M1.(a) (140 + 240 + 380 + 450 =) 1210

1

(b) the local people decided to farm cattle

1

a company starts growing plants for biofuels

1

(c) carbon dioxide

in this order only

1

photosynthesis

1

(d) animals and birds migrate because there is less food

1

more habitats are destroyed

1

(e) any **one** from:

- breeding programmes (for endangered species)
- regeneration (programmes)
- reintroduction of field margins / hedgerows
- awareness raising with politicians / public
- recycling

1

[8]

M2. (a) water

1

oxygen

in this order only

accept correct chemical symbols

allow H_2O / OH_2

1

(b) allow light (in / through) / need light

*do **not** accept attracts light*

ignore heat / moisture / carbon dioxide

ignore so the plants can be seen

accept the converse, ie the black plastic bag would not let light in (1)

1

for photosynthesis / make sugar / glucose

so there would be no photosynthesis (1)

*do **not** allow make food unqualified*

1

(c) Increase (in leaves / new leaves)

ignore growth unqualified

1

(then) level off **or** number of (new) leaves (then) stays the same

1

numerical statement eg max at 3 tablets / 5 (new) leaves

should refer to one of the first two marking points

*for every extra tablet get 1 extra leaf = **2** marks*

*for every extra tablet get 1 extra leaf then it levels off = **3** marks*

1

[7]

M3. (a) xylem **and** phloem

either order
allow words ringed in box
allow mis-spelling if unambiguous

1

(b) (i) movement / spreading out of particles / molecules / ions / atoms

ignore names of substances / 'gases'

1

from high to low concentration

accept down concentration gradient
ignore 'along' / 'across' gradient
ignore 'with' gradient

1

(ii) oxygen / water (vapour)

allow O_2 / O2
ignore O^2/ O
allow H_2O / H2O
ignore H^2O

1

[4]

M4. (a) protein

1

(b) (i) (more) magnesium gives more growth / more leaves / more duckweed

if converse must be clear that less magnesium gives less growth

1

(ii) **A** gave highest number of leaves / plants **or** more than others

*it equals **'A'***

*use of numbers must compare **A** with at least one other*

or

A gave most growth / most duckweed **or** more than others

allow faster / fastest / better / best growth

allow more growth with nitrate / less growth without nitrate

do not allow 'no' growth without nitrate

(c) (i) mark (c) as a whole

sensible method:

e.g. mass / weighing

ignore dry or fresh

allow other sensible method involving measuring eg length of roots – ignore 'size' of roots or measure roots unqualified

1

(ii) corresponding explanation:

ignore accuracy

e.g. includes roots / includes <u>whole</u> plant**or**leaves vary in size**or**(length / mass / surface area given in c(i)) is a continuous variable

1

[5]

M5.(a) oxygen

allow O_2 / O2
*do **not** accept O^2 or O*

1

(b) (i) light

1

(ii) chlorophyll

1

(iii) decrease

1

(c) any **three** from:

- for respiration / energy
  *do **not** accept use energy for photosynthesis*
- to make cellulose / starch
  accept named carbohydrate other than glucose
- to make lipid / fat / oil
  accept fatty acid / glycerol
- to make protein
  accept named protein / amino acid / named amino acid
- to build big molecules from small molecules / metabolism
  *if no other marks awarded for making molecules allow **1** mark for growth / repair / new cells*

3

[7]

M6. (a) (i) **C** and **D**

no mark if more than one box is ticked

1

(ii) any **one** from:

*do **not** allow if other cell parts are given in a list*

- (have) cell wall(s)
- (have) vacuole(s)

1

(b) (i) **A**

apply list principle

1

(ii) **D**

apply list principle

1

(c) respiration

apply list principle

1

[5]

M7.(a) chlorophyll is needed for photosynthesis

1

light is needed for photosynthesis

1

(b) increases

1

levels off / reaches a maximum / remains constant / stays the same / plateaus

*do **not** allow stops / stationary / peaks*

allow stops increasing

1

goes up to / reaches a maximum / levels off at (a rate of) 200 (arbitrary units)
or
levels off at 225 – 240 (light units)

ignore references to other numerical values

1

(c) (i) higher light intensity does not increase rate of photosynthesis

accept the graph stays level (above this value)

allow stops increasing

allow the rate of photosynthesis stays the same (above this value)

1

(ii) any **two** from:

- carbon dioxide (concentration)
- temperature / heat
- (amount of) chlorophyll / chloroplasts

allow water

allow ions / nutrients

ignore ref to surface area of the leaf

2

[8]

M8.(a) (i) in the direction of the force of gravity

1

(ii) against the force of gravity

1

(b) (i) diagram completed to show stem bending / leaning towards the window

the bend / lean can be at / from any point above pot level

ignore any leaves

1

(ii) more light (for leaves)

ignore heat

1

more photosynthesis / biomass / glucose

ref to 'more' needed once only, eg 'more light for photosynthesis' = 2 marks

if no other marks given allow 1 mark for 'to get light for photosynthesis'

1

[5]

M9.(a) (i) LHS = water

accept H_2O

*do **not** accept H^2O / H2O*

1

RHS = oxygen

accept O_2

*do **not** accept O / O^2 / O2*

1

(ii) light / sunlight

ignore solar / sun / sunshine

*do **not** allow thermal / heat*

1

(iii) chloroplasts

allow chlorophyll

1

(b) (i) 20

1

(ii) any **one** from:

- light (intensity)
- temperature.

1

(c) (i) To increase the rate of growth of the tomato plants

1

(ii) Because it would cost more money than using 0.08%

1

Because it would not increase the rate of photosynthesis of the tomato plants any further

1

[9]