

Mark schemes

1

- (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) $(11\,000 \times 0.1 =)$
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

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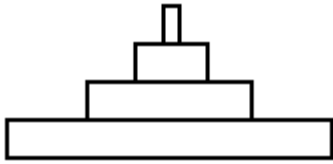
2

- (a) any **two** from:

- *idea of* absorption of light / energy
 - transfer to chemical energy
- allow produce sugars / glucose / starch / carbohydrate / food / biomass*
- provides food / energy for animals / caterpillar
 - releases oxygen

2

(b)



1

(c) 15(%)

allow 1 mark for $\frac{3 \times 100}{20}$ with no answer or incorrect answer

or

allow 1 mark for 0.15

2

(d) (i) any **two** from:

- markings look like eyes / face / mouth of much larger animal
- looks fierce / scary / dangerous
allow it looks like a snake
- to frighten blue tit / bird

max 1 if reference to camouflage

2

(ii) any **two** from:

- sharp / long / big claws
ignore strong
- sharp / hooked beak
ignore strong / big
- large wings **or** flies quickly
allow streamlined / aerodynamic
ignore powerful wings
- good eyesight

2

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3

(a) (i) any **two** from:

- not all eaten
allow eaten by other animals
- used for respiration
ignore used / lost in heat / movement
- lost as CO₂ / water / urea
- lost as faeces **or** not all digested
if neither mark awarded allow 1 mark for lost as waste

ignore references to energy losses

do not allow for growth / repair / reproduction

2

- (ii) any **one** from:
- thrushes eat other things
 - thrush numbers likely to vary (considerably)
allow it is only an estimate (of population size) or only counted thrushes for 5 hours
 - thrushes were not present all the time
 - thrushes feed on a much bigger area

1

- (b) (i) any **one** from:
- there are two dependent variables
 - there is no independent variable
 - to show the association / correlation / pattern (between the two variables)

1

- (ii) (snails in woodlands)
more have dark(er) colour(ed shells) **or** fewer have light-coloured shells
allow converse for grassland, if clear

1

(shells have) no / fewer stripes or have no stripes
allow converse for grassland, if clear

1

- (iii) less likely to be seen (by predators / birds / thrushes)
allow camouflaged (from predators / birds / thrushes)
allow light coloured shells with stripes would be more visible (to predators / birds / thrushes in woodland (than grassland)).

1

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4

- (a) limiting their movement
or
controlling the temperature of their surroundings

1

reason:
reduces energy transfer

if no other marks awarded, allow 1 mark for: 'fit more chickens in same space'

1

- (b) (i) without oxygen
ignore 'without air' 1
- (ii) any **two** from:
 - ethanol
allow alcohol
 - carbon dioxide
 - lactic acid.**do not accept** energy / ATP (apply list rule) 2
- (c) enzymes are denatured / change shape
ignore microbes are killed 1
- (enzyme) shape is vital for function **or** won't work (as efficiently) 1
- (d) (i) 200 1
- (ii) 120
allow ecf from (d)(i)
e.g.
60 x (i)
100 1
- (e) causes global warming 1
- one predicted consequence of global warming
eg rising sea levels, climate change, change in migration patterns, change in distribution of species
- or**
methane is flammable
so might cause fire / damage
if no other marks awarded, allow methane is a greenhouse gas for 1 mark 1
- 5** (a) methane / CH₄
allow CH₄
do not allow CH[#] or ch4 or CH4 1
- [11]**

- (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]

6

(a) it is impossible to weigh all the fish in the sea

1

(b) (i) increase / from 50 to 350 / by 300 thousand tonnes

1

(ii) due to fishing ban / not allowed

1

(c) (i) fishing quotas / limits

1

changes to net size

1

(ii) yes, biomass increases

1

use of figures from graph eg approx 4- times **or** (was effective at first) but numbers decline again after 2004

must use two comparative figures for 2nd marking point

1

(iii) so that breeding continues

allow prevent extinction / limit impact of fishing on food chain / web

1

(iii) 95%

correct answer gains 2 marks

2000-100=1900 award 1 mark

2

(d) any **four** from:

- increase in sea / water temperature
accept ref to lower sea / water temp if shift in Gulf Stream is referred to
- changes in migration patterns / distribution of species
- more eggs may survive (up to 19 °C) and could lead to an increase in herring pop
- reduction in herring pop (because eggs die if >19 °C)
accept change in other populations of fish which are alternative prey for cod
- (appropriate) change in cod population as a result

4
[14]

7

(a) (i) 76.0 / 76

correct answer with or without working gains 2 marks

allow 76.04 for 2 marks

allow 76.04 with extra decimal places eg 76.042 for 1 mark

$$\frac{465}{611.5} \text{ for 1 mark}$$

2

(ii) mass of fish declines (until 2008)

ignore use of numbers

allow number of fish decline (until 2008)

1

(due to an) increase in fishing / overfishing

1

and then rises (until 2010)

1

(which could be due to) quotas / net restrictions working

allow any reasonable suggestion, such as countries swapping quotas or restrictions on fishing during breeding seasons

ignore less fishing

*if no other marks awarded allow 1 mark for a decrease in mass **and** an increase in mass if answer relates to sustainable fishing*

1

(iii) (this is due to) public awareness / demand

allow legislation / rules

1

(b) fishing quotas / bans 1

(small) net / mesh size

if size of net is stated then it must be smaller

if size of mesh is stated then it must be larger

1

(c) (fish) cannot move freely / as much 1

(therefore) less energy loss from the fish

*do **not** allow 'no energy is lost'*

ignore references to less heat loss through controlling body temperature

ignore references to respiration

1

(there is) more food available / better quality food / fed more often

accept 'high-protein food (for making cells)'

1

(so) there is more energy for growth **or** (more food) is converted to biomass

1

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8 (a) (i) 1800(g) 1

(ii) triangular pyramid with four layers

accept ecf from (a)(i)

allow inverted pyramid

1

correctly labelled in order of food chain

1

(b) any **two** from:

- (lost as) crab faeces / not all digested
*allow waste / excretion for **one** mark if neither faeces nor urine are given*
- (lost as) crab urine / urea
- loss of carbon dioxide by crab
accept (lost via) respiration
- not all the limpet is eaten eg don't eat the shell
- not **all** limpets are eaten (by crabs)
*allow not enough crabs to eat **all** the limpets / the limpet population
ignore energy losses, such as movement*

2

[5]

9

(a) (i) 5.2

*award **2** marks for correct answer, irrespective of working or lack of it*

*award **1** mark for $62.4 \div 12$ only with incorrect or no answer*

2

(ii) the smaller the (mass of the) bird the more energy is needed (per gram of body mass)

allow converse

ignore figures

1

(iii) smaller bird has larger surface area : volume / mass ratio

allow converse

1

so heat / energy lost more quickly

allow lose more heat / energy

if (a)(ii) describes a trend of more energy with increasing body mass

*allow **one** mark for idea of more energy needed for flight*

1

(b) larger birds spend less time feeding

accept converse

allow the less energy they need per day the longer they spend feeding

1

since they need less food per gram of body mass (to satisfy energy needs)

1

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