

SCIENCE

**Answer key for
learner's book**

Learner's book page 148

- 4.1
 - a It can move. It feeds. It respires. It can sense changes in its environment.
 - b Any two of: it excretes, it reproduces, it grows.
- 4.2
 - A class arachnids
 - B class insects
 - C class insects
 - D class myriapods
 - E class crustacea

Learner's book page 148

- 4.3
- a -She did not find red-crowned and yellow-crowned parakeets making nests together which suggest that they do not reproduce with each other.
- b- She should check more pairs of parakeets in the wild.

Learner's book page 241

- Questions

- 3** Accept any food chain taken from the food web.
- 4** Acacia tree and grass
- 5** 7
- 6** 3
- 7** Any two from cheetah, leopard, hyena and aardvark.
- 8** Any two from:
Cheetah (predator) and springbok, zebra or aardvark.
Leopard (predator) and hyena, springbok, zebra or aardvark (prey).
Aardvark (predator) and termites (prey).
Hyena (predator) and springbok (prey).

Learner's book page 245

- Activity 7.3.1

Activity: What can microorganisms decay?

1 Bread, leather, wood, fruit

2 **Orange/Potato** made of organic matter.

Plastic/ silicon is not made of organic matter.

3 Bread, leather, wood, fruit and **Orange and Potato are** made of organic matter in the answer to question 1.

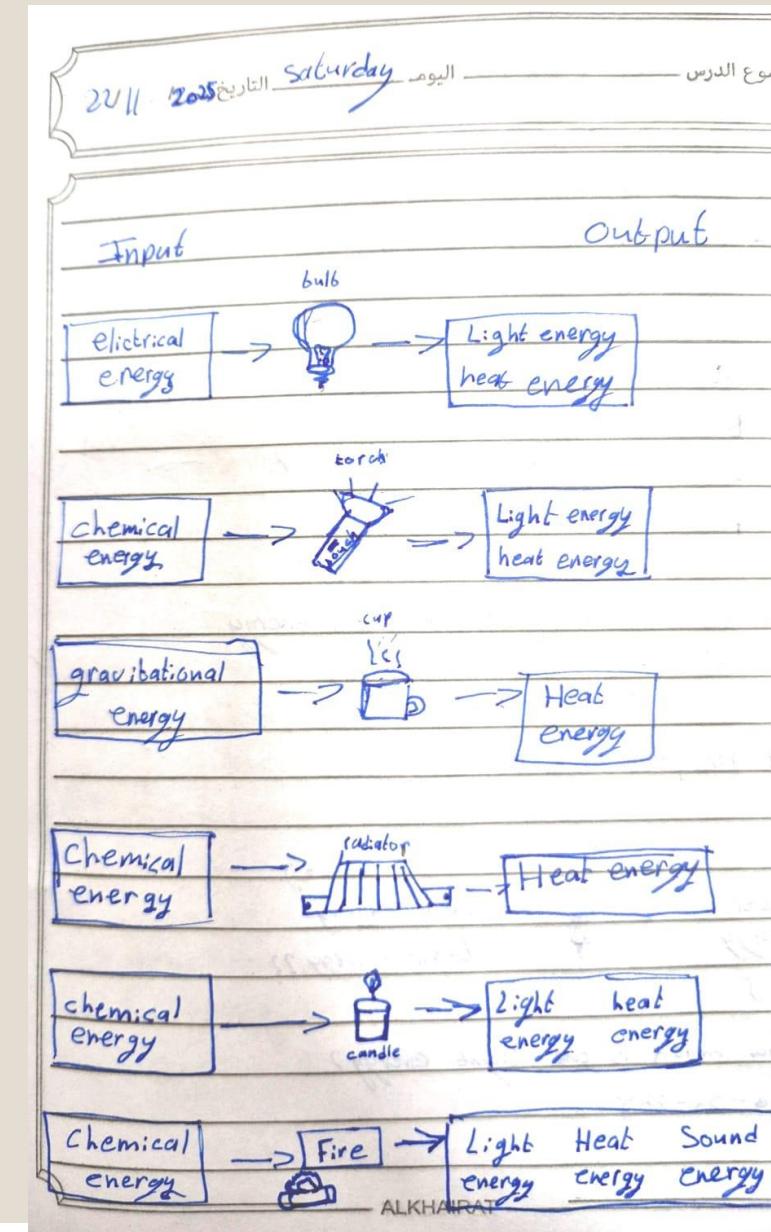
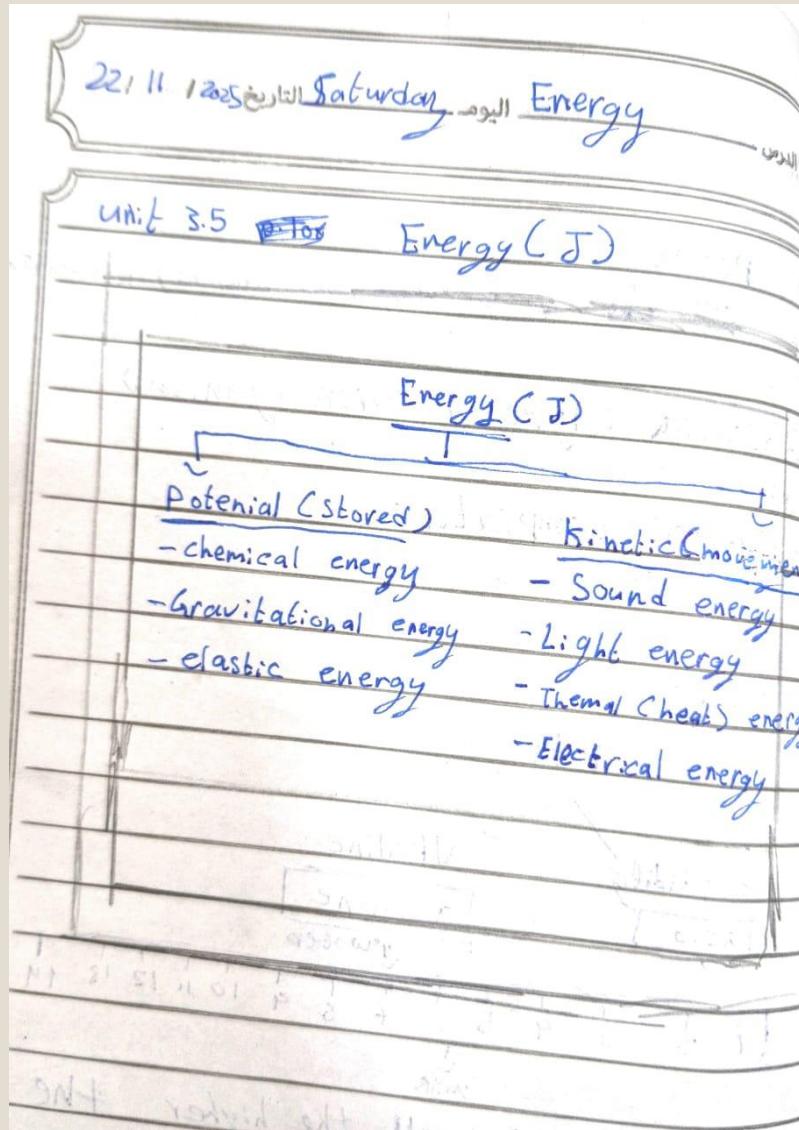
Learner's book page 246

Questions

- 1 Decomposers break down organic material, making it decay.
- 2 For example, they make food go bad.
- 3

Decay by microorganisms is useful because it **recycles nutrients back into the soil**, making them available for plants to grow.

Energy lesson extra examples



Energy lesson extra examples

```

graph LR
    Input[Input: chemical energy] --> Fash[fash]
    Fash --> Light[Light]
    Fash --> Thermal[Thermal energy]
    Light --> LightEnergy[light energy]
    Light --> Thermal
    LightEnergy --> Output[Output: light energy]
    Thermal --> Output
    
```

100 J How much is the thermal energy of 100 J ?

chemical energy \rightarrow Light energy 40J
 \rightarrow Thermal energy

How much is the chemical energy?

$$40 + 20 = 60 \text{ J}$$

Note: Input = output
energy energy

\rightarrow gravitational energy \rightarrow EP \rightarrow Thermal energy

Learner's book page 109

اليوم Monday التاريخ 12/02/2011 24/11

Q1 LB p.109

Q1 a-chemical energy
b-electrical energy

Q2 a-chemical energy

b- chemical energy

C-gravitational energy

d-gravitational energy

Q3 @ chemical and gravitational energy

⑥ - Light and sound energy

Q4 fire, fire works

Electrical energy \rightarrow  \rightarrow Heat energy
Light energy ??

How much is the light energy?

$$100 - 20 = 80$$

Learner's book page 1114+119

Q1 P.1114

change or transferred

Q2 at Electrical energy \rightarrow Light energy

b- chemical energy \rightarrow kinetic energy

C- Electrical energy \rightarrow Sound energy

b- Chemical energy \rightarrow Wood (fire) \rightarrow Thermal energy

C- Gravitational energy \rightarrow Bird Fly \rightarrow kinetic energy

d- gravitational energy \Rightarrow rolling ball \rightarrow Kinetic energy

موضوع الدرس _____ اليوم Thursday التاريخ 27/11/2025

p.119 Q1 Energy that spreads out becomes less useful

Q2 Thermal, Sound, Light

Q3 a-useful (light) / wasted (thermal)

6-useful (chemical) / wasted (thermal)

C - Wasted (Sound) / useful (kinetic)

Extra example

Energy can be transferred from one form into another form.

(a) A light source transfers 20 J of energy into 4 J of light and some heat energy.

(i) Calculate how much energy is transferred into heat energy.

16 J

(ii) Describe what happens to this heat energy.

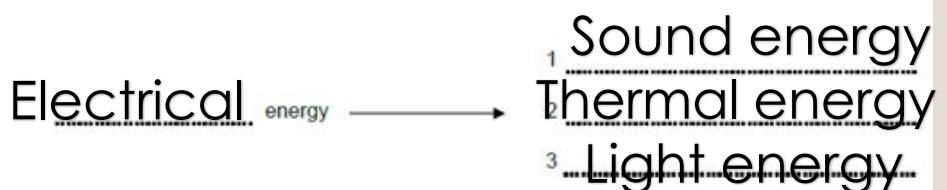
It is wasted or dissipated to the surrounding or air

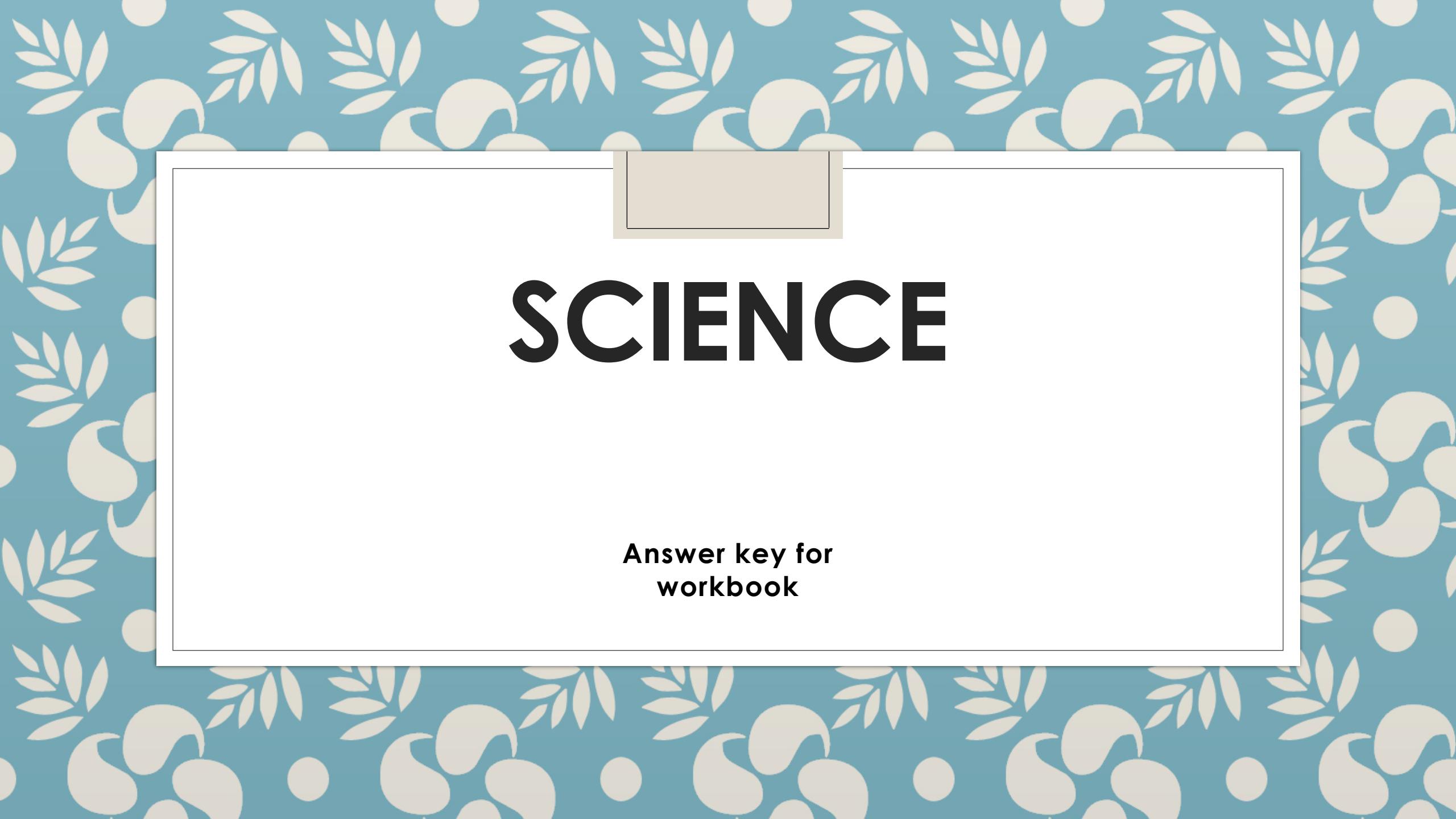
(b) A microphone transfers sound energy into 120 J of electrical energy and 30 J of heat energy.

Calculate how much sound energy is transferred.

(c) Look at the pictures.

Complete the energy transfer for each picture.





SCIENCE

**Answer key for
workbook**

Workbook page 59

Topic 3.5 Energy

Exercise 3.5A Describing energy

Elastic – energy stored in an object that has changed shape.

Gravitational potential – energy in objects that are lifted higher.

Electrical – energy carried by current in wires.

Chemical – energy stored in fuel.

Sound – energy transferred from vibrations.

Thermal – energy in hot objects.

Light – energy that we can see.

Kinetic – energy of moving objects.

Workbook page 60

Exercise 3.5B Examples of energy

- 1** **a** Food is a store of **chemical** energy.
- b** A book lifted up onto a shelf has a store of **gravitational potential** energy.
- c** The Sun transfers **thermal** energy and **light** energy to Earth (words can be in either order).
- d** A musical instrument transfers **sound** energy to our ears.

2 Gravitational potential and chemical are stored.
Thermal and light are transferred.

Workbook page 63

Topic 3.6 Changes in energy

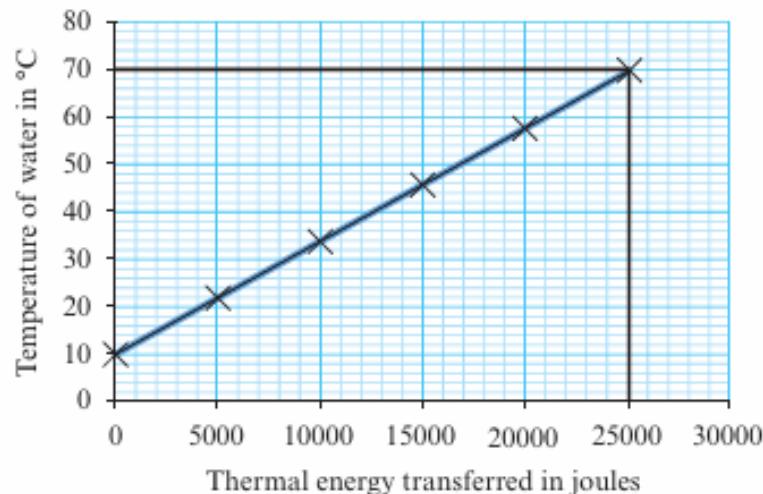
Exercise 3.6A Energy diagrams

- 1 Electrical \rightarrow light
- 2 Electrical \rightarrow sound
- 3 Chemical \rightarrow kinetic
- 4 Gravitational potential \rightarrow kinetic

Workbook page 64+65

Exercise 3.6B Reading from a graph

- 1 As the thermal energy transferred **increases** the temperature of the water **increases**.
Cannot be decreases in both because energy is being transferred to the water.
- 2 10 °C
- 3 Vertical line drawn down from a line at 70 °C to the 25 000 J on the x-axis.



- 4 Mass of water used.

Workbook page 67+68

Exercise 3.7B Energy loss

- 1 Two from: same volume/mass of water (do not accept amount), same shape of beaker/same surface area, same material of beaker, set up in same place, take temperatures at the same times.
- 2 Thermal
- 3 Two from: (surrounding) air, container, surface that the container is on, e.g. bench/table.
- 4 Measure the temperature of the surroundings before, during and after placing the hot water. The temperature will have increased (if thermal energy has gone there).
- 5
Gloves / lab coat / goggles

Workbook page 68+69

Exercise 3.7C Wasted energy

1 $100 - 80 = 20\%$

2 a $100 - 25 = 75\%$

b Two from: thermal; sound/vibration, chemical if clearly referring to unburned fuel/chemicals in exhaust.

c Diesel engine is more efficient;

Workbook page 72+73

- Exercise 4.1B Characteristics of living organisms
 - 1 Sensitivity
 - 2 Respiration
 - 3 Movement
 - 4 Excretion
 - 5 Nutrition
 - 6 Reproduction
 - 7 Growth

Workbook page 73

- Not all living things show these characteristics all of the time
- an elephant, for example, is alive but does not reproduce all the time
- apples do not show sensitivity (but they are respiration, and they contain seeds that will grow into a complete living thing)
- seeds do not move (but will eventually grow into a plant that can move parts of its body).

Workbook page 74+75

- Q1) Viruses are very small. Viruses are not made of cells. Viruses can only replicate when they are inside a living cell.
- Q2) a -They can replicate.
- b -They can only replicate inside a living cell and they are unable to carry out any of the other characteristics of living organisms

Workbook page 77

White rhinoceroses and Indian rhinoceroses belong to different **species**. This means that they cannot **reproduce** with each other to produce **fertile** offspring.

White rhinoceroses and Indian rhinoceroses do not look **exactly** the same as one another. Indian rhinoceroses have one **horn** but white rhinoceroses have two **horns**

Workbook page 78+79

4 Grouping and identifying organisms

Exercise 4.3B Horses, donkeys and mules

Practice

This exercise is about the meaning of the word 'species'. It will also give you practice in observing carefully and recording your observations.

Donkeys and horses belong to different species.

People sometimes breed a female horse with a male donkey.

The offspring is called a mule. Mules are big and strong, like horses. They are quiet and easy to handle, like donkeys. Mules are infertile.

1 Write down three similarities between a horse and a donkey.
 First similarity:

1- Having four legs.

Second similarity:

2-Two ears

78

4.3 What is a species?

Third similarity:

3-Hair on the body

Write down **two** ways in which a donkey differs from a horse.

First difference:

1-Donkey is smaller than horses

Second difference:

2-Donkey body colour is different than horses.

3 Find **two** pieces of evidence in the information at the start of this exercise to show that horses and donkeys belong to different species.

First piece of evidence:

~~1~~ Different names

Second piece of evidence:

~~Cannot breed~~

Workbook page 81+82+83+84

- **Exercise 4.4A Using a key to identify a fruit**

- Fruit B is sycamore.

- **Exercise 4.4B Using a key to identify four fish**

- 1) a-1a

- b -Basking shark (its eye is above the front end of its mouth)

- 2)a-1b

- b -Sea bream (it has short spines on its top fin).

- 3) Greenland shark

- 4)1a , 2b

Workbook page 85+86

- **Exercise 4.4C Using a key to identify tree species, using their leaves**
- 1) Leaf A is hazel
- 2) 1b, 2a, 3b
- 3) Leaf B: 1a, rowan
- Leaf C: 1b, 2a, 3a, 4b, cherry Leaf
- D: 1b, 2a, 3a, 4a, willow
- Leaf E: 1b, 2b, maple

Workbook page 87

- **Topic 4.5 Writing keys Exercise**
- **4.5 Making a key to identify plant species from their leaves**

1-Shape – one whole shape, or divided into three parts, or with several ‘fingers’.

2- Edge (the proper biological term is the margin) – smooth or jagged.

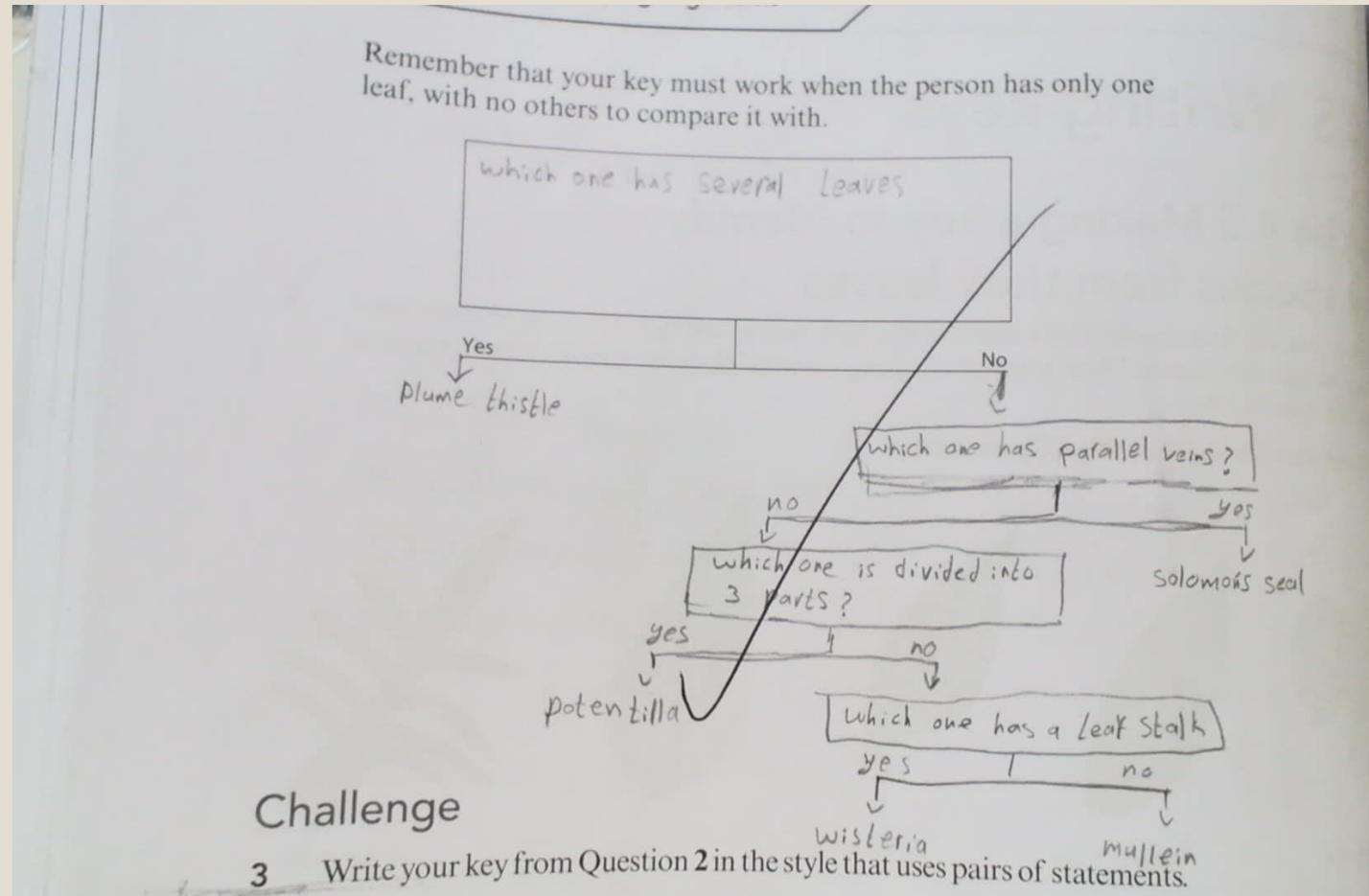
3-Veins – form a network, or run parallel to the midrib.

4-Texture – smooth or rough.

5-Stalk – some have a leaf stalk and some do not.

6-Size – some are larger than others

Workbook page 88



Workbook page 88

1a-which one has several leaves....Plume thistle
B-which one doesn't have several leaves Go to 2

2a-Does it have long stalkWisteria
B-Which one doesn't have long stalkGo to 3

3a-Does it have parallel veins.....Solomon's seal
B-Doesn't have parallel veinsGo to 4

4a-Does it have rough edgesPotentilla
B-Doesn't have rough edgesMullein

Challenge

3 Write your key from Question 2 in the style that uses pairs of statements.

yes | no
↓ ↓
wisteria mullein

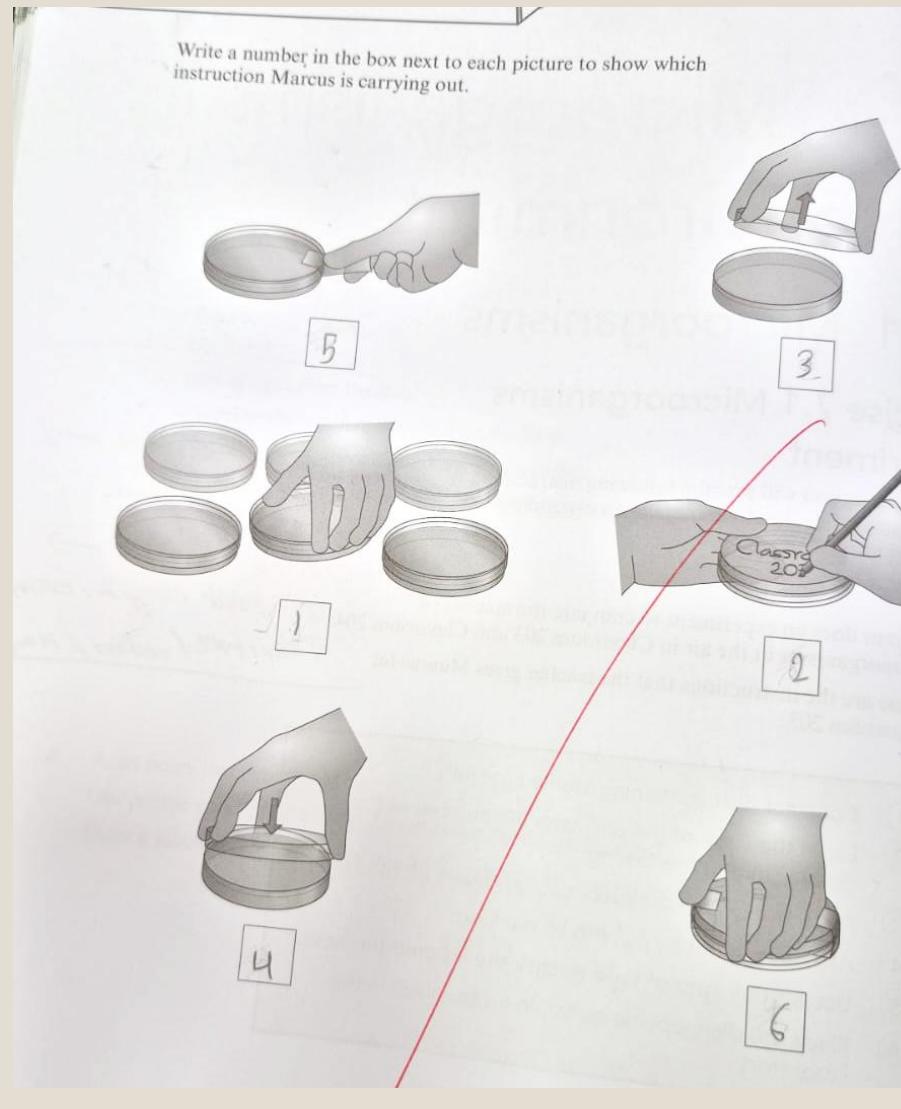
1a which one has several leaves --- plume thistle
b-which one has one leaf --- Go to 2

2a- which one has parallel veins --- solom's seal
b- which one is not parallel veins --- Go to 3

3a- which one is divided into 3 parts --- potentilla
b- which one is not divided into 3 parts --- Go to 4

4a-which one has a leaf stalk --- wisteria
b- which one doesn't have a leaf stalk --- mullein

Workbook page 126

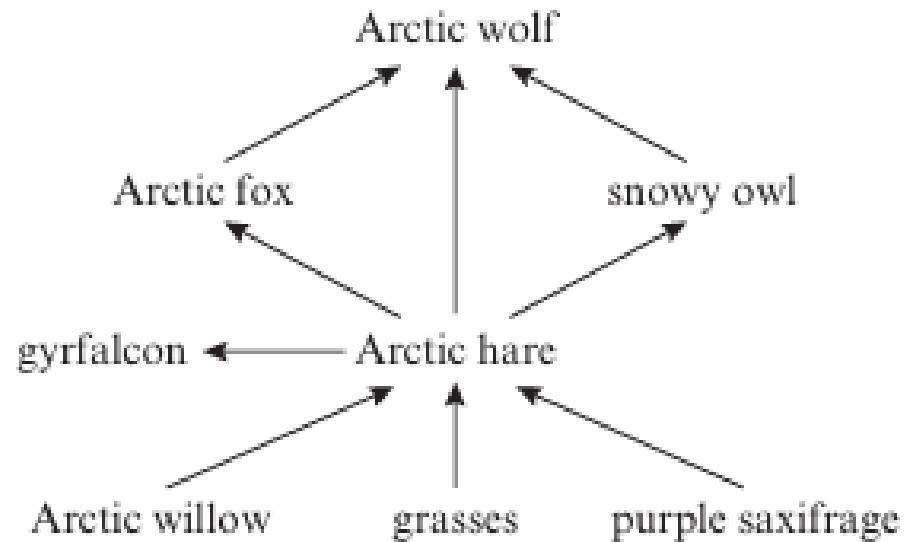


Workbook page 127+128

- 2** The length of time he leaves the lid off;
the type of jelly in the dish.
- 3** There are more microorganisms in the air in
Classroom 203 than in Classroom 204.
- 4** Bacteria grow faster at a temperature of 30°C
than at 10°C.

Workbook page 129

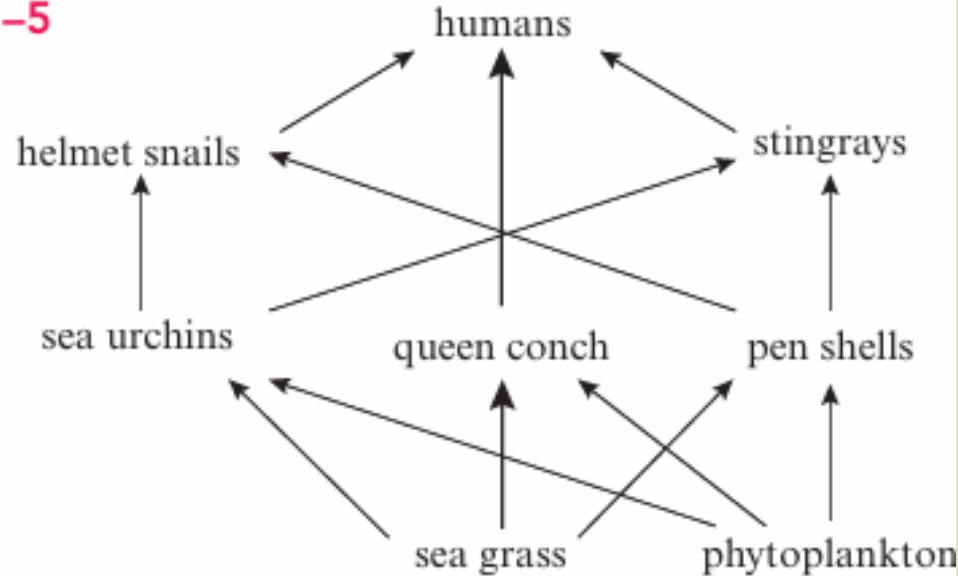
Exercise 7.2A Arctic hares



Workbook page 130

Exercise 7.2B Building up a food web

1–5



- 6 Sea grass and phytoplankton
- 7 Any two of: sea urchins, pen shells, queen conch
- 8 Any two of: helmet snails, stingrays, humans

Workbook page 133

- 1 Circles drawn around glass, metal and plastic.
- 2 These things are not organic and they will not rot/cannot be broken down by microorganisms

Workbook page 134+135

- 1 The October result for the leaves in the 1 cm mesh bag.
- 2 The bag with the 1 cm mesh
- 3 Microorganisms, earthworms and other small animals.
- 4 Parts of the leaves disappeared because they decayed. The results show that decay was greatest when earthworms and other small animals, as well as microorganisms, could reach the leaves.

Workbook page 140+141

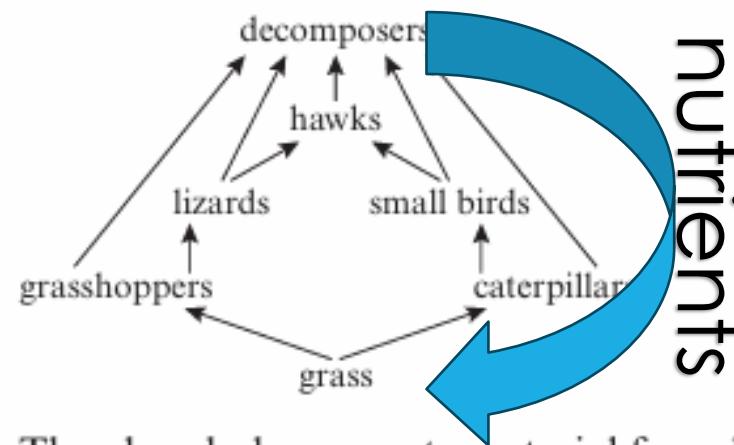
Exercise 7.4 Microorganisms in food webs

1 a Microorganism

b Food web

c Decomposer

2



3 They break down waste material from living organisms, and also their dead bodies. This returns nutrients to the soil, which plants can use to grow.