**M5U1 Reading and writing**

**Copernicus’ Revolutionary Theory**

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**教材分析：**

本单元的主题语境是“人与社会”，围绕“科学精神”的话题展开。“语言运用”的阅读部分从当时的社会背景、问题产生的原因、研究过程、新理论的形成和贡献等方面介绍了哥白尼是如何发现“日心说”的。通过阅读，学生能理解哥白尼的“日心说”及他推迟公布理论的原因，并思考为什么哥白尼的“日心说”是一个革命性的理论，从而感悟科学家勇于探索、认真钻研的科学精神及科学发现的严密性。“语言运用”的写作部分要求学生根据阅读文章内容及提示给哥白尼写一封信，建议他尽早公布他的发现，以此来培养学生收集、整理信息及传递信息的能力，同时提高学生逻辑思维能力和写作能力。

**教学目标：**

At the end of the class, students will be able to:

1. understand Copernicus’ theory and its development
2. judge whether Copernicus was right to be careful and analyze the reason why he hid his theory for so many years
3. appreciate Copernicus’ scientific method of doing research and his scientific spirit
4. evaluate Copernicus’ contribution and reflect on why his theory is revolutionary
5. apply what have been learnt to a persuasive writing.

**教学过程：**

**Step1. Activate relevant knowledge**

Review the seven stages in setting out a new scientific idea.

Talk about the planets in the solar system.

**Step2. Predict**

**Raise questions based on the title:**

Who is Nicolaus Copernicus?

What’s his theory about?

How did he prove his theory?

Why was his theory revolutionary?

**A brief introduction to Nicolaus Copernicus**



**Step3. Read for structure (one word for each blank)**

Para.1 the \_\_\_\_\_\_

Para.2 something \_\_\_

Copernicus’ revolutionary theory

Para.3 the \_\_\_\_\_\_\_

Para.4 Copernicus’ \_\_\_ theory

Para.5 \_\_\_\_\_\_\_\_\_\_

**Step4. Read for information and thinking**

**Para1. The problem**

1. Circle two adjectives that describe Copernicus’ feelings.
2. Why was Copernicus confused?

All his mathematical calculations led to the same conclusion: ①that earth was not the centre of the solar system. ②Only if you put the sun there did the movements of the other planets in the sky ③make sense.

Language focus:

1. appositive Clause: to give information on the conclusion
2. partial Inversion: to stress that the sun is the center of the solar system
3. make sense: be reasonable or logical
4. Why was Copernicus frightened?

Because the powerful Christian Church would have punished him for even suggesting such an idea.

1. What did the Christian Church believe?

They believed God had made the world and for that reason the earth was special and must be the centre of the solar system.

Activity:

Draw the two theories of the universe.

Showing Copernicus’ theory

Before Copernicus’ theory

Vs

**Para.2 Something strange**

What had astronomers found strange?

Others appeared brighter at times and less bright at other.

Some planets in the sky seemed to stop, move backward and then go

forward in a loop.

forward in a loop.

\_\_

\_\_\_\_

\_\_\_\_\_ in the movements of the planets \_\_\_\_\_\_ of the stars

The earth was not the center of the solar system.

**Para.3 The observations**

1. Circle the verbs that show Copernicus’ research.

Copernicus had thought long and hard about these problems and tried to find an answer. He had collected observations of the stars and used all his mathematical knowledge to explain them. But only his new theory could do that. So between 1510 and 1514 he worked on it, gradually improving his theory until he felt it was complete.

1. What do these verbs tell you about Copernicus’ qualities?

His theory is now the basis ⑦on which all our ideas of the universe are built. There is a direct link between his theory and the work of Issac Newton, Albert Einstein and Stephen Hawking.

replaced the Christian idea of gravity which said things fell to earth because God created the earth as the centre of the universe

**Para. 5 Contributions**

1. Why was he right to be careful?
2. Why was his theory revolutionary?

2. When did he show it privately to his friend? Why?

3. When did Copernicus publish his theory?

4. Do you think he was right or not to be cautious?

* The sun is the centre of the solar system.
* The planets go round the sun, including the earth.
* The earth is spinning as it went round the sun.
* The moon goes round the earth.

He placed a fixed sun at the centre of the solar system ④with the planets going round it and only the moon still going round the earth. He also suggested that the earth was ⑥spinning as it went round the sun and ⑥this explained changes in the movement of the planets and in the brightness of the stars.

Language focus:

1. with+n./pron.+to do/doing/done
2. spin: turn round quickly
3. “this” refers to “the earth was spinning as it went round the sun”
4. What was Copernicus’ theory?

**Para. 4 The new theory**

…

persistent

patient

rigorous

dedicated

determined

perseverant

Copernicus’ qualities

founder of modern astronomy

changed the old theory

Language focus:

⑦ on which…= all our ideas of the universe are built on the basis

**Step5: Read for writing**

Para2. The problem arose because astronomers had noticed that…

Para3. Copernicus had thought long and hard about these problems and tried to find an answer.

Para4. In 1514 he showed it privately to his friends.

Para5. Certainly he was right to be careful.

Writing tips:

Repetition of key words and use of reference words make writing cohesive

**Step6: Discuss**

If you were Nicolaus Copernicus, would you have hidden your theory for so many years? Give your reasons.

**Step7: Write a persuasive letter**

Now write a short letter asking Copernicus to publish his ideas so everyone can read them.

First, in pairs brainstorm some reasons why he should publish his theory.

* there are problems with the present theory
* he has done many years of observations to prove his new theory is true
* science cannot develop unless people publish their ideas

Second, make a plan.

* Para.1: Tell Copernicus who you are and why you want him to publish his ideas.
* Para.2: The first reason
* Para.3: The second reason
* Para.4: Ask him again to reconsider publishing his idea.

Dear Nicolaus Copernicus,

I am a student…

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

So I hope you will feel you can publish your new theory.

Yours sincerely,

(your name)