

## Mark schemes

### Q1.

- (a) • leaf

*accept 'stem' or 'stalk'*

1 (L5)

- (b) (i) • it controls the cell **or** cell's activities  
*accept 'it tells the cell what to do'*  
*'it is the brain of the cell' is insufficient*  
*accept 'it contains or passes on (genetic)*  
*information or genes or DNA'*

1 (L5)

- (ii) any **one** from

- absorbs light **or** Sun's energy  
*accept 'traps or catches light'*  
*do not accept 'it attracts light'*
- photosynthesis  
*accept 'it makes food or glucose or sugar*  
*or starch or carbohydrate'*  
*'it produces oxygen' is insufficient*

1 (L6)

- (iii) any **one** from

- gives the cell its shape  
*'it protects the cell' is insufficient*
- supports the cell

1 (L6)

- (c) any **two** from

- cell wall  
*accept 'wall'*
- vacuole
- chloroplast

2 (L6)

(d) •

| <i>photosynthesis</i> | <i>respiration</i> |
|-----------------------|--------------------|
|                       | ✓                  |
| ✓                     |                    |
|                       | ✓                  |
| ✓                     |                    |

*if all four answers are correct, award two marks  
if two or three answers are correct, award one mark  
if more than one box is ticked in any row, do not credit that row*

2 (L6)

[8]

## Q2.

- (a) (i) • absorb **more** light **or** have a larger green area  
*accept 'they have more chlorophyll'  
do not accept 'attract more light'  
accept 'the variegated leaves have less chlorophyll'  
'catch more light' is insufficient  
'absorb more Sun' is insufficient*

- make more food **or** photosynthesise more  
*accept 'make more glucose or starch or sugar or protein'*

2 (L7)

- (ii) • variegated and normal (leaved plants) (IV)  
*accept 'both types of plant'  
a full description of the investigation can be awarded the full marks e.g. 'take both types of plant, count the leaves, give them the same amount of water, repeat the measurement at the end of the experiment and see how much the plants grew'*

1 (L7)

- named factor which can be measured (DV)  
e.g. weight of the plant **or** height of the plant **or** number of leaves  
*accept 'size of leaves'  
accept 'weight or mass of plant'*

1 (L7)

- named condition(s) for a fair test (CV) e.g.  
temperature **or** amount of water **or** same

species of plant **or** ambient conditions such as  
light **or** same size plant at the beginning **or** same age of plant

*'the same place' is insufficient for the CV  
'time' is insufficient as it is given in the question*

1 (L7)

- calculate (percentage) change for each type of plant  
*accept 'measure both (groups of) plants at the start  
**and** measure both (groups of) plants at the finish'  
accept 'record how much each plant grew over 6  
weeks and compare results'*

1 (L7)

- (b) • respiration ✓

*if more than one box is ticked, award no mark*

1 (L6)

[7]

### Q3.

- (a) • leaves are bigger

*accept 'there are leaves **or** a canopy'*

*accept 'leaves open **or** grow'*

*'trees block the light' is insufficient*

1 (L5)

- (b) any **two** from

- light is needed for photosynthesis

*accept 'photosynthesis'*

- more (photosynthesis)

*accept, for two marks, 'the rate*

***or** amount of photosynthesis increases if the light  
increases'*

- light provides energy for growth

*'they need light to grow' is insufficient*

*'light is a source of food' is insufficient*

- biomass **or** food **or** sugar **or** starch **or** carbohydrate is produced

2 (L6)

- (c) • glucose

1 (L6)

- water

*answers must be in the correct order*

1 (L6)

[5]

**Q4.**

(a) 6 6 6

*all required*

*accept a '6n 6 n n 6n' version of the balanced equation  
provided it is correct in every detail*

1

(b) any **two** of

- (presence of) chlorophyll **or** (amount of) chloroplasts  
*accept green leaves (or other green parts)*
- (sufficient) light (intensity)
- (light) of **a** suitable wavelength  
*any light other than green light  
do not credit Sun's energy or sunshine or Sun*

2

(c) **guard cells**

any **two** of

- \* control by osmosis
- \* the movement of gases

*accept movement of carbon dioxide **or** oxygen **or**  
water vapour beware movement of CO<sub>2</sub> out  
accept a diagram or description*

- \* through the stoma

2

**palisade cells**

any **two** of

- \* near the upper surface
- \* contain (a great) many **or** more chloroplasts
- \* (so) contain the most chlorophyll

2

(d) any three of

\* for respiration

\* conversion to (insoluble) starch

**or** to food store **or** to (other) carbohydrates

\* (conversion to) sucrose **or** to food store **or** to (other) carbohydrates

**or** polysaccharides

*do not credit just to grow **or** live*

***or** survive*

*accept conversion to food store*

***or** to (other) carbohydrates once only*

\* (conversion to) lipids **or** fats **or** oils

\* (conversion to) amino acids **or** (plant) proteins **or** auxins **or** (plant) hormones

**or** enzymes

3

[10]

**Q5.**

(a) • 7 days

1 (L3)

(b) • air temperature and soil moisture ✓

*if more than one box is ticked, award no mark*

1 (L4)

(c) any **one** from

• he only carried out his experiment at a medium light level

*accept 'he did not try other levels'*

*'it was not a fair test' is insufficient*

• he only used one light level

• he did not change the (amount of) light

1 (L4)

(d)

|      |       |
|------|-------|
| tray | day 4 |
| A    | 8     |
| B    | 7     |
| C    | 5     |
| D    | 2     |

*accept any whole number from 6 to 8*

*accept any whole number from 2 to 8*

*accept any whole number from 0 to 4*

*award two marks for all four correct answers*

*award one mark for any two or three correct answers*

2 (L4)

[5]

**Q6.**

(a) (i) any **one** from

- it is long and spindly  
*accept 'it is tall' or 'it has grown more'*  
*accept 'it is thinner' or 'it is thin'*
- the leaves are far apart
- the leaves are white **or** pale  
*accept 'the leaves are yellow'*  
*accept 'it is lighter'*  
*accept 'it has no chlorophyll'*  
*accept 'its leaves are a different colour'*  
*'they are shrivelled or crinkled' is insufficient*

1 (L3)

(ii) any **one** from

- it has wilted  
*accept 'it is not turgid' 'it has dried out' is insufficient*
- it has drooped  
*accept 'leaves pointing down'*
- the leaves are floppy  
*accept 'it is floppy'*  
*accept 'it has shrivelled'*  
*'it has died' is insufficient*  
*'it is discoloured' is insufficient*

1 (L3)

(b) any **two** from

- water

*accept 'H<sub>2</sub>O'*  
*accept 'moisture'*

- minerals

*accept a named mineral*  
*award two marks for two named minerals*  
*accept 'nutrients' **or** 'salts'*  
*do **not** accept 'food'*

- oxygen

2 (L4)

[4]

### Q7.

(a) any **three** from

- by photosynthesis
- carbon dioxide and water used
- oxygen produced

*accept for two marks the second and third marking points in a word **or** symbol equation, for example 'carbon dioxide + water → glucose + oxygen'*

- chlorophyll **or** chloroplasts absorb solar energy **or** sunlight  
*accept 'solar energy transferred to chemical energy'*

3 (L7)

(b) carbohydrates

1 (L6)

(c) (i) any **one** from

- loss of habitat  
*accept 'more buildings'*
- use of herbicides **or** weedkillers
- climate change  
*accept 'global warming'*
- competition with other plants

*do **not** accept 'growing populations'*  
*as this answer is too vague*

1 (L7)

- (ii) it increases  
because there is more light **or** there is more photosynthesis

***both** the answer and the explanation  
are required for the mark*

1 (L6)

[6]

**Q8.**

- (a) (i) respiration

1 (L7)

- (ii) carbon dioxide is produced

*accept 'maggots breathe out carbon dioxide'*

1 (L7)

- (b) (i) photosynthesis

1 (L7)

- (ii) any **one** from

- carbon dioxide is used up
- carbon dioxide reacts with water in the plant  
*accept 'the carbon dioxide reacts with water'  
'carbon dioxide is absorbed' is insufficient  
do **not** accept 'the carbon dioxide reacts with  
water in the tube'*

1 (L7)

- (c) any **one** from

- carbon dioxide produced by respiration was used up in photosynthesis
- carbon dioxide produced by the maggots is used in photosynthesis
- carbon dioxide produced by the maggots was used by the leaves  
*answers must refer either to respiration  
**or** maggots **and** photosynthesis or leaves  
'the concentration of carbon dioxide remains  
unchanged' is insufficient*

1 (L7)