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| <b>Student Name:</b>                            | <b>Centre Number: 22227</b>                    |
| <b>Transition Pack</b>                          |  |
| <b>Assignment : Writing a Scientific Report</b> |  |
| <b>Start Date:</b>                              | <b>Deadline: 8<sup>th</sup> September 2023</b> |
| <b>Assessor:</b>                                |  |

**Grading Criteria covered by this assignment:**

|    |  |
|----|--|
| P1 | Carry out a suitable experiment and write up a <b>scientific lab report</b>  |
| M1 | In your <b>Scientific lab report</b> describe the optimum conditions for plants and relate them to your investigation                                |
| D1 | At the end of your <b>Scientific lab report</b> add ideas that explain the factors industrial farms need to consider before producing a new product. |

**STUDENT COMMENTS:**

I certify that all of the work produced in this assignment is my own, and that I have acknowledged all external resources used when producing my work.

**STUDENT DECLARATION:** \_\_\_\_\_

**Mark achieved (to be completed by assessor):**

|          | PASS CRITERIA | MERIT CRITERIA | DISTINCTION CRITERIA |
|----------|---------------|----------------|----------------------|
| CRITERIA | P1            | M1             | D1                   |
| SIGN     |               |                |                      |
| DATE     |               |                |                      |

**Assessor Comments:**

I declare that this student has completed all necessary tasks to achieve the mark given above:

**Candidates Work Internally Verified**    **YES**    **NO**

**IV Name:**

**Sign:**

**Date:**

As a student following a BTEC Diploma course you will need to have the confidence to independently research scientific information and present your findings. You will need to be able to follow detailed success criteria and produce clearly presented assignments which show that you have considered and included the required elements for success.

### How the work should be presented

You should produce a written report which is long enough to address the success criteria. You should focus on the requirements and avoid including any irrelevant (albeit interesting) information. Your work will be in the format of a scientific lab report. Some great advice on how to do this on these website [https://www.sheffield.ac.uk/polopoly\\_fs/1.96443!/file/report-writing-06-07.pdf](https://www.sheffield.ac.uk/polopoly_fs/1.96443!/file/report-writing-06-07.pdf) or <https://www.youtube.com/watch?v=Yqioa8Njhhk> and on pages 145 to 172 in the BTEC book if you have it already.

### How the work will be assessed

The work will be assessed by your teacher on how well you have followed the success criteria and the level of detail you include in the assessment. You will be given a grade for the overall task following assessment.

#### ASSIGNMENT BRIEF

The purpose of this assignment is to demonstrate an understanding of photosynthesis and to write a scientific report.

You are going to need to buy some dried peas from the supermarket or you can use cress seeds if you can source some during the lockdown period.

If neither of these are available any seeds will do as they are only going to be grown and measured for a limited period of time.

Grass seed for lawns, basil, chives, onion and coriander seeds from your spice rack, will all work for this.

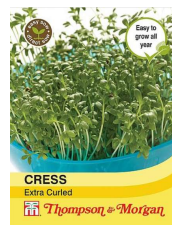
Alternatively use a simulation on the Internet like this -

<https://www.explorelearning.com/index.cfm?method=cResource.dspView&ResourceID=615&ClassID=2774634>

This is what  
you are  
looking for



or



Other seed  
companies  
have cress  
too, but these  
are commonly  
sold in the  
supermarkets

**Top tip for growing pea shoots and other seeds soak your seeds for 24 hours before you plant them. This ensures they are fully hydrated.**

**Scenario:**

You work for Premier Foods, Wisbech who produce salad for the major supermarkets. One of the large supermarkets has asked if Premier Foods can introduce pea shoots to their salad range. Your boss has asked you to investigate the best condition to grow the pea shoots in.

**Tasks:****1. The Investigation**

- Research photosynthesis and the variables which affect it. Include your research in the work you hand in. Reference where you have got the information from.
- Decide on a variable you are going to investigate e.g. growing the pea shoots in different amounts of light.
- Plan a method for your experiment. Use the support sheets to help.
- Plant your pea shoots seeds and wait for them to grow. (Measure their height every day and record.)
- Remember to make it a fair test. Include in your method how you will do this e.g. give the same amount of water to each plant.

P1

**2. The Report (and success criteria)**

Your employer has asked you to write a report on your findings. Use the 'How to write a scientific report' info to help you do this.

P1

Add to your report a detailed description on which variable you should focus on next to establish the optimum conditions for growing pea shoots and the method that should be used.

M1

Explain what factors would need to be considered by Premier Foods to make this a profitable business. You should consider limiting factors.

D1

## **How to write a Scientific Report**

### **Title**

In the form of a question e.g. 'How does the amount of light affect pea shoots growth?'

### **Abstract** (WRITE THIS LAST but needs to be at the top of the report)

It is an overview of the whole report so somebody could read it 2 minutes and decide if the report is relevant to what they would like to find out without reading the whole report. It should be a few sentences to summarise the whole report.

### **Introduction**

Write the purpose of the experiment and what you are trying to find out. State your hypothesis (what you think will happen) and explain how you came to that prediction. Use the previous research you have done and your knowledge.

### **Method** (A step by step guide)

Details on how you tested your hypothesis and why you performed your study in that particular way.

Include your independent, dependent and control variables and a risk

Independent variable – What you changed

Dependent variable – What you measured

Control variables – Things you kept the same

### **Results**

Results table.

Graphs, including a description of the trend of the graph.

### **Discussion**

What do the results tell you? Consider whether the data you obtained supports your hypothesis. Does this agree with the literature you read?

### **Conclusion**

Explore the implications of your findings and judge the potential limitations of your experimental design.

Recommendations for future experiments should be made here.

### **Reference List**

Try to reference using the Harvard system

**Refer back to page 2 to visit some good websites on scientific report writing**

### 3. Questions:

You have also been issued with some biology, chemistry and physics questions which you should complete some independent research on in order to be able to answer the questions. They will give you an idea of the nature/level of questions that you could be asked in the externally assessed units.

#### Biology questions:

1. State the maximum magnification that can be achieved by a light microscope and a transmission electron microscope.

Select your answers from the list below.

10x    40x    100x    400x    1500x    25 000x    50 000x    500 000x

light microscope ..... x

transmission electron microscope ..... x

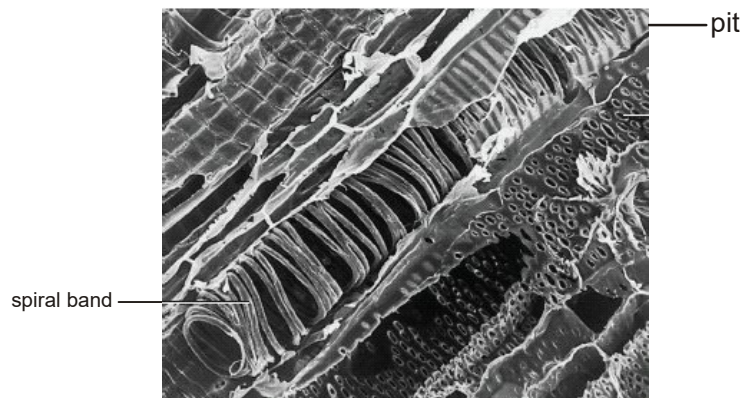
[Total 2 marks]

2. Describe what is meant by the term *resolution*.

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

[Total 2 marks]

3. The figure below is an electron micrograph of xylem tissue in the stem of a plant.



- (i) State **one** function of xylem tissue.

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

[1]

[Total 6 marks]

4. (i) Explain what is meant by the term *tissue*.

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

[2]

- (ii) Name **one** type of epithelial tissue found in the lungs.

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

[1]

[Total 3 marks]

5. Explain why the lungs can be considered to be an organ.

.....  
.....

[Total 2 marks]

6. In the lungs, goblet cells secrete mucus. The mucus is then moved by cilia. Name **one** cellular structure from the list below that is associated with each of the following functions. You must select a structure once only.

**mitochondria    ribosome    Golgi vesicle    centriole    nucleus    cytoskeleton**

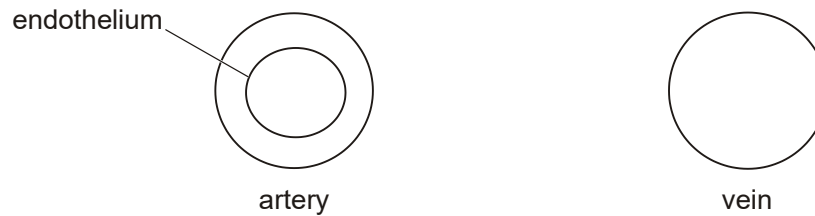
- (i) release of energy .....
- (ii) movement of cilia .....
- (iii) secrete mucus .....

[Total 3 marks]

7. (i) The figure below represents a transverse section of an artery and a

vein.

Draw a line to show the relative position of the endothelium of the **vein**.



[1]

(ii) State **two other** ways in which the wall of an artery is different from the wall of a vein.

- 1 .....
- .....
- 2 .....
- .....

[2]

[Total 3 marks]

**Chemistry questions:**

(a) Give the relative charge and relative mass of an electron.

Relative charge .....

Relative mass .....

(2)

(b) Isotopes of chromium include  $^{54}\text{Cr}$  and  $^{52}\text{Cr}$

(i) Give the number of protons present in an atom of  $^{54}\text{Cr}$

.....

(ii) Deduce the number of neutrons present in an atom of  $^{52}\text{Cr}$

.....

(iii) Apart from the relative mass of each isotope, what else would need to be known for the relative atomic mass of chromium to be calculated?

.....

(3)

(c) One isotope of sodium has a relative mass of 23.

(i) Define, in terms of the fundamental particles present, the meaning of the term *isotopes*.

.....  
.....

(ii) Explain why isotopes of the same element have the same chemical properties.

.....  
.....

(3)

(d) An atom has half as many protons as an atom of  $^{28}\text{Si}$  and also has six fewer neutrons than an atom of  $^{28}\text{Si}$ . Give the symbol, including the mass number and the atomic number, of this atom.

.....  
.....

(2)

**Physics questions: YOU NEED GRAPH PAPER or use excel to draw a graph on your computer**

1. Using a piece of graph paper plot a graph of the following data:

| Time (Seconds) | Activity (Bq) |
|----------------|---------------|
| 0              | 128           |
| 10             | 100           |
| 20             | 74            |
| 30             | 56            |
| 40             | 42            |
| 50             | 32            |
| 60             | 24            |

Use your results to work out the half life of the isotope.

**Uses of Isotopes And Their Half Lives**

Doctors use radioactive tracers inside the body to monitor some internal organs during the course of a few hours or even days.

1. Why is it important to choose the correct half-life when looking at radioactive tracers?
2. What could be the potential dangers of choosing an incorrect isotope for a procedure?
3. Describe the Rutherford scattering experiment and explain the results obtained from it.
4. Describe some properties of X-rays.
5. Explain how we obtain images using X-rays.
6. State the 3 types of nuclear radiation and describe their properties.
7. Write out the order of the EM spectrum, for each type of EM wave, give uses and properties.