

Unit 1 SCIENCE AND SCIENTISTS

Lesson 3: Discover Useful Structures & Using Structures

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Learning Objectives (学习目标)

By the end of the lesson, you will be able to:

1. understand the basic form of predicative clauses (表语从句).
2. master the usages of different subordinating conjunctions (从属连词) that lead predicative clauses.
3. understand the meanings and functions of predicative clauses.
4. use predicative clauses correctly and properly in context (语境中).



JOHN SNOW DEFEATS “KING CHOLERA”

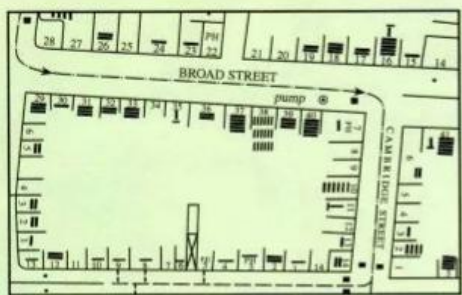
Cholera used to be one of the most feared diseases in the world, until a British doctor, John Snow, showed how it could be overcome. This illness causes **severe** diarrhoea, dehydration, and even death. In the early 19th century, when an outbreak of cholera hit Europe, millions of people died from the disease. As a young doctor, John Snow became frustrated because no one knew how to prevent or treat cholera. In time, he rose to become a famous doctor, and even attended to Queen Victoria when she gave birth. However, he never lost his desire to destroy cholera once and for all.



In general, doctors in those days had two **contradictory** theories to explain how cholera spread. One theory was that bad air caused the disease. Another was that cholera was caused by an **infection** from germs in food or water. Snow **subscribed** to the second theory. It was correct, but he still needed **proof**. Consequently, when an outbreak of cholera hit London in 1854, Snow began to investigate. He discovered that in two particular streets the cholera outbreak was so severe that more than 500 people died in ten days. He was determined to find out why.

Snow began by marking on a map the exact places where all those who died had lived. There were **multiple** deaths near the water pump in Broad Street (especially house numbers 16, 37, 38, and 40). However, some **households** (such as 20 and 21 Broad Street, and 8 and 9 Cambridge Street) had had no deaths. These people worked in the pub at 7 Cambridge Street. They had been given free beer, and so had not drunk the water from the pump. Snow **suspected** that the water pump was to **blame**. What is more, in another part of London, a woman and her daughter had died of cholera after moving

away from Broad Street. It seemed that the woman liked the water from the pump so much that she had it delivered to her house every day. As a result of this evidence, John Snow was able to announce that the pump water carried cholera germs. Accordingly, he had the **handle** of the pump removed so that it could not be used. Through this **intervention**, the disease was stopped in its tracks.



Part of Snow's Cholera Map
Note: —: 1 death PH: public house
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The truth was that the water from the Broad Street pump had been infected by waste. Moreover, Snow was later able to show a **link** between other cases of cholera and the different water companies in London. Some companies sold water from the River Thames that was polluted by **raw** waste. The people who drank this water were much more likely to get cholera than those who drank **pure** or boiled water.

Through Snow's tireless efforts, water companies began to sell clean water, and the threat of cholera around the world saw a **substantial decrease**. However, cholera is still a problem. Each year, millions of people around the world get cholera and many die from it. Fortunately, we now know how to prevent cholera, thanks to the work of John Snow. Moreover, in his use of maps and **statistics**, Snow **transformed** the way scientists study diseases. For this reason, Snow is considered the father of modern epidemiology.

Q1. In Para.2, what were the two contradictory theories doctors had in those days?

Q2. In Para.3, why did the woman and her daughter die of cholera after moving away from Broad Street?

Q3. What was “the truth” mentioned in Para.4?

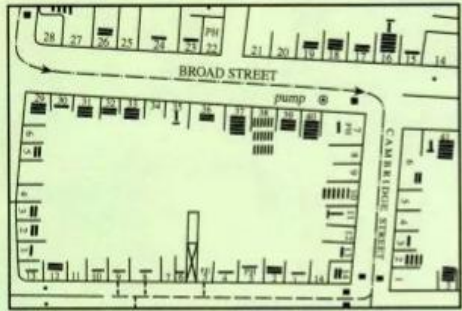


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away from Broad Street. It seemed that the woman liked the water from the pump so much that she had it delivered to her house every day. As a result of this evidence, John Snow was able to announce that the pump water carried cholera germs. Accordingly, he had the **handle** of the pump removed so that it could not be used. Through this **intervention**, the disease was stopped in its tracks.

The truth was that the water from the Broad Street pump had been infected by waste. Moreover, Snow was later able to show a **link** between other cases of cholera and the different water companies in London. Some companies sold water from the River Thames that was polluted by **raw** waste. The people who drank this water were much more likely to get cholera than those who drank **pure** or boiled water.

Through Snow's tireless efforts, water companies began to sell clean water, and the threat of cholera around the world saw a **substantial decrease**. However, cholera is still a problem. Each year, millions of people around the world get cholera and many die from it. Fortunately, we now know how to prevent cholera, thanks to the work of John Snow. Moreover, in his use of maps and **statistics**, Snow **transformed** the way scientists study diseases. For this reason, Snow is considered the father of modern epidemiology.

Q1. In Para.2, what were the contradictory theories doctors had in those days?

One theory was that bad air caused the disease. Another was that cholera was caused by an infection from germs in food and water.

Q2. In Para.3, why did the woman and her daughter die of cholera after moving away from Broad Street?

It seemed that the woman liked the water from the pump so much that she had it delivered to her house every day.

Q3. What was "the truth" mentioned in Para.4?

The truth was that water from the Broad Street pump had been infected by waste.



Explore: Observe and find

1. One theory was that bad air caused the disease.

Subject

Linking verb

Dependent clause(从句)

2. Another was that cholera was caused by an infection from germs in food

Subject

Linking verb

and water.

Dependent clause(从句)

Linking verb

3. It seemed that the women liked the water from the pump so much that she

Subject

had it delivered

The basic form of Predicative Clause:

be, seem, appear, look, sound...

PC



Subject+Linking verbs+[subordinating conjunction+other elements]

that, whether, how, where, what, as if...

4. The truth was that water from

Subject

Linking verb

by waste.





Practice: Find out predicative clauses in each sentence.

- 1. Understanding science and pushing the boundaries of science is what makes me immensely satisfied. —Bill Gates**
- 2. The next major explosion is going to be when genetics and computers come together. —Alvin Toffler**
- 3. The doctor has been taught to be interested not in health but in disease. What the public is taught is that health is the cure for disease. —Ashley Montagu**
- 4. Research is what I'm doing when I don't know what I'm doing. —Wernher von Braun**

Practice: Find out predicative clauses in each sentence.

1. Understanding science and pushing the boundaries of science **is what makes me immensely satisfied.** —Bill Gates

2. The next major explosion is going to **be when genetics and computers come together.** —Alvin Toffler

3. The doctor has **health but disease. What** **disease.** —Ashley
What subordinating conjunctions (从属连词) can lead a predicative clause?



4. Research **is what I'm doing when I don't know what I'm doing.**
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Practice: Find out predicative clauses in each sentence.

1. Understanding science and pushing the boundaries of science **is what makes me immensely satisfied.** —Bill Gates

2. The next major explosion is going to **be when genetics and computers come together.** —Alvin Toffler

3. The doctor has been taught to cure **but** disease. What the public is taking is **but** disease. —Ashley Montagu

How are these conjunctions used in a predicative clause?



4. Research **is what I'm doing when I don't know what I'm doing.**
—Wernher von Braun



Tip 1: Usages of different subordinating conjunctions that can lead a predicative clause

引导词		用法
连词	that	在从句中不充当成分，无意义
	whether	在从句中不充当成分，意为“是否”
连接代词	what(ever),which(ever),who(ever),whom(ever), whose	在从句中充当主语，宾语，定语
连接副词	how,when,where,why	在从句中充当状语
其它连词	because,as if ,as though	在从句中不充当成分，意为“因为，好像，似乎”

连词：在从句中不充当成分

1. One theory **was** that bad air caused the disease.

(在从句中不充当成分)

表语从句中**SVO**成分完整

2. What people really doubt **is** whether the doctor will defeat the serious illness.

(在从句中不充当成分, 意为“是否”, 表语从句中不能使用“if”)

表语从句中**SVO**成分完整

3. It **seemed** as if the world were coming to an end.

(在从句中不充当成分, 意为“好像”)

表语从句中**SP**成分完整

4. This applied science, which saves work and makes life easier, brings us little happiness. That **is** because we have not yet learn to make sensible use of it.

(在从句中不充当成分, 意为“因为”)

表语从句中**SVO**成分完整



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连接代词：在从句中充当主语、宾语、定语

5. Understanding science and pushing the boundaries of science **is what makes me immensely satisfied.**

(在从句中充当主语，意为“...的事情”)

↑
表语从句中缺少主语

6. That **is what many experts are worrying about.**

(在从句中充当宾语，意为“...的事情”)

↑
表语从句中缺少宾语

7. There are dozens of books about Zoology in library. However, what really makes him confused **is which is the most suitable one for his research paper.**

(在从句中充当主语，意为“哪一（本）...”)

↑
表语从句中缺少主语

连接代词：在从句中充当成分主语、宾语、定语

8. The problem **is** who **could find out a cure for the disease.**

(在从句中充当主语, 意为“谁”)

表语从句中缺少主语

9. What I have not decided **is** whom **I am going to visit.**

(在从句中充当宾语, 意为“谁”)

表语从句中缺少宾语

10. Both my parents have given me some advice on how to save money.

But the question **is** whose **advice I should take.**

(在从句中充当定语, 意为“谁的...”)

表语从句中缺少定语



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连接副词：在从句中充当方式、地点、原因、时间状语

11. What John Snow showed to the world was how **cholera could be overcome.**

表语从句中SV成分完整，缺少方式状语：“如何”

12. The exact places Snow marked on the map were where **all those who died had lived.**

表语从句中SV成分完整，缺少地点状语：“...的地方”

13. What Snow was determined to find out was why **more than 500 people died in ten days.**

表语从句中SVA成分完整，缺少原因状语：“为什么...”

14. The next major explosion is going to be when **genetics and computers come together.**

表语从句中SV成分完整，缺少时间状语：“...的时候”



Explore: Observe and think

1. One theory was that bad air caused the disease.

2. Another was that cholera was caused by an infection from germs in food and water.

3. It seemed that the water was so much that she

What meanings and functions do these predicative clauses communicate in each sentence?

ump so



4. The truth was that water from the Broad Street pump had been infected by waste.

Explore: Observe and think

1. One theory was **that bad air caused the disease.**

2. Another was **that cholera was caused by an infection from germs in food and water.**

Predicative Clauses are often used:

1. to directly explain or emphasize what the **Subject** is in greater detail.
2. function as a **Complement** (补语) to the **Subject**.

been infected by waste.



Practice: Complete the following questions by using predicative clauses and figure out what meanings and functions they communicate.

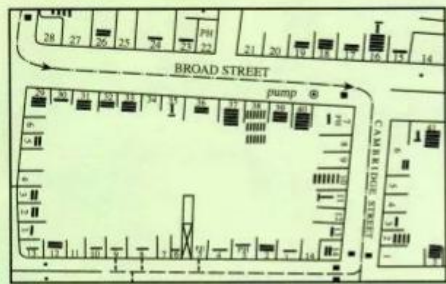
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away from Broad Street. It seemed that the woman liked the water from the pump so much that she had it delivered to her house every day. As a result of this evidence, John Snow was able to announce that the pump water carried cholera germs. Accordingly, he had the **handle** of the pump removed so that it could not be used. Through this **intervention**, the disease was stopped in its tracks.

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EXAMPLE

What was it that John Snow showed to the world?

What John Snow showed to the world was how cholera could be overcome.

1 What was Snow's discovery in two particular streets in London?

Snow's discovery in two particular streets in London was that _____.

2 What was Snow determined to find out during the 1854 outbreak of cholera in London?

What Snow was determined to find out was why _____.

3 What were the exact places Snow marked on the map?

The exact places Snow marked on the map were where _____.

4 What was the **finding** that Snow announced?

Snow's finding was that _____.

Practice: Complete the following questions by using predicative clauses and figure out what meanings and functions they communicate.

EXAMPLE

What was it that John Snow showed to the world?

What John Snow showed to the world was how cholera could be overcome.

1. What was Snow's discovery in two particular streets in London?

Snow's discovery ~~in two particular streets in London~~ was that the cholera outbreak was so severe that more than 500 people died in ten days.

2. What was Snow determined to find out during the 1854 outbreak of cholera in London?

What Snow was determined to find out was why the cholera outbreak had caused more than 500 people died in ten days.

3. What were the exact places Snow marked on the map?

The exact places ~~Snow marked on the map~~ were where all those who died had lived.

4. What was the finding that Snow announced?

Snow's finding was that the pump water carried cholera germs.

Apply: Use the target structure in context

David is talking to Maria about their scientific research project.

- First, complete David's lines (A-E), using the words in the box;

as if that what who when how why whose which whether

A: Absolutely! You may not believe it, but that was _____ happened at the initial (初始的) stage of our group's research on developing a vaccine for malaria.

B: Yes, it is. And it seemed _____ all the theories were useful, but the fact was _____ we couldn't persuade one another that one theory was better than another.

C: Exactly. The problem was not about _____ all our theories were equally good, but in deciding _____ theory to depend upon.

D: We realized that what we cared about was not _____ aspect we needed to develop a theory in, but rather _____ we can reduce the cost of a vaccine without reducing its effect!

E: You're right. At last, we became focused on the key issue, which was _____ we had to carry out the research in the first place.



- First, complete David's lines (A-E), using the words in the box;

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A: Absolutely! You may not believe it, but that **was** what **happened at the initial (初始的) stage of our group's research on developing a vaccine for malaria.**

B: Yes, it is. And it **seemed** as if **all the theories were useful, but the fact was** that **we couldn't persuade one another that one theory was better than another.**

C: Exactly! The problem **was** not about whether **all our theories were equally good, but in deciding** which/what **theory to depend upon.**

D: We realized that what we cared about **was** not what/which **aspect we needed to develop a theory in, but rather** how **we can reduce the cost of a vaccine without reducing its effect!**

E: You're right. At last, we became focused on the key issue, which **was** why **we had to carry out the research in the first place.**



● Then put David's lines in the correct order.

Maria: This mix of theory and data is one of the key characteristics of what we call science.

David: _____

Maria: With your theoretical framework?

David: _____

Maria: Deciding on a theory is definitely of critical importance.

David: _____

Maria: This was when you should have calmed down and got down to doing some solid work.

David: _____

Maria: So what happened in the end?

David: _____

A: Absolutely! You may not believe it, but that was what happened at the initial (初始的) stage of our group's research on developing a vaccine for malaria.

B: Yes, it is. And it seemed as if all the theories were useful, but the fact was that we couldn't persuade one another that one theory was better than another.

C: Exactly. The problem was not about whether all our theories were equally good, but in deciding what/which theory to depend upon.

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E: You're right. At last, we became focused on the key issue, which was why we had to carry out the research in the first place.



● Then put David's lines in the correct order.

Maria: This mix of theory and data is one of the key characteristics of what we call science.

David: A: "initial stage" (logical connector)

Maria: With your theoretical framework?

David: C: "deciding what theory to depend upon"- "Deciding on a theory" (lexical connectors)

Maria: Deciding on a theory is definitely of critical importance.

David: B: "couldn't persuade one another"- "this" (grammatical connector)

Maria: This was when you should have calmed down and got down to doing some solid work.

David: E: "At last"- "in the end" (logical connectors)

Maria: So what happened in the end?

David: D: a possible answer to the Wh-question (grammatical connector)

A: Absolutely! You may not believe it, but that was what happened at the initial (初始的) stage of our group's research on developing a vaccine for malaria.

B: Yes, it is. And it seemed as if all the theories were useful, but the fact was that we couldn't persuade one another that one theory was better than another.

C: Exactly! The problem was not about whether all our theories were equally good, but in deciding what/which theory to depend upon.

D: We realized that what we cared about was not what/which aspect we needed to develop a theory in, but rather how we can reduce the cost of a vaccine without reducing its effect!

E: You're right. At last, we became focused on the key issue, which was why we had to carry out the research in the first place.



● Answer the comprehension questions by using predicative clauses.

Maria: This mix of theory and data is one of the key characteristics of what we call science.

David: Absolutely! You may not believe it, but that was what happened at the initial stage of our group's research on developing a vaccine for malaria.

Maria: With your theoretical framework?

David: Exactly The problem was not about whether all our theories were equally good, but in deciding what/which theory to depend upon.

Maria: Deciding on a theory is definitely of critical importance.

David: Yes, it is. And it seemed as if all the theories were useful, but the fact was that we couldn't persuade one another that one theory was better than another.

Maria: This was when you should have calmed down and got down to doing some solid work.

David: You're right. At last, we became focused on the key issue, which was why we had to carry out the research in the first place.

Maria: So what happened in the end?

David: We realized that what we cared about was not what/which aspect we needed to develop a theory in, but rather how we can reduce the cost of a vaccine without reducing its effect!

Q1: What was David's group's research?

A: David's group's research **was that they wanted to develop a vaccine for malaria.**

Q2: What was the problem?

A: The problem **was that they had to decide which/what theory to depend upon.**

Q3: What was the key issue?

A: The key issue **was why they had to carry out the research in the first place.**

Q4: What did they care about?

A: What they cared about **was how they can reduce the cost of a vaccine without reducing its effect.**

A recap of predicative clauses

● Form:

Subject+Linking verbs+[subordinating conjunction+other elements]

● Functions:

Predicative Clauses are often used to directly explain or emphasize what the **Subject** is in greater detail and function as a **Complement** (补语) to the **Subject**.

● Usages:

	引导词	用法
连词	that	在从句中不充当成分, 无意义
	whether	在从句中不充当成分, 意为“是否”
连接代词	what(ever),which(ever),who(ever),whom(ever), whose	在从句中充当主语, 宾语, 表语, 定语
连接副词	how, when, where, why	在从句中充当状语
其它连词	because, as if ,as though	在从句中不充当成分, 意为“因为, 好像, 似乎”



Complete Exercise 2 in Assessing Your Progress on P10.

Assignment

2 Fill in each blank with a word or expression that introduces a predicative clause.

Science is simply _____ you can do. And doing science makes you a scientist! So, what do scientists do? Actually, what matters is not only _____ they observe in the world around them and what questions they ask, but also _____ they use evidence or data to answer the questions. They identify useful data and take new measurements. Some of the key issues that scientists face are _____ calculations they do and _____ they analyse their data to draw conclusions about the questions they ask. The final issue, which many believe to be the most important, is _____ they need to communicate their results. This is _____ they want everyone to benefit from their work! It seems _____ science is all around us. You see, by doing science, scientists get a better understanding of the world around them and share that understanding with the whole world.





2. Complete Exercise 2 of Using Structures in Workbook on P62.

Using Structures

1 Complete the following ideas by famous scientists with a word or expression that introduces a predicative clause.

as though	because	that
what	whoever	why

- Research is _____ I'm doing when I don't know what I'm doing. (Werner von Braun)
- The saddest aspect of life right now is _____ science gathers knowledge faster than society gathers wisdom. (Isaac Asimov)
- An expert can be _____ has made all the mistakes that can be made in a very narrow field. (Niels Bohr)
- ... when different experiments give you the same result, it is no longer subject to your opinion. That's the good thing about science: It's true whether or not you believe in it. That's _____ it works. (Neil deGrasse Tyson)
- This applied science, which saves work and makes life easier, brings us little happiness. That is _____ we have not yet learnt to make sensible use of it! (Albert Einstein)
- There are only two ways to live your life. One is _____ nothing is a miracle. The other is _____ everything is a miracle. (Albert Einstein)

2 Complete the conversations using noun clauses as the predicative.

- A:** Papermaking, printing, gunpowder, and the compass are the four great inventions of ancient China. They are significant contributions of the Chinese nation to the world.

B: Sure, they are. What I want to know though is _____

2 **A:** The ancient Chinese were the first to invent paper and printing. Then they went on to invent books and had opened bookshops in many cities.

B: What I'm curious about is _____

3 **A:** The compass is a special invention of ancient China, dating back to as early as the Warring States Period.

B: Yes. It seems _____

4 **A:** Gunpowder was originally used for making fireworks.

B: But what surprises me is _____

5 **A:** After the discovery of medicine, acupuncture was invented in China. Acupuncture is a treatment which doesn't involve any drugs. Very thin needles are put in certain parts of a person's body.

B: Really? What puzzles me is _____

6 **A:** High-speed trains, mobile payments, the bike-sharing system, and online shopping are considered by some as the new "four inventions" of China.

B: Is that so? I feel/It seems _____

THANK YOU!



Unit 1 SCIENCE AND SCIENTISTS

Lesson 3: Discover Useful Structures & Using Structures

答疑

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1. Complete Exercise 2 in *Assessing Your Progress* on P10.

Assignment

2 Fill in each blank with a word or expression that introduces a predicative clause.

Science is simply _____ you can do. And doing science makes you a scientist! So, what do scientists do? Actually, what matters is not only _____ they observe in the world around them and what questions they ask, but also _____ they use evidence or data to answer the questions. They identify useful data and take new measurements. Some of the key issues that scientists face are _____ calculations they do and _____ they analyse their data to draw conclusions about the questions they ask. The final issue, which many believe to be the most important, is _____ they need to communicate their results. This is _____ they want everyone to benefit from their work! It seems _____ science is all around us. You see, by doing science, scientists get a better understanding of the world around them and share that understanding with the whole world.





Using Structures

1 Complete the following ideas by famous scientists with a word or expression that introduces a predicative clause.

as though	because	that
what	whoever	why

- Research is _____ I'm doing when I don't know what I'm doing. (Werner von Braun)
- The saddest aspect of life right now is _____ science gathers knowledge faster than society gathers wisdom. (Isaac Asimov)
- An expert can be _____ has made all the mistakes that can be made in a very narrow field. (Niels Bohr)
- ... when different experiments give you the same result, it is no longer subject to your opinion. That's the good thing about science: It's true whether or not you believe in it. That's _____ it works. (Neil deGrasse Tyson)
- This applied science, which saves work and makes life easier, brings us little happiness. That is _____ we have not yet learnt to make sensible use of it! (Albert Einstein)
- There are only two ways to live your life. One is _____ nothing is a miracle. The other is _____ everything is a miracle. (Albert Einstein)

2 Complete the conversations using noun clauses as the predicative.

- A: Papermaking, printing, gunpowder, and the compass are the four great inventions of ancient China. They are significant contributions of the Chinese nation to the world.

B: Sure, they are. What I want to know though is _____

2 A: The ancient Chinese were the first to invent paper and printing. Then they went on to invent books and had opened bookshops in many cities.

B: What I'm curious about is _____

3 A: The compass is a special invention of ancient China, dating back to as early as the Warring States Period.

B: Yes. It seems _____

4 A: Gunpowder was originally used for making fireworks.

B: But what surprises me is _____

5 A: After the discovery of medicine, acupuncture was invented in China. Acupuncture is a treatment which doesn't involve any drugs. Very thin needles are put in certain parts of a person's body.

B: Really? What puzzles me is _____

6 A: High-speed trains, mobile payments, the bike-sharing system, and online shopping are considered by some as the new "four inventions" of China.

B: Is that so? I feel/It seems _____

2. Complete Exercise 2 of *Using Structures* in Workbook on P62.

1. Complete Exercise 2 in *Assessing Your Progress* on P10.

Science is simply what you can do. And doing science makes you a scientist! So, what do scientists do? Actually, what matters is not only what they observe in the world around them and what questions they ask, but also how they use evidence or data to answer the questions. They identify useful data and take new measurements. Some of the key issues that scientists face are what calculations they do and how they analyse their data to draw conclusions about the questions they ask. The final issue, which many believe to be the most important, is why they need to communicate their results. This is because they want everyone to benefit from their work! It seems that/as if science is all around us. You see, by doing science, scientists get a better understanding of the world around them and share that understanding with the whole world.

2. Complete Exercise 2 of *Using Structures* in Workbook on P62.

1 A: Papermaking, printing, gunpowder, and the compass are the four great inventions of ancient China. They are significant contributions of the Chinese nation to the world.

B: Sure, they are. What I want to know though is **which one is the greatest invention.**
/how these inventions have changed China and the world.

2 A: The ancient Chinese were the first to invent paper and printing. Then they went on to invent books and had opened bookshops in many cities.

B: What I am curious about is **who invented paper/when ink was invented.**
/when and how printing spread to the rest of the world.



2. Complete Exercise 2 of *Using Structures* in Workbook on P62.

3 A: The compass is a special invention of ancient China, dating back to as early as the Warring States Period.

B: Yes, It seems that ancient Chinese had developed a good knowledge of magnetism.
/that the compass was particularly useful.

4 A: Gunpowder was originally used for making fireworks.

B: But what surprises me is that gunpowder was not used initially for firearms.
/how it is so unexpectedly used today.



2. Complete Exercise 2 of *Using Structures* in Workbook on P62.

5 A: After the discovery of medicine, acupuncture was invented in China. Acupuncture is a treatment which doesn't involve any drugs. Very thin needles are put in certain parts of a person's body.

B: Really? What puzzles me is who first started this practice.
/for whom this practice was first done.

6 A: High-speed trains, mobile payments, the bike-sharing system, and online shopping are considered by some as the new “four inventions” of China.

B: Is that so? I feel/It seems that these inventions have really made our lives easier.
/as if I could not live without them, especially when it comes to online shopping.



The END!

