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Writing in Science

Highlighting the use of simple, compound and complex sentences in student writing

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This practice guide is one in a series that focuses on the types of sentences students should use in their writing in the subjects of English, Science and Health and Physical Education.

It has been developed for secondary Science teachers and builds on the Australian Education Research Organisation (AERO)'s [simple](#), [compound](#) and [complex](#) sentence practice guides. It offers guidance for analysing and providing targeted feedback on your students' sentence structure, grammar and punctuation. We recommend referring to the glossary in the [simple sentence practice guide](#) for definitions of key technical terms used in this practice guide.

Whether you're an experienced teacher or new to the field, this practice guide is designed to enhance your ability to teach simple, compound and complex sentences in Science. Through exploring annotated writing examples written at a Year 8 level, we hope you'll gain valuable insights into the impact of teaching specific sentence types and providing targeted feedback to improve student writing.

Simple, compound and complex sentences in Science

Precision is key in scientific writing. To achieve this, it's best to minimise the use of **adverbs** and **adjectives**. Instead, Science texts should employ **nouns**, **noun groups** and **verbs**, as these contribute to the clarity and conciseness of sentences.

Relational verbs are particularly useful in science writing. These act like equal signs (=) and connect 2 closely related concepts. They express meaning about what things 'are' and what they 'have'. Examples of relational verbs include *resemble*, *consist of*, *represent*, *indicate* and *appear*.

Articles are also important as they distinguish between the general and specific aspects of scientific concepts. When we use indefinite articles like '**a** liquid' or '**an** atom,' the writing is generalised. By using definite articles like '**the** liquid', the writing draws our attention to the specificity. These small tips highlight opportunities to create precision in students' writing in Science.

Incorporating complex noun groups into simple sentences in science writing provides the means for dealing with complex content in a simple grammatical structure. Once this is mastered, students should work to include noun groups in more complex sentences.

One way this can be done is by incorporating data such as volume and measurement. This helps students communicate their understanding of the content, including complex thinking, such as analysis and evaluation. By using precision in sentence structures, we can support students in crafting compelling, credible scientific content – for example, 'After pouring **equal volumes of water and syrup** through **identical tubes** and recording **the time taken for each liquid to travel 10 cm**, we observed a **difference in their viscosity**'.

In the following section, we've provided examples of where simple, compound and complex sentences can be used effectively in Science.

Simple sentences allow for precise communication of scientific understandings, processes, facts and findings.

The river depth of 40 metres was 20 metres from the shoreline.

Ants communicate through chemical signals called pheromones.

Higher temperatures lead to the formation of rocks with larger crystals.

Compound sentences are an excellent way to connect related ideas and highlight similarities, differences and causality.

Compressed sediment can form solid rock over time, but it can also crumble under pressure.

Root hair cells were found in the root of the plant, and they absorbed water and nutrients from the soil.

This indicates that the drought affected the water supply; this will have an impact on salinity.

Complex sentences enable students to illustrate cause and effect, offer detailed explanations, explore relationships between scientific concepts, and construct evidence-based arguments and conclusions.

In arid regions, the degree of salinity was extreme, due to limited agricultural activity.

As magma cools and solidifies, it undergoes a process of crystallisation.

Although Fertiliser A was less effective than Fertiliser B, it still contributed to plant growth, indicating its potential as a viable option.

These examples illustrate how each sentence type can be used strategically to communicate scientific information and understanding. The following section outlines the features of quality Science writing in more detail.

Student writing samples and feedback: Focusing on simple, compound and complex sentences

A good piece of Science writing will:

- **describe cause and effect relationships.** To achieve this, technical, scientific language should be used with nominalisation, nouns, noun groups and verbs to create precision and avoid repetition.
- **be definitive, justifying the 'why' rather than explaining the 'what'.** The writer needs to communicate a clear and concise message using evidence and data to justify the statement being made. This is particularly important when writing is indicating a sequence of events or explaining a complex process – for example, 'the increase in salinity from 2020 to 2023 was evident in the graph, which showed a 38% increase during this time'. Using articles such as 'the' helps avoid ambiguity and contributes to more definitive writing.

- **include a variety of sentence types.** Using a combination of simple, compound and complex sentences helps connect ideas logically, and ensures the piece is engaging to read – for example, simple and compound sentences work well in the introduction/rationale/background, aim, methodology, and hypothesis of a Science report, while complex sentences can support the writer in expanding on their ideas in the analysis, discussion, evaluation and conclusion.

With this in mind, we've analysed two Year 8 Science writing examples to explore the types of sentences used and examine whether the authors have been effective in communicating their ideas to the reader. The sentence types have been highlighted in different colours (teal for simple, purple for compound and orange for complex), and the verbs in each sentence have been marked in bold. Each example has been assessed and comments provided about the effectiveness of the sentence types used in relation to Science.

This task was part of a broader Biology unit in which students studied the process of photosynthesis by observing the effect of light intensity on the rate of photosynthesis in plants. This analysis provides insights into some of the strengths and areas for development in students' writing to help you identify opportunities for targeted teaching and feedback.

Writing example 1

Investigating the effect of light intensity on the rate of photosynthesis in plants¹

Rationale/Introduction/Background

(complex) Photosynthesis **is** a process where plants **uses** sunlight, water and carbon dioxide and **turn** it into oxygen and glucose. **(simple)** It mostly **happens** in the chloroplasts of plant cells. **(complex)** Photosynthesis **needs** things like light, carbon dioxide chlorophyll and water and it **depends** on things such as the intensity of light because this will **make** it happen quicker.

Aim

(complex) The aim of this experiment **is** to see how changing the distance between a light and an Elodea plant in a test tube **changes** how fast or slow the plant **makes** oxygen. **(complex)** The bubbles that **come** from the plant **will be counted**. **(complex)** The numbers of bubbles **released** over time **will show** how fast the photosynthesis **is happening**. **(complex)** The experiment **will show** how the strength of a light **impacts** how plants **make** food and **give off** oxygen so how moving a light closer or further away from a plant **affects** photosynthesis. **(simple)** The light **will be placed** 10, 20 and 30 centimetres from the plant. **(complex)** This **will change** how strong the light **is** and **change** the light intensities. **(complex)** Doing the experiment at 3 different spots **will show** how light **affects** the number of bubbles.

Hypothesis

(complex) If the light **is moved** closer to the plant the plant **will make** more bubbles. **(complex)** This **will mean** the photosynthesis **is** faster then if the light **is** put further away from the light which **will make** the light less strong. **(complex)** The further away the plant **is** from the light the slower photosynthesis **will happen** because the light **will be** less strong.

Discussion

(compound) The data and the hypothesis **were** the same so the hypothesis **was** correct. **(complex)** The experiment **showed** that when the light **was** closer to the plant there **were** more bubbles so photosynthesis was happening faster. **(complex)** When the light **was moved** 10cm further away each time, there **were** less bubbles so it **meant** that photosynthesis **was** happening less quickly. **(compound)** The light **became** weaker so photosynthesis **slowed** down.

¹ Sections of this student's work have been used to illustrate writing features.

Key takeaways

Student writing: ‘Photosynthesis is a process where plants uses sunlight, water and carbon dioxide and turn it into oxygen and glucose.’

Teacher feedback: The subject-verb agreement in the text is mostly accurate, but there are a few instances where errors occur. The verb ‘uses’ should agree with the subject (plants). Correctly written, the sentence reads, ‘Photosynthesis is a process where plants use sunlight, water and carbon dioxide and turn it into oxygen and glucose.’

Student writing: ‘The experiment will show how the strength of a light impacts how plants make food and breathe out oxygen so how moving a light closer or further away from a plant affects photosynthesis.’

Teacher feedback: Splitting this run-on sentence into 2 shorter simple sentences creates clear steps regarding the intention or aim of the experiment. Nominalisation allows the sentence to be more objective and less focused on action – for example, ‘The experiment aims to demonstrate how light intensity affects plants’ food production and oxygen release. It will investigate whether adjusting the distance of the light source from the plant may influence photosynthesis.’

The auxiliary verb ‘**will**’ could be removed in the first sentence. While this is acceptable in some cases, the intention is to try to encourage scientific writing that is objective and avoids predetermining the outcome of the experiment. The second sentence has used verbs such as ‘**whether**’ and ‘**may**’ to also remain objective.

Student writing: ‘This will mean the photosynthesis is faster than if the light is put further away from the light which will make the light less strong.’

Teacher feedback: This is also a run-on sentence and lacks commas to mark clauses.

Correctly punctuated and using a connective (whereas) we can create a more accurate sentence that demonstrates cause and effect, ‘When the light is moved closer to the plant, the process of photosynthesis speeds up, whereas moving the light further away slows down the process.’

Going one step further and splitting this into 2 simple sentences would make the writing even more precise – for example, ‘Placing the light closer to the plant speeds up photosynthesis. Moving it further away slows down the process.’

Student writing: ‘The further away the plant is from the light the slower photosynthesis will happen because the light will be less strong.’

Teacher feedback: Moving the dependent clause to the start of this sentence, with a different subordinating conjunction prioritises the subject of the sentence. This also creates an immediate understanding of cause and effect – for example, ‘As the plant moves further away from the light, photosynthesis will slow down.’

Student writing: ‘If the light is moved closer to the plant the plant will make more bubbles.’

Teacher feedback: This sentence in the hypothesis needs a comma to separate the dependent and independent clauses. Removing the repetition of ‘the plant’, makes the sentence more precise – for example, ‘If the light is moved closer to the plant, it will make more bubbles.’

Summary

This student has incorporated some technical scientific language to convey their ideas.

Terms such as 'photosynthesis', 'carbon dioxide', and 'chloroplasts', have been used appropriately to explain key concepts, however, some of the writing lacks the formal tone required for a Science report.

There are several errors in the text that detract from its overall meaning and clarity. These errors include using the wrong word (for example, 'then' instead of 'than'; 'intensities' instead of 'intensity'), incorrect punctuation (for example, missing commas) and subject-verb agreement

errors (for example, '...which they needs as fuel'). Such errors can cause confusion.

Although the text incorporates a combination of sentence types, the inclusion of more complex sentences to illustrate cause and effect relationships would enhance its structure and flow. While the student has attempted to include complex sentences, these are not all structured or punctuated correctly. This highlights the value of modelling and explicitly teaching complex sentences to help students develop their ability to demonstrate their knowledge of the content.



Writing example 2

Investigating the effect of light intensity on the rate of photosynthesis in plants²

Rationale/Background/Introduction

(complex) Plants **use** light energy to **convert** carbon dioxide and water into glucose and oxygen through a process **called** photosynthesis. **(compound)** This process **takes** place in the leaf of the plant and **relies** on factors such as the amount of light, carbon dioxide and water available. **(complex)** The intensity of light **is** a key factor that **can** significantly **influence** the rate at which photosynthesis **takes** place.

Aim

(complex) The aim of this experiment **is to explore** how changing the distance of a light from a plant, representing different light intensities, **affects** the rate of photosynthesis in plants. **(simple)** The impact of light intensities at three different distances: 10 centimetres, 20 centimetres, and 30 centimetres from the plant **will be investigated**. **(compound)** The results **will be measured** by recording the volume of oxygen produced in millilitres per minute & this **will indicate** the rate of photosynthesis.

Hypothesis

(complex) If the distance of the light from the plant **increases**, representing decreased light intensity then the rate of photosynthesis **will decrease**. **(simple)** This **will result** in a lower volume of oxygen produced. **(complex)** On the other hand, if the distance of the light from the plant **is reduced**, representing increased light intensity, the rate of photosynthesis **will increase**. **(simple)** This **will result** in a higher volume of oxygen produced.

Discussion

(simple) The hypothesis for the experiment **was** correct. **(complex)** Decreasing the distance between the light & the plant **increased** the light intensity which **increased** the rate of photosynthesis. **(complex)** When the light intensity **was** increased, the volume of oxygen **produced** per minute **increased**. **(complex)** As light intensity **decreases** the rate of photosynthesis also **decreases**. **(complex)** This **is** because photosynthesis **relies on** the absorption of light energy by chlorophyll for the reaction to **take place**.

2 Sections of this student's work have been used to illustrate writing features.

Key takeaways

Student writing: ‘The aim of this experiment is to explore how changing the distance of a light from a plant, representing different light intensities, affects the rate of photosynthesis in plants.’

Teacher feedback: This sentence successfully establishes a definitive objective for the investigation. This is achieved by predominantly using nouns, which create an objective and formal tone. Explicitly teaching technical vocabulary supports the opportunity for creating effective complex sentences.

Student writing: ‘If the distance of the light from the plant increases, representing decreased light intensity then the rate of photosynthesis will decrease.’

Teacher feedback: Here, the student uses a complex sentence starting with a subordinating conjunction to explain their hypothesis. While it provides a logical explanation based on the principles of photosynthesis, including a comma after ‘intensity’ and using the adverb ‘accordingly’ will make it easier for the reader to see the ‘effect’.

‘If the distance of the light from the plant increases, representing decreased light intensity, the rate of photosynthesis will decrease accordingly.’

Student writing: ‘The hypothesis for the experiment was correct. Decreasing the distance between the light & the plant increased the light intensity which increased the rate of photosynthesis.’

Teacher feedback: This exemplifies how a complex sentence can be used after a simple sentence to provide additional information and greater clarity for the reader. Given this sentence is part of the discussion, it’s important that there is a change to past tense (for example, ‘was’) to indicate that the experiment has already taken place.

Student writing: ‘This is because photosynthesis relies on the absorption of light energy by chlorophyll for the reaction to take place.’

Teacher feedback: This sentence demonstrates the student’s use of technical, scientific language and understanding of the process of photosynthesis.

Nominalisation (the process of forming nouns from verbs – for example, absorption, reaction), nouns (for example, photosynthesis, chlorophyll) and noun groups (for example, light energy) are used to create precision and describe cause and effect relationships.

Summary

This student’s investigation report demonstrates clarity and conciseness. The effective combination of sentence types engages the reader and facilitates the connection of facts and ideas. The writing demonstrates a sound use of simple sentences containing complex noun groups when dealing with scientific concepts and processes.

The use of technical terminology enhances scientific accuracy, and the inclusion of evidence justifies the student’s ideas, contributing to a definitive and credible text. These qualities make the report highly effective in communicating scientific information. While the student would benefit from explicit instruction relating to punctuation (for example, commas, appropriate use of ampersands), this doesn’t detract from the overall meaning of the text.

Suggested teaching activities

Simple, compound and complex sentences

1. Present new learning
 - a. Provide students with an example of writing (for example, a scientific report).
 - b. Identify the simple, compound and complex sentences in the text as you explain and demonstrate their function in Science.
 - c. Model writing a simple, compound and complex sentence to summarise the main ideas in the text.
2. Guided practice
 - a. Support students to work in pairs or small groups to identify simple, compound and complex sentences in the text provided, using worked examples.
 - b. Ask students what types of sentences this topic or text type uses and discuss the effect of combining sentence types.
 - c. Working together, students can practise writing a simple, compound and complex sentence to summarise the main ideas in the text.
3. Independent practice
 - a. Students identify simple, compound and complex sentences in the text provided, using worked examples to guide them.
 - b. Using the text as a model, they can practise using a variety of sentence types in their own writing.
 - c. Monitor initial attempts and plan time for continual practice.
 - d. Provide correction and feedback.

Pre-writing activity: Verbs

1. Present new learning
 - a. Provide students with a topic (for example, kinetic energy).
 - b. Explain and demonstrate the function of verbs in relation to this topic.
 - c. Generate a list of verbs related to the topic – for example:
 - move
 - convert
 - vibrate
 - propel
 - transfer
 - accelerate.
 - d. Model using the verbs in simple, compound and complex sentences about the topic – for example:
 - Wind turbines **convert** wind into kinetic energy.
 - The wind will **propel** the sailboat; kinetic energy will **move** it forward.
 - When the bat struck the ball, kinetic energy **transferred** from the bat to the ball.
2. Guided practice
 - a. Ask students to select a verb/s from the list to practise writing simple, compound and complex sentences about the topic.
 - b. Provide correction and feedback.
3. Independent practice
 - a. Students generate their own list of verbs and practise using them to write a range of simple, compound and complex sentences about the topic.
 - b. Monitor initial attempts and plan time for continual practice.
 - c. Provide correction and feedback.

Pre-writing activity: Nouns

1. Present new learning
 - a. Explain and demonstrate the function of nouns in relation to a topic (for example, states of matter).
 - b. Generate a list of nouns related to the topic – for example:
 - solid
 - liquid
 - gas
 - temperature
 - condensation
 - evaporation
 - viscosity.
 - c. Model using the nouns in simple, compound and complex sentences about the topic – for example:
 - The three states of matter are **solid**, **liquid** and **gas**.
 - **Condensation** results from cooling a **gas** but it can be prevented by maintaining dry conditions.
 - If the **temperature** increases, the **viscosity** of the **liquid** will decrease.
2. Guided practice
 - a. Ask students to select a noun/s from the list to practise writing simple, compound and complex sentences about the topic.
 - b. Provide correction and feedback.
3. Independent practice
 - a. Students generate their own list of nouns and practise using them to write a range of simple, compound and complex sentences about the topic.
 - b. Monitor initial attempts and plan time for continual practice.
 - c. Provide correction and feedback.