



**MIGHTY MINDS**  
Educational Consultants

[www.mightyminds.com](http://www.mightyminds.com)



**SAMPLE**

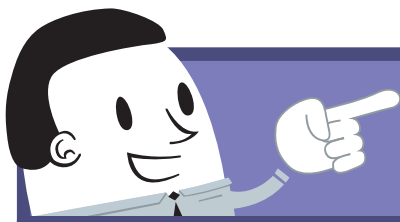


## Structure & Cohesion

### Literacy

- Famous Scientists
- Notable Newton
- Einstein's Escapades

Resource code: 27052995



# Famous Scientists

Scientists throughout history have made significant discoveries which we live. Complete the following exercises involving the history of science.

Q1

The four paragraphs below are arranged out of order. Rearrange them into a logical structure to connect each paragraph to its name on the right. Match each scientist with their field of expertise.

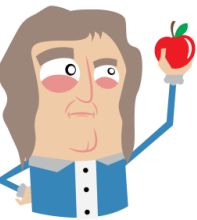


Charles Darwin

By using hypotheses and experiments, scientists can make meaningful statements about the world. Darwin's theory of genetics. The scientific method and will continue to be used to gain understanding our universe.

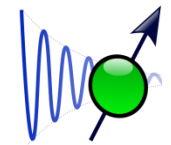


Chemistry



Isaac Newton

A hypothesis is a statement that predicts the cause of an event. It is based on theory and previous experiments. The results of an experiment would be compared to the hypothesis.

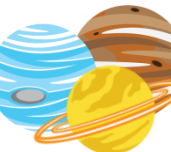


Body 1

Physics



Scientists try to understand the world by using the scientific method. The scientific method has two main parts: observation and experimenting. Scientists observe and test accurate data. For example, combining



Body 2

Astronomy



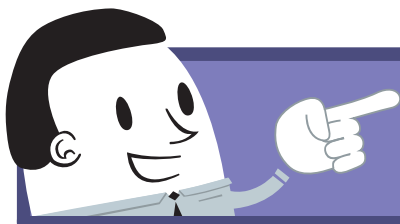
An experiment is a test of something where the results are measured and recorded. Experiments are designed to prove or disprove a hypothesis. Without experiments, scientists have no real world evidence of their theories, such as the position of different planets in the universe.



Conclusion

Biology

SAMPLE



# Famous Scientists

Q2

Analyse the two body paragraphs below and write an approximation of 2-3 sentences.



---

---

---

---

---

---

---

---



*Claudius Ptolemy*

The geocentric Greco-Roman model of the universe, the literal centre of the universe, was the Earth. Moons and planets orbited the Earth. We now know this model is incorrect.

Ptolemy, a first century Greco-Roman astronomer, developed the geocentric model, the Earth was the centre of the universe, including planets, stars, moons and the Earth. We now know this model is incorrect.

The heliocentric model of the universe, the 15<sup>th</sup> and 16<sup>th</sup> century Polish astronomer Nicolaus Copernicus proposed that the Sun was the centre of the solar system, including planets, moons and the Earth. We now know this model is correct.

15<sup>th</sup> and 16<sup>th</sup> century Polish astronomer Nicolaus Copernicus proposed that the Sun was the centre of the solar system, including planets, moons and the Earth. We now know this model is correct.



*Nicolaus Copernicus*

Q3

Use the information in the two body paragraphs above to write a paragraph of 4-5 sentences on the negative effects of the geocentric model.



---

---

---

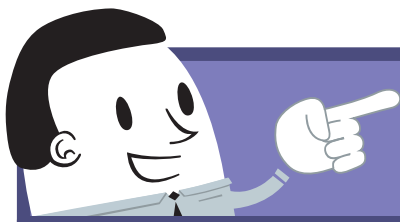
---

---

---

---

---



# Notable Newton

Isaac Newton was an English physicist and mathematician in the 18<sup>th</sup> century. Complete the following exercises involving text and investigate his contributions to science.



Q1

The sentences from a body paragraph are listed below. Classify each sentence as either introductory, supporting or concluding. Write the letter that appears in the paragraph to find the answer to the question.

Letter	Sentence	Num.
A	He formulated four laws of mechanics, the law of universal gravitation and his three laws of motion.	
C	However, Einstein's theory of general relativity and emerging theories of quantum mechanics have extended Newton's laws.	
E	However, this attraction could not be explained for large and close objects.	
G	Newton's contributions to science were not immediately succeeded by general relativity and quantum mechanics today and represent major scientific breakthroughs.	
I	Newton's greatest contribution to science was his contribution to the understanding of the universe and their effects on the world.	
L	Newton discovered that the force of gravity is inverse to the square of the distance between two objects.	
N	Newton's theory of gravity explained the behaviour of objects in motion.	
	Newton's theory of gravity explained the motion were	

SAMPLE

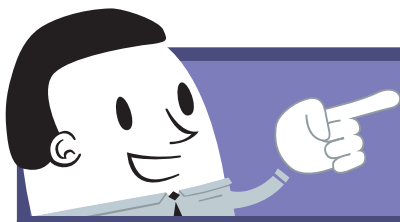


What is said to have been caused by what?

$\frac{P}{6}$   $\frac{P}{6}$   $\frac{L}{3}$   $\frac{E}{4}$



the  
the  
here.



# Notable Newton

Q2

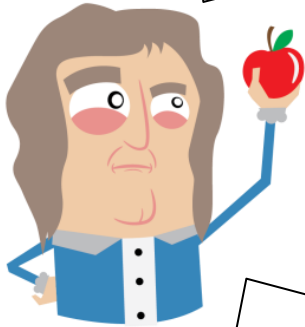
Shown below are several of Newton's beliefs. For each, write a sentence explaining your understanding using your general knowledge.



The Earth revolves about the Sun.

---

---



Mathematics is the language of science.

---

---

---

---

All discoveries in science are made by building on what came before.

---

---

---

---

Q3

The paragraph below is jumbled. Rewrite the paragraph in the space provided, using the beginning and concluding sentences.

Newton's  
Gravitation



...field of  
...there is  
...contributed

---

---

---

---

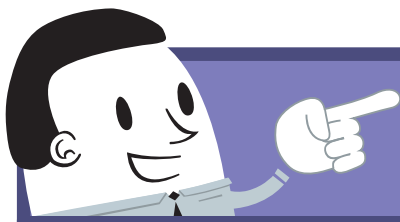
---

---

---

---

SAMPLE



# Einstein's Escapades

Albert Einstein was a German-born physicist in the late 19th century. This activity investigates his personal life and contributions to science.



Q1

Link each of the cohesive ties below to the appropriate sentence in the text. Use the letter intersected by each line to find the answer to the question. Each line will pass through only one letter.

1. Additionally

H

\_\_\_\_\_ Einstein was born in a German city.

2. Although

O

\_\_\_\_\_ he was a brilliant student, Einstein scored exceptionally well on a university entrance exam.

3. Consequently

E

\_\_\_\_\_ his work in quantum chemistry.

4. Despite

P

\_\_\_\_\_ proposed that light was made of particles called photons. \_\_\_\_\_, these quanta of light have a dual nature.

5. Eventually

K

\_\_\_\_\_ relativity was a huge breakthrough. \_\_\_\_\_, he was awarded the Nobel Prize for his theoretical discoveries.

6. However

F

\_\_\_\_\_ he lived in a static universe. \_\_\_\_\_, his law of general relativity showed that the universe was expanding.

7. Initially

\_\_\_\_\_ he was a shy person who avoided the public eye. \_\_\_\_\_, he appeared twice and appeared publicly on occasion. \_\_\_\_\_, he was an intensely private individual.

8. \_\_\_\_\_

\_\_\_\_\_ of many talents, Einstein was an accomplished pianist. \_\_\_\_\_, he co-invented an environmentally-friendly and energy-efficient refrigerator.

\_\_\_\_\_ Einstein disbelieved in quantum theory until his death. \_\_\_\_\_, he ignored many important developments in quantum mechanics and theoretical physics.



When he made some of his greatest scientific breakthroughs?

3   1   7   3   2   5   5   9   6   1





Text Str  
& Co



**SAMPLE**

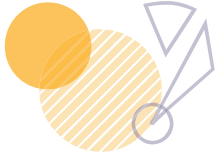
62995



**MIGHTY MINDS**  
Educational Consultants







# Mighty Minds Lesson Installs

## 'Fundamentals' Lesson



Firstly, thank you for your support of Mighty Minds and our resources. We are proud to provide quality resources that are both educational and engaging, and we hope you enjoy using our works.

To assist you in using this resource, we have compiled some information for you.

### About this resource

This Mighty Minds 'Fundamentals' Lesson focuses on a specific skill (in this case, *Maps and Plans* and *Maps and Plans* presents this skill through a theme from the Australian Curriculum (Geography). This lesson is also targeted at a certain skill level (in this case, *Year 5*) and is designed for completing work that is suited to them.

### How to use this resource

Our 'Fundamentals' Lessons are split into two parts: a Teacher's Copy and a Student Workbook. Each contain different types of resources.

The student workbook contains:

- The main title page; and
- The blank student workbook pages.

The teacher resources include:

- This set of instructions for using the resource;
- The Teacher's Copy of the lesson, which includes the lesson plan, the lesson content, and any resources that will be needed to teach the lesson;
- The Item Description, which provides a detailed description of the lesson and its aims, as well as extension ideas;
- The student model responses, which provide examples of student responses on the student worksheets to ensure that answers are clear and easy to understand;
- The teacher's copy of the student model responses, which provide a more detailed explanation of the model responses or answers to the questions;
- Final notes for the teacher.

We recommend that you print out the Student Workbook (the first set of pages) for the students. If students are using the Student Workbook, you may also like to provide them with the student answer key.

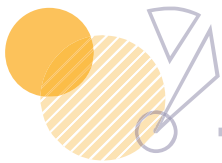


### Helping us

We would love to hear from you. If you have any feedback or suggestions that if you email us with suggested changes to any lesson, we will be happy to consider them. We will send you the revised lesson – free of charge.

You can email us at [resources@mightyminds.com.au](mailto:resources@mightyminds.com.au) and we'll get back to you as soon as we can.





# Text Structure

Text structure in academic writing is very important. With a good structure, your writing can be improved dramatically. This structure contains three parts:



**Introduction**  
 The introduction has to introduce the piece. It must orientate the reader with the key argument and the points to be raised in the body which will support the hypothesis.

**Body**  
 The body has to support the introduction by supplying key arguments. Each paragraph should contain a main point. This hypothesis is usually supported by a point for each paragraph.

**Conclusion**  
 The conclusion has to summarise the piece. This usually includes a reiteration of the supporting points, and a reiteration of the hypothesis. The last sentence should be strong and leave the reader thinking.

## Introduction

The introductory paragraph is the first paragraph of an essay. The most important task of the introduction is present the hypothesis clearly and strongly. This hypothesis should then be followed by the main points to be addressed in the body of the essay. Below are a few examples of how an introduction can be presented.

"I believe...

"I think...

In either case, the hypothesis should be followed or followed by points that support the argument. For example, "Dogs are better than cats because dogs are loyal, obedient, and can fetch."

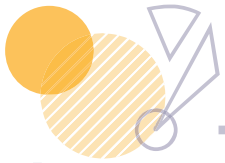


...because dogs are loyal, obedient, and can fetch."

...obedient, and can fetch a stick; therefore, dogs are better

*This teaching guide is continued on the next page...*





*...This teaching guide is continued from the previous page.*



In the first of the above examples, the supporting points are introduced in the introduction and presented, and in the second example the supporting points are introduced in the body paragraphs and presented. Generally, the first example should be used at the beginning of the text and the latter at the end to reinforce the argument. Although the argument can be introduced anywhere in the introduction, the hypothesis should be introduced in the first few sentences. However, as long as the introduction flows, it is not a problem.

It is generally the case that the argument and supporting points should be introduced in order to have a greater effect. The introduction should always be designed to attract the reader's attention – whether this be the hypothesis or otherwise – and to set the scene for the argument. The closing sentence of the introduction may also be used to introduce the main argument in order to provide a clear focus for the reader. This is a good way to ensure that the reader is clear about the basic structure!

**Body**

The body of the text is where the supporting points are introduced and related back to the main hypothesis. The body generally consists of several paragraphs, each containing supporting points although this is not an absolute rule. Each supporting point should be clearly introduced and supported by evidence in the form of quotations, statistics, anecdotal evidence, etc. At the close of the paragraph, it should be clear how the point relates to the main hypothesis and also linking to the next body paragraph.

**Conclusion**

The conclusion of the text should contain a summary of each of the supporting points and a restatement of the main hypothesis. If the text is long, it should just be a brief recap to remind readers of the argument. The conclusion should restate the main hypothesis in a similar way to the introduction (but not necessarily using the same words). The closing sentence can vary but it should be catchy. Furthermore, any supporting points introduced in the conclusion.

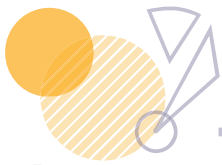
**Cohesion**

One of the most important aspects of writing is cohesion. The body paragraphs in the order that they were introduced should be clear, but it does improve cohesion and the general organisation of the text. The introduction is considered as a sort of signpost, telling the reader what to expect. If the supporting points are not in the order that they were introduced, then the reader might become confused if these are not in the order that they were introduced. Accordingly, nothing should ever be introduced out of the blue. Always stick to the plan! so that the piece is organised and structured; this will ensure that the reader can follow the argument.



*This teaching guide is continued on the next page...*





...This teaching guide is continued from the previous page.

### Cohesive Ties

Cohesive ties are an excellent way to improve cohesion within a text. They are useful for making a text more interesting. Using ties such as *firstly*, *additionally*, *however* and *consequently* can help to improve the flow of a text by making the introduction of a supporting paragraph more logical. They are also useful for introducing supporting paragraphs and can also be used to link related ideas together. Without cohesive ties, a text would be dull and repetitive.

Some examples of useful cohesive ties may be found in the table below.

Below is a table of handy cohesive ties and how to use them.



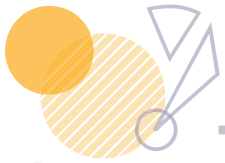
Cohesive Tie	How to use it	Example
Additionally/ In addition	This cohesive tie is used to add extra information to the clause. It is used at the beginning of the clause.	This table contains information about how to use cohesive ties. <u>Additionally</u> , there are examples to illustrate how to use them.
Although	Although is used to show a contrast between two clauses. It is used at the beginning of the first clause.	<u>Although</u> I really enjoy English, my favourite subject is History.
As a result	As a result is used to show the consequence of the first clause. It is used at the beginning of the second clause. In the examples, it is used at the beginning of the two clauses (with a separating them) or at the beginning of the second clause.	I worked extremely hard in Year 12. <u>As a result</u> , I gained entry into my first choice of university. OR <u>As a result</u> of working extremely hard in Year 12, I gained entry into my first choice of university.
Consequently	The cohesive tie <i>consequently</i> is useful when the information in the second clause is a direct result of the information in the first clause.	The population grew this year by approximately 150 million people. <u>Consequently</u> , Santa Claus has been busy.



This teaching guide is continued on the next page...







...This teaching guide is continued from the previous page.

The table of cohesive ties is continued below.



Cohesive Tie	Usage
Nevertheless	This cohesive tie indicates that the second clause provides contrary or opposite information to that in the first clause. Example: <u>Nevertheless</u> , he had good food for me to love.
Otherwise	The cohesive tie <i>otherwise</i> indicates a different situation to that in the preceding clause. Example: Remember to call me. <u>Otherwise</u> , we will be victims of the virus.
Therefore	<i>Therefore</i> serves to connect information in the second clause to the information in the first clause. Example: The movie isn't on tonight. <u>Therefore</u> , we should wait until tomorrow to go out.
Thus	The cohesive tie <i>thus</i> connects information in the second clause to the information in the first clause. Example: There was a ridiculous amount of traffic this morning; <u>thus</u> , I was very late for work.
Whereas	This cohesive tie connects information in the second clause to the information in the first clause. Example: <u>Whereas</u> you like to go ice skating, I prefer to read. OR You like to go ice skating <u>whereas</u> I prefer to read.

SAMPLE





Item Description

Please note: any activity that is not completed during class time will be undertaken at a later date.



'Famous Scientists', 'Notable Moments in History', 'Escapades'

Activity Description:

- This lesson consists of three activities designed to develop skills in relation to the history of science.
  - In the first activity, 'Famous Scientists', students will identify key features of paragraphs based on their structure and content, and will be able to identify key features of body paragraphs.
  - In the second activity, 'Notable Moments in History', students will be given a series of sentences from a body paragraph and will be required to identify the main topic sentence and supporting sentences given. They will be required to write their own supporting introductory, supporting and concluding sentences for a paragraph with appropriate cohesive ties and to reorder the sentences in the given paragraph to form a coherent paragraph.
  - In the third activity, 'Escapades', students will match a series of cohesive ties to a sample paragraph. They will be required to identify incorrectly used cohesive ties, replace incorrectly used cohesive ties and rewrite a paragraph to improve its readability.

- Purpose:** This activity is designed to develop students' ability to correctly structure sentences within paragraphs, to identify key features of paragraphs within articles, and to use cohesive ties to improve the readability of paragraphs.



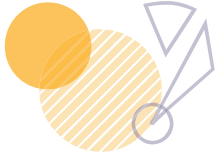
SAMPLE

- Identifying key features of paragraphs (α1)
- Identifying key features of body paragraphs (α3)
- Identifying the meaning of words or other symbols (α4)
- Identifying the meaning of tables or diagrams or maps or graphs (α6)
- Identifying key features of paragraphs systematically (α53)
- Identifying/ organising extended written text (β21)
- Identifying (β30)
- Identifying/ relating ideas/ themes/ issues (β31)
- Identifying/ generalising from information (β38)

This Item Description is continued on the next page...







Item Description – continued

...This Item Description is continued from the previous page.

‘Famous Scientists’, ‘Notable N...  
Escapad

• **CCEs (cont’d):**

- Perceiving patterns (Φ37)
- Hypothesising (Θ41)
- Analysing (Θ43)
- Synthesising (Θ45)
- Judging/ evaluating (Θ47)
- Justifying (Θ49)
- Using correct grammar (π20)
- Using vocabulary (π20)
- Summarising (π20)
- Setting out an argument (π20)
- Creating a text (π20)
- Applying knowledge to solve the required answer (Φ37)

• **Suggested Time**

- This lesson should take 1 hour to complete – 20 minutes per activity.

• **Teaching Method**

- Students should work individually, with the answers discussed as a class.
- Before the lesson, students should be taught correct paragraph and article structure, including the opening, body and concluding paragraphs and introductory, supporting and concluding paragraphs. Students should also be able to identify and use these structures.

This exercise is slightly harder than the previous exercises. Because of this, the writing task should be made optional for students who are struggling. For these students, they could be told to write a paragraph or article, with the question: Who is your favourite scientist and why.

**Discussion Questions:**

- How does the information presented in a paragraph influence the reader?
- How do supporting points in the introduction make concepts easier to understand?







# Famous Scientists

Scientists throughout history have made significant discoveries which we live. Complete the following exercises involving the history of science.

Q1

The four paragraphs below are arranged out of order. Structure to connect each paragraph to its name on the right. Connect each scientist with their field of expertise.

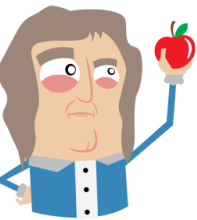


Charles Darwin

By using hypotheses and experiments, scientists can make meaningful statements about the world. The scientific method and will continue to be used to understand our universe.



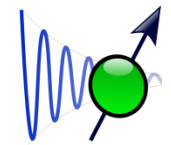
Chemistry



Isaac Newton

A hypothesis is a statement based on theory or experiment. It is a prediction of an outcome that would be made.

Body 1

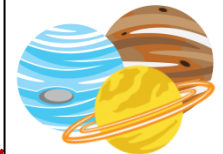


Physics



Scientists tried to understand the scientific method. It has two main parts: observation and experimenting. Scientists observe and test accurate data. For example, combining

Body 2



Astronomy



An experiment is a test of something where the results are measured and recorded. Experiments are designed to prove or disprove a hypothesis. Without experiments, scientists have no real world evidence of their hypotheses, such as the position of different planets in the universe.

Conclusion



Biology

SAMPLE



# Famous Scientists

Q2

Analyse the two body paragraphs below and write an appropriate response of 2-3 sentences.



The place of Earth in the universe has been an intense subject of much of history. Two significant models of this have been the geocentric and the heliocentric model. Prior to the 16<sup>th</sup> century most believed in the geocentric model, while afterwards most believed in the heliocentric model.



Claudius Ptolemy

The geocentric model was developed by Claudius Ptolemy, a first century Greco-Roman astronomer. In this model, the Earth was the literal centre of the universe, with the sun, planets, stars, moons and other celestial bodies orbiting the Earth. We now know this model is incorrect.

The heliocentric model was developed by Nicolaus Copernicus in the 15<sup>th</sup> and 16<sup>th</sup> century Polish astronomer. In this model, the sun was the centre of the solar system, with the Earth and other planets, including the moon, orbiting it.



Nicolaus Copernicus

Q3

Use the two body paragraphs below to write an appropriate response of 4-5 sentences on the negative effects of human activity on the environment.

Human activity has had a significant impact on the environment through pollution, habitat destruction and climate change. The environment is polluted by smoke from power plants, factories and cars. This pollution is released into waterways and improperly disposed rubbish. Habitat destruction is caused by the construction of buildings and farms. Non-native pests, such as cane toads, have been introduced to new areas, where they outcompete and kill native animals and plants. If we continue to destroy the environment, there will be nothing left for future generations.



## Famous Scientists

### Question One:

In this exercise, students are required to determine the order of paragraphs based on their sentence structure. The correct order is shown in the exercise.

Model Response:

*Since ancient times, scientists have tried to establish a scientific method. The scientific method has two main components: hypothesising and experimenting. Both are necessary to make and test accurate hypotheses.*

*A hypothesis is an educated guess as to what the results of an experiment will be. Hypotheses are usually based on theory and verified by experiment. Scientists would not conduct an experiment aimlessly and never repeat an experiment until they are satisfied with the results.*

*An experiment is a test of some hypothesis. Experiments are designed to test a hypothesis and recorded. In laboratory experiments, scientists would have no real world effects.*

*By using hypotheses and experiments, scientists can make meaningful and reliable statements about the world. Hypotheses have been, and will continue to be, a vital tool to understand the world.*

Students should have identified the introductory sentence, 'Since ancient times...', and the listing sentence, 'hypothesising and experimenting'. They should have identified the body paragraph topics in the first sentence, 'By using hypotheses and experiments...'. The broad concluding sentence, '...will continue to be, and will continue to be...'. The order of the body paragraphs should have been determined by the order in which the paragraph topics were listed in the introduction. As hypothesising is listed first, the first paragraph will concern hypothesising.

To complete the exercise, students are required to write an appropriate introductory paragraph giving context to the geocentric and heliocentric models.



*The universe has been an intense scientific and religious debate for centuries. Significant models of this have been developed: the geocentric model and the heliocentric model. Prior to the 16<sup>th</sup> century, most people believed in the geocentric model. Today, most people believe in the heliocentric model.*

**This answer guide is continued on the next page...**





...This answer guide is continued from the previous page.

### Question Two (cont'd):

Students' responses should have included an appropriately detailed paragraph that establishes the context of the following paragraphs. The student should have listed the geocentric and heliocentric models, compared the two models in terms of their accuracy or the majority of the population. Correct grammar is necessary for the response.

### Question Three:

This exercise requires students to write a brief paragraph, one sentence, 2-3 supporting sentences and a concluding sentence, detailing the effects of humans on the environment.

Model Response:

*Humans negatively impact the environment through habitat destruction and introduction of invasive species. Air pollution from smoke from power plants, run-off from factories, and landfills contribute to environmental degradation. Habitat is destroyed to make way for agriculture and urban development. Invasive pests, such as cane toads, have been introduced to control other pests and kill native animals and plants. If humans continue to pollute and destroy habitats, there will be nothing left for future generations.*

The introductory sentence should state the main point of the paragraph—the negative effect of humans on the environment. The supporting sentences should detail the specific effects that were addressed in the following paragraph. Points could have been made about air pollution, landfills, habitat destruction, introduction of invasive species, deforestation, global warming, etc. The concluding sentence should summarize the main point by detailing the predicting eventual consequences.

As the student is given a paragraph with appropriate sentence structure on a given topic, the student is judged on the veracity of the information they present in their response and grammar was necessary.





# Notable Newton

Isaac Newton was an English physicist and mathematician in the 18<sup>th</sup> century. Complete the following exercises involving text and investigate his contributions to science.



Q1

The sentences from a body paragraph are listed below. Classify each sentence as either introductory, supporting or concluding. Write the letter that appears in the paragraph to find the answer to the question.

Letter	Sentence	Function	Num.
A	He formulated four laws of mechanics, discovered universal gravitation and his three laws of motion.	Supporting	2
C	However, Einstein's theory of general relativity and emerging theories of quantum mechanics have extended Newton's laws.	Concluding	7
E	However, this attraction could not explain the motion of large and close objects.	Supporting	4
G	Newton's contributions were not only groundbreaking but also succeeded by general relativity and quantum mechanics today and represent major scientific breakthroughs.	Concluding	8
I	Newton's greatest contribution was his theory of gravity and his contribution to the understanding of light and their effects on the world.	Introductory	1
L	Newton's theory of gravity states that the force of gravity is inverse to the square of the distance between two objects.	Supporting	3
N	Newton's theory of gravity explains the behaviour of objects in motion.	Supporting	5
	Newton's theory of gravity explains the motion of objects in motion were	Supporting	6

SAMPLE



What is said to have been caused by what?

$\frac{P}{6}$   $\frac{P}{6}$   $\frac{L}{3}$   $\frac{E}{4}$



the  
the  
here.



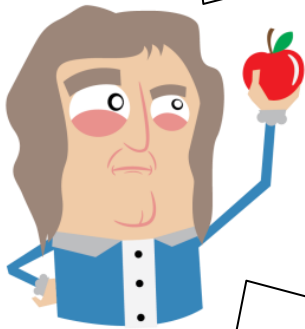
# Notable Newton

Q2

Shown below are several of Newton's beliefs. For each, write a sentence using your general knowledge.

The Earth revolves about the Sun.

This model of the solar system is known as heliocentric, in which all celestial bodies revolve about the Earth.



Mathematics is found throughout nature.

Mathematics helps us understand the patterns in the universe and

All discoveries in science are based on what was known before.

Every discovery is based on the discoveries of past scientists. Each scientist adds to the body of knowledge with their own discoveries.

Q3

The paragraph below is jumbled. Rewrite the paragraph in the space provided using beginning and concluding sentences.

Newton's work advanced every field of maths then  
he died. Newton invented calculus along with Gottfried  
Leibniz. However, there is some dispute about who  
contributed more to calculus. He also invented  
Newton's method, which is used widely in algebra.  
Newton's mathematical ability resulted in him becoming  
the Lucasian Professor of Maths at the University of  
Cambridge.





## Notable Newton

### Question One:

To complete this exercise, students were required to classify the sentences which were listed out of order, as introductory, supporting or concluding, and to number them in the order they would appear in the paragraph.

Model Response:

*Newton's greatest accomplishment is considered to be his study of the study of forces and their effects on physical objects. This is the focus of the term mechanics: his law of universal gravitation and his three laws of motion. Universal gravitation states that the force of gravitation exists between all objects, each other. However, this attraction can only be detected between objects with mass. Newton's three laws of motion describe the behavior of objects in motion. Until the 20<sup>th</sup> century, his laws of motion were used to describe the motion of objects. The theory of general relativity and emerging theories of quantum mechanics have replaced Newton's laws. Newton's contribution to mechanics, which includes his law of universal gravitation, is still used in physics today and represents one of the greatest achievements in history.*

Students should have identified the introductory sentence as the first sentence, which explains the focus of the paragraph, '...his contribution to mechanics is his study of forces and their effects on physical objects'. The second sentence, which also acts to introduce the paragraph, should have been identified as the second sentence, '...four laws of motion'. The third sentence, '...his contribution to mechanics...', and the fourth sentence, '...his laws of motion...', should have been identified as the third and fourth sentences. The fifth sentence, '...the theory of general relativity and emerging theories of quantum mechanics have replaced Newton's laws', should have been identified as the fifth sentence. The sixth sentence, '...his contribution to mechanics, which includes his law of universal gravitation, is still used in physics today and represents one of the greatest achievements in history', should have been identified as the sixth and final sentence.

As Newton's law of universal gravitation is mentioned before his three laws of motion in the second introductory sentence, the first sentence should have detailed the law of universal gravitation. The second sentence should have logically followed from the first, as it mentioned the attraction of objects, '...his attraction...'. Students should have identified the third sentence as the third sentence, as it mentioned Newton's three laws of motion. The fourth supporting sentence should have followed the third, as it mentioned Newton's laws of motion, '...his laws of motion...'. The fifth supporting sentence presented general relativity, the modern theory that has replaced Newton's laws, and must therefore be the final supporting sentence. The sixth sentence should have preceded the concluding sentence because the theory of general relativity introduced in this sentence.

Students were required to write 1-2 supporting sentences for each of three given model answers for each are shown on the following page.

*This answer guide is continued on the next page...*



...This answer guide is continued from the previous page.

## Question Two (cont'd):

Model Response:

The earth revolves about the sun.

*This model of the solar system is known as heliocentric. In this model, all celestial bodies revolve about the Earth, was succeeded by the geocentric model.*

Mathematics is useful.

*Mathematical patterns are found throughout nature.*

*Mathematics helps us to understand and predict the world around us. Mathematics is very useful.*

All discoveries in science are made possible by mathematics.

*Every discovery in mathematics or science is made possible by the work of scientists.*

*Each new scientist adds to the existing body of knowledge and makes new discoveries.*

Students' answers will have varied from the model response. If their answers flowed logically from the given introductory sentence and included relevant concepts, they should have been marked as correct.



## Question Three:

For this exercise, students were given a paragraph, which had its sentences jumbled, by rearranging them into a paragraph with a supporting and concluding sentences.

Model Response:

*Newton's mathematical ability was studied. Newton invented calculus along with Gottfried Wilhelm Leibniz. There was a dispute about who contributed more to calculus. The binomial theorem, which is used widely in algebra. Newton's mathematical ability resulted in him becoming the Lucasian Professor of Maths at the University of Cambridge.*

Students' answers will have varied. The first supporting sentence should have been identified by its clear explanation of the focus of the paragraph. The concluding sentence should have been identified by the phrase 'resulted in him becoming the Lucasian Professor of Maths at the University of Cambridge'.



The first supporting sentence based on it being the only supporting sentence that was not a previous supporting sentence, either by starting with a cohesive device like 'also...'. The second supporting sentence should have been identified as the binomial theorem, which was introduced in the first supporting sentence. The third supporting sentence follows the second.

In the new paragraph, students should have preserved the structure of each sentence, while minor alterations to the content of the sentences were acceptable, as long as all the original sentences was conveyed in the new paragraph.







# Einstein's Escapades

Albert Einstein was a German-born physicist in the late 19th century. This activity investigates his personal life and contributions to science.



Q1

Link each of the cohesive ties below to the appropriate sentence. Use the letter intersected by each line to find the answer to the question. Each letter will pass through only one letter.

1. Additionally	H	_____ Einstein was born in a small town in a German city.
2. Although	O	_____ he was a brilliant student who scored high marks on a university entrance exam.
3. Consequently	W	_____ he worked in a patent office in Bern, Switzerland, where he developed his theory of relativity.
4. Despite	E	_____ he proposed that light was made of particles called photons. _____, these quanta of light energy could be described as waves.
5. Eventually	P	_____ his theory of relativity was a huge breakthrough in physics. _____, he was awarded the Nobel Prize for his work on the photoelectric effect.
6. However	K	_____ his theory of relativity showed that the universe was not static but expanding.
7. Initially	F	_____ he was a shy and reserved person who rarely appeared twice and appeared publicly on occasion. _____ he was an intensely private individual.
8.		_____ of many talents, Einstein was an accomplished violinist. _____, he co-invented an environmentally-friendly and energy-efficient refrigerator.
		_____ Einstein disbelieved in quantum theory until his death. _____, he ignored many important developments in quantum mechanics and theoretical physics.

SAMPLE



When he made some of his greatest scientific breakthroughs?

1 3 3 1 7 3 2 5 5 9 6 1



# Einstein's Escapades

Q2

Circle the incorrectly used cohesive ties in the following paragraph. Circle the correct cohesive ties above the incorrect ones.



Einstein was interested in mathematics **Additionally** he was fascinated by music. **However** he spent his spare time **Despite** his young age, he was a genius in science, mathematics and philosophy. **Although** his work was ahead of his peers, he developed an understanding of relativity that was far ahead of his peers.



Q3

The following paragraph is boring. Rewrite the paragraph in the space provided, using at least three cohesive ties to improve its readability.

Albert Einstein was one of the most influential physicists of the 20<sup>th</sup> century. He is widely regarded as the most influential physicist of the 20<sup>th</sup> century. He was crucial for their development. Einstein's greatest contribution was his theory of general relativity, one of the foundations of modern physics. He also developed the formula for mass-energy equivalence,  $E = mc^2$ . This allowed for the development of nuclear reactors. He opposed nuclear weapons. He initially campaigned for their development during the early stages of World War II.

Albert Einstein was one of the most influential scientists of all time. Additionally, he is widely regarded as the most influential physicist of the 20<sup>th</sup> century. Einstein contributed to the development of modern physics and cosmology (the study of the universe). Although his greatest contribution was his theory of general relativity, one of the foundations of modern physics, he also developed the formula for mass-energy equivalence,  $E = mc^2$ . This allowed for the development of nuclear weapons and reactors. However, he is best known for determining the formula for mass-energy equivalence,  $E = mc^2$ . This allowed for the development of nuclear weapons and reactors. He opposed nuclear weapons, he initially campaigned for their development during the early stages of World War II.





## Einstein's Escapades

### Question One:

This exercise required students to match a series of cohesive ties to missing cohesive ties, based on their appropriateness. Each student wrote a sentence and vice versa. The completed sentences are shown below. The correct usage of each cohesive tie, with the exceptions of 'initially' and 'eventually', is shown in the teacher's guide for this lesson. Explanations of initially and eventually are shown below.



- *Although* Einstein was born in Germany, he refused to join the military to avoid military service.
- *Despite* having dropped out of school, Einstein continued to study mathematics and physics on a university level.
- *Initially*, Einstein published only papers on quantum theory.
- His paper on the photoelectric effect introduced the concept of discrete groups, or quanta. *Eventually*, these quanta were used to explain the photoelectric effect.
- Einstein's theory of general relativity revolutionized physics. *Nevertheless*, he was awarded the Nobel Prize in physics.
- Einstein at first believed that the universe was static. *However*, general relativity showed that the universe was expanding.
- Einstein married twice. *Otherwise*, he was an intensely private individual.
- A man of many talents, Einstein was also a violinist. *Additionally*, he co-invented an engine for the atomic bomb.
- Einstein disliked fame. *Consequently*, he ignored many important details of his life.

'Initially', when used at the beginning of a sentence, indicates that the event of the sentence took place 'at first'. 'Eventually', as a cohesive tie, indicates that the event of the sentence took place 'in the end'.

The only potential cohesive tie that could be used in which sentence was between 'however' and 'Einstein's theory of general relativity showed that the universe was expanding'. The cohesive tie between 'however' and the sentence 'Einstein's theory of general relativity showed that the universe was expanding' have intersected any letters, 'however' must have been correct. 'Nevertheless' could only have been used in the sentence 'Einstein's theory of general relativity showed that the universe was expanding'.



Students were required to circle the cohesive ties used incorrectly in a paragraph. The correct cohesive ties are shown above them. A model response is shown below.

Einstein was a genius in mathematics and mechanics from an early age. *Additionally*, he was a skilled inventor of mechanical machinery and built mechanical devices in his spare time. *Despite* his genius, he did not read books on science, mathematics and philosophy from the age of five. *Consequently*, he developed an understanding of mathematics and science several years before his peers.



**This answer guide is continued on the next page...**

...This answer guide is continued from the previous page.

## Question Two (cont'd):

Prior to modification, 'additionally', 'despite' and 'consequently' and 'otherwise' respectively.

'However' was an incorrectly used cohesive tie because it contradicts the previous clause. 'Additionally' was a suitable alternative because the following clause builds upon the preceding clause. Other suitable cohesive ties include 'in addition to' and 'also'.

'Although' was an incorrectly used cohesive tie because it contradicts the previous clause. 'Despite' was a suitable alternative because the following clause can precede 'his youth'.

'Otherwise' was an incorrectly used cohesive tie because it indicates a different situation to that discussed in the previous clause. 'Consequently' was a suitable alternative because it indicates that the following clause is a result of the preceding clause. Other suitable cohesive ties include 'as a result', 'therefore' and 'thus'.

## Question Three:

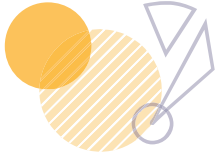
In this exercise, students were given a paragraph which had no cohesive ties, and insert at least three cohesive ties. The response is shown below.

Albert Einstein was one of the greatest scientists of all time. Additionally, he is widely regarded as one of the most influential figures of the 20th century. Einstein contributed to the fields of theoretical physics, including quantum mechanics (the study of the universe). Although he denied quantum mechanics, his work was crucial for their development. Einstein's greatest contribution was his theory of general relativity, one of the foundations of modern physics. His work led to the development of nuclear weapons and reactors. Einstein initially campaigned for their development to prevent Germany winning WWII.

When the paragraph was read, it was clear that significantly, several pairs of consecutive sentences in the original paragraph needed cohesive ties to improve readability. The sentences 'He denied quantum mechanics' and 'his work was crucial for their development.' should have been joined together with a cohesive tie; for example, 'Although he denied quantum mechanics, his work was crucial for their development.' Likewise, the sentences 'He opposed the development of nuclear weapons' and 'he initially campaigned to prevent Germany winning WWII.' should have been joined to form 'While he opposed nuclear weapons, he initially campaigned to prevent Germany winning WWII.'

In the original paragraph, these sentence pairs, students could have added cohesive ties to whatever





# End of Learning

Please

If you feel there are any issues with this booklet for you to use in your class, you may contact us via email or phone. We offer a variety of activities (whole worksheets, half worksheets, and worksheets) for

Alternative activities for the entire worksheet to be used at a later date.

