AQA GCSE Biology | 8461

SPECIFICATION POINT 4.3.1.2

# Viral diseases

## Mark schemes and examiner comments

| | |
|---|---|
| Tier | **Foundation** |
| Question groups | **15** |
| Available paper years | **2007–2025** |

## Using this booklet

1. Booklet answer numbers match the question booklet.
2. Use the original question number within marking tables.
3. Examiner comments are included where available.

**Name:** _____ **Date:** _____

Where a precise marking extract is unavailable, the full source document is included in an appendix. Any missing mark scheme is explicitly identified.

### 4.3.1.2 Viral diseases

**Answer 01 · Mark scheme**

March 2007 | BLY1A | Original Q6 | Legacy

| | | | |
|---|---|---|---|
| Six | **A** | antibiotics | **1** |
| | **B** | natural selection | **3** |
| | **C** | pandemic | **4** |
| | **D** | resistance | **2** |

| | | | | |
|---|---|---|---|---|
| | **A** | **B** | **C** | **D** |

**Answer 02 · Mark scheme**

June 2007 | BLY1A | Original Q5 | Legacy

| | | | |
|---|---|---|---|
| Five | **A** | hepatitis type b | **4** |
| | **B** | MMR | **1** |
| | **C** | pneumococcal infection | **3** |
| | **D** | tetanus | **2** |

### 4.3.1.2 Viral diseases

**Answer 03 · Mark scheme**

January 2009 | BLY1F | Original Q7 | Legacy

| question | answers | extra information | mark |
|---|---|---|---|
| **7**(a) | antibodies | allow antitoxins / memory cells<br>do **not** allow antigens | 1 |
| | immune | ignore protection<br>allow resistant | 1 |
| **7**(b)(i) | fell | | 1 |
| | numerical qualification to zero / nothing / by 100% | allow stopped in 1995 | 1 |
| **7**(b)(ii) | (no)<br>% vaccination fell **or** when no vaccination | ignore circle | 1 |
| | but autism numbers did not fall / stayed high / increased<br>**or**<br>'(yes) might support it if time lag between vaccination and autism symptoms' / 'time lag for diagnosis' (1)<br>6 year time lag quantified (1) | | 1 |
| **Total** | | | **6** |

### 4.3.1.2 Viral diseases

**Answer 03 · Mark scheme** January 2009 | BLY1F | Original Q7 | Legacy

Biology BLY1F - AQA GCSE Mark Scheme 2009 January Series

**COMPONENT NUMBER: BLY1F**

**COMPONENT NAME: Science B / Biology**

**STATUS: Final**

**DATE: January 2009**

**Answer 04 · Mark scheme** March 2009 | BLY1AP | Original Q7 | Legacy

| | | | | |
|---|---|---|---|---|
| Seven | **1** | **1** | **3** | **3** |

**Answer 05 · Mark scheme** June 2009 | BLY1AP | Original Q9 | Legacy

| | | | | |
|---|---|---|---|---|
| Nine | **2** | **1** | **2** | **1** |

**Answer 06 · Mark scheme** March 2010 | BLY1AP | Original Q8 | Legacy

| | | | | |
|---|---|---|---|---|
| Eight | **3** | **4** | **4** | **1** |

4.3.1.2 Viral diseases

Answer 07 · Mark scheme

June 2010 | BLY1F | Original Q9 | Legacy

## Question 9

| question | answers | extra information | mark |
|---|---|---|---|
| **9**(a) | worldwide **or** several countries (outbreak) | ignore affects large numbers of people | 1 |
| **9**(b) | any **three** from<br>• new strain of flu / virus changes / virus different<br>• vaccination not effective **or** new vaccine not yet developed<br>• antiviral drugs not effective / not yet developed<br>• *people* not immune to it<br>• virus not recognised by white blood cells / antibodies **or** antibodies / antitoxins not effective<br>• people / animals travel between countries / abroad spreading infection | ignore mutation<br>allow resistant / immune to vaccine<br>allow drugs / treatment not effective<br>do **not** allow antibiotics not effective<br>allow people not resistant<br>accept no antibodies / antitoxins<br>ignore white blood cells / antibodies fighting off | *3* |
| **Total** | | | **4** |

### 4.3.1.2 Viral diseases

**Answer 08 · Mark scheme**

November 2010 | BLY1AP | Original Q9 | Legacy

| | | | | |
|---|---|---|---|---|
| Nine | **3** | **2** | **4** | **2** |

4.3.1.2 Viral diseases

Answer 09 · Mark scheme

January 2012 | BL1FP | Original Q8 | Legacy

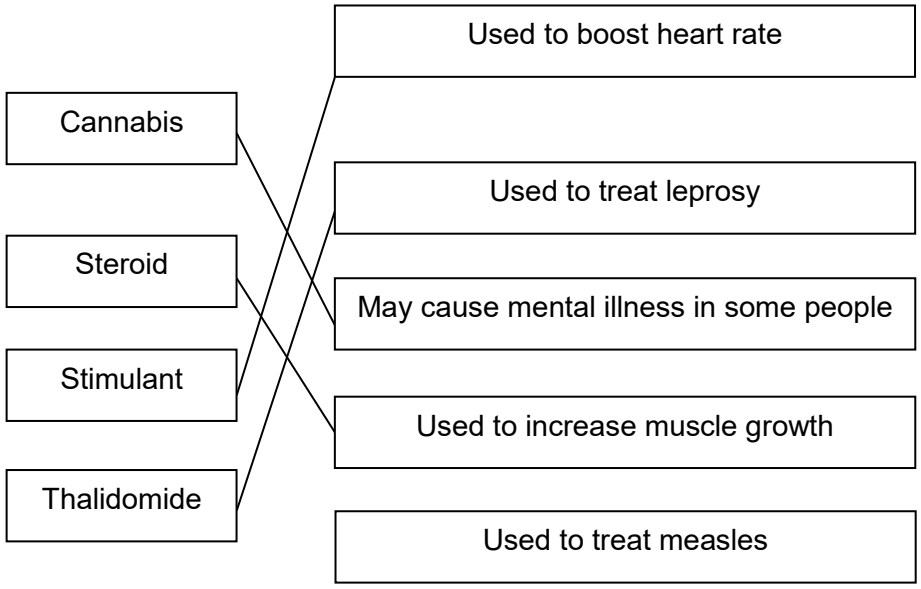
## Question 8

| question | answers | extra information | mark |
|---|---|---|---|
| 8(a) | both lead to reduction / fall (in measles cases) | can be implied | 1 |
| | measles vaccine caused a big drop **or** correct use of figures | | 1 |
| | MMR wipes out measles **or** drops to (almost) zero **or** doesn't fall as much as measles vaccine **or** correct use of figures. | | 1 |
| 8(b) | mump(s) | either order | 1 |
| | rubella / german measles | allow phonetic spelling | 1 |
| 8(c) | white blood cells | allow lymphocytes / leucocytes<br>ignore memory cells | 1 |
| | (wbc) produce antibodies | ignore antitoxins / antigens / antibiotics / engulfing | 1 |
| | in future / if re-infected antibody production rapid / fast(er) / quick(er) | allow ecf from antitoxins / antigens / antibiotics<br>ignore engulfing<br>ignore reference to specificity | 1 |
| **Total** | | | **8** |

**UMS Conversion Calculator** www.aqa.org.uk/umsconversion

### 4.3.1.2 Viral diseases

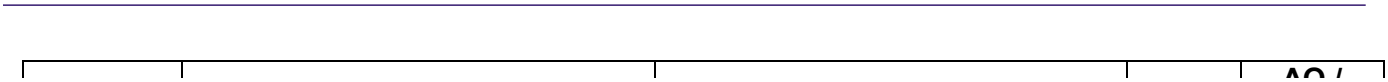
**Answer 10 · Mark scheme** June 2014 | BL1FP | Original Q4 | Legacy

| Question | Answers | Extra information | Mark | AO / spec ref. |
|---|---|---|---|---|
| 4(a) | <br>extra line from any drug cancels that mark | | 4 | AO1<br>1.3.1d,f,i |
| 4(b)(i) | any **one** from:<br>• (live) animals<br>• cells<br>• tissues | accept named examples, eg mice<br>ignore people / volunteers<br>do **not** allow plants | 1 | AO1<br>1.3.1b |
| 4(b)(ii) | to check that the drug works<br>to find the best dose to use | | 1<br>1 | AO1<br>1.3.1b |
| 4(b)(iii) | only scientists at the drug company | | 1 | AO2<br>1.3.1b |
| 4(c)(i) | 420 | | 1 | AO2<br>1.3.1 |
| 4(c)(ii) | statin(s) | | 1 | AO3<br>1.3.1 |
| 4(c)(iii) | any **one** from:<br>• side effects<br>• other medication<br>• other (medical) conditions | allow cost<br>allow patient choice<br>allow family history **or** age | 1 | AO3<br>1.3.1 |
| **Total** | | | **11** | |

### 4.3.1.2 Viral diseases

**Answer 10 · Mark scheme**

June 2014 | BL1FP | Original Q4 | Legacy



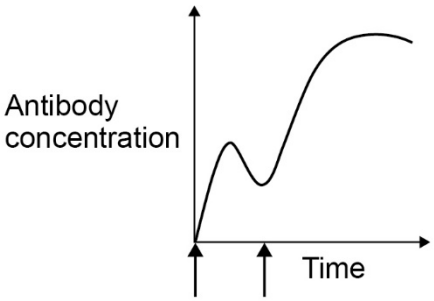
**Answer 11 · Mark scheme**

November 2020 | 8461/1F | Original Q3

The full source mark scheme begins on page 20. Follow original question 3 in that document.

### 4.3.1.2 Viral diseases

**Answer 12 · Mark scheme** November 2021 | 8461/1F | Original Q2

| | | | | |
|---|---|---|---|---|
| **02.1** | pathogens | | 1 | AO1<br>4.3.1.1 |
| **02.2** | viruses reproduce inside cells, damaging them | | 1 | AO1<br>4.3.1.1 |
| **02.3** | any **one** from:<br>• they do not have a cell membrane<br>• they do not have cytoplasm<br>• they do not have a nucleus<br>• they do not have mitochondria (like most eukaryotic cells)<br>• they do not have ribosomes | do **not** accept they do not have a cell wall<br><br>do **not** accept they do not have chloroplasts / chlorophyll<br><br>ignore they are not living / alive<br><br>ignore they can only replicate inside cells<br><br>ignore virus has a protein coat | 1 | AO2<br>4.1.1.2 |
| **02.4** | a weakened form of a virus | | 1 | AO1<br>4.3.1.7 |
| **02.5** |  | | 1 | AO2<br>4.3.1.7 |
| **02.6** | leaf | | 1 | AO1<br>4.3.1.2 |

4.3.1.2 Viral diseases

Answer 12 · Mark scheme



| | | | | |
|---|---|---|---|---|
| **02.7** | y-axis labelled rate of photosynthesis in arbitrary units<br><br>correct scale<br><br>all bars plotted correctly<br><br><br><br><br>all bars correctly labelled | <br><br><br><br>allow a tolerance of ± ½ small square<br>allow 2 correct bars for **1** mark<br>allow bars touching<br>allow any width of bars<br><br>ignore letters | 1<br><br>1<br><br>2<br><br><br><br><br>1 | AO2<br>4.4.1.1 |
| **02.8** | as the level of infection (with TMV) increases, (the rate of) photosynthesis decreases | allow as TMV increases, photosynthesis decreases<br><br>allow (the rate of) photosynthesis decreases as the level of infection (with TMV) increases<br><br>allow as infection gets worse, photosynthesis decreases<br><br>allow TMV reduces photosynthesis | 1 | AO3<br>4.4.1.1 |
| **02.9** | less chlorophyll<br><br><br><br>(so) less glucose / starch / protein made | allow fewer chloroplasts<br>allow less light absorbed<br>ignore less photosynthesis | 1<br><br><br><br>1 | AO2<br>4.4.1.1<br>4.4.1.3<br>4.3.1.2 |
| **Total** | | | **14** | |

### 4.3.1.2 Viral diseases

**Answer 12 · Mark scheme**

November 2021 | 8461/1F | Original Q2

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|

4.3.1.2 Viral diseases

Answer 13 · Mark scheme

June 2022 | 8461/1F | Original Q1

## Question 1

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **01.1** | sexual intercourse | | 1 | AO1<br>4.3.1.1<br>4.3.1.2 |

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **01.2** | increased (at first)<br><br>(then) decreased | ignore numbers unqualified<br><br>do **not** accept an implication of an overall increase<br><br>if no other mark awarded allow (overall) decrease for **1** mark | 1<br><br>1 | AO3<br>4.3.1.2 |

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **01.3** | better education on how to prevent the spread of HIV | | 1 | AO3<br>4.3.1.1<br>4.3.1.2 |

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **01.4** | (C) → E → A → B → D | allow **1** mark for E → A link<br>allow **1** mark for A → B link<br>allow **1** mark for B → D link<br><br>if no other mark awarded allow **1** mark for an answer of<br>(C) → E → B → A → D | 3 | AO1<br>4.3.1.1<br>4.3.1.6<br>4.3.1.7<br>4.3.1.2 |

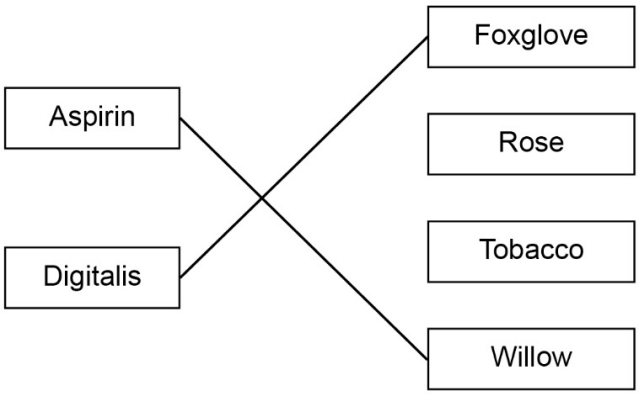
4.3.1.2 Viral diseases

Answer 13 · Mark scheme

June 2022 | 8461/1F | Original Q1

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **01.5** | testing on healthy volunteers | | 1 | AO1 4.3.1.9 |

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **01.6** | drugs that destroy viruses also damage body tissues | | 1 | AO1 4.3.1.8 |

| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **01.7** | **Drug** / **Plant the drug originated from**<br><br><br>do **not** accept more than one line from a box on the left | | 1<br><br><br><br><br><br><br>1 | AO1 4.3.1.1 4.3.1.9 |

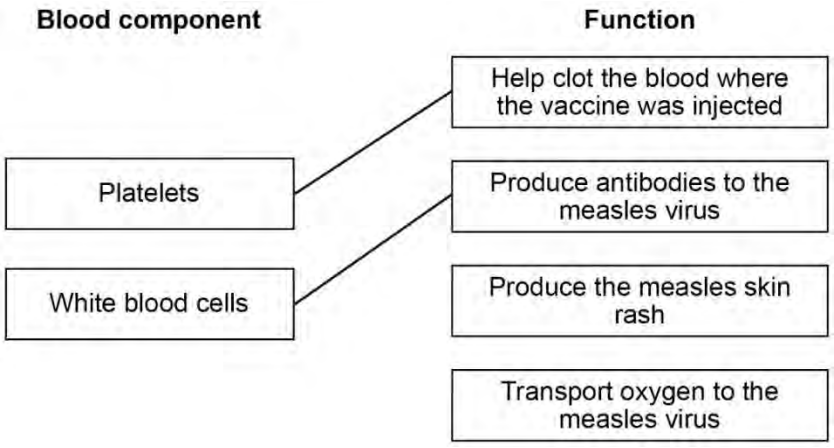
| Total Question 1 | | 11 |
|---|---|---|

4.3.1.2 Viral diseases

Answer 14 · Mark scheme

June 2024 | 8461/1F | Original Q3

## Question 3

| Question | Answers | Mark | AO / Spec Ref. |
|---|---|---|---|
| 03.1 | <br>do **not** accept more than one line from a box on the left | 1<br>1 | AO2<br>4.3.1.7<br>4.3.1.6<br>4.2.2.3 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 03.2 | 1968 | allow 1969 | 1 | AO3<br>4.3.1.2<br>4.3.1.7 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 03.3 | increases<br><br>(then) levels off / plateaus<br><br><br>(then) decreases | <br><br>allow (then) stays the same<br>allow reaches a maximum between 1956 and 1968<br><br>ignore use of numbers of people<br><br>if no other mark awarded allow **1** mark for (overall) decrease | 1<br><br>1<br><br>1 | AO3<br>4.3.1.2 |

4.3.1.2 Viral diseases

Answer 14 · Mark scheme



| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| **03.4** | (the percentage) decreased | allow (the percentage) decreased then increased<br>allow (the percentage) changed from 92% to 80% | 1 | AO3<br>4.3.1.2<br>4.3.1.7 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| **03.5** | parents were worried their children would get condition **X** | | 1 | AO3<br>4.3.1.2<br>4.3.1.7 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| **03.6** | have the research peer reviewed | | 1 | AO2<br>4.3.1.9 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| **03.7** | any **one** from:<br>• (the author was) biased<br>• (the author was) influenced by money<br>• because the research was not peer reviewed<br>• there was not enough evidence<br>• small sample size | ignore (the author) was paid | 1 | AO3<br>4.3.1.9 |

| | |
|---|---|
| **Total Question 3** | **10** |

4.3.1.2 Viral diseases

Answer 15 · Mark scheme

June 2025 | 8461/1F | Original Q6

## Question 6

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| **06.1** | virus | | 1 | AO1<br>4.3.1.2 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| **06.2** | any **one** from:<br>• (transfer of) droplets / saliva / mucus<br>• sneezes<br>• coughs | ignore other methods of transferring pathogens, unqualified such as touch or direct contact<br><br>do **not** accept transfer through sexual intercourse | 1 | AO1<br>4.3.1.2 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| **06.3** | willow | ignore parts of willow such as bark / leaves | 1 | AO1<br>4.3.1.9 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| **06.4** | fever<br>**or**<br>(red skin) rash | allow high temperature<br>allow (increased) sweating<br><br>allow (red) spots / lumps / boils<br>allow red / itchy skin<br><br>allow cough / sneeze<br>allow runny / blocked nose<br>allow sore throat<br>allow red / watery / sore eyes<br>allow headache<br>ignore flu-like symptoms, unqualified<br>ignore pain unqualified<br><br>do **not** accept nausea / diarrhoea | 1 | AO1<br>4.3.1.2 |

4.3.1.2 Viral diseases

Answer 15 · Mark scheme



| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 06.5 | **few(er)** people (in population) with pathogen / measles / disease (due to vaccination)<br><br>(so) **less likely** for pathogen / measles / disease to be passed on<br>**or**<br>(so) **less likely** for pathogen / measles / disease to be spread / caught | allow named types of pathogen<br><br>allow (provides) herd immunity<br><br>allow **less likely** to come into contact with a person with pathogen / measles / disease<br>ignore (so) spread of disease is reduced<br><br>allow **2** marks for fewer people with measles, so **less likely** to spread | 1<br><br>1 | AO2<br>4.3.1.2<br>4.3.1.7 |

| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 06.6 | (graph reading) = 45<br><br>$\frac{45}{100} \times 240$<br><br>108 | <br><br>allow 0.45 × 240<br><br>allow for **1** mark an answer of 7 / 7.2 with evidence of having used 3(%) from **Figure 9**<br>**or**<br>allow for **1** mark an answer of 88 / 88.8 / 89 with evidence of having used 37(%) from **Figure 9** | 1<br><br>1<br><br>1 | AO2<br>4.3.1.2 |

4.3.1.2 Viral diseases

Answer 15 · Mark scheme



| Question | Answers | Extra information | Mark | AO / Spec Ref. |
|---|---|---|---|---|
| 06.7 | | allow answers in terms of numbers of children or likelihood of getting disease | | AO3 4.3.1.2 |
| | a lower percentage of vaccinated children have severe measles / infection / disease **or** a higher percentage of unvaccinated children have severe measles / infection / disease **or** vaccination reduces severity of measles / infection / disease | allow converse | 1 | |
| | correct use of supporting comparative data from **Figure 9** | allow examples such as (severe disease is) 42% higher (in unvaccinated) **or** 15 times higher (than in vaccinated) **or** allow correct use of raw data used in a comparative way | 1 | |

| Total Question 6 | 11 |
|---|---|

**4.3.1.2 Viral diseases**



AQA

# GCSE
# BIOLOGY
# 8461/1F

Paper 1 Foundation Tier

**Mark scheme**

June 2020

Version: 1.0 Final Mark Scheme

*jun2084611F/MS*

### 4.3.1.2 Viral diseases





Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

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MARK SCHEME – GCSE BIOLOGY – 8461/1F – JUNE 2020

# Information to Examiners

## 1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement
- the Assessment Objectives, level of demand and specification content that each question is intended to cover.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right-hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

## 2. Emboldening and underlining

**2.1** In a list of acceptable answers where more than one mark is available 'any **two** from' is used, with the number of marks emboldened. Each of the following bullet points is a potential mark.

**2.2** A bold **and** is used to indicate that both parts of the answer are required to award the mark.

**2.3** Alternative answers acceptable for a mark are indicated by the use of **or**. Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.

**2.4** Any wording that is underlined is essential for the marking point to be awarded.

## 3. Marking points

### 3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution?

**[1 mark]**

| Student | Response | Marks awarded |
|---|---|---|
| 1 | green, 5 | 0 |
| 2 | red*, 5 | 1 |
| 3 | red*, 8 | 0 |

Example 2: Name two planets in the solar system.

**[2 marks]**

| Student | Response | Marks awarded |
|---|---|---|
| 1 | Neptune, Mars, Moon | 1 |
| 2 | Neptune, Sun, Mars, Moon | 0 |

### 3.2 Use of chemical symbols/formulae

If a student writes a chemical symbol/formula instead of a required chemical name, full credit can be given if the symbol/formula is correct and if, in the context of the question, such action is appropriate.

### 3.3 Marking procedure for calculations

Marks should be awarded for each stage of the calculation completed correctly, as students are instructed to show their working. Full marks can, however, be given for a correct numerical answer, without any working shown.

### 3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

### 3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward is kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation ecf in the marking scheme.

### 3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

### 3.7 Brackets

(…..) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

### 3.8 Allow

In the mark scheme additional information, 'allow' is used to indicate creditworthy alternative answers.

### 3.9 Ignore

Ignore is used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

### 3.10 Do <u>not</u> accept

Do **not** accept means that this is a wrong answer which, even if the correct answer is given as well, will still mean that the mark is not awarded.

## 4. Level of response marking instructions

Extended response questions are marked on level of response mark schemes.

- Level of response mark schemes are broken down into levels, each of which has a descriptor.
- The descriptor for the level shows the average performance for the level.
- There are two marks in each level.

Before you apply the mark scheme to a student's answer, read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

**Step 1: Determine a level**

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer.

When assigning a level you should look at the overall quality of the answer. Do **not** look to penalise small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level.

Use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 2 with a small amount of level 3 material it would be placed in level 2 but be awarded a mark near the top of the level because of the level 3 content.

**Step 2: Determine a mark**

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this.

The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do **not** have to cover all of the points mentioned in the indicative content to reach the highest level of the mark scheme.

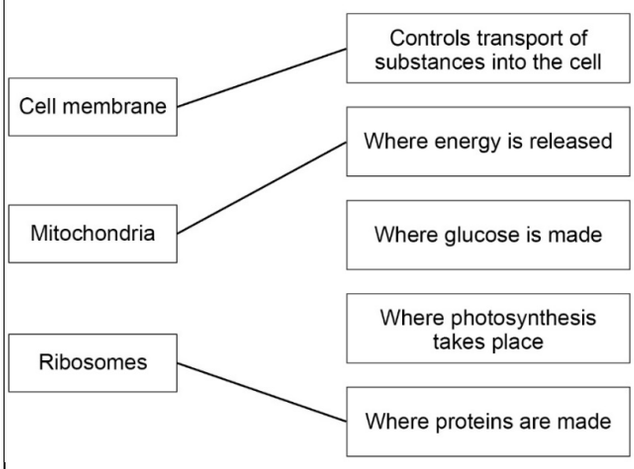
You should ignore any irrelevant points made. However, full marks can be awarded only if there are no incorrect statements that contradict a correct response.

An answer which contains nothing of relevance to the question must be awarded no marks.

### 4.3.1.2 Viral diseases





| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **01.1** | bacterium | | 1 | AO2<br>4.1.1.1 |
| **01.2** | to strengthen the cell | | 1 | AO1<br>4.1.1.1<br>4.1.1.2 |
| **01.3** | chloroplast | | 1 | AO2<br>4.1.1.2<br>4.2.3.1 |
| **01.4** | **Structure** **Function**<br><br><br>additional line from a box on the left negates the mark for that box | | 3 | AO1<br>4.1.1.2<br>4.1.3.1 |
| **01.5** | adjust the focus knob | | 1 | AO3<br>4.1.1.2<br>RPA1 |
| **01.6** | (A =) 15 (mm)<br>(B =) 60 (mm) | allow a tolerance of ± 1mm | 1<br>1 | AO2<br>4.1.1.2<br>RPA 1 |
| **01.7** | $\frac{60}{15} = 4(.0)$ | allow ecf from question **01.6** | 1 | AO2<br>4.1.1.2<br>RPA 1 |

### 4.3.1.2 Viral diseases





| | | | | |
|---|---|---|---|---|
| **01.8** | $\frac{40}{0.1}$<br><br>400 | <br><br>do **not** accept if a unit is given | 1<br><br>1 | AO2<br>4.1.1.5<br>RPA 1 |
| **Total** | | | **12** | |

### 4.3.1.2 Viral diseases





| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **02.1** | mitosis | | 1 | AO1<br>4.1.2.2 |
| **02.2** | all lines correct = **2** marks<br>1 or 2 lines correct = **1** mark<br>**Stage of cell cycle** / **What happens during that stage**<br>Stage 1 → The cell grows and the chromosomes replicate<br>Stage 2 → One set of chromosomes is pulled to each end of the cell<br>Stage 3 → The cytoplasm and cell membrane divide to form two new cells<br>additional line from a box on the left negates the credit for that box | | 2 | AO1<br>4.1.2.2 |
| **02.3** | $\frac{7}{10} \times 100$<br><br>70(%) | allow $\frac{252}{300} \times 100$<br><br>allow answer calculated from angle in range 250° to 254°<br><br>if no other mark awarded, allow 0.7 for **1** mark | 1<br><br>1 | AO2<br>4.1.2.2 |
| **02.4** | 3 | | 1 | AO2<br>4.1.2.2 |
| **02.5** | DNA | allow deoxyribonucleic acid | 1 | AO1<br>4.1.2.1<br>4.1.2.2 |
| **02.6** | a gene | | 1 | AO1<br>4.1.2.1 |

### 4.3.1.2 Viral diseases





| | | | | |
|---|---|---|---|---|
| **02.7** | (bone marrow) cells differentiate into many / other types of (named) cell<br><br>(so) will cure diseases where new cells are needed<br>**or** will cure diseases where cells are damaged | allow (bone marrow) cells can become many / other types of (named) cell<br><br>allow (so) will cure anaemia / leukaemia **or** blood cancer **or** blood disorders<br>allow (so) will cure paralysis / diabetes | 1<br><br>1 | AO1<br><br>AO2<br><br>4.1.2.3 |
| **Total** | | | **10** | |

### 4.3.1.2 Viral diseases





| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **03.1** | any **one** from:<br>• bacteria<br>• fungi<br>• protists | allow singular<br>allow names of pathogens e.g. Salmonella<br>ignore virus / germ | 1 | AO1<br>4.3.1.1<br>4.3.1.3<br>4.3.1.5 |
| **03.2** | hydrochloric acid is produced by the stomach<br><br>the skin is a barrier covering the whole body | | 1<br><br>1 | AO1<br>4.2.2.1<br>4.3.1.6 |
| **03.3** | white blood cells engulf the microorganisms. | | 1 | AO1<br>4.2.2.3<br>4.3.1.6 |
| **03.4** | weakened<br><br>fast | in this order only | 1<br><br>1 | AO1<br>4.3.1.7 |
| **03.5** | by coughs / sneezes | allow 'by droplets in the air'<br>do **not** accept other means of transmission e.g. touch | 1 | AO1<br>4.3.1.1<br>4.3.1.2 |
| **03.6** | (from day) 10 (to day) 18 | allow (from day) 18 (to day) 10 | 1 | AO2<br>4.3.1.2 |
| **03.7** | 14 (days) | allow in the range 13 to 15 (days) | 1 | AO3<br>4.3.1.2 |
| **03.8** | any **one** from:<br>• they had been vaccinated<br>• they already had antibodies<br>• they were immune<br>• they had had it before<br>• they did not get any / enough virus from infected child<br>• they did not play (much) with the infected child | <br><br><br><br>ignore they were resistant<br><br>ignore they wore a mask<br>unqualified | 1 | AO3<br>4.3.1.2<br>4.3.1.7 |

### 4.3.1.2 Viral diseases





| | | | | |
|---|---|---|---|---|
| **03.9** | antibiotics do not kill viruses | allow antibiotics do not work on viruses<br>allow antibiotics only kill bacteria | 1 | AO3<br>4.3.1.8 |
| **Total** | | | **11** | |

### 4.3.1.2 Viral diseases





| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **04.1** | increased (at first)<br><br>until 4 minutes **or** 50 breaths per minute<br><br>(then) stayed constant (from 4 minutes **or** at 50 breaths per minute) | | 1<br><br>1<br><br>1 | AO2<br>4.4.2.2 |
| **04.2** | 175 (beats per minute) | | 1 | AO2<br>4.4.2.2 |
| **04.3** | 140 (beats per minute) | | 1 | AO2<br>4.4.2.2 |
| **04.4** | because his rate is lower than the maximum safe rate | allow ecf for incorrect values in question **04.2** and question **04.3** | 1 | AO3<br>4.2.2.2<br>4.4.2.2 |

| | | | |
|---|---|---|---|
| **04.5** | **Level 3:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account. | 5–6 | AO3 |
| | **Level 2:** Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear. | 3–4 | AO2 |
| | **Level 1:** Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking. | 1–2 | AO2 |
| | **No relevant content** | 0 | |
| | **Indicative content**<br><br>• heart rate increased<br>  ○ to increase blood flowing to muscles / lungs<br>  ○ to provide more oxygen (to muscles)<br>  ○ to provide more glucose (to muscles)<br>  ○ to remove carbon dioxide more quickly (from the muscles / blood)<br>  ○ to remove lactic acid more quickly (from the muscles)<br><br>• breathing rate increased<br>  ○ supplies more oxygen / air to lungs<br>  ○ so more oxygen to blood<br>  ○ more carbon dioxide removed<br><br>• more oxygen to muscles<br>  ○ needed for (increased) respiration<br>  ○ to release / provide energy<br>  ○ for muscle contraction<br><br>• anaerobic respiration occurs<br>  ○ due to lack of oxygen<br>  ○ which causes a build-up of lactic acid<br>  ○ oxygen debt<br>  ○ muscle fatigue / pain<br><br>To reach **Level 3**, there must be reference to heart rate, breathing rate and respiration | | 4.2.2.2<br>4.2.2.3<br>4.4.2.1<br>4.4.2.3<br>4.4.2.2 |

| | | | |
|---|---|---|---|
| **Total** | | | **12** |

### 4.3.1.2 Viral diseases





| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **05.1** | will stop animals / herbivores eating it | allow it will not be eaten | 1 | AO3<br>4.3.3.2 |
| **05.2** | chemical | | 1 | AO1<br>4.3.3.2 |
| **05.3** | thorns / spikes / spines / prickles (to stop animals / herbivores eating it) | | 1 | AO3<br>4.3.3.2 |
| **05.4** | for respiration<br><br>to store as starch | | 1<br><br>1 | AO1<br>4.4.1.3<br>4.4.2.1 |
| **05.5** | add Benedict's (solution / reagent to the liquid)<br><br>boil / heat<br><br>(if glucose is present the blue) colour changes to yellow / green / orange / brown / (brick)red | <br><br>allow any temperature of 65 °C or above | 1<br><br>1<br><br>1 | AO1<br>4.2.2.1<br>RPA 4 |
| **05.6** | (nitrate ions are needed) to make proteins / amino acids<br><br>which are needed for growth / enzymes / new cells | allow to make chlorophyll / DNA / ATP / nucleic acid<br><br>allow correct process for named molecule in mp1 | 1<br><br>1 | AO1<br><br>AO2<br><br>4.1.3.3<br>4.4.1.3<br>4.4.2.3 |
| **05.7** | in / on the (soil) water | allow through air (spaces) in the soil | 1 | AO3<br>4.3.1.1<br>4.3.1.4 |
| **05.8** | dosage<br><br>toxicity | | 1<br><br>1 | AO1<br>4.3.1.9 |

### 4.3.1.2 Viral diseases



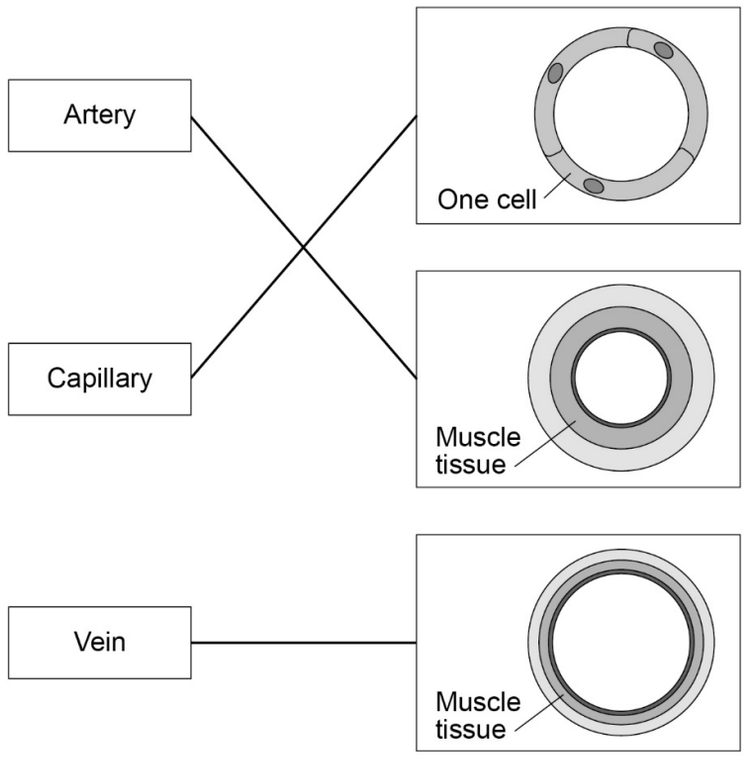


| | | | | |
|---|---|---|---|---|
| **05.9** | placebos | | 1 | AO1<br>4.3.1.9 |
| **Total** | | | **14** | |

### 4.3.1.2 Viral diseases





| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| 06.1 | all lines correct = **2** marks<br>1 **or** 2 lines correct = **1** mark<br>**Type of blood vessel** / **Structure of blood vessel**<br><br><br>additional line from a box on the left negates the credit for that box | | 2 | AO2<br>4.2.2.2 |

### 4.3.1.2 Viral diseases





| | | | | |
|---|---|---|---|---|
| **06.2** | any **one** from:<br><br>• thick(er) (muscle) walls / tissue (1)<br><br>to push blood (all) around the body (1)<br><br>**or**<br><br>• thick(er) elastic walls / tissue (1)<br><br>to maintain / withstand high (blood) pressure<br>**or** to retain / regain shape (1)<br><br>**or**<br><br>• narrow lumen (1)<br><br>to maintain high (blood) pressure (1) | allow to withstand high (blood) pressure<br>do **not** accept to pump blood (all) around the body | 2 | AO1<br>4.2.2.2 |
| **06.3** | (A) – white (blood) cell(s)<br><br>(B) – platelet(s) | allow any named white (blood) cell(s) | 1<br><br>1 | AO2<br>4.2.2.3 |
| **06.4** | (no nucleus) more space for haemoglobin / oxygen<br><br>(has haemoglobin) to bind / carry oxygen | allow to carry more oxygen<br><br>ignore carries carbon dioxide | 1<br><br>1 | AO3<br>4.1.1.2<br>4.1.1.3<br>4.2.2.3 |
| **06.5** | plasma | | 1 | AO1<br>4.2.2.3 |
| **06.6** | platelets | | 1 | AO3<br>4.2.2.3 |

### 4.3.1.2 Viral diseases





| | | | | |
|---|---|---|---|---|
| **06.7** | any **one** from:<br>• (continued) bleeding<br>• (more) bruising | allow described<br>allow blood does not clot (at cuts)<br>allow ecf from answer to question **06.6** | 1 | AO3<br>4.2.2.3 |
| **Total** | | | **11** | |

### 4.3.1.2 Viral diseases





| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **07.1** | | allow correct chemical symbols<br>ignore any attempt at balancing equation<br>ignore light / chlorophyll | | AO1<br>4.4.1.1 |
| | *before arrow*<br>carbon dioxide **and** water | either order | 1 | |
| | *after arrow*<br>glucose | ignore sugar / carbohydrate<br>do **not** accept starch | 1 | |
| **07.2** | | ignore description of subsequent parts of the photosynthesis reaction | | AO1<br>4.1.1.2<br>4.4.1.1 |
| | <u>light</u> | allow sun<u>light</u><br>ignore sun | 1 | |
| | (light) is captured / trapped / absorbed by chlorophyll / chloroplasts | allow (light) is used by chlorophyll / chloroplasts | 1 | |
| **07.3** | $\frac{(18.5 + 19.3 + 19.5)}{3}$<br>**or**<br>$\frac{57.3}{3}$ | | 1 | AO2<br>4.4.1.2<br>RPA 6 |
| | 19.1 ($cm^3$/hour) | allow an answer correctly calculated using only two correct values | 1 | |
| **07.4** | a ring around 14.2 | allow clear indication of correct result | 1 | AO3<br>4.4.1.2<br>RPA 6 |

### 4.3.1.2 Viral diseases





| | | | | |
|---|---|---|---|---|
| **07.5** | any **one** from:<br>• scale / value was misread<br>• there was air / oxygen in the syringe / measuring cylinder / apparatus<br>• the lamp / light was moved<br>• temperature changed<br>• had different mass / length of pondweed<br>• pondweed had not acclimatised | ignore human error<br>ignore references to counting bubbles or time<br>allow measurement error<br>allow light intensity changed<br>ignore different bulb / lamp unqualified | 1 | AO3<br>4.4.1.2<br>RPA 6 |
| **07.6** | did not use it in calculation (of mean) | | 1 | AO3<br>4.4.1.2<br>RPA 6 |
| **07.7** | any **one** from:<br>• light (intensity)<br>• carbon dioxide (concentration)<br>• pondweed size / amount<br>• pondweed species | do **not** accept temperature<br>ignore time<br>allow distance / power / colour of lamp / light<br>allow same (piece of) pondweed | 1 | AO3<br>4.4.1.2<br>RPA 6 |
| **07.8** | enzyme(s) lose the shape of the active site | allow enzyme(s) (start to) denature<br>allow enzyme(s) destroyed / damaged<br>do **not** accept enzyme(s) killed | 1 | AO2<br>4.2.2.1 |

### 4.3.1.2 Viral diseases





| | | | | |
|---|---|---|---|---|
| **07.9** | y-axis labelled '(rate of) photosynthesis in $cm^3$/hour' | | 1 | AO2<br>4.4.1.2<br>RPA 6 |
| | suitable scale on y-axis | must take up half or more of grid provided | 1 | |
| | all points plotted to within ± ½ small square | allow 3 or 4 correct plots for **1** mark<br>ignore any attempt to plot a point at 20 °C | 2 | |
| | correct curved line of best fit | ignore line joined point to point with straight lines<br>ignore extrapolation | 1 | |
| **Total** | | | **16** | |

### 4.3.1.2 Viral diseases





| Question | Answers | Extra information | Mark | AO / Spec. Ref. |
|---|---|---|---|---|
| **08.1** | movement / spreading out of molecules / particles | allow movement / spreading out of (named) substances / chemicals / gases / liquids<br>ignore reference to membranes / cells | 1 | AO1<br>4.1.3.1 |
| | from (an area of) high(er) concentration to (an area of) low(er) concentration | allow down / with the concentration gradient<br>ignore along / across the concentration gradient<br>do **not** accept movement from / to a concentration gradient | 1 | |
| **08.2** | increased carbon dioxide concentration in the air | | 1 | AO2<br>4.1.3.1<br>4.2.3.2 |
| | increased number of stomata that are open | | 1 | |

### 4.3.1.2 Viral diseases





| | | | |
|---|---|---|---|
| **08.3** | **Level 3:** Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account. | 5–6 | AO1<br>4.1.3.1<br>4.2.2.2<br>4.2.2.3 |
| | **Level 2:** Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear. | 3–4 | |
| | **Level 1:** Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking. | 1–2 | |
| | **No relevant content** | 0 | |
| | **Indicative content**<br>• (many) alveoli<br>  • provide a large(r) surface area (**:** volume)<br><br>• capillaries are thin<br>  **or** alveoli / capillary walls are thin **or** one cell thick<br>  **or** capillaries are close to the alveoli<br>  • which provides short diffusion path (for oxygen / carbon dioxide)<br><br>• breathing (mechanism) moves air in and out<br>**or** lungs are ventilated<br>  • to bring in (fresh) oxygen<br>  • to remove carbon dioxide<br>  • to maintain a concentration / diffusion gradient`<br><br>• large capillary network (around alveoli)<br>**or** good blood supply<br>  • to remove oxygen(ated blood) quickly<br>  • to bring carbon dioxide to the lungs quickly<br>  • to maintain a concentration / diffusion gradient | | |

### 4.3.1.2 Viral diseases





| | | | | |
|---|---|---|---|---|
| **08.4** | Osmosis | allow diffusion | 1 | AO1<br>4.1.3.1<br>4.2.3.2<br>4.1.3.2 |
| **08.5** | active transport<br><br>(because) energy is needed<br><br>(to move nitrate ions) from a low(er) concentration (in the soil) to a high(er) concentration (in the root / cell) | <br><br><br><br>allow (to move nitrate ions) against / up the concentration gradient<br><br>allow (because) there is a lower concentration (of nitrate ions) in the soil **or** (because) there is a higher concentration (of nitrate ions) in the root / cell<br><br>ignore reference to amount / number of nitrate ions<br><br>ignore along / across the concentration gradient<br><br>do **not** accept if reference to molecules / atoms moving | 1<br><br>1<br><br>1 | AO3<br><br>AO2<br><br>AO2<br><br>4.1.1.3<br>4.2.3.2<br>4.1.3.3 |
| **Total** | | | **14** | |

### 4.3.1.2 Viral diseases

**Answer 11 · Examiner comments** November 2020 | 8461/1F | Original Q3

**Question 3 (low & standard demand)**

Throughout this question, students commonly used the term ‘infection’ as a synonym for bacteria, resulting in many unclear answers. **03.9** differentiated well between lower- and higher-attaining students.

**Answer 13 · Examiner comments** June 2022 | 8461/1F | Original Q1

**Question 1 (Low demand)**

**01.1** The majority of students correctly identified sexual intercourse as causing the spread of HIV.

**01.2** Many students failed to recognise that there were 2 marks available for this question, and only described the overall trend shown in the table, rather than the increase followed by the decrease. Students are encouraged to check the number of marks available for each question and structure their answer accordingly. Nearly 60% of students were awarded the fallback mark on this question, describing an overall decrease.

**01.3** Nearly all students who attempted this question answered correctly.

**01.4** Just under half of all students gained full marks in this question. Students would benefit from crossing off the letters they have already used in questions such as these, to prevent the same letter being used twice, as was seen on rare occasions.

**01.5** Over 70% of students could identify the next stage in testing a vaccine following testing on live animals.

**01.6** Over 80% of students knew that drugs that destroy viruses also damage body tissues.

**01.7** Less than a third of students gained full marks in this question, and nearly 40% were awarded zero marks.

4.3.1.2 Viral diseases

Answer 14 · Examiner comments

June 2024 | 8461/1F | Original Q3

**Question 3 (low and standard demand)**

**03.1** 85% of students gained at least one mark in this question. As with other linking questions, some students drew more than one line from each box on the left, meaning no marks could be awarded for that box.

**03.2** Over 70% of students were awarded the mark for this question, with the most common incorrect answers being 1945 and 1970. A minority of students gave a range of years.

**03.3** Students found this question relatively easy to access, with nearly half being awarded full marks. The command word in this question was 'describe' and no credit was given for added explanatory detail, which a number of students provided. A number of students did not acknowledge the period where the number of people remained the same. A number of students who did acknowledge it used inappropriate terminology that was not creditworthy, such as the graph being 'consistent' or references to 'nothing happening' or there being 'no new cases' at the time, which were incorrect. A small number of students described the number of cases rather than the trend and linked the number of cases to the vaccination rate or vaccine introduction, which was not relevant here.

**03.4** Nearly 64% of students achieved the mark in this question.

**03.5** 88% of students answered this question correctly.

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Answer 14 · Examiner comments

June 2024 | 8461/1F | Original Q3

**03.6** 76% of students answered this question correctly.

**03.7** Nearly 36% of students gave a creditworthy response to this question, with many articulating the idea of bias. A large proportion of students repeated the stem of question by saying simply 'because he was paid' and many were unable to express their answer succinctly or precisely enough for the mark to be awarded. A variety of different responses were given credit here but those such as 'it was not proper research', 'the person might not have been a scientist' or 'it was not proven' were insufficient.

Answer 15 · Examiner comments

June 2025 | 8461/1F | Original Q6

## Question 6 (standard demand)

**06.1** Over 40% of students gained credit for the answer of 'virus' here but there were, equally, many incorrect responses of 'bacteria' (around 45%). Other incorrect suggestions included 'vector', 'antitoxin', 'airborne', 'infectious', and 'fungi' and 'protists'. A surprisingly large number of students (15%) did not give any answer at all.

**06.2** Nearly 40% of students correctly stated how measles could be spread, but a higher number (nearly 60%) referred, more vaguely, to 'direct contact' or 'through the air', neither of which gained credit. A few incorrectly believed that measles is a sexually transmitted disease.

**06.3** Although 'willow' appeared in answers with reasonable frequency (35%), many students (45%) did not achieve this quite straightforward mark. A wide range of suggestions was evident with 'foxglove' perhaps being the most common incorrect example. A high proportion (over 17%) of students, sadly, did not attempt the question.

**06.4** Nearly 70% of students achieved the mark in this question owing to the wide range of symptoms listed in the mark scheme. Occasional incorrect suggestions (25%) were made such as 'vomiting' or 'black spots'. Vague, unqualified responses such as 'temperature', 'feeling unwell' and 'changed skin colour' could not be credited.

**06.5** Although students found this question accessible, very few (2%) managed to gain both marks, with 20% gaining 1 mark. Many simply answered in terms of what happens in the body as a result of vaccination. Others focused on 'children' in particular being vaccinated, referring to the ease of pathogen transfer from one child to another due to frequent close contact or to limited appreciation of hygiene. A number of answers included incorrect suggestions such as 'when the vaccinated children become adults they will have gained progressively increased immunity', 'they will be able to pass on their own immunity to their children' or 'they will then be unable to genetically pass measles on to the next generation'. MP1 was gained by a significant number through correctly referring to 'herd immunity' but many could not be awarded the mark by saying that 'fewer people would catch the disease', rather than 'have' it at any one particular time. MP2 required the idea of reduced likelihood, chance or probability of measles being spread and not a simple rewrite of the question in terms of 'therefore spread would be reduced'.

**06.6** Several steps were involved in this question. Students were required to select data for unvaccinated children with severe measles and then use this percentage to calculate how many children this represented out of the total of 240. Although 55% of responses gained all 3 marks, common errors were seen. These included:

- calculations which used data for all bars
- incorrect choices from Figure 9
- mistakes in reading from the graph, for example, 55 instead of 45.

4.3.1.2 Viral diseases

Answer 15 · Examiner comments



In all these instances, no credit could be awarded. Answers which showed errors in converting 45% to the actual number of children, such as 45÷240 or 240÷45, could only achieve MP1.

**06.7** It was pleasing to see that students were not daunted by this question and that many made good attempts at answering. To do so, they had to appreciate exactly what the data in Figure 9 showed; the percentages of vaccinated and unvaccinated children who all had measles, and the degree of severity of these cases. The data did not show information about the likelihood of the children catching measles in the first place. Based on this information, students were required to say why the data supported all children being given a vaccination and to back up their statement with numerical evidence from Figure 9. This evidence did not need to be processed in any way to gain credit. Answers which matched both marks (17%) had to be clearly comparative, had to consider the severity of infection and had to give appropriate and accurate figures in support. Responses such as 'fewer vaccinated children had severe measles shown by there being 7 compared to 108 who had not been vaccinated', or, even more succinctly, '45% of unvaccinated children had a severe infection but only 3% of those who were vaccinated did', both gained full credit. Answers awarded only 1 mark (22%) often did not give comparative data or any data at all, despite the question asking for it. When student responses matched neither marking point (54%), it was usually because they referred to the value of vaccination only as a means of reducing the chance of getting measles in the first place.