Grade 8 Natural Science Worksheet

The importance of sunlight for green plants

Part One: Practical work

In this activity, you will see how important sunlight is for autotrophic green plants.

You will need:

Some seeds – radish or cress are best as they germinate very quickly

Three saucers

Kitchen paper/roller towel – about 6 pieces

Masking tape

What to do:

1. Line three saucers with two sheets of roller towel (fold each sheet into quarters).
2. Dampen the roller towel.
3. Divide the seeds into three groups. Sprinkle each saucer with one of the groups of seeds.
4. Place the seeds in a dark cupboard for three days. (If it is very hot, check at the end of two days that the roller towel is still damp. If not, sprinkle a little water on the seeds before replacing them in the cupboard.)
5. After three days, remove the saucers from the cupboard. Make a note of what you observe.
6. Dampen each saucer again. Replace one saucer in the dark cupboard. Mark each of the remaining two saucers with a piece of masking tape on the one side of the saucer. Place these two saucers on a windowsill where they will get lots of sunlight. Make sure that the masking tape faces the window.
7. Each day, for about 5 more days, make a careful note of what you observe happening. Remember to check the saucer in the dark cupboard too. Also remember to sprinkle water on the seedlings if the paper seems dry. If you move the saucers on the windowsill, remember each time to replace them with the masking tape facing the window.

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8. After 5 days, sprinkle water on the seedlings on the windowsill, if they need it, then replace ONE of the saucers with the masking tape facing AWAY from the window. Note what you observe over the next day or two.
9. What do all these observations tell you about the following?
    a. The plant's need for sunlight.
    b. The effect of directional sunlight on plants.

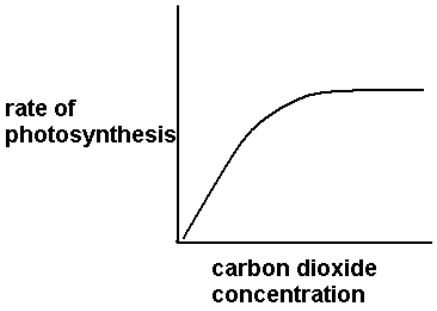
[16 marks]

Rubric to assess practical work and report

Criteria	Level 4 [4]	Level 3 [3]	Level 2 [2]	Level 1 [1]
Learner able to complete practical work independently by following instructions.	Outstanding.	Good.	Satisfactory.	Poor.
Learner worked consistently through period of practical work, making diligent observations each day and caring for seeds.	Outstanding.	Good.	Satisfactory.	Poor.
Learner able to conclude plant's need for sunlight from observations.	Outstanding.	Good.	Satisfactory.	Poor.
Learner able to conclude the effect of directional sunlight on plants from observations.	Outstanding.	Good.	Satisfactory.	Poor.

Part Two: The rate of photosynthesis

This graph shows what happens to the rate of photosynthesis when the concentration of carbon dioxide changes. Remember that rate means the speed at which the reaction takes place. When the concentration of CO_2 is low, then the



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rate of photosynthesis is low. As the CO_2 concentration increases, so the rate of photosynthesis increases. This means that a plant will undergo more rapid photosynthesis if there is more CO_2 available. However, look carefully at the trend of the graph. The increase in rate reaches a certain point and then the graph flattens. Even if more and more CO_2 is provided, the rate of photosynthesis cannot progress any quicker.

1. Supply a suitable title for the graph shown above.
2. Explain what is meant by the terms 'maximum', 'minimum' and 'optimum'.
3. With respect to the graph, use the three terms you described in (2) in sentences that describe the **trend** of the graph.
4. Draw a graph similar to the one illustrated above, but your independent variable must be 'light intensity'. Predict what the graph will look like.

[12 marks]

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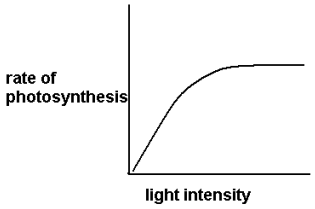
Suggested Solutions

Question number	Possible marks	Solution
1	16	Assist the learners in setting up their investigations. The initial period of darkness triggers germination. Once the plants are put into sunlight, they will thrive. The plants kept in the dark do not thrive. The plants will also grow towards the sunlight. See rubric in Appendix of Assessment Tools.
2	12	1. The relationship between CO_2 concentration and rate of photosynthesis. ✓ OR: The change in rate of photosynthesis with change in CO_2 concentration. Any suitable heading that takes into account both variables.✓ 2. Maximum – highest or most; ✓ Minimum – lowest or least; ✓ Optimum – best. ✓ 3. As the CO_2 concentration increases, the rate of photosynthesis increases from a minimum to a maximum. ✓ The rate of photosynthesis reaches a maximum point which is the optimum CO_2 concentration. ✓ If the CO_2 is concentration is increased beyond this point, there is no effect on the rate of photosynthesis.✓ 4. ✓✓✓✓ 

Appendix of Assessment Tools

Rubric to assess practical work and report

Criteria	Level 4 [4]	Level 3 [3]	Level 2 [2]	Level 1 [1]
Learner able to complete practical work independently by following instructions.	Outstanding.	Good.	Satisfactory.	Poor.

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Learner worked consistently through period of practical work, making diligent observations each day and caring for seeds.	Outstanding.	Good.	Satisfactory.	Poor.
Learner able to conclude plant's need for sunlight from observations.	Outstanding.	Good.	Satisfactory.	Poor.
Learner able to conclude the effect of directional sunlight on plants from observations.	Outstanding.	Good.	Satisfactory.	Poor.