Q1. An actor is on a stage in a theatre. A spotlight is shining on him.

(a) A ray of light travels from the spotlight to the actor.
   
   (i) Which line shows the ray? Give the correct letter.

   -----------  

   (ii) How long does the light take to travel from the spotlight to the actor?

   Tick the correct box.

   about a hundred millionth of a second

   about a tenth of a second

   about a second

   about ten seconds

   1 mark
(b) The actor’s voice sounds different to the people in the front and back rows of the audience.

(i) How does the actor’s voice sound different to a person in the back row?

(ii) Complete the sentence with longer, shorter or exactly the same.
When the actor is at the back of the stage, the time his voice takes to reach the audience is .................

Q2. The diagram shows a lamp and a piece of cardboard. The piece of cardboard has a hole in it. Light from the lamp passes through the hole and forms a bright spot on a wall.

(a) (i) Which point on the wall, A B, C, D or E, is lit up by the lamp?

(ii) Explain why the other points on the wall are not lit up by the lamp.

(b) A piece of clear green plastic is placed over the hole.
What is the colour of the light which shines on the wall?

(c) The diagram shows a ray of light from a lamp hitting a mirror.

Which arrow, P, Q, R or S, shows the reflected ray?

Which arrow, P, Q, R or S, shows the reflected ray?

Q3. Nadia is on her bicycle, waiting to pull out from a road junction. Michael is driving his car round the bend. A row of houses stops Nadia from seeing Michael's car.

(a) At what position will Michael's car be when Nadia first sees it? Tick the correct box.
(b) A row of shops was built opposite the junction. The shops have glass windows which act as a mirror.

Nadia could see Joan's motorbike reflected in the glass window.

(i) **On the diagram above**, draw a ray of light to show how Nadia can see Joan's motorbike reflected in the glass window. Add arrows to the ray. Use a ruler.

![Diagram showing ray of light](not to scale)

3 marks

(ii) How does the glass window help to reduce the number of accidents?

.............................................................................................................
.............................................................................................................

1 mark

Maximum 5 marks

Q4. Two cyclists are riding along a dark road at night. One is wearing black clothes and the other is wearing light-coloured clothes.

![Diagram of cyclists and car](not to scale)

A car is driving behind the two cyclists. Light from the car headlamp shines on the cyclists.
(a) What happens to the light when it reaches the light-coloured clothes?

(b) **On the drawing above,** draw a ray of light to show how light from the headlamp reaches the driver so that he can see the cyclist in the light-coloured clothes. Draw arrows to show the direction of the light.

(c) What happens to the light when it reaches the black clothes?

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**Q5.** When white light is shone through a glass prism the light bends and splits into the colours of the spectrum.

(a) (i) What word describes the bending of light as it enters and leaves glass?

(ii) What word describes the splitting of light into the colours of the spectrum?
(b) Some leaves from a buttercup plant were ground up in a solvent and filtered to give a green solution of chlorophyll. A glass container of this green solution was put in the rays of coloured light.

What change in the spectrum would you see on the screen? Explain your answer.

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..................................................................................................................................................................................
..................................................................................................................................................................................
..................................................................................................................................................................................

2 marks

(c) Why is it necessary to grind up the buttercup leaves to release the chlorophyll from the cells?

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..................................................................................................................................................................................
..................................................................................................................................................................................
..................................................................................................................................................................................

1 mark

(d) Buttercup plants grow mainly in open fields. Dog’s Mercury is a plant which grows mainly in woodland. The graph shows how the rate of photosynthesis in these two plants changes as the light intensity changes.
Q6. Sophie places a coin at the bottom of an empty mug. She cannot see the coin with her eye in the position shown.

(a) Sophie fills the mug with water. Her head is in the same position as before, but now she can see part of the coin.

Draw a ray of light on the diagram to show how Sophie can see part of the coin. Use a ruler. Draw an arrow on the ray to show its direction.
(b) Sophie pours some concentrated blackcurrant juice into the water. The blackcurrant drink acts like a red filter and makes the coin look red. Explain how a red filter works.

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..................................................................................................................................................

2 marks
Maximum 5 marks

Q7. A statue outside a zoo was made from two types of rock.

The panda was made of granite.
The base was made of limestone.

The drawings show the statue as it was in 1936 and in 2006.

(a) The surface of the limestone base has changed over the years.

(i) Which process caused this change?
Tick the correct box.

- evaporating
- melting
- reflecting
- weathering

..............................................................................................................................................

1 mark

(ii) The surface of the panda made of granite has not changed.
Suggest why granite does not change in the same way as limestone.

..................................................................................................................................................
..................................................................................................................................................

1 mark
(b) Acid rain can be formed when fossil fuels burn.

(i) Give the name of one fossil fuel.

............................................................

1 mark

(ii) What is true about all fossil fuels?
Tick the correct box.

All fossil fuels are a source of energy [ ] All fossil fuels are black [ ]

All fossil fuels are liquid. [ ] All fossil fuels take less than 50 years to form. [ ]

1 mark

(iii) Acid rain has changed the surface of the metal letters on the statue.

Which word describes the effect of acid rain on a metal? Tick the correct box.

corrosion [ ] friction [ ]
magnetism [ ] vibration [ ]

1 mark

(iv) What could the zoo owner put on the metal letters to protect them from acid rain?

.............................................................

1 mark

maximum 6 marks

##

The action of the weather and plants on rocks or building materials is called **weathering**.
The material is damaged but nothing gets taken away.

When material is broken down and removed from the area the process is called **erosion**.
(a) For the examples described in the table, tick one box in each row to show if the example is weathering, erosion or neither.

<table>
<thead>
<tr>
<th>example</th>
<th>weathering</th>
<th>erosion</th>
<th>neither</th>
</tr>
</thead>
<tbody>
<tr>
<td>The stones in an old wall have been pushed apart by the roots of weeds.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>A clay flower pot in the garden has crumbled and broken into pieces during the winter.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some soil has been washed from a flower bed by rain.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4 marks

(b) How does water cause weathering of a brick?

......................................................................................................................
......................................................................................................................

1 mark
Maximum 5 marks

Q9. The drawing shows a new statue made of sandstone. After some years the statue will look different because of weathering.
(a) Describe two ways in which the statue will look different because of weathering.

1. ..................................................................................................................
   ..................................................................................................................

2. ..................................................................................................................
   ..................................................................................................................

(b) Tick two ways in which the weathering of the statue can take place.

Water on it freezes. [ ] The weather around it becomes warm. [ ]

Plants grow on it. [ ] Atmospheric pressure on it increases. [ ]

(c) Another statue was made from limestone. Rain makes limestone weather more quickly than sandstone. What substance in the rainwater causes this?

.....................................................................................................................

Q10. Sandstone can be 'weathered' by doing the following each day for one week.

1. Soak the sandstone in water.
2. Place it in a freezer overnight.
3. Take it out of the freezer each morning.

(a) Explain how this freezing and thawing 'weathers' the sandstone.

.....................................................................................................................
.....................................................................................................................
.....................................................................................................................
.....................................................................................................................
.....................................................................................................................

2 marks
(b) Weathering of rock may be caused by **physical** processes or **chemical** processes.

(i) The process in part (a) is a physical process which weathers rock. Describe **another** physical process which occurs naturally and explain how it weathers rock.

.................................................................................................................
.................................................................................................................
.................................................................................................................
.................................................................................................................
.................................................................................................................

2 marks

(ii) Name a chemical process which occurs outdoors and explain how it weathers rocks and buildings.

.................................................................................................................
.................................................................................................................
.................................................................................................................
.................................................................................................................
.................................................................................................................

2 marks

Maximum 6 marks

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Q11. The drawings below show a snail and a slug.

![Snail and Slug Drawings]

(a) Look at the drawings above.

(i) Give one way the snail and slug are **different** from each other.

.................................................................................................................

1 mark

(ii) Give one way the snail and slug are the **same**.

.................................................................................................................

1 mark
(b) Snails produce mucus to help them move along the ground.

How does mucus help snails to move?
Tick the correct box.

- Mucus is cold.
- Mucus reduces friction.
- Mucus increases weight.
- Mucus leaves a trail.

1 mark

(c) Snails are herbivores. Thrushes and blackbirds eat snails.

Complete the food web below to show the relationship between plants, snails, thrushes and blackbirds.

Draw arrows on the diagram.

- plants

2 marks

(d) Snails that live in woodland areas are usually brown or red.

Suggest how the colour of snails in woodland areas protects them from birds.

........................................................................................................................

1 mark
maximum 6 marks
Q12. The drawing below shows a mole. Moles dig tunnels through soil.

(a) Give one way a mole is suited for digging through soil.
...........................................................................................................................................
...........................................................................................................................................
...........................................................................................................................................

1 mark

(b) Moles are part of the food chain shown below.

plant remains → worm → mole → owl

not to scale

(i) Which living thing in this food chain do moles eat?
...........................................................................................................................................

1 mark

(ii) Which living thing in this food chain is a predator of moles?
...........................................................................................................................................

1 mark
Some people use mole-scarers to get rid of moles from their gardens.

Two different mole-scarers are shown below. They both produce sounds that scare moles away.

(i) Where does the energy come from for the solar-powered mole-scarer?

........................................................................................................................................

........................................................................................................................................

........................................................................................................................................

1 mark

(ii) Suggest one reason for using a solar-powered mole-scarer instead of a battery-powered mole-scarer.

........................................................................................................................................

........................................................................................................................................

........................................................................................................................................

1 mark

(iii) Some gardeners use poison to kill moles.

Suggest one reason for using a mole-scarer rather than poison to get rid of moles.

........................................................................................................................................

........................................................................................................................................

........................................................................................................................................

1 mark

maximum 6 marks
Q13. The drawings show part of a farmland food chain.

(a) A pyramid of numbers represents the number of organisms at each stage in a food chain.

On each line by the pyramid of numbers below, write the name of the correct organism from the food chain above.

```
_ _ _
_ _
_ _
_ _
```

(b) Partridges feed mainly on insects and wild plants (weeds).
Some farmers spray their crops with chemicals to kill insects and weeds.
How would this affect the number of foxes?
..........................................................................................................................
..........................................................................................................................
..........................................................................................................................

Explain your answer.
..........................................................................................................................
..........................................................................................................................
..........................................................................................................................

(c) Partridges build their nests on the ground among plants.
They lay up to 18 eggs in the nest.
Suggest why partridges need to lay so many eggs.
..........................................................................................................................
..........................................................................................................................

1 mark
(d) Some farmers leave a strip of land around the edge of each field which they do not spray with chemicals.

Suggest two reasons why this will lead to an increase in the number of partridges on these farms.

1 ........................................................................................................................................

........................................................................................................................................

2 ........................................................................................................................................

........................................................................................................................................ 2 marks

maximum 5 marks

###

Pyramids of numbers represent the numbers of organisms at each stage in a food chain.

Study the four pyramids of numbers A, B, C and D shown below.

(a) For each of the food chains choose the pyramid of numbers which best represents the food chain.

(i) grass → insects → spiders → birds ................................. 1 mark

(ii) oak trees → aphids → blue tits → sparrow hawks ................. 1 mark

(iii) grass → rabbits → foxes → fleas ................................. 1 mark
(b) (i) Which is the main process transferring energy to the surroundings at each stage in a food chain?

Tick the correct box.

- growth
- nutrition
- reproduction
- respiration

1 mark

(ii) Which process transfers energy from organisms at one stage in a food chain to organisms at the next?

Tick the correct box.

- reproduction
- feeding
- movement
- photosynthesis

1 mark

Maximum 5 marks

Q15. The diagram below shows part of a grassland food web.
(a) One year the snail population increased in the grassland area.

How could an increase in the number of snails cause the caterpillar population to increase?

.................................................................................................................................
................................................................................................................................. 1 mark

(b) Snail poison can be used to control the number of snails. After some time, each owl contains more poison than each snail.

Explain why each owl contains more poison than each snail.

.................................................................................................................................
.................................................................................................................................
................................................................................................................................. 2 marks

(c) A scientist wants to record the number of dandelion plants in the grassland area.

Describe how they could use a $1m^2$ quadrat to estimate the number of dandelions growing in the grassland area.

.................................................................................................................................
.................................................................................................................................
................................................................................................................................. 2 marks
(d) The table below shows the population numbers for one food chain from the food web.

<table>
<thead>
<tr>
<th>organism</th>
<th>number</th>
</tr>
</thead>
<tbody>
<tr>
<td>dandelions</td>
<td>200</td>
</tr>
<tr>
<td>rabbits</td>
<td>20</td>
</tr>
<tr>
<td>foxes</td>
<td>4</td>
</tr>
</tbody>
</table>

Complete the pyramid of numbers on the graph paper below to represent this food chain. Label the pyramid to show each animal.
M1.  (a) (i) B 

(ii) about a hundred millionth of a second 
if more than one box is ticked, award no mark 

1 (L3)

(b) (i) quieter 
accept ‘softer’ or ‘fainter’ 
accept ‘they cannot hear him’ 
do not accept ‘lower’

1 (L3)

(ii) longer 
accept ‘more’

1 (L3)  [4]

M2.  (a) (i) B 

(ii) any one from 

• light travels in straight lines 

• light will not pass through the cardboard 
accept ‘the cardboard blocks the light’ 
or ‘the cardboard is opaque’ 

• they are in the shadow of the cardboard 
do not accept ‘they are in the shadow’

1

(b) green 

1

(c) Q 

1  [4]

M3.  (a) B √

if more than one box is ticked, award no mark 

1 (L5)
(b) (i) a continuous straight line from Joan's motor bike to the glass, and then from the glass to Nadia's head

- the incident ray and the reflected ray must touch the glass at the same point

angle of incidence must be approximately equal to the angle of reflection

- the incident ray must hit the mirror within the tolerance shown

an arrow pointing away from Joan's motor bike on either section of the ray

(ii) any one from

- traffic coming round the bend or at the junction will be seen
- Nadia or Joan or you can see round the bend

M4. (a) it is reflected

accept 'it is scattered

accept 'it reflects or bounces off
(b) one mark is for a ray from the headlamp to the light-coloured clothes and from them to the driver’s eye

- both parts of the ray are required
- accept small discontinuities in the ray
- accept rays which are almost straight but which have not been drawn with a ruler
- do not accept dotted lines

1 (L5)

- one mark is for accurately drawing the correct ray
  - this is a dependent mark do not award this mark unless the first mark was also awarded
  - the ray must touch the headlamp, touch the cyclist’s clothes, and touch the driver’s eye the ray must be continuous both parts of the ray must be drawn with a ruler

1 (L5)

- an arrow showing that the light enters the eye or leaves the headlamp
  - accept a correct arrow on an incomplete line

1 (L5)

(c) it is absorbed

- accept ‘it absorbs’
- accept ‘most is absorbed’
- accept ‘it is not reflected’
- accept ‘only some is reflected’

1 (L5) [5]

M5. (a) (i) refraction

1 (L6)

(ii) dispersion

1 (L7)

(b) One mark is for what would be seen on the screen. The second mark is for the explanation.

- only the green part would be seen
  - accept ‘only the green’

1 (L7)

- other colours are absorbed or removed by the green solution
  - accept ‘only green can go through’

1 (L7)
(c) any one from

- to break down the cell walls
- to break open the cells
- because the green substance is inside the cells or chloroplasts
  accept ‘to break up the chloroplasts’
  accept ‘to break down the cuticle’
  do not accept ‘to break them down’

(d) A comparison between the rate of photosynthesis in Dog’s Mercury and buttercup must be made.

any one from

- Dog’s Mercury has a higher rate of photosynthesis than buttercups in low light
  accept ‘Dog’s Mercury has a higher rate of photosynthesis in low light’
  accept ‘it can photosynthesise better than buttercups in the shade’
  accept ‘Dog’s Mercury can make more food in the shade’
  do not accept ‘it can photosynthesise in the dark’
- buttercups have a lower rate of photosynthesis than Dog’s Mercury in low light
  accept ‘buttercups have a lower rate of photosynthesis in lower light’
- buttercups reach their maximum rate of photosynthesis at higher light intensities
- Dog’s Mercury reaches its maximum rate of photosynthesis at lower light intensities

M6. (a) one mark for a ray from coin to eye, bending at the surface of the water, and not passing through the mug

both parts of the ray must slope upwards to the left
accept small discontinuities in the ray accept rays which are almost straight but which may have not been drawn with a ruler

one mark for accurately drawing the correct ray

do not award this mark unless the first mark was also awarded the ray must touch the coin, touch the pupil of the eye, and must be continuous
both parts of the ray must be drawn with a ruler

one mark for an arrow showing that the light enters the eye
(b) red light passes through

\[ \text{answers may be in either order accept ‘the filter or drink does not affect the red light’ do not accept ‘it reflects red light} \]

the other colours are absorbed

\[ \text{accept ‘only the red light passes through the filter’ or ‘every colour except red is absorbed for both marks do not accept ‘the light turns red} \]

1

M7. (a) (i) weathering √

\[ \text{if more than one box is ticked, award no mark} \]

1 (L3)

(ii) any one from

- it is hard or harder

\[ \text{accept ‘limestone is softer’ ‘granite or it is solid’ is insufficient} \]

- it is resistant to acid rain

\[ \text{accept ‘it is resistant} \]

\[ \text{accept ‘limestone is affected by acid rain} \]

- it is less permeable or porous

\[ \text{accept ‘limestone is more permeable or porous’ accept ‘granite is stronger} \]

- it is less easily weathered

\[ \text{accept ‘granite does not weather or erode} \]

1 (L4)

(b) (i) any one from

- coal

- gas

\[ \text{accept ‘methane} \]

- oil

\[ \text{accept ‘petrol’ or ‘diesel’ or ‘kerosene} \]

- peat

\[ \text{accept ‘turf} \]

1 (L3)

(ii) All fossil fuels are a source of energy √

\[ \text{if more than one box is ticked, award no mark} \]

1 (L3)
(iii) corrosion ✓
   if more than one box is ticked, award no mark
   1 (L4)

(iv) paint
   accept 'grease' or 'oil'
   accept 'plastic' or 'wax' or 'polish'
   accept 'varnish'
   accept 'zinc' or 'galvanise it'
   'waterproof coating' is insufficient
   'something to stop them reacting' is insufficient
   1 (L4)

M8.

(a)

<table>
<thead>
<tr>
<th>example</th>
<th>weathering</th>
<th>erosion</th>
<th>neither</th>
</tr>
</thead>
<tbody>
<tr>
<td>The stones in an old wall have been pushed apart by the roots of weeds.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>An old granite gravestone is still smooth and shiny.</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>A clay flower pot in the garden has crumbled and broken into pieces during the winter.</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Some soil has been washed from a flower bed by rain.</td>
<td></td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>

if more than one box is ticked in any row, award no mark for that row
4 (L4)

(b) freezing or freeze-thaw
   accept 'acid rain' or 'chemical weathering'
   do not accept 'weathering' or 'rain'
   1 (L4)
M9. (a) any two from

- discoloured
  accept 'stone gets dirty' or 'things grow on it' or 'mouldy'

- loss of detail or material worn away
  accept 'rounded' or 'smoother'

- bits broken off or cracks
  accept a named feature altered, eg nose, eyes accept 'eroded'
  or 'gets smaller' or 'crumbled'
  do not accept 'graffiti' or 'weathered'

(b) water on it freezes

plants grow on it
  if more than two boxes are ticked deduct one mark for each incorrectly ticked box;
  minimum mark zero

(c) any one from

- acid
  accept an appropriate acid

- sulphur dioxide
  accept 'SO₂'

- carbon dioxide
  accept 'CO₂' do not accept 'pollution'

M10. (a) when water freezes it expands

bits are forced off the sandstone or cracks are forced open
  accept 'cracks are opened up'
(b) (i) answers may include processes which are sometimes classified as erosion award one mark for the correct statement and one mark for the correct explanation

either

expansion and contraction due to rapid changes in temperature
   accept 'due to hot days and cold nights'

or

rocks split open due to growth of plant roots

or

rocks are pitted or cracked due to wetting and drying
   accept 'material hitting the surface'
   or 'attrition' or erosion due to wind or water
   or animals or people or rain'

(ii) acid rain or rain or pollutants

reacting with substances in the rock

   accept 'oxidation' or 'rusting'
   accept 'reacts with or dissolves or breaks down rock
   or named rock'
   do not accept 'wears away the rock'

[M11. (a) (i) any one from

• the snail has a shell
   accept 'the shell'

• the slug does not have a shell
   accept 'patch on back'
   references to size are insufficient

1 (L3)]
(ii) any one from

- antennae
  accept ‘tentacles or feelers or horns’
- stalked eyes
- shape of body
  accept ‘mouth’
  accept ‘no legs’
  accept ‘no internal skeleton’
  accept ‘they both produce mucus or are slimy or have a wet body’
  accept ‘they have a muscular foot’
  accept ‘slither along’
  references to size are insufficient

(b) mucus reduces friction ✓

if more than one box is ticked, award no mark

(c)

accept, for two marks, other arrangements of arrows that are correct, e.g.

accept, for one mark

‘thrushes’ and ‘blackbirds’ may be either order
award one mark for the organisms in the correct place
award one mark for the arrows showing the correct energy flow through the food web
all three arrows are required for the mark
(d) any one from

- they are camouflaged
  accept ‘they are harder to see’
  ‘it is easier for them to hide’ is insufficient

- they blend into their background
  accept ‘birds or predators cannot see them’
  ‘fewer will be eaten’ is insufficient as it does not refer to protection
  ‘they are disguised’ is insufficient

1 (L3) [6]

M12. (a) any one from

- it has large or wide hands or paws
  accept ‘its paws are like shovels’
  accept ‘big or strong feet’

- it has a pointed head or face or nose
  accept ‘it has a long nose’
  accept ‘it is streamlined’

- it has strong or big claws
  accept ‘it has sharp or long claws or nails’
  ‘claws’ is insufficient
  accept ‘eyes protected by fur’ or ‘eyes deep in fur’
  ‘it has small eyes’ is insufficient

1 (L3)

(b) (i) • worm

1 (L3)

(ii) • owl
  accept ‘bird’

1 (L3)

(c) (i) • the Sun
  accept ‘light’
  ‘solar’ or ‘solar panel’ or ‘solar energy’ are insufficient

1 (L4)
(ii) any one from

- batteries have to be replaced
- solar power is free
- solar power does not run out
  accept ‘it is a renewable source of power’
- it is cheaper to run
  accept ‘it is cheaper’
  ‘it is environmentally friendly’ is insufficient
  
1 (L4)

(iii) any one from

- it does not kill the moles
  accept ‘it is humane’
  ‘it is friendlier’ or ‘it is nicer’ are insufficient
- it does not harm other animals
  accept ‘it does not harm humans’
- poison kills or hurts moles
- poison kills or hurts owls or predators or other living things
  ‘poison is dangerous’ is insufficient
- poison enters food chains
  ‘you do not have to get rid of dead moles’
  or ‘you can leave them in the tunnel’ are insufficient
  ‘you have to keep adding poison’ is insufficient
  ‘so they do not become extinct’ is insufficient

1 (L4)

M13.  

(a)   

- fox
- partridge
- plant

answers must be in the correct order all three answers are required for the mark

1 (L5)

(b) fewer foxes or they decrease

accept ‘there would be less’
accept ‘they would drop or go down’
both the answer and the correct explanation are required for the mark
credit both correct answers written in the same space
‘foxes die’ is insufficient
any one from

- fewer partridges (for foxes to eat)
- the poison gets into the food chain
- they move elsewhere to find food
  accept 'less food'
  accept 'partridges would be poisoned'
  accept 'some die of starvation'
  do not accept 'the chemicals poison the foxes'
  do not accept 'they all die of starvation'
  do not accept 'they have nothing to eat'

(c) any one from

- greater chance of survival
- more would survive
  accept 'the more eggs they lay the more partridges there will be'
  accept 'some eggs will be damaged or eaten'
  accept 'some eggs will not hatch'
  accept 'young partridges or chicks may be eaten or trampled on or die'
  accept 'so they will not become extinct or die out'
  'partridges will die' is insufficient

(d) any two from

- there would be a greater variety of plants
- more plants or weeds
- more insects
- more nesting places
- more cover
- the partridges are not poisoned
  accept 'there would be plants to eat'
  accept 'there would be insects to eat'
  accept 'protection from predators'
  accept 'more food or they would have food'
  or 'partridges will come to feed if none of the first three marking points are given'
  do not accept 'they had not been sprayed with chemicals'
##

**M14.**

(a)  

(i) **D**  

if more than one letter is given award no mark  

1

(ii) **A**  

if more than one letter is given award no mark  

1

(iii) **B**  

if more than one letter is given award no mark  

1

(b)  

(i) respiration √  

if more than one box is ticked award no mark  

1

(ii) feeding √  

if more than one box is ticked award no mark  

1

[5]

##

(a)  

• blackbirds eat more snails so they eat fewer caterpillars  

  accept ‘blackbirds eat snails instead of caterpillars’  
  ‘blackbirds eat more snails’ is insufficient  
  do not accept ‘blackbirds stop eating caterpillars’  

1 (L6)

(b)  

• blackbirds eat the snails, owls eat the blackbirds  

  accept ‘the owls eat many blackbirds’  
  accept ‘blackbirds eat many snails’  
  ‘snails eat the poison’ is insufficient  

1 (L7)

• the poison (passes up the food chain and) becomes more concentrated  

  accept ‘bioaccumulation’  
  accept ‘the poison accumulates’  
  accept ‘animals do not excrete the poison’  
  accept ‘the poison persists (in the body)’  
  ‘owls eat a large amount of poison that has been passed up the food chain’ is insufficient  
  ‘owls are bigger’ is insufficient  

1 (L7)

(c)  

any one from  

• throw the quadrat (randomly) and count the number of dandelions  

• take several readings and find an average  

  for two marks, an answer must contain one of the first two marking points and an indication that the number will be multiplied by the area  

1 (L7)

• multiply the number by the total (grassland) area  

1 (L7)
(d) • a pyramid of numbers drawn to scale with dandelions on the bottom where:
  rabbits cover 50 small squares
  foxes cover 10 small squares

accept an otherwise correct response that is not aligned to the centre
one mark for labelled boxes in the correct order as shown
one mark for correctly sized bars (even if not labelled)

2 (L7) [7]