Empowering Hong Kong STEM Secondary Students' Reading Abilities through a School-based Reciprocal Reading Programme and An Online Learning Platform

City University of Hong Kong, Department of English
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Tutorial 6: Strategy 4, Interpreting

Student Handout

Introduction

- What is interpreting?
- Understanding cohesion and identifying cohesive devices in texts: Determiners, pronouns, conjunctions, adverbs/adverbials, key word/concept repetition
- Practice: Interpreting texts

Section 1: Introduction to interpreting

I. Warming up

What is interpreting?

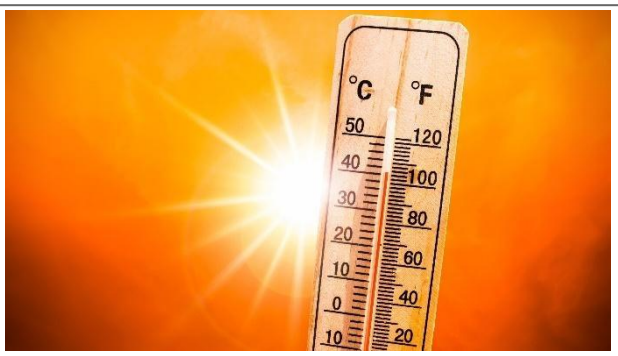
Interpreting means how you identify the meaning of the author. In order to interpret what the author means, you should first determine the text type. Next, you should study the relationships between sentences or paragraphs. Oftentimes, signal words or cohesive devices, such as conjunctions, pronouns, determiners and adverbs, can help you work out the links between sentences or paragraphs.

Types of scientific texts

Information report	To organise information about things or events in the natural world
Explanations	To account for the underlying causes or processes.
Experimental account	To present the procedures and results of an experiment
Argument	To present evidence to support or reject a claim

Collaborative information report

Work in groups of 4-5 and verbally create an information report on "How hot is the Sun?". A table on the information of the Sun is given to you. The report begins with the given sentence where the topic and context are mentioned. All members of the group will take turns to make a sentence based on the previous one to construct and complete an information report. Each of the sentences you make should contain one signal word provided in the table on the next page. An example has been done for you.



Age	4.6 billion years
Diameter	1.4 million km
Mass	33,000 times the mass of Earth
Core Temperature	(15 million °C)
Distance	147 to 152 million km from Earth
Structure	Inner layers: the Core, Radiative Zone and Convection Zone Outer layers: the Photosphere, the Chromosphere, the Transition Region and the Corona.

The given first sentence of the information:
The Sun is an important source of heat energy for the Earth.

Signal words:

Relational verbs
be
consist of
comprise
Have
Resemble
Look
Comprise
belong to

Example: The first sentence from Student 1:
The Sun **is** an important source of heat energy for the Earth. ("is" ⊚ relational verb)

_____
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II. What is cohesion and what are cohesive devices?

Cohesion refers to the way in which we use vocabulary items and grammatical rules to make connections between the ideas within a text.

Cohesive devices are the words or phrases that are used to link or clarify the relationships among ideas in sentences or paragraphs.

How many types of cohesive devices do you usually see in a scientific text?

Exercise 1: You will be shown a short video which introduces cohesive devices (https://youtu.be/TScPcKfQ9ds**).** Below is a list of cohesive devices which often appear in your reading materials. Seek clarifications from your teacher if there are any words or phrases you do not know.

A. Determiners
1. Articles: (a) Definite article, e.g., the; (b) Indefinite articles, e.g., a, an
2. Demonstratives: e.g., this, that, these, those
4. Quantifiers: e.g., much, many, a lot of, most, some, any, enough, a few, a little
5. Numbers: e.g., one, two, three
6. Distributives: e.g., all, each, every, both, half, either, neither
7. Difference words: e.g., other, another
8. Pre-determiners: e.g., what, such, quite, rather

B. Conjunctions
1. Coordinating conjunctions: e.g., and, or, but
2. Subordinating conjunctions: e.g., because, since, as, when, while, before, after, although, so that, if, unless
3. Correlative conjunctions: e.g., not only… but also…

C. Verbs
1. Material verbs: e.g., move, put, block, falls, set up, pour
2. Verbs with low-degree modality: e.g., believe, suggest, could be, propose
3. Relational verbs: e.g., be, consist of, comprise, have, resemble, belong to

D. Adverbs or Adverbials
1. Words and phrases used to **make lists:**

e.g., First, second, third…; To begin with, then, finally, eventually
2. Words and phrases used to **give examples**:
e.g., For example, for instance, namely, in other words,
3. Words and phrases used to **show a result or consequence**:
e.g., So, thus, hence, therefore, as a result, as a consequence, accordingly, consequently
4. Words and phrases used to **show concession**:
e.g., Although, though, however, nevertheless, nonetheless, despite, in spite of
5. Words and phrases used to **show contrast**:
e.g., On the contrary, by contrast, in contrast, conversely
6. Words and phrases used to **show similarities**:
e.g., Likewise, similarly, in a similar vein
7. Words and phrases used to **generalize**:
e.g., Generally, on the whole, usually, for the most part
8. Words and phrases used to **summarize**:
e.g., In conclusion, to conclude, in brief, to summarize, in summary, overall

Exercise 2: Read Texts A and B and complete the following cohesive devices summary table. Discuss which text type Texts A and B belong to (e.g., information report, explanation, argument, or experimental account).

Text A
Goats have cloven feet. They can be brown, white, grey, or black. Some adult goats have horns. These horns are sometimes used by goats when they fight. Goats eat plants. Animals that eat plants are called herbivores. During the winter months, when there is no fresh grass, the farmer can feed the goats hay.

Passage B
People believe that keeping animals in zoos is beneficial to the life of animals. It is because some zoos help rehabilitate wildlife and take in pets that people no longer want or are no longer able to care for. Hence, such animals can have a place to call home.

	Text A	**Text B**
1. Type of text (information report/ explanation/argument/experimental account)		
2. Number of determiners		
3. Number of conjunctions		
4. Number of verbs		
5. Number of adverbs/adverbials		
6. Total words	54	49

Section 2: Identifying and interpreting cohesive ties in scientific texts

Exercise 3: Work in groups of 3-4. Each group will be assigned one text which features a STEM topic. Circle all the cohesive devices in the text. Then, choose from the text two

groups of sentences with cohesive devices you are interested in and interpret the sentences based on the following examples. Finally, decide which type of text it is.

Examples:

Determiner:
Selected sentence(s): A cat is *an example of* living things. It can move and eat.
Type of scientific text: Information report
Cohesive device(s): Article: ***an*** *example of*
Self-questioning: Why is "a cat" classified as a "living thing"?
Your interpretation: Cat can be classified as living things.

Conjunction:
Selected sentence(s): Water is liquid because water particles are arranged in a random way touching many of their neighbours.
Type of scientific text: Explanation
Cohesive device(s): Subordinating conjunction: *because*
Self-questioning: Why is water considered a kind of liquid?
Your interpretation: Liquid particles, like those water particles, are arranged in a random way touching many of their neighbours.

Verbs:
Selected sentence(s): Pour the cornflour into the container and slowly add water.
Type of scientific text: Experimental account
Cohesive device(s): Material verbs: *pour, add*
Self-questioning: What are the steps of preparing a thickening liquid?
Your interpretation: The first step is to put cornflour into a pot, followed by pouring water into it.

Adverbs or Adverbials:
Selected sentence(s): Human are mammals. Likewise, cats are mammals.
Type of scientific text: Information report
Cohesive device(s): Adverb: *likewise*
Self-questioning: In what ways are humans and cats similar?
Your interpretation: Both humans and cats are mammals.

Group Work:

Text 1[1] for Group _____
1 The United States has its own process for identifying plants and animals in peril. A law called the Endangered Species Act (ESA) guides the process. Unlike the Red List, the U.S.

[1] Chambers, J. (2022, March 10). *Explainer: What is an endangered species?* Science News Explores. https://www.snexplores.org/article/explainer-what-is-an-endangered-species

Endangered Species List has just two categories. Species it lists as endangered are considered currently at risk of extinction. Threatened species are those it believes could become endangered in the future.

2 But there is something very important about the Endangered Species List. “Once a species is listed, it gets legal protection,” explains Brenna Forester. She is a biologist with the U.S. Fish and Wildlife Service in Fort Collins, Colo. That is one of the agencies that collects information about the health, habitat and threats that species face. The information is used to decide whether a species should be listed and protected.

1. _____:
Selected sentence(s):
Type of scientific text:
Cohesive device(s):
Self-questioning:
Your interpretation:

2. _____:
Selected sentence(s):
Type of scientific text:
Cohesive device(s):
Self-questioning:
Your interpretation:

Text 2[2] for Group _____

1 A lot of the chemicals that we know can disrupt the endocrine system, namely the complex network of glands and organs inside the human body, which is tightly regulated by law. This is not good for human health because those Endocrine-disrupting chemicals (EDCs) have harmful effects. They can be bad not only for humans, but may also endanger species living in a contaminated area, or even in remote areas like the Arctic.

[2] Metcalfe, C., Bayen, S., & Yargeau, V. (2022, July). How can chemicals influence your hormones? *Science Journal for Kids.* https://www.sciencejournalforkids.org/articles/how-can-chemicals-influence-your-hormones/

2 Unfortunately, some EDCs are essential for industrial uses, so they still find their way into water, soil, and also food. So just saying "Hey, you are not allowed to use this anymore!" is sometimes not the best option. We need to:

- First, identify the dangerous chemicals.
- Then, find a substitute for them that is similar enough to let us use it for the necessary processes, but which is also different enough so as not to have the same bad effects on the environment.

1. _____:
Selected sentence(s):
Type of scientific text:
Cohesive device(s):
Self-questioning:
Your interpretation:

2. _____:
Selected sentence(s):
Type of scientific text:
Cohesive device(s):
Self-questioning:
Your interpretation:

Text 3[3] for Group _____

1 Plastic is an important part of our day-to-day lives. Since its invention, plastic has become a popular material for manufacturing. It is cheap and flexible, as well as being strong and long-lasting. However, these useful properties become a problem once we throw an item away. Plastic takes a long time to break down; worse still, we currently recycle only about 10% of global plastics. This has left us with a growing mountain of plastic pollution.

2 Recycling plastic can be tricky because it is hard to separate different types of plastic. Plastic is usually sorted by hand or put in a flotation tank to separate sinking and floating plastics. However, it is difficult to identify and separate all the different types of plastic by

[3] Henriksen, M., Karlsen, C. B., Klarskov, P., & Hinge, M. (2022, May). Can computers help us recycle more plastic? *Science Journal for Kids.* https://www.sciencejournalforkids.org/articles/can-computers-help-us-recycle-more-plastic/

simply looking at them. Our research project aimed to find a solution to this problem. Our study shows that computers with cameras can recognize 12 types of plastic. Next, they can use this knowledge to identify plastics as they move along a conveyor belt. Our findings could revolutionize plastic recycling and bring us one step closer to solving the global plastic challenge.

1. _____:
Selected sentence(s):
Type of scientific text:
Cohesive device(s):
Self-questioning:
Your interpretation:

2. _____:
Selected sentence(s):
Type of scientific text:
Cohesive device(s):
Self-questioning:
Your interpretation:

Text 4[4] for Group _____

1 The levels of smartphone addiction among the participants in this study are high. This is especially true for students below age 21. This might be because they have more free time; or it could be because they are happy to use smartphones in different ways, such as for social media.

2 There is a significant association between using the smartphone for longer and being addicted to it. But do people use their phones more because they are addicted? Or are they addicted because they use their phones more? It is hard to know.

3 There is also an association between addiction and using the smartphone late at night. For example, using the smartphone after 1 am is three times as likely to develop an

[4] Sohn, S., Krasnoff, L., et al. (2022, February). How do smartphones affect our sleep? *Science Journal for Kids*. https://www.sciencejournalforkids.org/articles/how-do-smartphones-affect-our-sleep/

addiction. As a result, the amount of time spent on the phone is not enough to suggest addiction. However, combining that with the latest time one uses the smartphone can be a good indicator.

4 Our study also shows that smartphone addiction could be harming people's sleep. This is not just because of the screen time. Students could suffer from addiction and poor sleep even when using the smartphone for under 2 hours a day. Furthermore, use in the late hours or right before bedtime tended to harm the students' sleep.

1. _____:
Selected sentence(s):
Type of scientific text:
Cohesive device(s):
Self-questioning:
Your interpretation:

2. _____:
Selected sentence(s):
Type of scientific text:
Cohesive device(s):
Self-questioning:
Your interpretation:

Practice of interpreting

Exercise 5: Read the following passage "Human threats to stratospheric ozone". Complete the cohesive devices chart that follows the text. Then as a class, based on the identified cohesive devices in the chart, determine the main ideas of the text and write a one-paragraph summary of the text.

Steps:	**1.** *Circle* the cohesive ties: Determiners, conjunctions, verbs, adverbs/adverbials.

	2. *Determine* the text type (information report, argument, explanation, or experiment account). 3. *Link* the cohesive ties to other words or ideas. 4. *Write* the meaning of the sentence or paragraph.
Sharing:	1. **Explain the meaning of the sentences or paragraphs.** 2. **Help the other group members to understand the text and summarize the whole text.**

Steps		☐
Did you circle…	**Determiners**	
	Conjunctions	
	Verbs	
	Adverbs/Adverbials	

	Human threats to stratospheric ozone[5]
1	In 1985, scientists discovered that ozone in Earth's stratosphere was thinning. This
2	was especially true over Antarctica. Scientists referred to this thinning as a "hole" in
3	the ozone layer. For decades, halogens had been destroying the high-flying ozone.
4	The major sources of those halogens, scientists learned, were gases released at
5	Earth's surface by humans. For example, air conditioner chemicals, car exhaust, and
6	factory exhaust.
7	One main contributor was a type of refrigerant used in air conditioners. These
8	chemicals had a long name: chlorofluorocarbons (Klor-oh-FLOOR-oh-kar-bunz).
9	These chemicals were destroying so much atmospheric ozone in 1987;
10	consequently, a worldwide ban was initiated. All 198 members of the United
11	Nations agreed to ban them. The worldwide ban was called the Montreal Protocol,
12	which became the first treaty in history to win support from all countries.
13	The ban prevented disaster. The hole in the ozone layer has since started to heal. The
14	ozone layer is getting smaller, but it is taking a long time to recover. Susann
15	Tegtmeier, a climate scientist in Canada says, "we still see an ozone hole over the
16	Antarctic every winter."
17	The continued release of chemicals like chlorine and bromine will not help. These
18	halogens are highly effective ozone-destroyers. Halogens are found in swimming
19	pools, toothpaste, drinking water, and salt. They are important for developing

[5] Carpenter, K. G. (2022, February 18). *Widely used pesticides may threaten Earth's ozone layer.* Science News Explores. https://www.snexplores.org/article/widely-used-pesticides-may-threaten-earths-ozone-layer

20	everyday products for people to use, which makes them even harder to ban.
21	However, halogens are the chemical destroyers of the ozone. When halogens
22	destroy ozone, Tegtmeier explains, “they do so catalytically.” That is, the halogens
23	survive the chemical reaction taking place when the ozone is destroyed.
24	As a result, halogens in the atmosphere can destroy ozone molecules again and again
25	without breaking down.
26	Unfortunately, halogens are manufactured to create products for everyday human
27	use. Although the worldwide ban of chlorofluorocarbons was successful, it may be
28	difficult to ban the use of halogens and other chemicals. Despite this, banning ozone
29	destroying chemicals may be the only way to save the ozone layer.

Step 1: Complete the cohesive devices chart

Cohesive devices	**Line #**	**Meaning**
1. This (determiner)	1	the discovery that ozone in Earth’s stratosphere was thinning
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Step 2: Determine which type of scientific texts this article belongs to. You can select more than one answer.

Types of scientific texts	***“√” if appropriate***
1. Information report	
2. Argument	
3. Explanation	
4. Experimental account	

Step 3: Write down the main ideas based on your understanding of the cohesive devices
Main idea 1 (problem):
Main idea 2 (looking deeper):
Main idea 3 (looking deeper):
Main idea 4 (solution and a bigger picture):

Step 4: Write a one-paragraph summary based on the main ideas. Explain which type(s) of scientific texts is(are) included in this article.
Summary

Mind map summary of this lesson: