



**Week 1 Learning Check
Biology Foundation**

Name: _____

Class: _____

Date: _____

Time: **30 minutes**

Marks: **30 marks**

Comments:

Q1.

Muscle cells divide to form new muscle cells.

(a) Which **two** cell components are copied before the muscle cells start to divide?

Tick **two** boxes.

- Cytoplasm
- Mitochondria
- Plasmids
- Ribosomes
- Vacuole

(2)

(b) Why do muscle cells need to divide by mitosis more often than most other cells?

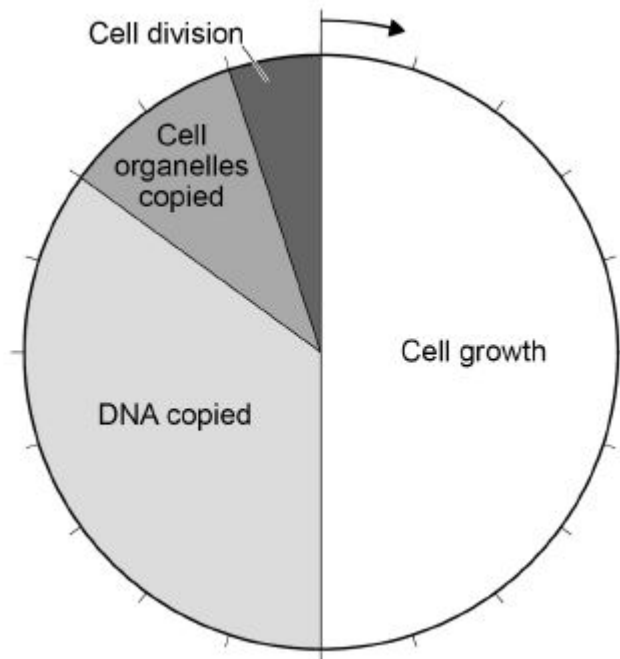
Tick **one** box.

- To contract the muscles
- To repair the muscles
- To supply more oxygen to the muscles
- To transmit nerve impulses

(1)

Mitosis is part of the cell cycle.

The diagram below shows the percentage of time taken by each stage of a cell cycle.



(c) The cell cycle shown in the diagram above takes 21 hours in total.

Cell division takes 5% of the total time.

Calculate how many hours cell division takes.

Time taken = _____ hours

(2)

(d) What percentage of time is spent copying DNA in the cell cycle shown in the diagram above?

Percentage = _____

(2)

(e) A sperm cell from a dog contains 39 chromosomes.

How many chromosomes are there in each dog muscle cell?

Tick **one** box.

39	<input type="checkbox"/>	156	<input type="checkbox"/>
78	<input type="checkbox"/>	312	<input type="checkbox"/>

(1)

(f) A sperm cell fuses with an egg cell.

What is this process called?

Tick **one** box.

Fertilisation	<input type="checkbox"/>	Ovulation	<input type="checkbox"/>
Meiosis	<input type="checkbox"/>	Respiration	<input type="checkbox"/>

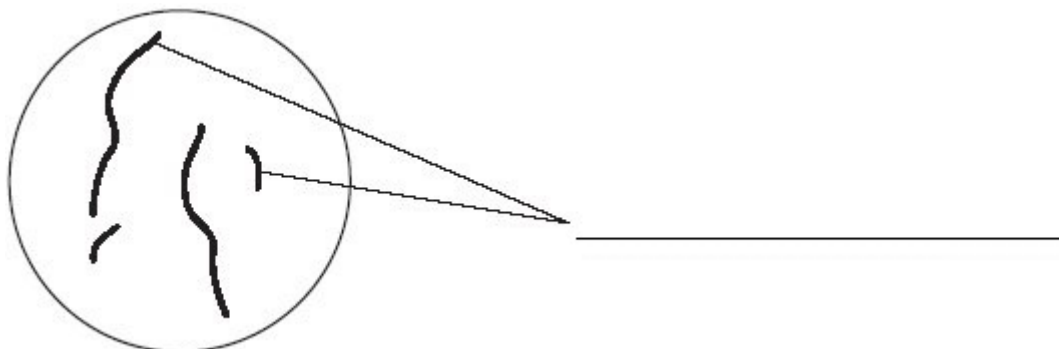
(1)

(Total 9 marks)

Q2.

Diagram 1 shows the nucleus of a body cell as it begins to divide by mitosis.

Diagram 1



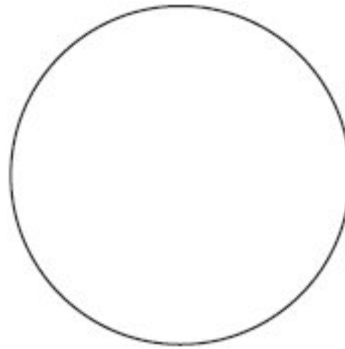
(a) Use a word from the box to label **Diagram 1**.

alleles	chromosomes	gametes
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(1)

- (b) Complete **Diagram 2** to show what the nucleus of one of the cells produced by this mitosis would look like.

Diagram 2



(1)

- (c) Stem cells from a recently dead embryo can be grown in special solutions.

Some facts about stem cells are given below.

- Stem cells from an embryo can grow into any type of tissue.
- Stem cells may grow out of control, to form cancers.
- Large numbers of stem cells can be grown in the laboratory.
- Stem cells may be used in medical research or to treat some human diseases.
- Patients treated with stem cells need to take drugs for the rest of their life to prevent rejection.
- Collecting and growing stem cells is expensive.

Use **only** the information above to answer these questions.

- (i) Give **two** advantages of using stem cells.

1. _____

2. _____

(2)

- (ii) Give **two** disadvantages of using stem cells.

1. _____

2. _____

(2)

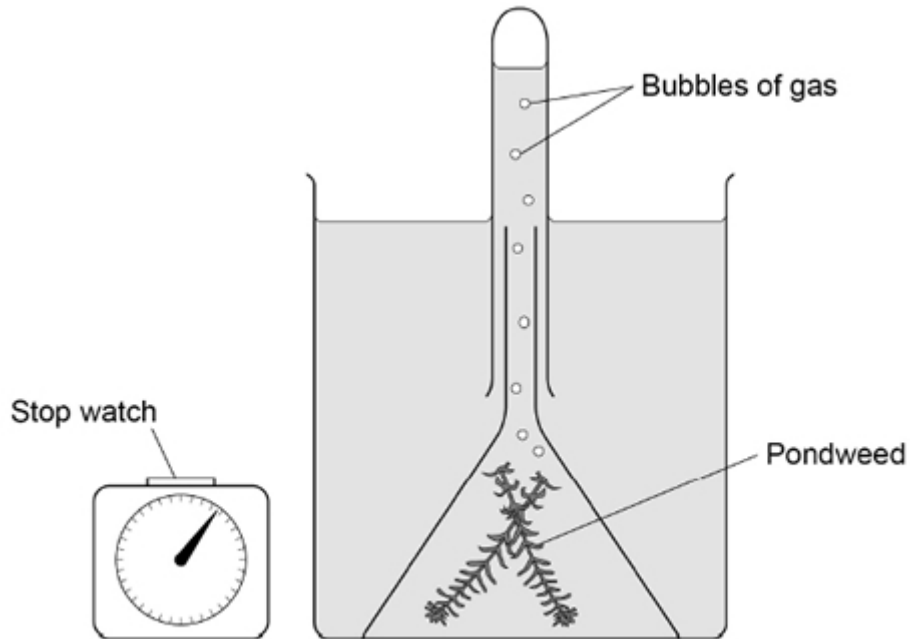
(Total 6 marks)

Q3.

A student investigated the effect of light intensity on the rate of photosynthesis.

Figure 1 shows some of the apparatus used.

Figure 1



(a) Name the gas produced by the pondweed in the light.

_____ (1)

(b) Describe **one** way the student could change the intensity of light reaching the pondweed.

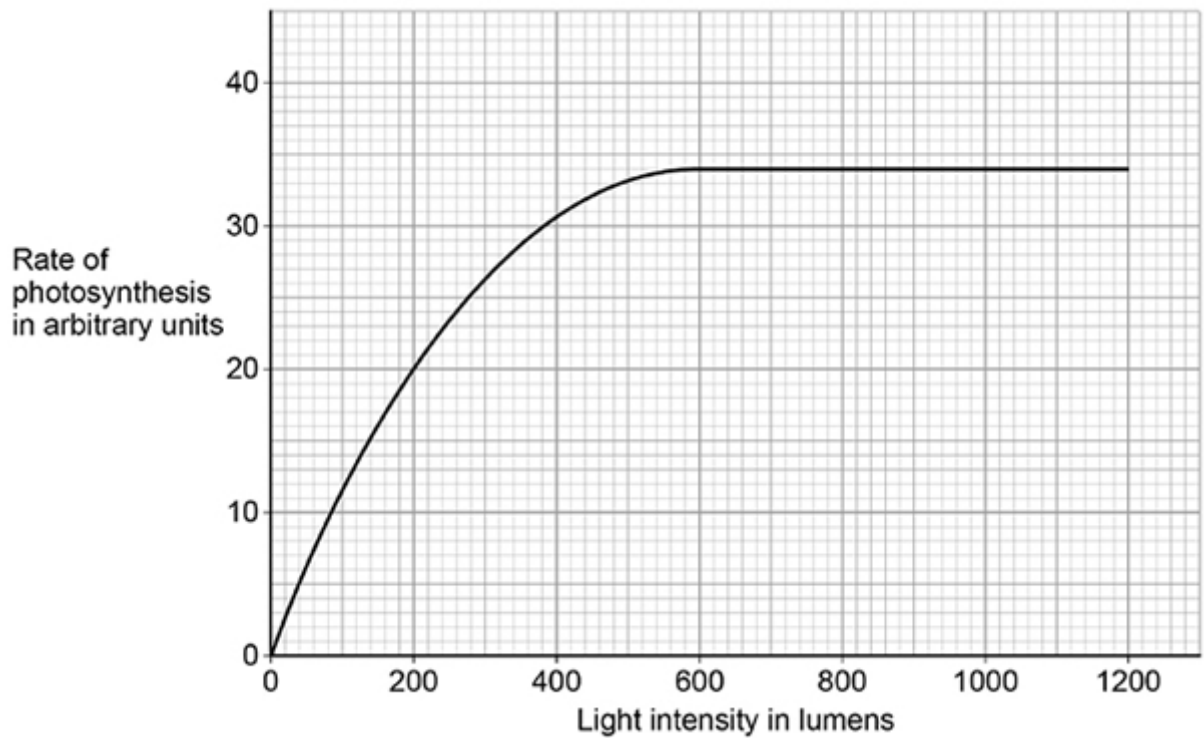
_____ (2)

(c) Describe how the student could use the apparatus in **Figure 1** to measure the rate of photosynthesis.

_____ (2)

Figure 2 shows the student's results.

Figure 2



(d) What was the maximum rate of photosynthesis?

Maximum rate = _____ arbitrary units

(1)

(e) At which light intensity was light a limiting factor?

Tick (✓) **one** box.

200 lumens

600 lumens

1200 lumens

(1)

(f) Light intensity can affect the rate of photosynthesis.

Give **one** other factor that can affect the rate of photosynthesis.

(1)

(Total 8 marks)

Q4.

Flu is an infectious disease caused by a virus.

Many people in England become infected with the flu virus in winter.

- (a) Doctors do not prescribe antibiotics to patients with flu. Doctors do not prescribe antibiotics to patients with flu.

State why.

(1)

- (b) A flu vaccine is offered to people with a high risk of having a severe illness if they are infected by the flu virus.

What does a flu vaccine contain?

Tick (✓) **one** box.

Inactive antibodies	<input type="checkbox"/>
Inactive viruses	<input type="checkbox"/>
White blood cells	<input type="checkbox"/>

(1)

- (c) The table shows the percentage of people in high-risk groups who had been vaccinated against flu by November in 2013. The data is for England.

Group at risk of a severe illness	Percentage (%) of group vaccinated by November in 2013
2-year-old children	31.1
3-year-old children	27.9
People 65 years and older	64.4

Give **one** conclusion from the data in the table above.

Suggest a reason for this.

Conclusion: _____

Reason: _____

(2)
(Total 4 marks)

Q5.

Four foods were tested for starch, sugar and protein.

The table shows the results.

Food	Test for starch: colour after iodine test	Test for sugar: colour after Benedict's test	Test for protein: colour after Biuret test
A	Blue-Black	Brick red	Blue
B	Orange	Blue	Lilac
C	Blue-Black	Yellow	Blue
D	Orange	Orange	Lilac

(a) Give **three** conclusions about food **D**.

1 _____

2 _____

3 _____

(3)
(Total 3 marks)

Mark schemes

Q1.

(a) mitochondria 1

ribosomes 1

(b) to repair the muscles 1

(c) $\frac{5}{100} \times 21$
allow $\frac{1}{20} \times 21$ 1

1.05 (hours)
allow for 2 marks 1 hour 3 minutes or 1:03 (hours)
an answer of 1.05 hours scores 2 marks 1

(d) $\frac{7}{20} \times 100$
allow 5×7 1

35 (%) 1
an answer of 53 (%) scores 2 marks

(e) 78 1

(f) fertilisation 1

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Q2.

(a) chromosomes 1

(b) diagram showing four separate chromosomes two long and two short (as in diagram 1)
allow each chromosome shown as two joined chromatids do not allow if chromosomes touching each other 1

(c) (i) any **two** from:
• can grow into any type of tissue / named tissue

- used in medical research
- used to treat human diseases
- large numbers can be grown

2

(ii) any **two** from:

- expensive
- grow out of control / ref cancers
- may be rejected
- need for drugs (for rest of life)

2

[6]

Q3.

(a) oxygen

name takes precedence

allow O₂

ignore O² / O / O₂

1

(b) (use) a lamp / light (source)

1

(and) move away and / or towards pondweed

*allow use different power ratings **or** use a dimmer switch*

*allow change the opacity of the beaker for **2** marks*

1

(c) count the number of bubbles

allow measure the volume of gas collected

1

in a given time

*allow for **2** marks measure time taken to collect a specific number of bubbles*

1

(d) 34 (arbitrary units)

allow a value in the range 33.5 – 34.5 (arbitrary units)

1

(e) 200 lumens

1

(f) any **one** from:

- temperature
- carbon dioxide (concentration)

- amount of chlorophyll
 - ignore light (intensity)*
 - ignore heat*
 - ignore oxygen*
 - allow light colour / wavelength*
 - allow water*
 - ignore pH*

1

[8]

Q4.

- (a) antibiotics do not kill viruses
- allow antibiotics only kill bacteria*
 - allow flu is not caused by a bacterium*

or

antibiotics are not effective against viruses

- allow antibiotics cannot reach viruses inside cells*

1

- (b) Inactive viruses

1

- (c) Conclusion:
people 65 years and older had the highest percentage vaccinated.
- ignore references to figures unless qualified*

1

Reason:

more worried about becoming ill

or

had more time to go to the doctor.

OR

Conclusion:

children aged 3-years had the lowest percentage vaccinated.

Reason:

parents didn't have time to take them to the doctor

or

they had been vaccinated when 2-years old.

1

[4]

Q5.

- (a) it does **not** contain starch

1

it contains sugar

- ignore high / low amount*

1

it contains protein

1

(b)	carbohydrase	1
(c)	mitochondria	1
(d)	B	
	<i>no marks if incorrect or no food given</i>	
	<i>if no food written on answer line check the table</i>	1
	does not contain sugar	1
	does not contain starch (that can be converted to sugar)	
	<i>ignore references to protein</i>	1

[8]

Examiner reports

Q1.

- (a) Mitochondria were the best known examples of animal cell components. Plasmids proved a powerful distractor despite only being associated with bacterial cells. 29% of students achieved full marks.
- (b) 51% of students did not make the link needed between mitosis producing new cells and the need for new cells for repair.
- (c) This calculation was quite well attempted, with 41% of students gaining two marks.
- (d) This calculation was well attempted, with 48% achieving two marks. 11% of students did not attempt the question.
- (e) 60% of students knew that a muscle body cell would have double the number of chromosomes found in a sperm cell.
- (f) 87% of students were able to name the process of fertilisation.

Q3.

- (a) Over half of the students correctly named the gas that is produced when the pondweed is in the light as oxygen. When students are asked for the name of a chemical, they should write the name, not give the formula. If an incorrect formula is given, for example O₂, O or O², the mark cannot be awarded.
- (b) About 58% of students gained two marks for saying the light intensity could be changed by moving a lamp nearer to, or further from, the pondweed. Some suggested altering the temperature, using more pondweed or leaving it for a longer period of time. None of these gained credit.
- (c) Half the students gained full marks for this question which differentiated between students very well. It was very clear when students had a real practical grasp of the investigation. They gave a concise response describing counting the bubbles of gas produced in a given time, or in one minute.

When only one mark was awarded this was usually for the first marking point; to count the bubbles. Other students described how to vary the light intensity, rather than describing what should be measured in order to calculate a rate.

- (d) Around 83% of students correctly gave the maximum rate of photosynthesis as 34 $\frac{1}{2}$ arbitrary units. As is usual for graph readings, a tolerance of $\pm \frac{1}{2}$ a small square was allowed. Therefore a value between 33.5 and 34.5 was allowed. Incorrect readings of 35 and 40 were commonly seen. Some students read the wrong axis and gave an answer of either 600 or 1200.
- (e) About 12% of students identified the correct part of the graph when light intensity was limiting the rate of photosynthesis. The vast majority selected 600 lumens as the answer.
- (f) The question asked for a factor that affects the rate of photosynthesis. Many students gave light intensity, which had been given in the question and was therefore ignored. Around 64% of students answered correctly with the most

common correct response being temperature. The amount of carbon dioxide and water availability were other correct responses that were seen.

Q4.

- (a) The most common correct response was that antibiotics do not kill viruses. A common misconception was that viruses are immune or resistant to antibiotics. Quite a lot of students said 'antibiotics should not be prescribed for flu because it will go away on its own in a few days', or that 'the body will fight it off'. These ideas were not creditworthy.
- (b) Just under half the entry gained the mark for saying that a flu vaccine contains inactive viruses.
- (c) Quite a lot of students misinterpreted the information given in the table. Some thought it showed the percentage of each age group who had flu, and others thought it was a percentage of the whole population. Some said 'as you get older a higher percentage of people get vaccinated', which is incorrect as the data does not show a pattern. The most common reasons given were that older people had weaker immune systems, or were more likely to catch flu, both of which were ignored.

Q5.

- (a) Food tests were not answered well with about 9% gaining all three marks. Approximately 10% of all students did not attempt to answer this question.

Most were unable to score by simply describing the colours with no reference to whether starch, sugar or protein was present.
- (b) About 43% of students gained the mark for correctly selecting carbohydrase. The most common error was the selection of lipase.
- (c) Approximately half of all students scored the mark for correctly identifying the mitochondria. The most common error given was ribosomes.
- (d) Around 3% of students achieved three marks with almost a quarter scoring one or two marks. Many were unable to correctly identify the food from the table. Most that gave the correct food only gave reference to sugar being a problem for a person with Type 2 diabetes.

Some did not gain credit because they gave inconclusive results with phrases such as less sugar or a bit of starch. There were very few references to starch being a problem.