M1.(a) snail

or

shrew

additional incorrect answer negates correct answer

1

(b) shrew

additional incorrect answer negates correct answer

1

(c) fewer shrews to eat them

1

(d) population

1

(e) **C**

1

(f) (11 000 × 0.1 =)
1 100 (kJ)

1

(g) the snails do not eat the roots of the lettuces

1

(h) any **one** from:

- light (intensity)
- temperature
- moisture (levels)
- soil pH
- mineral / ion content (of soil)
- wind intensity / speed

ignore wind direction

- carbon dioxide (levels)
- oxygen (levels)

1

[8]

M2.(a) 40 – 60 hours

1

(b) (i) decrease

1

1st slowly then faster / appropriate detail from the graph – e.g. from 7.8 to 0 / faster after 4 – 10h

1

(ii) oxygen after glucose

extra box ticked cancels 1 mark

1

oxygen less than glucose

1

(iii) respiration

1

[6]

M3.(a) a higher concentration would be difficult to stir

1

(b) (i) methane

1

(ii) 60

100 - (5 + 35) but incorrect answer allow 1 mark

2

(c) (i) aerobic respiration

1

(ii) oxygen

1

[6]

M4.(a) place all the quadrats randomly on the lawn

1

(b) (i) 1 4

2 2

3 2

4 0

all 4 counts correct

1

Total = 15

total correct for their figures

1

(ii) 1.5

allow ecf from (b)(i)

1

(iii) 180

correct answer with or without working

*if answer incorrect, allow **1** mark for* $\frac{15}{10}$ *x 120* ***or*** *15 x 20*

or $\frac{15}{10}$ *x 12 x 10*

or *1.5 x 12 x 10* ***or*** *1.5 x 120*

allow ecf from (b)(ii)

*allow **1** mark if only 1 error*

2

(c) use a larger sample size / more quadrats

ignore repeats but allow repeat in different places

ignore 'count them all'

or

use bigger quadrats

1

[7]

M5. (a) microorganisms / microbes / bacteria / fungi / decomposers

*allow named example **or** mould*

ignore germs / worms / other detritivores

1

(b) (weather / it is) warm(er) / hot(ter)

accept optimum conditions for enzymes

allow cold(er) <u>in winter</u>

ignore wet(ter) / light(er) / sun

*do **not** accept heat dries the leaves out*

1

(c) oxygen

no mark if more than one box is ticked

1

[3]

M6. (a) methane / CH_4

allow CH_4

*do **not** allow CH^4 **or** ch4 or CH4*

1

(b) any **two** from:

- didn't carry out repeats
- only tested four types of manure
- don't know the mass of manure was the same each time
- inaccuracies in measuring (diameter of) balloon
- bottles might have been different sizes
- temperature of the room may have been different.

2

(c) The potato contains a lot of carbohydrate

1

[4]

M7.(a) any **three** from:

- place 30-m tape measure across field / from one wood to the other
- place quadrat(s) next to the tape
- count / record the number / amount of dandelions / plants in the quadrat

  ignore 'record the results'

  ignore measures / estimates dandelions
- repeat every 2 metres

  allow every metre / at regular intervals

3

(b) (i) low light / it is shady

allow no light

ignore sun / rays

or

not enough water / ions / nutrients

accept correct named ion

ignore no water / ions / nutrients

or

wrong pH of soil

accept competition with trees for light / water / ions

ignore competition for space and competition unqualified

accept soil too acidic / too alkaline

ignore temperature

1

(ii) sensible suggestion for a small area, eg chance variation / anomaly / poisoned by animal waste / wrong pH of soil / eaten (by animals) / cut down / footpath

1

(c) repeat (transect) / compare with the results of other groups

allow 'do it in two different locations' for 2 marks

1

at different / random location(s) / elsewhere (across the field)

*do **not** allow 'in other fields'*

1

[7]

M8.(a) measure the length / area of the field

1

(b) use (a) random number(s) (generator)
or
use coordinates method explained

1

(c) compare their results with another student's results

1

place more quadrats

1

(d) 0.25 × 5 = 1.25

1

500 / 1.25 = 400

1

(40 × 400 =) 16 000
*allow 16 000 with no working shown for **3** marks*

1

(e) 11

1

(f) (quadrat) 5
*both quadrat number and correct reason must be given for **1** mark*

1

very few or only 2 growing (here)

[9]

M9.(a) any **two** from:

- amount of waste on each heap

  allow size of heap
- (type of) materials on each heap

  *if neither marking points one or two awarded, allow **1** mark for same waste*
- put heaps in same (environmental) conditions.

  e.g. keep at same (outside) temperature

  allow put in same place

2

(b) microorganisms / microbes / bacteria / fungi / decomposers

ignore detritivores / examples (such as worms, maggots, insects)

ignore pathogens / germs

*do **not** allow viruses*

1

(c) (i) oxygen / air added (when turning over)

allow idea that decay will be aerobic

allow bacteria / microorganisms need oxygen / air

allow (microorganisms) respire faster

1

(ii) any **two** from:

- dead leaves / fruit / plants (fall off / onto the ground)
- (fallen dead leaves / fruit / plants) decay
- minerals / ions / nutrients are recycled / released.

ignore references to carbon dioxide

*allow animal waste **or** dead animals*

2

[6]