

2022 年優等作品 翁薛珉老師（高雄市中正高中）

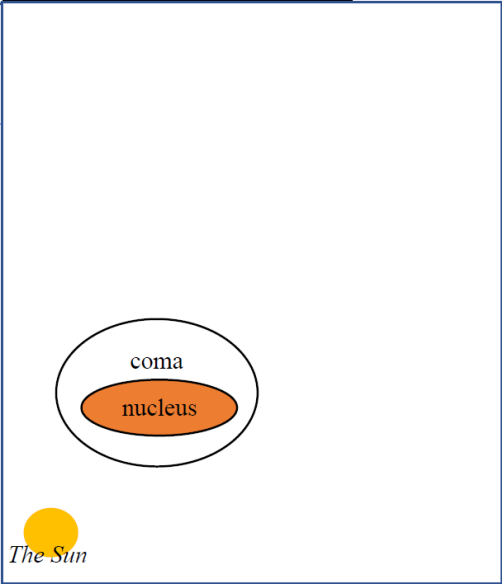
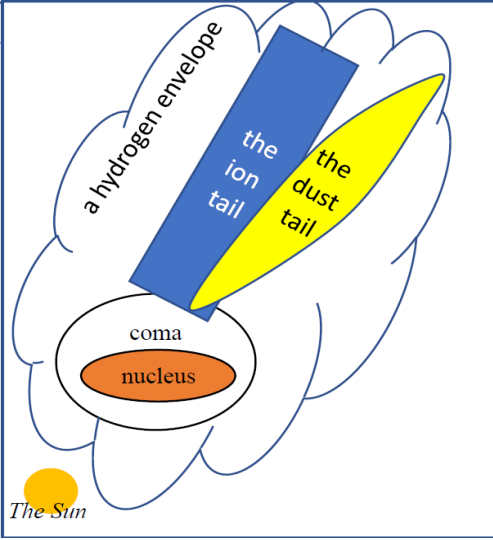
一、教學單元設計簡介

單元名稱	Introduction to Comets		
學生年級	<input type="checkbox"/> 國小____年級 <input type="checkbox"/> 國中____年級 <input checked="" type="checkbox"/> 高中_一_年級 <input type="checkbox"/> 高職____年級	單元時間 (包含評量活動執行時間)	共 2 節 (約 100 分鐘)
學習領域 (可複選)	<input checked="" type="checkbox"/> 語文 <input type="checkbox"/> 數學 <input type="checkbox"/> 健康與體育 <input type="checkbox"/> 全民國防教育	<input type="checkbox"/> 科技 <input type="checkbox"/> 綜合活動 <input type="checkbox"/> 藝術 <input type="checkbox"/> 其他_____	<input checked="" type="checkbox"/> 自然科學 <input type="checkbox"/> 生活 <input type="checkbox"/> 社會
<b>第一節</b>			
教學活動簡介	<ol style="list-style-type: none"> <li>1. 學生形成三至四人小組，討論學習單內第一大題的三個暖身問題，看其正確與否，如敘述錯誤，則需討論如何修正該敘述，最後進行班級內分享。</li> <li>2. 教師介紹專業術語的英文定義，視情況輔以圖片或中文敘述，以利其文本閱讀。</li> <li>3. 教師帶領學生閱讀指定選文，協助學生瞭解彗星架構、彗尾方向、彗星亮度及分析”when”及”while”的使用時機。</li> <li>4. 學生完成形成性評量中的填空式摘要。</li> </ol>		
<b>第二節</b>			
教學活動簡介	<ol style="list-style-type: none"> <li>1. 學生再度閱讀文本，複習第一節課所學內容，並完成形成性評量中的彗星架構繪製。</li> <li>2. 學生藉由總結性評量內的四項要點，組織、分析哈雷彗星在不同天文單位時，其亮度、彗尾方向、彗髮及彗尾出現位置。學生隨後兩兩一組，以英文彼此分享自己組織整理的內容。</li> </ol>		

## 二、評量設計

### 評量活動(1)

	學科	英語																		
評量目標	<p>1. 學生藉由教師導讀及個人閱讀文本的機會，瞭解彗星的結構及其相應名稱，包含 the nucleus, the coma, the head, a dust tail, an ion tail, and a hydrogen envelope。</p> <p>2. 學生藉由教師導讀及個人閱讀文本的機會，瞭解彗尾出現後，會指向太陽的反方。</p>	<p>目標語言技能（可複選）：  <input checked="" type="checkbox"/>聽 <input checked="" type="checkbox"/>讀 <input type="checkbox"/>說 <input checked="" type="checkbox"/>寫 其他_____</p> <p>目標字彙與句型（請列表）：  <i>Vocabulary</i></p> <table border="1"> <tr> <td>1. nucleus</td> <td>n.</td> <td>核心</td> </tr> <tr> <td>2. orbit</td> <td>n.</td> <td>軌道</td> </tr> <tr> <td>3. evaporate</td> <td>v.</td> <td>使蒸發</td> </tr> <tr> <td>4. enormous</td> <td>adj.</td> <td>巨大的</td> </tr> <tr> <td>5. extend</td> <td>v.</td> <td>延伸</td> </tr> <tr> <td>6. gravity</td> <td>n.</td> <td>重力</td> </tr> </table> <p><i>Pattern</i>            When/While S + V ..., S + V ...</p>	1. nucleus	n.	核心	2. orbit	n.	軌道	3. evaporate	v.	使蒸發	4. enormous	adj.	巨大的	5. extend	v.	延伸	6. gravity	n.	重力
1. nucleus	n.	核心																		
2. orbit	n.	軌道																		
3. evaporate	v.	使蒸發																		
4. enormous	adj.	巨大的																		
5. extend	v.	延伸																		
6. gravity	n.	重力																		
評量流程	<p>1. 教師以英文進行文章講解，講解彗星的具體結構及彗尾出現時間及方向。</p> <p>2. 教師提供填空式短文作為鷹架，引導學生完成填空式摘要。</p> <p>3. 教師提供彗星內部的 head 作為鷹架，學生根據文本內容，判斷彗星和太陽的方向，繪出彗尾的方向，最後畫上氫雲。</p>																			
評量時機	指定選文導讀完成後																			
鷹架支持	<p>1. 填空式短文</p> <p>No comets are identical in the universe. Their shapes are all different. However, every comet is made up of four parts. The innermost section is a _____, whose size is usually within 10 kilometers in diameter. Outside this section is the _____, the shining cloud of gas. These two parts constitute the _____ of a comet. _____ a comet is away from the Sun, it is cold. However, while it gets closer to the Sun, the materials under the surface of a comet start to evaporate, thus creating an enormous tail. Nonetheless, the huge tail is composed of two smaller ones. One is _____. The other one is _____. Both tails point to the direction of the Sun. After receiving ultraviolet radiation or light, the comet starts to shine and releases a kind of gas which escapes the gravity of the comet and forms _____.</p> <p>2. The head of a comet</p>																			

	<p><i>Please finish the magnified comet.</i></p> 	
<p>評量標準</p>	<p>學科</p>	<p>英語</p>
	<p>學生必須在填空式摘要中，填入：  <b><u>nucleus</u>, <u>coma</u>, <u>head</u>, <u>a dust tail</u>, <u>an ion tail</u>, <u>opposite</u>, <u>a hydrogen envelope</u></b>          學生須完成彗星繪製，參考答案如下：</p> 	<p>學生必須在填空式摘要中的其中一格，填入：  <b><u>when/while</u></b></p>
<p>資料來源</p>	<p>請表列參考／改寫依據資料：          指定文本改編自：  <a href="https://solarviews.com/eng/comet.htm">https://solarviews.com/eng/comet.htm</a></p>	

評量活動(2)

	學科	英語
評量目標	<p>1. 學生藉由教師導讀及個人閱讀文本的機會，瞭解彗尾出現的時機。此外，亦須藉由已知線索「The closer the comet gets to the Sun, the more intense the fluorescence becomes.」以及「At around 5 AUs, the glow resulting from the fluorescence becomes brighter than reflected sunlight.」，比較哈雷彗星在 5 AUs、6 AUs、以及 a few AUs 這三個地點的亮度。</p> <p>2. 學生指出哈雷彗星在 5 AUs、6 AUs、以及 a few AUs 這三個地點時，彗尾和太陽的相對位置。</p>	<p>目標語言技能（可複選）：  <input type="checkbox"/>聽 <input checked="" type="checkbox"/>讀 <input checked="" type="checkbox"/>說 <input checked="" type="checkbox"/>寫 其他_____</p> <p>目標字彙與句型（請列表）：</p>
評量流程	<p>1. 學生再度閱讀文本，瞭解彗尾出現的時間及在三個指定位置的亮度。</p> <p>2. 根據總結性評量裡面的四項要點，撰寫出哈雷彗星在三個指定位置的亮度比較、彗尾位置，並使用到至少三次”when”或”while”。</p> <p>3. 進行配對分享。</p>	
評量時機	確認完學生形成性評量的答案是否正確，即進行總結性評量。	
鷹架支持	<p>英文寫作/口說架構鷹架：</p> <p>1. When S V ..., S V ...</p> <p>2. <i>The enormous comet tail at _____ points to the <u>east/west/south/north/southeast</u>...</i></p>	
評量標準	學科	英語

Rubrics of the Summative Assessment

	<i>Great</i> (3 points)	<i>Good</i> (2 points)	<i>Need Improvement</i> (1 point)
<i>the direction of the comet tail at AU 5, AU 6, and a few AUs</i>	The direction of the comet tail at <b>all</b> these three spots is correctly pointed out.	The direction of the comet tail at <b>two</b> of the three spots is pointed out correctly.	The direction of the comet tail at <b>one</b> or <b>none</b> of the three spots is pointed out correctly.
<i>brightness of the comet when it is at AU 5, AU 6, and a few AUs</i>	The brightness of the comet at <b>all</b> of the three spots is correctly indicated.	The brightness of the comet at <b>two</b> of the three spots is correctly indicated.	The brightness of the comet at <b>one</b> or <b>none</b> of the three spots is correctly indicated.
<i>the time when the comet gets warm and the tail appears</i>	The <b>two</b> pieces of the information are offered and correct with evidence cited.	<b>Either</b> piece of the information is offered and correct with evidence cited.	<b>One</b> of <b>two pieces</b> of the information is/are offered; however, <b>no evidence is cited</b> .
<i>the number of “when” or “while”</i>	Either of the two conjunctions is used correctly <b>three times</b> .	Either of the two conjunctions is used correctly <b>twice</b> .	Either of the two conjunctions is used correctly <b>once</b> or <b>below</b> .
<i>fluency</i>	Students make a presentation with <b>no</b> or <b>few pauses</b> .	Students make a presentation with <b>some pauses</b> .	Students make a presentation with <b>quite a few pauses</b> .
<i>pronunciation</i>	Students describe the process with <b>no</b> or <b>few</b> pronunciation errors.	Students describe the process with <b>some</b> pronunciation errors.	Students describe the process with <b>quite a few</b> pronunciation errors.

資料來源

請表列參考／改寫依據資料：  
無

### 三、附件（任務素材、網頁、學習單、試卷、評量/回饋意見表等）

#### 學習單

Class: \_\_\_\_\_ No: \_\_\_\_\_ Name: \_\_\_\_\_

## Getting to Know Comets

### I. Lead-In

#### ① Questions for you to think about

Work in a group of three or four. Try to figure out whether the following statements are *true* or *false*. If a statement is false, correct it.

1. Comets are stars. T / F
2. Comets are solid rocks with different materials. T / F
3. Comets move along a fixed orbit. T / F

#### ② Word bank

1. elliptical *adj.* *having the shape of an egg*
2. proximity *n.* *nearness in distance and time*
3. diameter *n.* *a straight line from one side of a circle to the other side, passing through the center of the circle*
4. coma *n.* *gas surrounding the core of a comet*
5. AU *abbr.* *a unit of length, roughly the distance from Earth to the Sun and equal to about 150 million kilometers*
6. luminous *adj.* *shining in the dark*
7. fluoresce *v.* *to show the emission of radiation, especially of visible light*
8. hydrogen *n.* *the outermost part of a comet when it flies closer to the Sun*  
envelope

### II. Assigned Reading

A comet is found to be small and fragile with an irregular shape. Below the surface of a comet is a mixture of dust and frozen gas. In addition, a comet flies along a highly elliptical orbit, an oval-like route, which leads it to get to the proximity of the Sun, to orbit around the star, and eventually to fly away from it.

The structure of a comet is diverse and changeable. In the center of a comet is a small nucleus, which measures less than 10 kilometer in diameter. Outside the nucleus is what we call a coma, the brightly shining cloud of gas surrounding the nucleus. The coma grows in size and becomes brighter when the comet approaches the Sun. The closer the comet gets to the Sun, the larger the coma is. The two sections together make up the head of a comet.

When a comet is far away from the Sun, its nucleus is cold and everything there is frozen. In this state, the nucleus can only be detected by faintly reflected sunlight. Therefore, the object is hard to be spotted when moving in space. When a comet reaches a few astronomical units (AU) of the Sun, its frozen nucleus gets warm, and the material below the surface of the comet starts to evaporate. Then, an enormous tail made up of luminous material is formed opposite the Sun and extends for millions of kilometers from the head. In fact, this large tail is made up of two smaller ones. The first one is a dust tail, comparatively more massive than the other one, which is accelerated slowly and tends to be curved. The other one is an ion tail, which is sped up so greatly that it looks like a straight line.

While a comet approaches the Sun, the gas in the coma absorbs ultraviolet radiation and starts fluorescing and glowing, causing the object to be more likely to be detected. The closer the comet gets to the Sun, the more intense the fluorescence becomes. At around 5 AUs, the glow resulting from the fluorescence becomes brighter than reflected sunlight. What's more, when a comet absorbs ultraviolet light, chemical processes release hydrogen, which escapes the comet's gravity and forms a hydrogen envelope. This envelope cannot be seen from Earth because its light is absorbed by our atmosphere, but it can be detected by spacecraft in the universe. All of these constitute what we are familiar with—comets.

Adapted from <https://solarviews.com/eng/comet.htm>

### III. Grammar Focus

In the assigned reading, the conjunction “*when*” and “*while*” are used to introduce the situation that **two events happen at the same time** as shown below:

1. *The coma grows in size and becomes brighter when the comet approaches the sun.*
2. *While a comet approaches the Sun, the gas in the coma absorbs ultraviolet radiation and starts fluorescing and glowing.*

In the first example sentence, the events of ***growing in size*** and ***approaching the Sun*** happen at the same time.

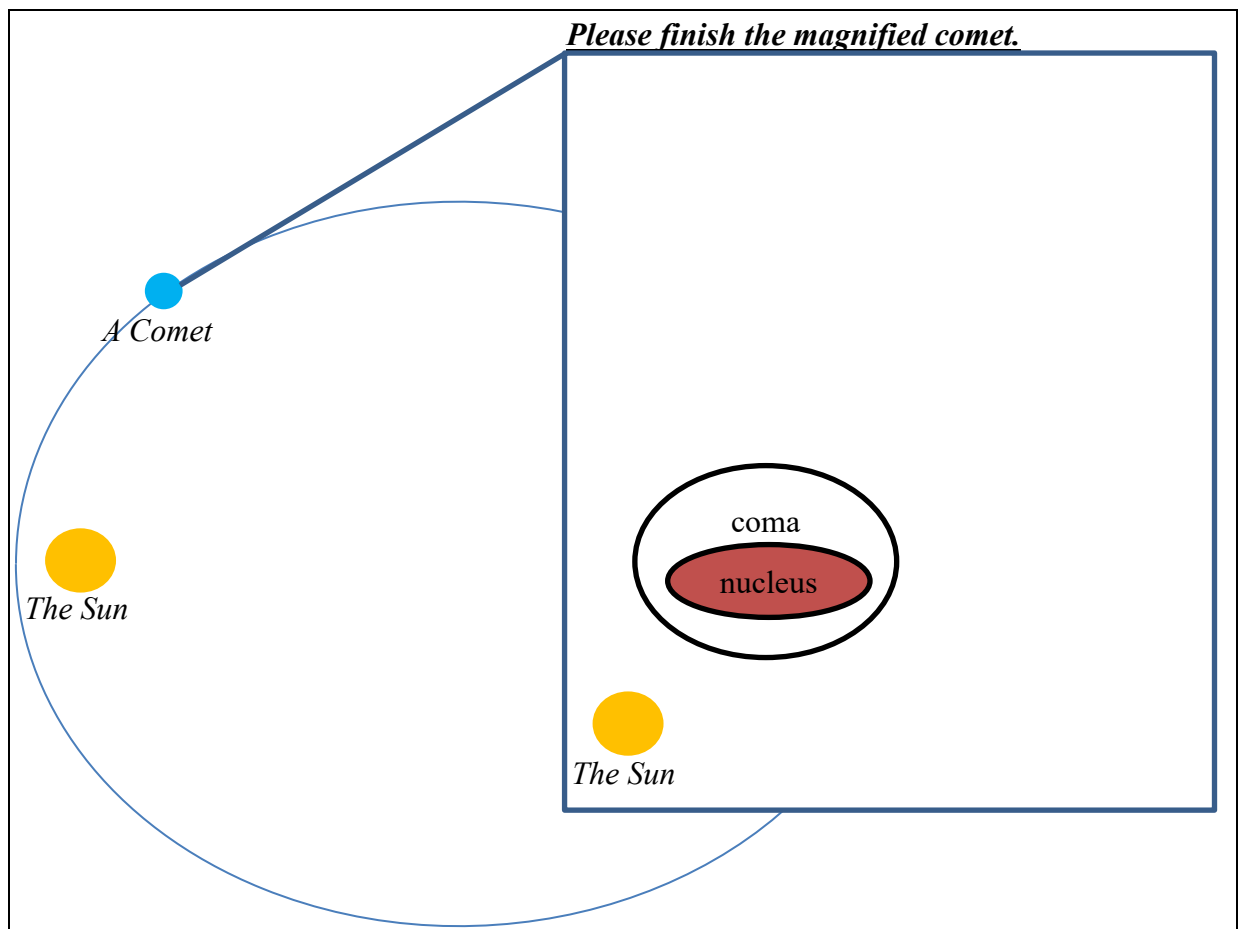
In the second example sentence, the events of ***approaching the Sun*** and ***absorbing ultraviolet radiation and starting fluorescing and glowing*** happen at the same time.

#### IV. Formative Assessment

- ① Based upon what you read in the assigned reading, finish the summary by filling in the blanks.

No comets are identical in the universe. Their shapes are all different. However, every comet is made up of four parts. The innermost section is a \_\_\_\_\_, whose size is usually within 10 kilometers in diameter. Outside this section is the \_\_\_\_\_, the shining cloud of gas. These two parts constitute the \_\_\_\_\_ of a comet. \_\_\_\_\_ a comet is away from the Sun, it is cold. However, while it gets closer to the Sun, the materials under the surface of a comet start to evaporate, thus creating an enormous tail. Nonetheless, the huge tail is composed of two smaller ones. One is \_\_\_\_\_. The other one is \_\_\_\_\_. Both tails point to the \_\_\_\_\_ direction of the Sun. After receiving ultraviolet radiation or light, the comet starts to shine and releases a kind of gas which escapes the gravity of the comet and forms \_\_\_\_\_.

- ② In the blank below, the head of a comet is offered. Please finish the sketch of the comet by adding **the last two parts** of the comet, including **the two tails** and **the cloud-like gas**. Be careful! The **features** of the two tails and the two tails' **direction** should be clearly presented.



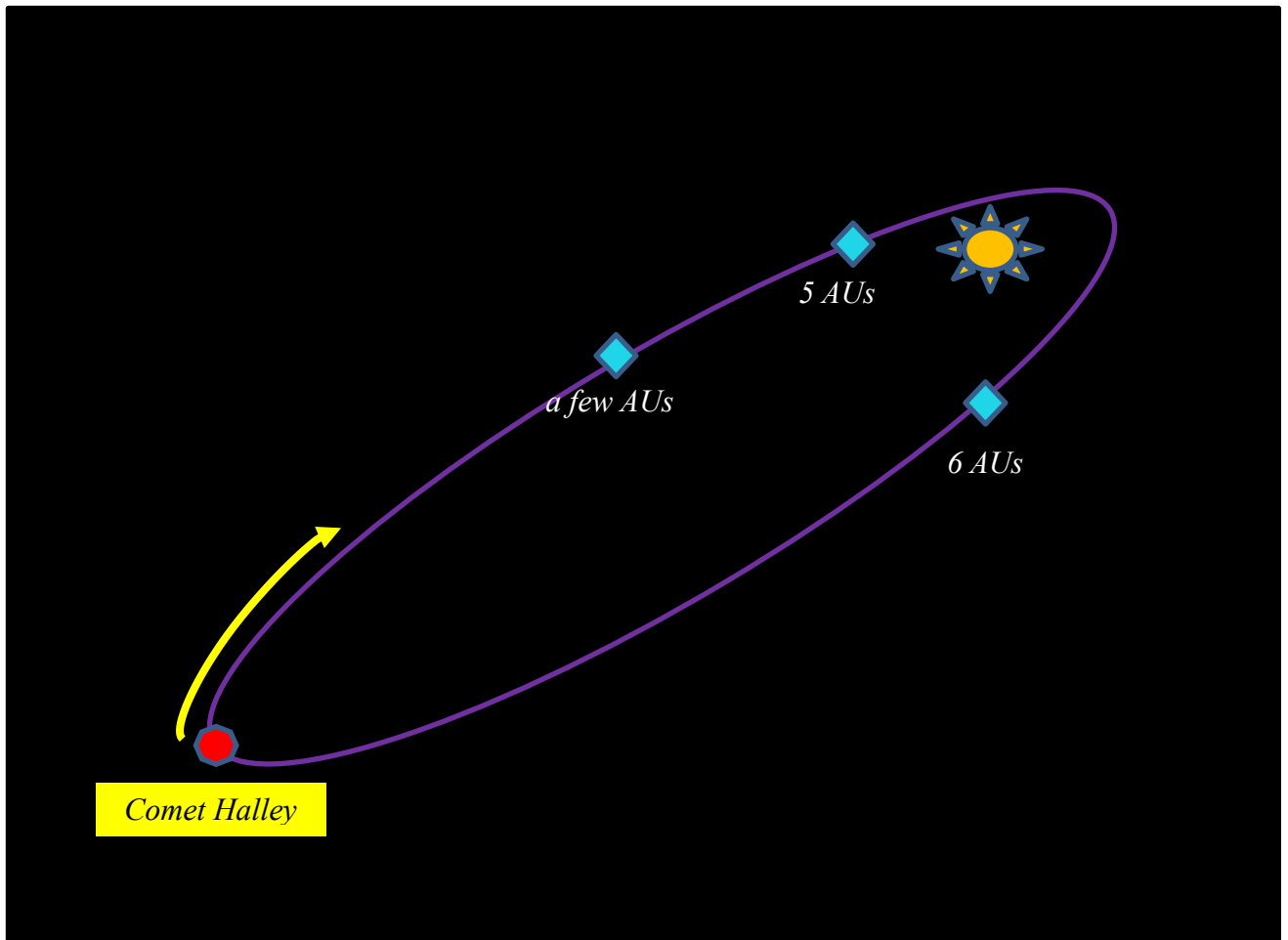
*Self-designed material*



## V. Summative Assessment

Below is a picture with the Sun and the location of Comet Halley. Besides, three different astronomical units are specified. Please describe what happens to Comet Halley when it arrives at the three specified spots to your partner. You should:

1. use “*when*” or “*while*” at least three times in your description,
2. point out when the head of Comet Halley gets warm and in which place the comet tail appears,
3. show the direction of the enormous comet tail when it is at the three spots with the sentence, “*The enormous comet tail at \_\_\_\_\_ points to the east/west/south/north/southeast ...*,”
4. and compare the brightness of Comet Halley when it is at *5 AUs*, *6 AUs*, and *a few AUs* and support your description with evidence taken from the passage.



*Self-designed material*

## 評分標準

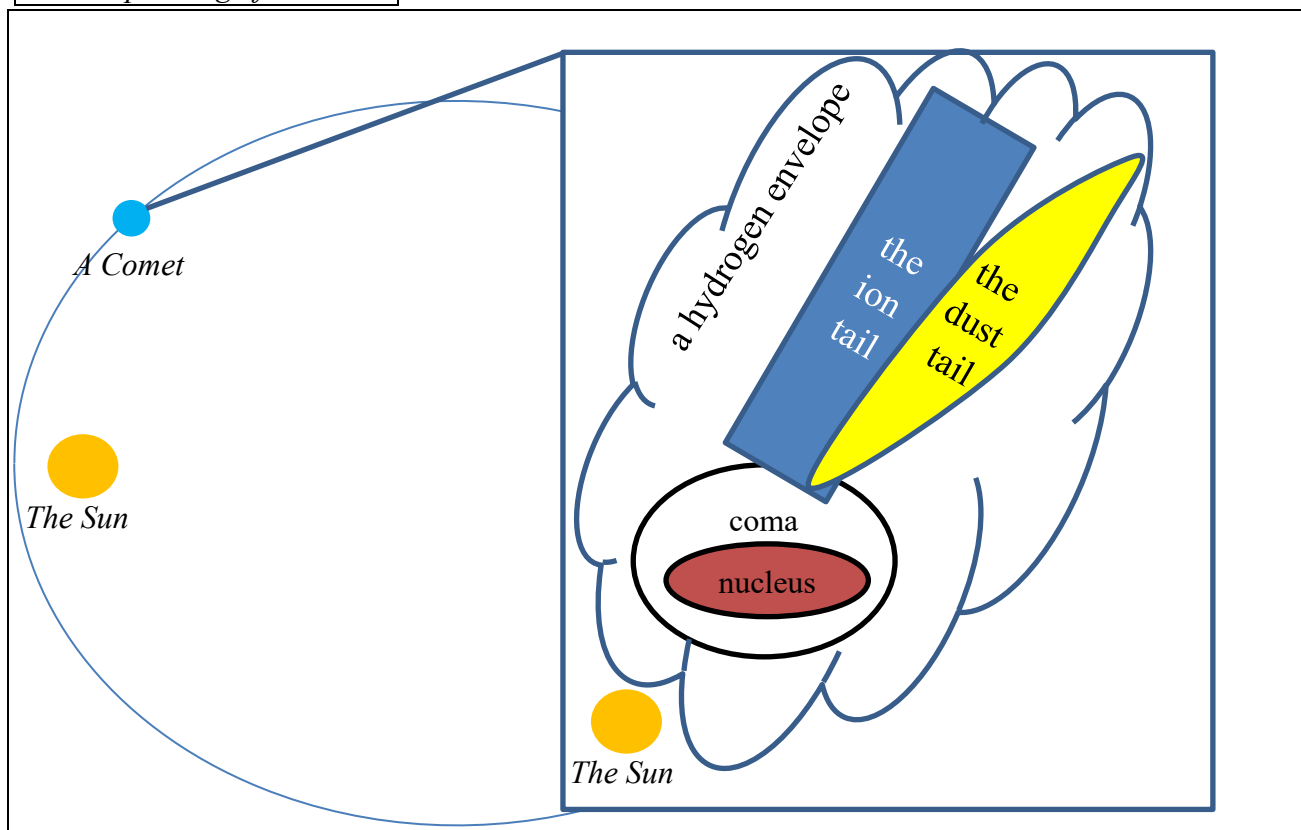
### I. The Complete Summary and the Sample Magnified Comet in the Formative Assessment

The designed task aims to test students' understanding of the structure of a comet and the direction of its tail. Hence, the answers are fixed somewhat as shown below. What's more, with the conjunctions "when" and "while" used repeatedly, they are supposed to get to know how/when to use the two conjunctions. Therefore, it is expected that they can finish the summary by filling in all the eight blanks after they have a thorough understanding of a comet and successfully finish drawing a comet with the direction of its tail and a hydrogen envelope painted correctly. The answers are provided below.

#### The Complete Summary

No comets are identical in the universe. Their shapes are all different. However, every comet is made up of four parts. The innermost section is a **nucleus**, whose size is usually within 10 kilometers in diameter. Outside this section is the **coma**, the shining cloud of gas. These two parts constitute the **head** of a comet. **When** a comet is away from the Sun, it is cold. However, while it gets closer to the Sun, the materials under the surface of a comet start to evaporate, thus creating an enormous tail. Nonetheless, the huge tail is composed of two smaller ones. One is **a dust tail**. The other one is **an ion tail**. Both tails point to the **opposite** direction of the Sun. After receiving ultraviolet radiation or light, the comet starts to shine and releases a kind of gas which escapes the gravity of the comet and forms a **hydrogen envelope**.

#### The Sample Magnified Comet



## II. Rubrics of the Summative Assessment

	<i>Great</i> (3 points)	<i>Good</i> (2 points)	<i>Need Improvement</i> (1 point)
<i>the direction of the comet tail at AU 5, AU 6, and a few AUs</i>	The direction of the comet tail at <b>all</b> these three spots is pointed out correctly.	The direction of the comet tail at <b>two</b> of the three spots is pointed out correctly.	The direction of the comet tail at <b>one</b> or <b>none</b> of the three spots is pointed out correctly.
<i>brightness of the comet when it is at AU 5, AU 6, and a few AUs</i>	The brightness of the comet at <b>all</b> of the three spots is indicated correctly.	The brightness of the comet at <b>two</b> of the three spots is indicated correctly.	The brightness of the comet at <b>one</b> or <b>none</b> of the three spots is indicated correctly.
<i>the time when the comet gets warm and the tail appears</i>	The <b>two</b> pieces of the information are offered and correct with evidence cited.	<b>Either</b> piece of the information is offered and correct with evidence cited.	<b>One</b> of <b>two pieces</b> of the information is/are offered; however, <b>no evidence is cited</b> .
<i>the number of “when” or “while”</i>	Either of the two conjunctions is used correctly <b>three times</b> .	Either of the two conjunctions is used correctly <b>twice</b> .	Either of the two conjunctions is used correctly <b>once</b> or <b>below</b> .
<i>fluency</i>	Students make a presentation with <b>no</b> or <b>few pauses</b> .	Students make a presentation with <b>some pauses</b> .	Students make a presentation with <b>quite a few pauses</b> .
<i>pronunciation</i>	Students describe the process with <b>no</b> or <b>few</b> pronunciation errors.	Students describe the process with <b>some</b> pronunciation errors.	Students describe the process with <b>quite a few</b> pronunciation errors.

### Model Answer

When Comet Halley reaches the spot of so-called “a few AUs,” it starts to get warm; at the same time, its enormous tail appears, which is shown in the third line of the third paragraph. Right at this spot, the comet itself can only reflect sunlight. Therefore, it is relatively dark now. While it arrives at “5 AUs,” the fluorescence becomes brighter than the reflected sunlight. However, when Comet Halley starts flying away from the sun, its fluorescence weakens and the comet itself becomes darker than it is at 5 AUs but brighter than it is at a few AUs. As Comet Halley is at a few AUs, the enormous comet tail points to the southwest. When it is at 5 AUs, the tail points to the west. While it is at 6 AUs, the tail points to the south.

## 回饋表

### 一、個人基本資料：

1. 班級：\_\_\_\_\_
2. 座號：\_\_\_\_\_
3. 姓名：\_\_\_\_\_

### 二、課程內容

1. 我可以藉由英文學習彗星結構的知識。

非常不同意	不同意	沒有意見	同意	非常同意
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. 學習單上提供的鷹架(如：填空式摘要、彗星 head 的附圖、英文句構)有助於我完成任務。

非常不同意	不同意	沒有意見	同意	非常同意
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. 我能看懂英文寫成的任務說明。

非常不同意	不同意	沒有意見	同意	非常同意
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. 我可以獨力完成填空式摘要。

非常不同意	不同意	沒有意見	同意	非常同意
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. 我可以獨力完成彗星結構繪製。

非常不同意	不同意	沒有意見	同意	非常同意
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. 我可以獨力完成描述哈雷彗星繞行軌道時，不同位置的亮度比較及相應的彗尾位置。

非常不同意	不同意	沒有意見	同意	非常同意
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. 我想要繼續參與雙語學習課程。

非常不同意	不同意	沒有意見	同意	非常同意
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

### 三、其他建議

---

---

---