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

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Tutorial 5: Strategy 3, Clarifying

Student handout

Introduction

- What is clarifying?
- Understanding the context and looking for context clues
- Practice: Clarifying a text

Section 1: Review & Introduction to clarifying

I. Review and Warming up

In the previous lessons, you learnt the following two useful reading strategies:

	Your role	**Textual support**	**Questions you may ask yourself**
Predicting	Predict what you think you will learn from the text	• Titles • Headings • Subheadings • Pictures	• Based on the title/headings/pictures, I guess the text will talk about... • As mentioned in the section/paragraph, I predict the next section/paragraph will be about...
Self-questioning	Raise the questions that will help you understand the text not only on the surface but also under the surface	• Unclear parts • Puzzling information • Connections to previous knowledge	• What information can be easily spotted on the surface of the text and what has to be discovered between the lines? • Is there anything that I do not understand about a specific concept/idea/ paragraph/section? • What does the author really want to tell me through the text? • What does the author not discuss but may be further followed up on?

In this lesson, you will learn the third reading strategy, which is clarifying.

What is clarifying?

Clarifying will help you address difficult parts which you cannot follow or understand. These parts comprise difficult word choice, organization, and/or unfamiliar concepts. Here are some typical questions you would ask yourself when clarifying:

- The word/phrase/sentence/paragraph/section I do not understand is…
- I do not really understand…/ A question I have is... because…
- A question I would like to be answered by the author is…

Try to recall the four types of scientific texts you have seen before. In different types of scientific texts, you should ask different questions.

	1. What is it?	2. What clarifying questions would you ask?
Reporting Information	Information about the world	What is the concept discussed? When/where can the scientific object be found? How are two concepts related together?
Providing explanations	Causes <-> Effects	• Why does this event happen? How does this event happen?
Describing experimental procedures	Procedures and results of experiments	• How do we carry out the steps? • How do we use these apparatuses/laboratory apparatuses?
Arguing for a standpoint	Claims <-> Evidence	• What are the claims of the argument? • What is the evidence of the argument? How does the evidence support the claims?

Read the following sentence that contains a terminology which refers to a scientific concept that you do not understand. Determine which type of text it is. Take turns to ask your teacher clarifying questions about this sentence to collect hints about this concept. Study the example below and write down both the questions and hints during the clarifying process.

Corals[1] provide food and shelter for other organisms in the ocean. Corals are found in shallow salt oceans and seas around the world. They attract many tourists to see them, usually by diving or riding in a glass bottom boat.

1. Which type of text is it? Circle the correct answers.

A. Reporting information
B. Providing explanations
C. Describing experiments
D. Arguing for a standpoint

2. What are "corals"?

Question posed to the teacher for hints (*Please DO NOT ask your teacher directly what "acoustical" means!*)	**Teacher's answer**

[1] Fazio, X., Gallagher, T. L., & DeKlerk, C. (2022). Exploring adolescents' critical reading of socioscientific topics using multimodal texts. *International Journal of Science and Mathematics Education*, 1-24.

Example What are “corals”?	Example ”Corals” provide food and shelter for other organisms in the ocean.

After seeking clarifications from my teacher, I guess what “corals” mean:

_____.

II. Clarifying: Understanding the context

What is context?

According to the Cambridge Dictionary, “context” is the situation within which something exists or happens, and which can help explain it. For example:

The photo shows two scientists arguing about the causes of global warming. The contextual information revolving around the issue includes:

Scientist on the left:

- CLAIM: Global warming is caused by volcanic eruption.
- EVIDENCE: Volcanic eruption produces methane which causes global warming.

Based on the contextual information shown in the photo where the two scientists do not agree with each other, can you guess the claim and evidence from the scientist on the right?

Scientist on the right:

- What is his claim?
- A possible answer: Methane gases do not cause global warming. The increase in global temperature is caused by sunlight.

- What is his evidence?
- A possible answer: Most heat energy on the Earth is from sunlight.

Exercise 1: Identify the contextual information in the photo below. Guess what happened and identify the causes and effects of the problem in the text.

1. Which type of text is it? Circle the correct answers.

A. Reporting information
B. Providing explanations
C. Describing experiments
D. Arguing for a standpoint

2. Fill in the table below.

What happens in this photo?	•
What is the contextual information you can identify in the photo?	• • • •
Your inference: **What is the cause of the problem? Why?**	•
Your inference: **What is the effect of the problem? Why?**	• •

Section 2: Context clues in text practice

III. Looking for context clues

What are *context clues?*

Context clues refer to the hints a reader can find within a sentence, a paragraph, or a passage, based on which the reader can use to **infer** the meaning of an unfamiliar word or phrase in the text. In other words, it is an indirect decoding strategy you can use to guess the meaning of a difficult vocabulary item without looking it up in a dictionary.

Exercise 2: Watch the video that introduces what context clues are (https://www.youtube.com/watch?v=eHCpJ86XDY4**). Jot notes while watching by filling in the blanks below.**

1. Context clues help us find the meanings of _____ words.

2. What are the five types of context clues?
   a) P _____
   b) D_____
   c) E_____
   d) S_____
   e) A_____

3. Show your understanding of what 2(d) and 2(e) mean by providing the 2(d) and 2(e) of the adjective "spacious" mentioned towards the end of the video.

2(d) S_____ of "spacious":	
2(e) A_____ of "spacious":	

Exercise 3: Based on what you have learnt about context clues in Exercise 2, look for the useful context clues in the following excerpt from an academic text to infer what the difficult words mean step by step.

> Unlike other long-existing coronaviruses, SARS-CoV-2 is a novel one that spreads worldwide and was declared a pandemic by the World Health Organization 3 months after the outbreak. Termed as COVID-19, airborne or surface transmission occurs as droplets/aerosols and seems to be reduced by social distancing and wearing mask. Demographic and geo-temporal factors like population density, temperature, healthcare system efficiency index and lockdown stringency index also influence the COVID-19 epidemiological curve. The 435 days dataset for 15 countries, where the first wave of epidemic is almost ending, have been considered in this study.[2]

1. What does the adjective "novel" mean in the first sentence? Think about the

[2] Nikita, S., Raman, R., & Rathore, A. S. (2021, September). A chemical engineer's take of COVID-19 epidemiology. *American Institute of Chemical Engineers Journal*, 67(9): e17359. doi: 10.1002/aic.17359

following in order to arrive at the answer:

(a) Based on the first word "unlike" that starts the sentence, do you think the phrase before the comma and that after the comma form a logical contrast?

(b) Do you think the adjective "long-existing" in the first phrase is a synonym or antonym of the adjective "novel" in the second phrase?

(c) Now, write down your understanding of the word "novel":

_____

2. What do "demographic and geo-temporal factors" in the third sentence mean?

(a) Are there any examples provided after "demographic and geo-temporal factors"?

(d) Based on the examples, write down your understanding of the phrase "demographic and geo-temporal factors":

_____

3. What does the adjective "epidemiological" in the third sentence mean?

(a) In the last sentence, there is the noun phrase "the first wave of epidemic"; you can therefore infer that "epidemic" refers to the aforementioned _____.

(b) Based on your understanding of the noun "epidemic" now, what do you think "epidemiological" means?

_____

Section 3: Applying the clarifying skill in reciprocal reading

IV. Practise clarifying in groups

Exercise 4: Based on the following *strategies and steps*, read the article and apply the clarifying reading strategy to infer the meanings of the unfamiliar words in bold.

Strategies:

1. Identify the type of scientific texts.
2. Ask clarifying questions according to the type of scientific text.
3. Find the following five types of context clues:
   - Pictures
   - Definitions

	• Examples • Synonyms • Antonyms 4. Check language that may indicate context clues: … is defined as…; … means…; In other words, …; …, for example, …; … such as…; … like…; … including…; … is similar to/different from…, etc.
Steps:	1. *Circle* the unknown words 2. *Underline* the context clues 3. *Write* the inferred meaning of each word

How well do masks protect against COVID-19?[3]

Section 1. Introduction

[1] It has been two years since the beginning of the COVID-19 pandemic. Even now many of us have to wear face masks and distance ourselves from others. But why is that?

[2] SARS-CoV-2, the virus that causes COVID-19, spreads through small droplets. We produce droplets of water when we cough, sneeze, speak, and breathe. If a person has a cold or COVID-19, there will be **virions**, similar to viruses, in these droplets. We can infect other people through the virions.

[3] If the droplets are big in size (above 50 microns), then they will fall rapidly to the ground. In this case, we have to be close to another person to infect them. But droplets can also be smaller, meaning that they can stay and travel in the air for quite some time. When they travel so far, they may **shrink** as **evaporation** takes away some of the moisture. In other words, when the water leaves the air, the droplets become smaller. How do we know that wearing masks can stop COVID-19 from spreading?

Section 2. Methods

[4] We invited 130 healthy volunteers from the age range of 5 to 80 to help us figure out what we release into the air. We measured the droplets they produced while breathing out and talking both with and without masks. We also compared two different types of masks: FFP2 masks (similar to N95 masks) and surgical masks.

[5] Now, imagine two people are facing each other and talking. One of them is **infectious**: they carry the SARS-CoV-2 virus. The other one is **susceptible**: they have no immunity (against COVID-19) and can become sick. We considered three scenarios: 1. Neither one is wearing a mask but they keep a distance; 2. Only the susceptible person is wearing a mask and they still keep a distance; 3. Both are wearing masks and standing right next to each other.

[3] Bagheri, G., & Thiede, B., et al. (2022). How well do masks protect against COVID-19? *Science Journal for Kids and Teens*. https://www.sciencejournalforkids.org/articles/how-well-do-masks-protect-against-covid-19/

[6] The risk of infection in the first scenario depends mainly on the viral load, infectious dose, and how much people's breath dilutes in the surrounding air. We assumed the most common values for these parameters that many researchers report.

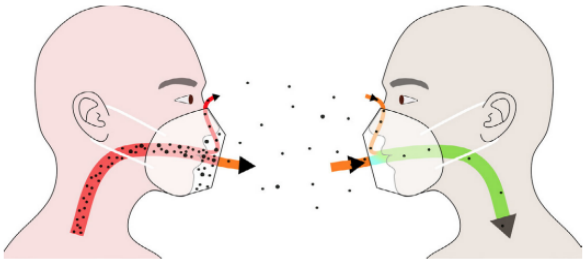


Figure 1:
Masks protect both the wearer and the people nearby. Still, some droplets leak out (and in) of the mask, both through the filter itself (big arrows) and around the edges of the mask (little arrows).
Source: Birte Thiede / MPIDS

[7] For the other two scenarios, we also had to estimate what percentage of the droplets might leak in and out of the masks (Figure 1). There are two main ways for this leakage to happen: the droplets either penetrate the filter itself or slip around the edges. To estimate the leakage, we used a particle size **spectrometer**. It allowed us to count particles in the air and inside the mask. Comparing both counts gives us an accurate idea of what goes in (and out of) the mask.

Section 3. Results

[8] The bad news is that social distancing alone does not protect against infection. Even at a distance of 3m (10 ft), there is a 90% chance the susceptible will become infected in less than 5 minutes.

[9] However, if only the susceptible wear a surgical mask, it will take at least 30 minutes to become infected even at a distance of 1.5m (5 ft) from the infectious. If the susceptible wear an FFP2 mask, the chances of infection even after an hour are only about 20%.

[10] Of course, the best scenario is when both the infectious and the susceptible wear a mask. If both wear surgical masks, the risk of infection after one hour is below 30%. If both masks are FFP2, the risk stays below 0.4%. Figure 2 shows more detailed results for various mask combinations.

Strategy 1. Identify the type of scientific text. Put a ⚜ to describe the type of scientific texts in each section. The first example has been done for you.

	Reporting information	Providing explanations	Arguing for a standpoint	Describing experiment procedures
Section 1. Introduction		□		
Section 2. Methods				
Section 3. Results				

Strategy 2. Ask clarifying questions according to the type of scientific text in each section.

	Clarifying questions
Section 1. Introduction	• Example 1: How is COVID-19 spread?

	• Example 2: Why do masks protect people against COVID-19 infection?
Section 2. Methods	• •
Section 3. Results	• •

Strategy 3. Find the following five types of context clues:

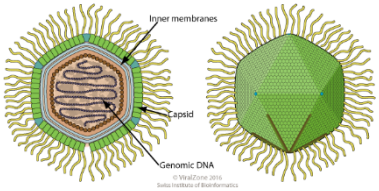
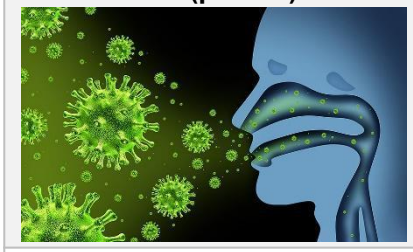
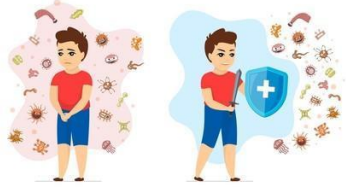
- Pictures
- Definitions
- Examples
- Synonyms
- Antonyms

Strategy 4. Check language that may indicate context clues:
… is defined as…; … means…; In other words, …; …, for example, …; … such as…; … like…; … including…; … is similar to/different from…, etc.

Steps: Complete the chart	
Unfamiliar word in the text	**Meaning**
1. virions (para. 2)	
2. shrink (para. 3)	
3. evaporation (para. 3)	
4. infectious (para. 5)	
5. susceptible (para. 5)	
6. spectrometer (para. 7)	

V: Reporting your clarifying procedures

Work in pairs to discuss with your partner how you have just made use of the context clues to arrive at the meaning of each unfamiliar word. You will be invited to explain your clarifying procedures to the class.

Your clarifying procedures	
Unfamiliar word in the text	**What context clues you used and how you used them**
1. virions (para. 2) 	
2. shrink (para. 3) 	
3. evaporation (para. 3) 	
4. infectious (para. 5) 	
5. susceptible (para. 5) 	
6. spectrometer (para. 7)	

Mind map summary of this lesson: