same mixture' is insufficient
 - used the same amount of water (in the water bath)
accept 'she did it at the same time'
accept 'use the same size or type of measuring cylinder'
'use the same measuring cylinder' is insufficient
- 1 (L5)
- (ii) the dough could contain a different amount of yeast **or** sugar **or** flour **or** water **or** ingredients
accept 'different doughs might rise differently'
'it might have different ingredients' is insufficient
accept 'different doughs have different properties'
- 1 (L5)
- (c) • as the temperature increased, the volume of dough increased to 60°C
accept 'it increased up to a volume of 77 cm³'
'it increased' is insufficient
the unit of measurement is required for the mark
- 1 (L6)
- it does not rise as much (at temperatures higher than 60°C)
accept 'it decreases (after 60°C)'
accept, for two marks, 'it has a maximum volume at 60°C'
accept, for two marks, 'it increased to 60°C, then decreased'
accept, for one mark, 'it increased then decreased'
- 1 (L6)
- (d) any **one** from
- repeat the experiment without yeast in the mixture
accept 'do it without yeast'
*do **not** accept 'use just yeast'*
 - change the amount of yeast
accept 'increase the amount of yeast'
- 1 (L6)

[6]

4.

- (a) • genetic material **or** genes **or** DNA

accept 'nucleus'

accept 'chromosomes'

1 (L7)

each method of prevention must be related to the method of spread for a mark

the method of spread **and** prevention are required for each mark

the same prevention method cannot be used for both methods of spread

- (b) **method**

- touch **or** contact

prevention

any **one** from

- wash hands before **or** after touching a patient
or before **or** after touching surfaces **or** articles

accept 'quarantine patients suspected of carrying disease'

- use alcohol rub when entering **or** leaving ward
or room **or** hospital

accept 'change gloves between patients'

*accept 'stop contact with others' **or** 'limit visitors'*

*'cleaning' **or** 'washing hands' are insufficient*

'wearing gloves' is insufficient

1 (L7)

method

- coughing **or** sneezing

*accept 'through the air' **or** 'breathing on someone'*

prevention

- cover mouth **or** nose **or** use a handkerchief **or**
wear a mask disease'

accept 'quarantine patients suspected of carrying

*accept 'stop contact with others' **or** 'limit visitors'*

1 (L7)

(c) any **three** from

- vaccine contains a dead **or** weakened form of the bacterium **or** virus
*accept 'inject with protein from the bacterium **or** virus'
'it contains a small amount of bacteria **or** virus' is insufficient*
- antibodies **or** antitoxins (are produced)
- (made by) white blood cells
accept 'white cells'
- further infections are prevented **or** bacteria **or** viruses **or** toxins are destroyed
*accept 'kills the bacteria **or** viruses'
'stop you getting it again' is insufficient
'fights bacteria' is insufficient
'you become immune to the disease' is insufficient
as it is given in the question*

3 (L7)

[6]

5.

(a) (i) 35

1 (L3)

(ii) 37°C ✓

1 (L4)

(iii) any **one** from

- less chance of micro-organisms being passed on **or** spread
- glass could break
*accept 'less chance of germs being passed on'
accept 'might pass on disease'
accept 'a child might bite **or** swallow the thermometer'
if more than one box is ticked, award no mark*
- mercury **or** alcohol **or** liquid could spill
(if the glass thermometer broke)
- mercury is poisonous
- you could choke

1 (L3)

(b) any **one** from

- bacteria
- fungi
- protozoa

accept a named non-viral pathogenic micro-organism such as 'salmonella'

*do **not** accept names of diseases*

*do **not** accept 'germs'*

1 (L4)

(c) (i) any **one** from

- so that alcohol can be seen

accept 'so you can see it'

- alcohol is difficult to see

- you cannot easily see a colourless liquid

accept 'you cannot see a colourless liquid'

- to make it easier to read the thermometer

accept 'so you can read it'

1 (L4)

(ii) • gas

1 (L3)

- liquid

1 (L4)

answers must be in the correct order

[7]

6.

(a) any **one** from

- for transport **or** for blood **or** plasma
accept 'it stops cells becoming dehydrated'
'it stops the body becoming dehydrated'
or 'it keeps us hydrated' are insufficient
- it is needed for sweat **or** for cooling
- for tears
- it is a solvent
- for getting rid of waste
- it is needed for gas exchange
- it is a lubricant
- it is part of the cytoplasm
accept 'allows chemical reactions to take place'
accept 'for digestion'

1 (L7)

(b) any **two** from

- white blood cells
- (produce) antibodies **or** antitoxins
- prevent further infections **or** destroy the toxin **or** poison
*accept 'destroy **or** kill the bacteria'*

2 (L7)

(c) (i) any **one** from

- so that the patient does not get cholera
accept 'the person might die'
- so the poison does not prevent the large intestine from absorbing water
accept 'intestine' for large intestine
*do **not** accept 'small intestine'*

1 (L7)

- (ii) any **one** from
- no need for injections
 - some people are afraid of needles
accept 'it does not hurt'
 - less **or** no risk of infection
*do **not** accept 'so they can be vaccinated against several diseases'*
- 1 (L7)

[5]

7.

(a) 16 1

- (b) (i) any **one** from
- anaerobic respiration
*do **not** accept 'respiration'*
 - fermentation
- 1

(ii) glucose → ethanol + carbon dioxide
accept 'alcohol' for ethanol
accept ' $C_6H_{12}O_6 \rightarrow 2C_2H_5OH + 2CO_2$ '

1

(c) enzymes were denatured **or** destroyed
*do **not** accept 'the yeast was denatured **or** destroyed'*
***or** 'the enzyme was killed'*

1

[4]

8.

(a) (i) any **one** from

- resistant to disease
accept 'having antibodies against the disease'
- will not catch the disease
*do **not** accept 'able to fight the disease'*

1 (L7)

(ii) antibodies
accept 'antitoxins'

1 (L7)

- (iii) any **one** from
- dead bacteria **or** virus **or** micro-organism
 - weakened bacteria **or** virus **or** micro-organism
 - non-virulent strain of bacteria
 - mild strain of virus
 - antigens
- 1 (L7)

- (b) any **one** from
- antibodies pass to baby via placenta
 - antibodies pass to baby via breast milk
accept 'through the placenta'
accept 'through mother's milk'
*do **not** accept 'antibodies passed to baby through milk'*
- 1 (L7)

- (c) any **one** from
- it goes down and stays down
accept 'it goes down'
 - continues downwards
 - fewer people got measles after 1967
- 1 (L6)

- (d) it will increase **or** return to the pre-1967 levels
- 1 (L6)

[6]

9.

- (a) any **one** from
- bacteria
*do **not** accept 'germs' **or** 'microbes'*
 - viruses
 - fungi
- 1 (L4)

- (b) (i) to stop micro-organisms passing from Michael to the first-aider
*accept 'bacteria' **or** 'viruses' **or** 'fungi'*
***or** 'microbes' **or** 'germs' for micro-organisms*
accept 'to stop blood getting on the first-aider'
- 1 (L3)

- (ii) to stop micro-organisms passing from the first-aider's hands to the cut **or** to Michael

accept 'bacteria' or 'viruses' or 'fungi' or 'microbes' or 'germs' for micro-organisms accept 'rubber gloves are sterile or cleaner than hands'

accept 'to prevent the spread of infection or HIV or AIDS' as an alternative to one of the answers only

1 (L3)

[3]

10.

- (a) any **two** from

- they contain weakened viruses
- the body makes antibodies

accept 'the body makes antitoxins'

- antibodies kill **or** destroy healthy viruses

accept 'antibodies destroy new infections'

2

- (b) any **one** from

- it does not produce the right antibodies

accept 'it makes the wrong antibodies'

- antibodies only kill one type of virus

- antibodies only work on the right proteins

accept 'the old antibodies do not recognise the new viruses'

do not accept 'vaccines only work on one type of virus'

1

[3]

11.

- (a) 37°C

if more than one box is ticked, award no mark

1 (L5)

- (b) the lotion killed the bacteria

accept 'they died' or 'they were killed or destroyed'

1 (L5)

- (c) the paper disc soaked in water

accept 'the other disc'

1 (L5)

- (d) any **two** from
- keep the lid on the dish
 - seal **or** secure the dish
 - wear gloves
 - wear a mask **or** goggles
 - use tweezers to add the paper disc
*do **not** accept 'do the experiment in a fume cupboard'*

2 (L5)

[5]

12.

- (a) any **one** from
- there were not enough bacteria in the food **or** body
accept 'the bacteria had to grow first'
 - the bacteria multiplied by the next day
- (b) the antibiotic **or** medicine killed all the bacteria
*accept 'the antibiotics got rid of all the bacteria'
or 'there were no bacteria left'*

1 (L6)

1 (L5)

- (c) any **one** from
- antibiotic **or** medicine had not killed all the bacteria
accept 'not all the bacteria had gone'
 - there were still bacteria left alive
 - the bacteria multiplied
*accept 'the population rose again'
accept 'they could grow again'
accept 'they reproduced again'*

1 (L6)

1 (L6)

(d) any **one** from

- it slows down reproduction
accept 'it stops them reproducing'
or *'it stops them breeding'* **or** *'it stops them multiplying'*
- it is too cold for the bacteria to divide **or** reproduce
accept 'it stops them growing'
accept 'slows down growth'
*do **not** accept 'they are dormant'*
*do **not** accept 'it freezes them'*

1 (L6)

[5]