

SCIENCE *Ahead* International

Lower Secondary

WORKBOOK



PREFACE

SCIENCE *Ahead* is a comprehensive, three-level science programme aligned to the Cambridge Assessment International Education lower secondary curriculum. The series uses the constructivist-inquiry approach to offer a learner-centred solution that helps students acquire scientific concepts, processes and skills. The use of spiral progression allows students to revisit concepts and skills at different stages with increasing depth in order to build a strong foundation.

The workbook has been designed to help students hone their science process skills and critical thinking skills.

ACTIVITY 9.3 LOUDNESS OF SOUND

1. To measure the loudness of sound, the loudness with respect to the amplitude of the sound wave.

2. To study the effect of amplitude on loudness.

3. To study the effect of amplitude on loudness, observing, identifying, inferring, relating, comparing.

4. To study the effect of amplitude on loudness.



1. How do you think the loudness of sound changes with the amplitude of the sound wave? Write down your prediction.

Procedure:

Experiment:

2. How do you think the loudness of sound changes with the amplitude of the sound wave? Write down your prediction.

ACTIVITIES

Engaging and relevant exercises and experiments designed to cultivate science process skills and critical thinking skills, as well as an inquisitive attitude in students



Timely tips and reminders to enhance students' learning process and ensure their safety when carrying out experiments

ACTIVITY 7.2 CHEMICAL REACTIONS BROUGHT ABOUT BY HEAT

1. To observe chemical reactions brought about by heat.

2. To observe chemical reactions brought about by heat.

3. To observe chemical reactions brought about by heat.

4. To observe chemical reactions brought about by heat.

A Burning magnesium in air (Teacher's demonstration)

1. Observe an experiment to observe a chemical reaction.

2. Observe an experiment to observe a chemical reaction.



Note:

Remember to wear safety goggles when working.

Observe and record what happens.

Procedure:

Experiment:

Conclusion:

Reflection:

REVISION WORKSHEET

A checkpoint to reinforce learning through exposure to exam-format questions

REVISION WORKSHEET 1

Section A: Multiple-choice questions

Choose the most suitable answer (A, B, C or D) and tick the box in the table provided.

1. Which of the following substances is not a pure substance?

A. Oxygen

B. Copper

C. Distilled water

D. Iron

E. Air

F. Sugar

G. Salt

H. Paper

I. Milk

J. Oil

K. Juice

L. Soap

M. Glass

N. Wood

O. Plastic

P. Rubber

Q. Wax

R. Gold

S. Silver

T. Bronze

U. Steel

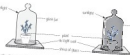
V. Aluminium

W. Zinc

X. Lead

Y. Tin

Z. Nickel



When you work on this worksheet, you should be able to:

1. Identify the reactants and products in a chemical reaction.

2. Write a balanced chemical equation for a chemical reaction.

3. Explain the importance of a balanced chemical equation.

4. Explain the importance of a balanced chemical equation.

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20. Explain the importance of a balanced chemical equation.

REFLECTION

1. How do you think your learning is going?

2. How do you think your learning is going?

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29. How do you think your learning is going?

30. How do you think your learning is going?

REFLECTION

A self-assessment checklist that provides students with an opportunity to be aware of their level of understanding and take responsibility for their learning

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Reproduction and Development*

*Online chapter, available for teachers only to download

*Online resources available at: www.MCEduHub.com

CHAPTER 1

PHOTOSYNTHESIS AND TRANSPORT IN PLANTS

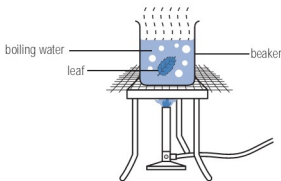
ACTIVITY 1.1 TESTING FOR THE PRESENCE OF STARCH IN GREEN LEAVES

AIM To test for the presence of starch in a green leaf

MATERIALS Plant with small green leaves, beaker, tripod stand, wire gauze, Bunsen burner, water, forceps, boiling tube, alcohol (ethanol), white tile, dropper, iodine solution

SKILLS Using apparatus, observing, inferring, communicating

- 1 Pluck a small leaf from a plant that has been exposed to strong sunlight for a few hours.
- 2 Place the leaf in boiling water for one minute.



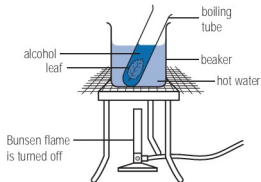
- 3 Turn off the Bunsen burner. Use forceps to gently remove the leaf from the hot water. Place the leaf in a boiling tube half-filled with alcohol.



Note

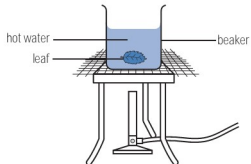
Alcohol is flammable. Remember not to heat alcohol directly with a flame or place it near a flame.

- 4 Place the boiling tube containing the alcohol and leaf in hot water for ten minutes. This is to remove the chlorophyll from the leaf. Use forceps to remove the leaf from the boiling tube.

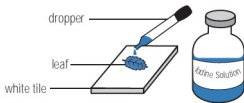


What has happened to the colour of the leaf?

- 5 Soak the leaf in hot water to soften the leaf.



- 6 Place the leaf on a white tile. Place a few drops of iodine solution on the leaf.



What happens to the iodine solution on the leaf?

- 7 From your observation in step 6, infer whether starch is present in the leaf.
-

ACTIVITY 1.2 DO PLANTS NEED CARBON DIOXIDE FOR PHOTOSYNTHESIS? (TEACHER'S DEMONSTRATION)

AIM To find out whether plants need carbon dioxide for photosynthesis

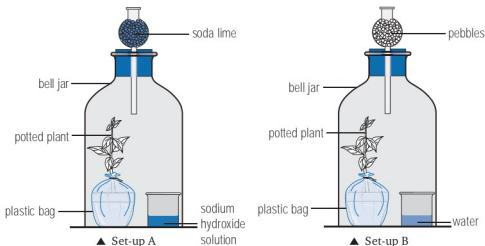
MATERIALS Two identical potted plants, two plastic bags, two pieces of string, two bell jars, two thistle funnels, two rubber bungs, two beakers, soda lime, sodium hydroxide solution, water, pebbles, tripod stand, wire gauze, Bunsen burner, forceps, boiling tube, alcohol (ethanol), white tile, dropper, iodine solution

SKILLS Communicating, identifying, comparing, identifying variables, observing, inferring

- 1 Place two identical potted plants in a dark room for 48 hours to de-starch their leaves. The starch in the leaves will be depleted. This is to ensure that there is no starch in the leaves at the beginning of the experiment.
- 2 Tie a plastic bag around each potted plant as shown here. The plastic bag will prevent carbon dioxide from organisms in the soil from being released into the set-ups in step 3.



- 3 Place each potted plant in a bell jar as shown below. The sodium hydroxide solution and soda lime in set-up A absorb carbon dioxide from the air.



a What is the purpose of set-up B?

b What variable is changed in the two set-ups?

4 Leave both set-ups in strong sunlight for at least six hours.

5 Pluck a leaf from each plant and test the leaves for starch. (See Activity 1.1 on testing a leaf for starch.)

a What happens to the iodine solution when it is added onto the leaf from set-up A?




b What happens to the iodine solution when it is added onto the leaf from set-up B?

6 From your observations, which plant has not carried out photosynthesis?

7 From your observations, infer the condition necessary for photosynthesis.

REFLECTION

- 1 Tick (✓) to show how well you have learnt.

I have learnt to	 Yes	 Not sure	 No	Student Book section(s)
explore how carbon dioxide, water and light are needed for photosynthesis				1.1
explore how photosynthesis produces biomass and oxygen				1.1
describe how water and mineral salts are absorbed and transported in flowering plants				1.2

- 2 Write down ways to improve your understanding of the Student Book section(s) that you do not know well.

REVISION WORKSHEET 1

Section A: Multiple-choice questions

Choose the most suitable answer (A, B, C or D) and write it in the brackets provided.

1 Which of the following substances do plants need to carry out photosynthesis?

- I Carbon dioxide
- II Oxygen
- III Mineral salts
- IV Water

- A I and II only
- B I and IV only
- C I, III and IV only
- D I, II, III and IV

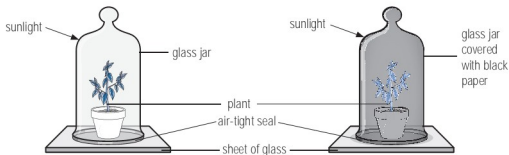
()

2 During photosynthesis, plants produce food in the form of _____.

- A fats
- B proteins
- C starch
- D sugar

()

3 Study these experimental set-ups.



Both set-ups are placed in the dark for 48 hours, after which they are placed in strong sunlight for a few hours. A leaf from each set-up is then plucked off and tested for starch. What is the aim of this experiment?

- A To investigate whether plants are able to make their own food
- B To investigate whether plants can make food using artificial light
- C To investigate whether plants need light to make food
- D To investigate whether plants need chlorophyll to make food

()

4 Which part of a plant captures sunlight so that photosynthesis can take place?

- A Chlorophyll
- B Root hair
- C Stoma
- D Vein

()

5 In which part(s) of a flowering plant can the xylem be found?

- A Leaves only
- B Leaves and stem only
- C Stem and roots only
- D Leaves, stem and roots

()

Section B: Short-answer and free-response questions

Write the correct answers in the spaces provided.

1 The leaves of a plant in a garden are coated with oil on both surfaces. The plant is watered every day.

a Will the plant be able to carry out photosynthesis? Why?

b What will happen to the plant after a few days?

2 Ali has guppies, which he keeps in an aquarium. Guppies, like other living things, need oxygen to live. One way to supply oxygen to the guppies is to fit an air pump in the aquarium.

a Instead of fitting an air pump, Ali places some water plants in the aquarium. The guppies survive. Explain why.

b Will the guppies survive if Ali places water plants in the aquarium and then leaves the aquarium in a dark place throughout the day? Why?

3 The roots of a flowering plant are cut off. The plant is then placed in a container of water.

a Will the plant be able to take in water from the container? Explain.

b How does cutting off the roots affect the plant?



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Relevant experiments and activities allow students to apply the concepts they have learnt to their daily lives. Revision worksheets provide a checkpoint to reinforce learning by exposure to exam-format questions.



Teacher's Guide and
other online resources

For more teaching and learning resources, log on to: www.MCEduHub.com

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Our materials are research-based, and our authors are subject experts and experienced educators. Our insistence on quality has enabled our materials to be approved by the Singapore Ministry of Education since the 1980s. Over the years, our materials have also gained international recognition and are now used in over 70 countries.

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