

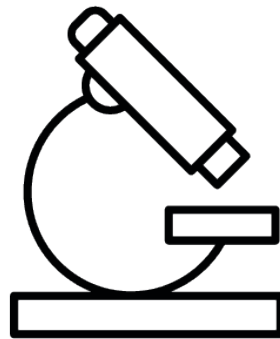


basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA



Planner & Tracker for Recovery ATP

Natural Sciences



Grade 8 Term 3

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Introduction

Dear Natural Sciences Teachers,

The COVID-19 Pandemic has left us with an enormous challenge in education. As we return to 'normal schooling', we all have to work smarter and harder to ensure that our system recovers.

This document is designed to help you achieve this. By systematically working through this plan, we are confident that you can address the loss of teaching and learning time, and bring your learners to the level where they need to be in terms of NS.

We thank you in advance for the commitment, dedication and hard work that is required of you. You are truly building our nation.

With very best wishes for the term ahead,

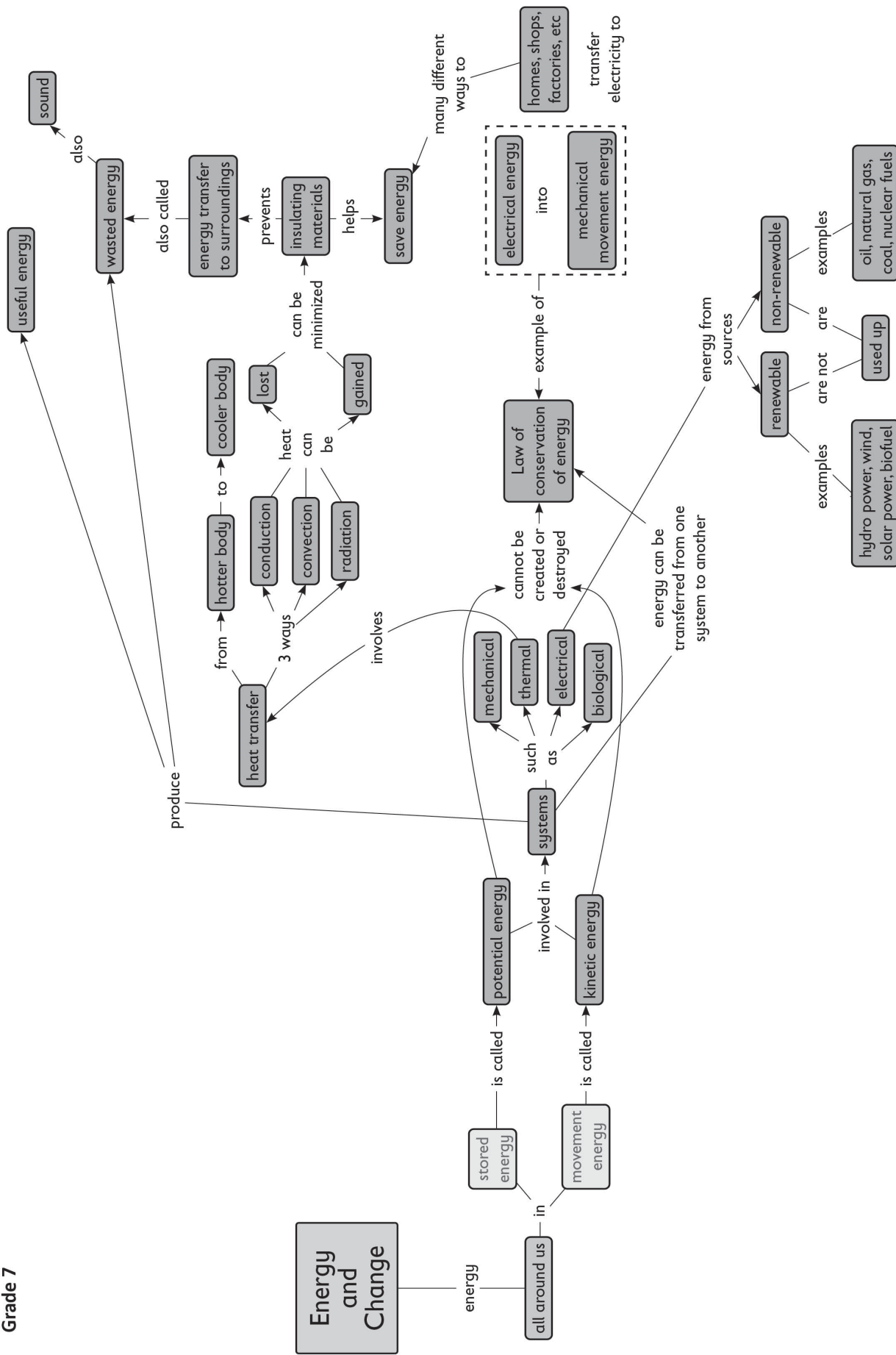
The DBE / NECT Recovery ATP Trackers Team

Overview

Please continue to keep the following key principles in mind throughout the recovery journey:

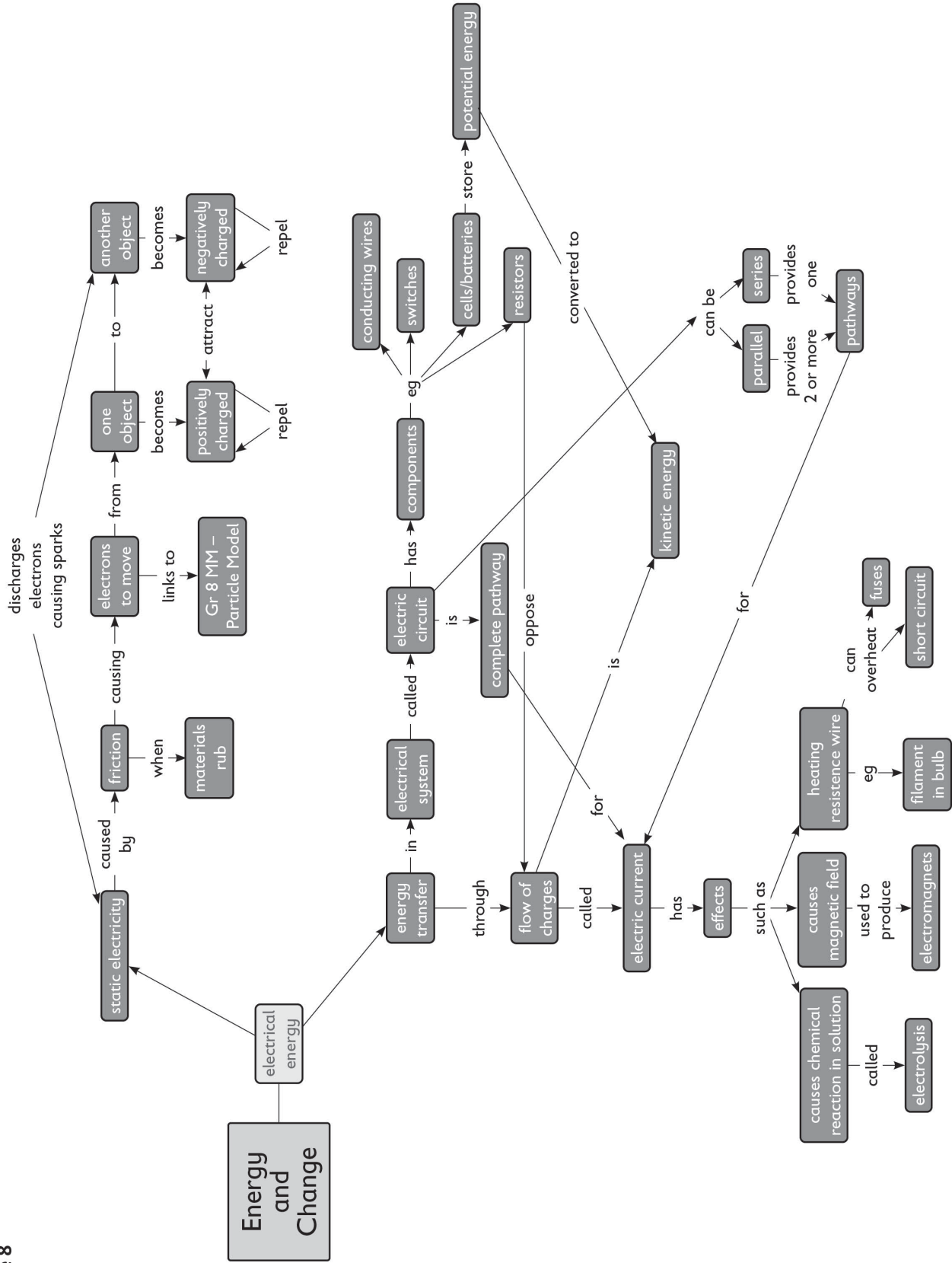
- The development of **Science Process Skills** is key to the teaching and learning of the subject. Focussing on these skills is critical.
- Learners should be given as many opportunities as possible to **write regularly and read for meaning, in Natural Science, in order** to develop **language skills** as well. Due to learning losses, as a result of the Covid pandemic, it is the responsibility of every educator to develop these literacy skills.
- It is very important to give learners a sense of **how science applies to their daily lives**, and of **the value that science adds to their lives**. Hold a brief discussion on this point when introducing a new topic, and invite learners to contribute their ideas on the uses and value that this topic has.
- At the end of every topic, come back to the topic overview, and **reflect on what has been learnt and taught**. In particular, it is important to note your challenges and ideas for future improvement, so that you can improve your teaching the next year.
- At the core of all scientific activities is the need to **ask questions**. These questions help us seek answers through observation and experimental design. The results of these questions should raise more questions. It is this natural curiosity that all teachers, and especially science teachers, should be encouraging in their classrooms. **Encourage curiosity and questions that investigate, inquire and probe**.
- **Build a solid conceptual foundation** for learners. A **conceptual chain** for the phase is provided at the start of this document. It is important for all NS teachers to work cohesively to ensure that learners are equipped with a solid understanding of the required concepts, by the time they leave the phase.
- Using the **CONCEPTUAL CHAIN** provided, **work together** as a department to:
 - a. Check that all **concepts for the phase are covered** in your school's recovery plan.
 - b. **Check for overlaps** across the grades.
 - c. **Identify the weak links in the conceptual chain** - points where learners struggle and may be the source of misconceptions or common errors.
 - d. Decide how to **emphasise critical concepts from previous grades** especially where topics have moved from a different grade in the revised ATP.

Concept Maps
Grade 7

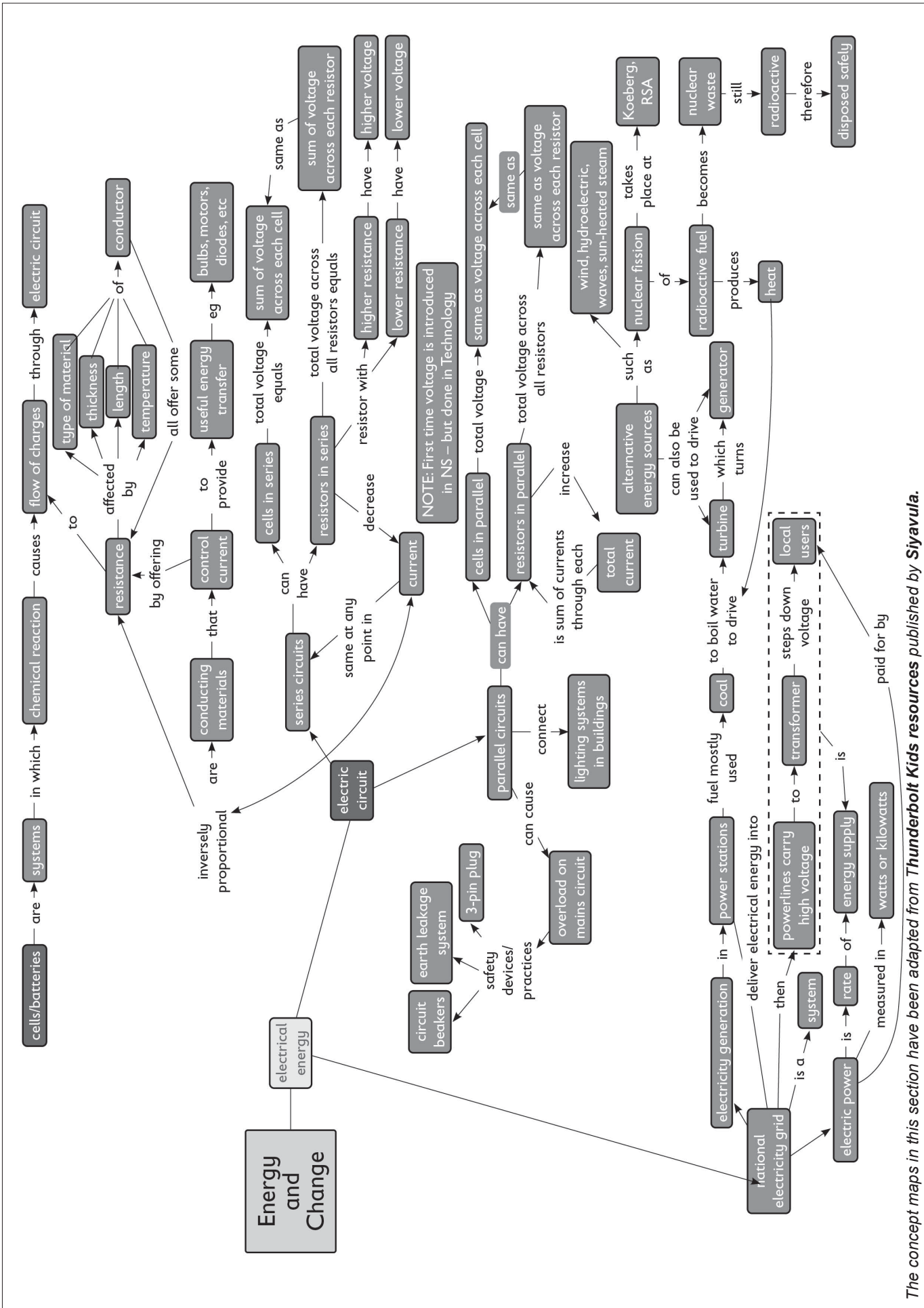


The concept maps in this section have been adapted from *Thunderbolt Kids resources* published by *Siyavula*.

Concept Maps
Grade 8



The concept maps in this section have been adapted from *Thunderbolt Kids resources published by Siyavula.*



The concept maps in this section have been adapted from *Thunderbolt Kids resources published by Siyavula.*

Amendments to the Annual Teaching Plan

The Recovery ATP for Natural Sciences has the **same content as in CAPS**, however, this content has been arranged as follows for Term 3::

- **Some topics remain the same:**
 1. Static electricity (1 week)
 2. Energy transfer in electrical systems (3 weeks)
 3. Visible light (3 weeks)
- Some topics have been **reduced in time:**
 1. Series and parallel circuits (1 week-was 2 weeks)
- **Some topics from Grade 7 have been included/recovered:**
 1. Potential and Kinetic energy (1 week)

Directions on how to cover all required topics are provided in the Tracker that follows.

Amendments To The Programme Of Assessment

- The Programme of Assessment is aligned to the *Revised Section 4 of CAPS*.
- Both formal and informal assessment should continue as normal.
- Recording of the informal assessment is left to the discretion of the teacher.
- The 2021 formal assessment tasks for Grade 8 are as follows:

	TERM 1	TERM 2	TERM 3	TERM 4
Practical Task/Investigation/Projects	20 marks	20 marks	30 marks	-
Test	60 marks	90 marks	60 marks	90 marks

Sample Assessment Tasks and Memoranda / Rubrics for Grade 8 Term 3 are included in this document.

Notes:

- **Column 1** shows the **time allocation** per topic.
- **Column 2** shows the **Recovery ATP requirements** for Grade 8 Term 3.
- **Column 3** shows **where in the NECT lesson plans** this is covered.
- **Column 4** shows **where in the approved textbooks** this is covered.
- Finally, if, for any reason, the **Term 3 teaching time** for NS **is reduced**, please ensure that the **KEY CONCEPTS** listed below each table are thoroughly covered.

Key To Approved Textbook Abbreviations:

S&M	Study & Master Natural Sciences Grade 8 Cambridge University Press
VIVA	Viva Natural Sciences Grade 8 Vivlia
PLAT	Platinum Natural Sciences Grade 8 Maskew Miller Longman
SFA	Solutions for All Natural Sciences Grade 8 MacMillan
DbD	Day by Day Natural Sciences Grade 8 Maskew Miller Longman
OX	Oxford Successful Natural Sciences Grade 8 Oxford University Press
SO	Spot On Natural Sciences Grade 8 Pearson
TC	Top Class Natural Sciences Grade 8 Shuter and Shooter
SIBB	Sasol Inzalo Bk B Natural Sciences Grade 8 Sasol
SbS	Step-by-Step Natural Sciences Grade 8 Van Schaik
VA	Via Afrika Natural Sciences Grade 8 Via Afrika
PEL	Pelican Natural Sciences Grade 8 Global MBD Africa

ATP / NECT Lesson Plan / Textbook Alignment: Grade 8 Term 3

SNS	Successful Natural Sciences Grade 8
NS	Natural Science Grade 8
NSS	Natural Sciences Grade 8

TIME ALLOCATION	DBE RECOVERY ATP REQUIREMENTS	NOTES	NECT LESSON PLANS: LESSONS	APPROVED TEXTBOOKS	DATE COMPLETED
Week 1 3 hours	Potential & Kinetic energy 1. Potential energy 2. Kinetic energy 3. Potential and Kinetic energy in systems 4. Law of Conservation of Energy	<i>This topic has been recovered from Grade 7 Term 3. In Grade 7, the topic is taught over a 2 week period. However, it is only recovered for 1 week in Grade 8.</i>	<u>Gr 7 Term 3 Lesson Plans</u> In Gr7, this topic is covered from Lesson 2A to Lesson 3C. The main content for recovery is in the following lessons: Lesson 2A & 2B: Potential & Kinetic energy Lesson 2C & 3A: Potential and Kinetic energy in systems Lesson 3B & 3C: Law of Conservation of Energy & Energy transfer	S&M Gr 7 128 – 140 VIVA Gr 7 202 – 219 PLAT Gr 7 103 – 111 SFA Gr 7 116 – 129 DbD Gr 7 104 – 109 OX Gr 7 131 – 142 SO Gr 7 102 – 111 TC Gr 7 166 – 185 SIBB Gr 7 6 – 8, 18 -41	

Scaling down

If the Term 3 teaching time is reduced, ensure that learners have a thorough understanding of the following key content and concepts:

Potential and Kinetic energy

- Potential energy is energy that is stored in a system
- Kinetic energy is energy that a body has when it is moving
- Understand potential and kinetic energy in systems
- Understand the Law of Conservation of Energy

TIME ALLOCATION	DBE RECOVERY ATP REQUIREMENTS	NOTES	NECT LESSON PLANS: LESSONS	APPROVED TEXTBOOKS	DATE COMPLETED
Week 2 3 hours	Static electricity 1. Friction and static electricity		<u>Gr 8 Term 3 Lesson Plans</u> Lesson 1A: Friction and static electricity Lesson 1B: Effect of charged materials Lesson 1 C: Discharge of static electricity	SNS Gr 8 104 - 105 TC Gr 8 103 – 106 VA Gr 8 102 – 105 SFA Gr 8 111, 129 – 130 NS Gr 8 127 – 128 SO Gr 8 98 – 101 PLAT Gr 8 126 – 133 SbS Gr 8 80 – 83 NSS Gr 8 127 – 135 SIBB Gr 8 8 -15	

If the Term 3 teaching time is reduced, ensure that learners have a thorough understanding of the following key concepts:

Static electricity

- Understand friction as transfer of electrons
- Understand positive and negative charge of electrons in friction
- Understand negative and positive charges, repel and attract
- Understand discharge of electrons causes the shock of static electricity

TIME ALLOCATION	DBE RECOVERY ATP REQUIREMENTS	NECT LESSON PLANS: LESSONS	APPROVED TEXTBOOKS	DATE COMPLETED
Weeks 3, 4 & 5 9 hours	Energy transfer in electrical systems 1. Circuits and current electricity 2. Components of a circuit 3. Effects of an electric current	Gr 8 Term 3 <u>Lesson Plans</u> Lesson 2A: Circuits: Electrical systems Lesson 2B: Electrical current Lesson 2C: Components of a circuit: Cells Lesson 3A: Components of a circuit: Wires and switches Lesson 3B: Components of a circuit: Resistors Lesson 3C: Circuit diagrams Lesson 4A: Effect of an electrical current: Heat Lesson 4B: Effect of an electrical current: Magnetic effect Lesson 4C: Effect of an electrical current: Chemical change	SNS Gr 8 106 – 117 TC Gr 8 107 – 114 VA Gr 8 106 – 117 SFA Gr 8 136 – 149 SO Gr 8 104 – 119 PLAT Gr 8 135 – 148 SbS Gr 8 84 – 98 NSS Gr 8 141 – 157 SIBB Gr 8 20 - 44	

If the Term 3 teaching time is reduced, ensure that learners have a thorough understanding of the following key concepts:

Energy transfer in electrical systems

- Understand circuits as systems for transferring electrical energy
- Understand the components of a circuit and how they work
- Understand resistors and how they work in the flow of electric current
- Understand the effects of an electric current

TIME ALLOCATION	DBE RECOVERY ATP REQUIREMENTS	NOTES	NECT LESSON PLANS: LESSONS	APPROVED TEXTBOOKS	DATE COMPLETED
Week 6 3 hours	Series and parallel circuits 1. Series circuits 2. Parallel circuits	<i>This topic was originally designed to take 2 weeks, but must now be reduced to 1 week .</i>	<u>Grade 8 Term 3 Lesson Plans</u> Lesson 5A & 5B: Series circuits Lesson 5C & 6A: Parallel circuits Lesson 6B & 6C are omitted.	SNS Gr 8 118 – 121 TC Gr 8 118 – 121 VA Gr 8 118 – 121 SFA Gr 8 154 – 157 SO Gr 8 122 – 125 PLAT Gr 8 154 – 158 SbS Gr 8 99 – 100 NSS Gr 8 164 – 172 SIBB Gr 8 52 - 73	

If the Term 3 teaching time is reduced, ensure that learners have a thorough understanding of the following key concepts:

Series and parallel circuits

- Understand a series circuit has only 1 pathway for electric current. Resistors decrease the current
- Understand a parallel circuit has 2 or more pathways for electric current. Resistors increase the current

TIME ALLOCATION	DBE RECOVERY ATP REQUIREMENTS	NOTES	NECT LESSON PLANS: LESSONS	APPROVED TEXTBOOKS	DATE COMPLETED
Weeks 7, 8 & 9 9 hours	Visible Light 1. Radiation of light 2. Spectrum of visible light 3. Opaque substances 4. Transparent substances 5. Absorption of light 6. Reflection of light 7. Seeing light 8. Refraction of light		Grade 8 Term 3 Lesson Plans Lesson 7A: Radiation of light Lesson 7B: Spectrum of visible light Lesson 7C: Opaque substances Lesson 8A: Transparent substances Lesson 8B: Absorption of light Lesson 8C: Reflection of light Lesson 9A: Light and the eye Lesson 9B: Refraction of light Lesson 9C: Application of the refraction of light	SNS Gr 8 130 – 153 TC Gr 8 125 – 135 VA Gr 8 126 – 137 SFA Gr 8 168 – 187 SO Gr 8 130 – 145 PLAT Gr 8 164 – 186 SbS Gr 8 105 – 120 NSS Gr 8 185 – 201 SIBB Gr 8 84 – 128, 284	

If the Term 3 teaching time is reduced, ensure that learners have a thorough understanding of the following key concepts:

Visible light

- Understand that light is emitted from luminous objects
- Understand how light travels
- Understand the spectrum of colour of visible light
- Understand absorption and reflection of light
- Understand how the eye sees light
- Understand refraction of light

Grade 8 Natural Sciences Term 3 Assessment

Below is a set of sample assessment tasks and memoranda. Please feel free to use these tasks as is, or to adapt for your context. It is important to ensure that learners are only assessed on work that has been taught.

Natural Sciences Grade 8 Term 3 Information and instructions for the teacher

NOTES TO THE TEACHER

1. If possible, photocopy the project information for each learner. If this is not possible, write the information on the chalkboard and have the learners copy it down.
2. This project will focus on OPAQUE AND TRANSPARENT SUBSTANCES.
3. Time needs to be taken to explain the project at the beginning of term 3.
4. A due date needs to be set for submission at the end of Term 3 or early in Term 4.
5. The project mark is to be used in Term 4.
6. This project is out of 30 marks.
7. The rubric for assessing the project is provided.
8. Ongoing support, encouragement and reminders should be provided for the learners.
9. The due date should be visibly displayed in the classroom.

Project

Topic: Opaque and Transparent Substances

30 Marks

Name of learner: _____

Due date: _____

INSTRUCTIONS TO THE LEARNERS

1. This project will be done individually.
2. Pay attention to the mark allocations.
3. The marks for this project count towards term 4 assessment.
4. Read through the entire project to ensure you understand the tasks.
5. Plan your time carefully.
6. NO LATE projects will be accepted.
7. Work neatly and pay attention to your presentation.

THE PROJECT CRITERIA:

You are going to conduct tests on the differences between transparent, opaque and translucent materials.

- To conduct the tests, you will need a light source (cell phone torch, electric lamp, paraffin lamp, torch), cardboard, clear plastic, plastic shopping bag, scissors, ruler.
- All answers must be recorded in your workbook.
- The shapes used to test the materials must be handed in for assessment.

Step-by-step:

- Cut your cardboard into three different sized squares:
 - o 15cm x 15cm
 - o 10cm x 10cm
 - o 5cm x 5cm
- Cut the clear plastic and the plastic shopping bag into the same shapes.
- You should now have 9 squares.
- Write the heading "Opaque, transparent and translucent materials project" in your workbook.
- Complete the tasks and questions below:

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THE QUESTIONS AND INSTRUCTIONS:

QUESTION 1:

1. Define the following terms:
 - 1a. Opaque
 - 1b. Translucent
 - 1c. Transparent

QUESTION 2:

- Switch on your light source. Make sure it is shining onto a wall.
 - Hold your largest cardboard square between the light source and the wall.
- 2a. What do you observe?
 - Now do the same with the second cardboard square.
 - 2b. What do you observe?
 - Now do the same with the third cardboard square.
 - 2c. What do you observe?
 - 2d. What differences do you observe between the shadows of the three shapes?

QUESTION 3:

- Switch on your light source. Make sure it is shining onto a wall.
 - Hold your largest plastic shopping bag square between the light source and the wall.
- 3a. What do you observe?
 - Now do the same with the second plastic shopping bag square.
 - 3b. What do you observe?
 - Now do the same with the third plastic shopping bag square.
 - 3c. What do you observe?
 - 3d. What differences do you observe between the shadows of the three shapes?

Grade 8 Natural Sciences Term 3 Assessment

QUESTION 4:

- Switch on your light source. Make sure it is shining onto a wall.
 - Hold your largest clear plastic square between the light source and the wall.
- 4a. What do you observe?
- Now do the same with the second clear plastic square.
- 4b. What do you observe?
- Now do the same with the third clear plastic square.
- 4c. What do you observe?
- 4d. What differences do you observe between the shadows of the three shapes?

QUESTION 5:

- Using only the cardboard shapes, answer these questions:
- 5a. Is the cardboard transparent, translucent or opaque? How do you know?
- 5b. What do you predict will happen if you move the cardboard shapes closer or further away from the light source?
- Test your prediction by moving the shapes closer and further away from the light source.
- 5c. Was your prediction correct? If not, what happened when you moved the shapes closer or further away?

QUESTION 6:

- Using the plastic shopping bag and clear plastic shapes:
- 6a. Explain if the plastic shopping bag transparent or opaque?
- 6b. Did the plastic shopping bag cast a shadow?
- 6c. Explain why the plastic shopping casts a lighter shadow than the cardboard shapes.
- 6d. Did the clear plastic shape cast a shadow?
- 6e. Explain why the cardboard and the plastic shopping bag cast shadows but the clear plastic does not.

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PROJECT ASSESSMENT RUBRIC

Grade 8 Term 3

Name of learner: _____

Date: _____

	Excellence achieved	Achieved	Mostly achieved	Was not submitted	Total
Score	5	4-3	2-1	0	
Question 1	Definitions are detailed and accurate with examples	Definitions are correct but lack details or examples	Definitions are incorrect, contain errors or are incomplete	Work was not submitted	
Question 2	<p>The 3 cardboard shapes have been submitted and are accurately prepared</p> <p>The 3 observations have been recorded and are clear and show critical thinking</p> <p>The comparison has been recorded and reflects accurate observation</p>	<p>The 3 cardboard shapes have been submitted but are not accurately prepared</p> <p>The 3 observations have been recorded</p> <p>The comparison has been recorded and shows some critical thinking</p>	<p>The shapes may or may not have been submitted</p> <p>At least 2 observations are recorded</p> <p>The comparison shows little critical thinking</p>	Work was not submitted	
Question 3	<p>The 3 plastic shopping bag shapes have been submitted and are accurately prepared</p> <p>The 3 observations have been recorded and are clear and show critical thinking</p> <p>The comparison has been recorded and reflects accurate observation</p>	<p>The 3 plastic shopping bag shapes have been submitted but are not accurately prepared</p> <p>The 3 observations have been recorded</p> <p>The comparison has been recorded and shows some critical thinking</p>	<p>The shapes may or may not have been submitted</p> <p>At least 2 observations are recorded</p> <p>The comparison shows little critical thinking</p>	Work was not submitted	

Grade 8 Natural Sciences Term 3 Assessment

	Excellence achieved	Achieved	Mostly achieved	Was not submitted	Total
Score	5	4-3	2-1	0	
Question 4	<p>The 3 clear plastic shapes have been submitted and are accurately prepared</p> <p>The 3 observations have been recorded and are clear and show critical thinking</p> <p>The comparison has been recorded and reflects accurate observation</p>	<p>The 3 clear plastic shapes have been submitted but are not accurately prepared</p> <p>The 3 observations have been recorded</p> <p>The comparison has been recorded and shows some critical thinking</p>	<p>The shapes may or may not have been submitted</p> <p>At least 2 observations are recorded</p> <p>The comparison shows little critical thinking</p>	Work was not submitted	
Question 5	<p>All questions are answered with accurate reasoning</p> <p>Clear prediction is made before testing the hypothesis and answered after testing</p>	<p>All questions are answered with some reasoning present</p> <p>Prediction is made before testing the hypothesis. Clear finding may or may not be evident</p>	<p>All questions are answered but with flawed or no reasoning</p> <p>Prediction is made before testing the hypothesis. Clear finding is not made</p>	Work was not submitted	
Question 6	<p>All questions are answered with detailed and accurate explanations</p>	<p>All questions are answered with some explanation</p>	<p>All questions are answered but explanations contain errors</p>	Work was not submitted	
30 marks					

Grade 8 Natural Sciences Term 3 Assessment

Test

60 Marks

90 Minutes

NOTE TO THE TEACHER:

If possible, photocopy this test for each learner. If this is not possible, write the test on the chalkboard.

INSTRUCTIONS TO THE LEARNERS

1. Answer all questions in blue or black ink.
2. Read each question carefully before answering it.
3. Pay attention to the mark allocations.
4. Plan your time carefully.
5. Write your answers in the spaces provided.
6. Write neatly.

PRACTICE QUESTION

Read the question and circle the letter that shows the correct answer.

1. Which of the following is an example of a conductor of electricity?
 - a. rubber
 - b. copper
 - c. wood
 - d. plastic

You have answered correctly if you have circled **(b)**

QUESTION 1: MULTIPLE CHOICE

[6]

Read each question and circle the letter that shows the correct answer.

- 1a. Which one of these is NOT an example of output energy?
- a. light
 - b. sound
 - c. movement
 - d. electricity
- 1b. Which one of these statements is false?
- a. Potential energy is energy that is stored in an object or system.
 - b. The food we eat has chemical potential energy.
 - c. A compressed spring is an example of elastic potential energy.
 - d. Potential energy cannot be transferred.
- 1c. Which of these statements is true?
- a. Light is reflected from luminous objects.
 - b. An object that emits light is called an illuminated object.
 - c. Light is transmitted from luminous objects by radiation.
 - d. Light travels in straight lines.
- 1d. Which one of these is the output energy of an electric motor?
- a. Kinetic energy and heat energy
 - b. Light energy and heat energy
 - c. Light energy and kinetic energy
 - d. Kinetic energy only

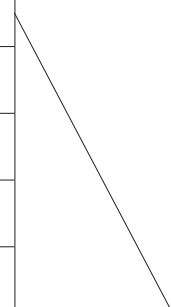
QUESTION 2 - MATCH THE COLUMNS

[4]

- Match the sentences in COLUMN A with the words in COLUMN B.
- Draw a line to join the sentence in COLUMN A with the correct word in COLUMN B. Do this as shown in the example below.

COLUMN A	
example	Needed by all living things to survive
2a.	Energy that is stored.
2b.	An object that is a source of light.
2c.	The sensory layer at the back of the eye.
2d.	A chemical system that stores electrical potential energy.

COLUMN B
A. luminous
B. potential
C. retina
D. cell
E. air



QUESTION 3

[10]

Write the word or words that is/are being described in the sentences below.

Only write the answer.

3a. The number of wavelengths that pass a point in one second.

3b. A material that does not allow charge to run through it.

3c. Two or more cells forming a chemical system that store electrical potential energy.

3d. An object that allows light to travel through it.

3e. The splitting of white light into different colours.

3f. The process by which a compound is decomposed into simpler substances by an electric current.

3g. A device that opposes the flow of electric current.

3h. An atom or molecule with a positive charge or negative charge due to the loss or gain of electrons.

3i. A system used for the transfer of electrical energy.

3j. The source of electrical energy in a torch.

QUESTION 4

[11]

(Note to educator: This drawing can be replicated, or Resource 2 can be used.)

Look at the drawing below:



4a. What form of electricity is being demonstrated in this drawing?

4b. Explain how this form of electricity is generated using the words in the box below:

Atoms, protons, neutrons, electrons, nucleus, negative, positive, particles, friction, charge, separation

4c. Explain why the balloon sticks to your head when you rub it on your hair.

QUESTION 5

[10]

5a. Explain the difference between a closed circuit and an open circuit.

5b. What 2 things that are needed for an electrical current to flow.

5c. Explain how a light bulb works, using the words in the box below:

filament, insulator, flow of current, electrical energy, heat energy, light energy

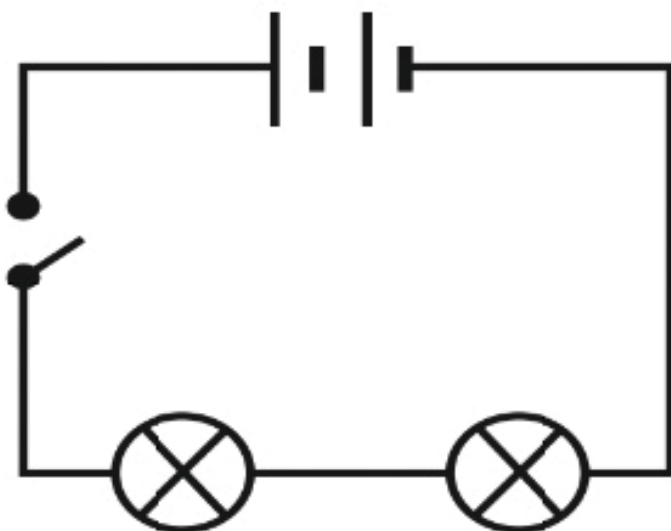
QUESTION 6

[9]

6a. Look at the open electrical circuit diagram below.

Write the names of the following 3 components in the correct place on the diagram:

- two cells
- two bulbs in series
- a switch



6b. As the circuit is now, will the bulbs shine? Give a reason for your answer.

6c. Once the switch is closed, will both bulbs shine at equal brightness? Give a reason or your answer.

6d. Explain why all the lights in a house cannot be connected in series.

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6e. (i) What kind of circuit is best to use to connect lights in a house?

(ii) Give the advantages and disadvantages of this kind of circuit.

Advantages: _____

Disadvantages: _____

QUESTION 7

[6]

Say if the following sentences are TRUE or FALSE:

7a. Refraction is the bending of light waves.

7b. All light is reflected by coloured objects.

7c. White light consists of a spectrum of different colours.

7d. A yellow object appears yellow because the object has absorbed only the frequency of yellow light.

7e. When an object is in water, its image appears to be shallower than it really is.

7f. The law of reflection states: The angle of incidence and the angle of reflection are equal.

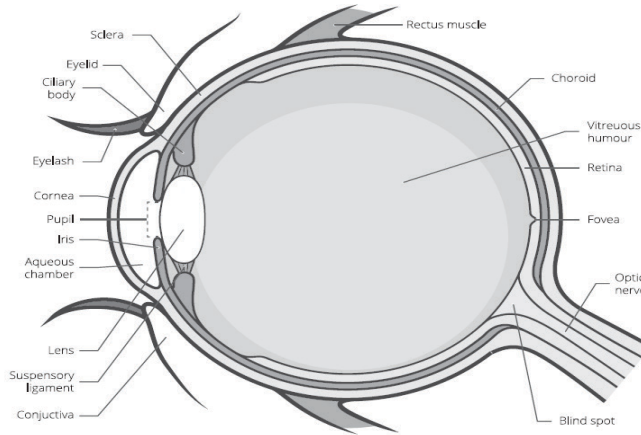
QUESTION 8

[6]

8a. Look at the diagram below, showing the different parts of the eye. (Resource 35).

Different parts of the eye help us to see the images and objects around us.

Explain how the different parts of the eye work so that we can see.



8b. Many people need spectacles (glasses) to be able to see more clearly.

Explain how you think glasses help people to see more clearly?

TOTAL: 60

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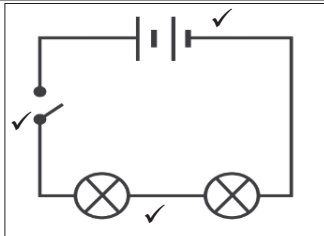
TEST MEMORANDUM

CAPS Topic	Questions	Expected answer(s)	Marks
	1		
Energy transfer in electrical systems	1a	C ✓	1
Series and parallel circuits	1b	D ✓	1
Visible light	1c	D ✓	1
Series and parallel circuits	1d	A ✓	1
	2.		
Series and parallel circuits	2a	B ✓	1
Visible light	2b	A ✓	1
Visible light	2c	C ✓	1
Energy transfer in electrical systems	2d	D ✓	1
	3.		
Visible light	3a	frequency ✓	1
Static electricity	3b	isolator ✓	1
Energy transfer in electrical systems	3c	battery ✓	1
Visible light	3d	transparent ✓	1
Visible light	3e	dispersion ✓	1
Energy transfer in electrical systems	3f	electrolysis ✓	1
Energy transfer in electrical systems	3g	resistor ✓	1
Energy transfer in electrical systems	3h	ion ✓	1
Energy transfer in electrical systems	3i	circuit ✓	1
Energy transfer in electrical systems	3j	battery ✓	1
	4.		
Static electricity	4a	Static electricity ✓	1

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Static electricity	4b	<ul style="list-style-type: none"> • Atoms are made up of positively charged protons and neutral neutrons that are packed into the nucleus. ✓ • Negatively charged electrons move freely around the nucleus. ✓ • A neutral atom has an equal number of negatively and positively charged particles. ✓ • Friction between objects causes electrons to move from one object to another. ✓ • The object that gains electrons becomes negatively charged because it has more electrons than protons. ✓ • The object that loses electrons becomes positively charged because it has fewer electrons than protons. ✓ • This separation of charges is called static electricity. ✓ 	7
Static electricity	4c	<ul style="list-style-type: none"> • The balloon obtained electrical charge through friction against the hair. ✓ • A charged object has an affect on other charged or neutral objects. ✓ • Objects with different electric charges (the hair and the balloon) attract each other. ✓ 	3
	5.		
Series and parallel circuits	5a	<p>A closed circuit is a complete electrical pathway through which current can flow. ✓</p> <p>An open circuit is an open electrical pathway through which no current can flow. ✓</p>	2
Series and parallel circuits	5b	A source of energy ✓ and a closed circuit ✓	2

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Series and parallel circuits	5c	<p>A light bulb has a resistance wire called a filament. ✓</p> <p>The filament is connected to 2 contact points inside the casing of the bulb. These 2 points are separated by an insulator that prevents the flow of current between them. ✓</p> <p>When the light bulb is turned on, the electric current flows through the filament and is slowed down. ✓</p> <p>Some of the electrical energy ✓ is changed to heat energy ✓ and as the filament heats up, some of the energy is changed to light energy. ✓</p>	6
	6		
Series and parallel circuits	6a		3
Series and parallel circuits	6b	No, because the circuit is open and the current cannot flow continuously. ✓	1
Series and parallel circuits	6c	Yes, because the current is the same throughout a series circuit. ✓	1
Series and parallel circuits	6d	If one light is switched off, then all the other lights will also switch off ✓	1
Series and parallel circuits	6e	<p>Parallel circuit ✓</p> <p>Advantages: if 1 light goes out, the other lights will continue to work. It is easy to add resistors to the circuits. ✓</p> <p>Disadvantages: the circuit can easily be overloaded. The resistors can heat up and cause a fire. ✓</p>	1 1 1
	7		
Visible light	7a	True ✓	1
Visible light	7b	False ✓	1
Visible light	7c	True ✓	1
Visible light	7d	False ✓	1

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Visible light	7e	True ✓	1
Visible light	7f	True ✓	1
	8		
Visible light	8a	<p>Light enters the eye at the pupil and is focused to form an upside down image on the retina at the back of the eye. ✓ The retina has photoreceptors that detect colours.</p> <p>The light energy of the image is converted to electrical nerve impulses that go to the optic nerve of the brain. ✓</p> <p>The brain interprets the impulses and forms a picture. It turns the image around so that we see the right way round. ✓</p>	3
Visible light	8b	<p>Answers will vary, but may include:</p> <ul style="list-style-type: none"> • To see properly the light that enters the eyeball needs to enter on an exact spot on the retina. • Some people may have eyes where the light entering the eyeball is not reaching the exact spot for clear vision. • The lenses of the glasses have different thicknesses and so the light will bend to find the exact spot on the retina. • This bending of light is called refraction. <p>(Any 3) ✓ ✓ ✓</p>	3
TOTAL 60			