

**Genre-based Approach to Enhancing Secondary Students' English Writing Ability in Science Subjects**

**Students’ Handouts**

City University of Hong Kong, Department of English

&

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**Lesson 7: Explaining how the research was carried out**

**Introduction**

*The methods (sometimes called ‘methodology’) section of a scientific report explains how you did your research. In other words, it tells readers how you got the data that you used to try to answer your research questions or test your hypotheses. It also usually explains how you analysed the data.*

*A methods section should include enough information about how you carried out your research so that readers can feel sure that the results you report are likely to be valid. Valid results are results that are reliable because they are based on good evidence and good reasons. This section should also explain what you did clearly enough so that other researchers can use the same methods themselves to research the same or a similar phenomenon.*

*In this lesson you will first examine a methods sections from a research report written by university students. In the second task you will be asked to write a methods section yourself based upon a set of instructions.*

VOCABULARY PREPARATION

Read through Task 1 below. Find the words that are in bold type and use these words to complete the following sentences.

1. \_\_\_\_\_\_\_ is an adjective. If you are \_\_\_\_\_\_\_ of something you know about it.
2. When you \_\_\_\_\_\_ something, you keep a \_\_\_\_\_\_\_ (same spelling but a different syllable is stressed) of it in order to remember it. This \_\_\_\_\_\_\_ may be in the form of writing, or it may be audio (sound) or video.
3. When you do something \_\_\_ \_\_\_\_\_\_\_, you do it without a definite plan or you do it without following a specific pattern.
4. The \_\_\_\_\_\_\_\_ of something is the place where it has been put, or where it can be found.
5. The \_\_\_\_\_\_\_\_ of something is the largest amount that it can contain.

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|  | ***Task 1: Sequencing sentences from a methods section*** |

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| **TEXT ONE**  Methods   1. In order to find out how **aware** students are of the waste problem at the university, 10 students chosen **at random** were interviewed. 2. The bins were checked from time to time and the total volume of rubbish inside them was measured and **recorded**. 3. Bin 1 was at the entrance to the canteen, bin 2 was near the lift on the ground floor and bin 3 was near the exit to the university concourse. 4. Each of the students was asked to answer questions and the interviews were audio-recorded for the later analysis. 5. The **capacity** of each bin was recorded using a tape measure. 6. In order to estimate the amount of rubbish produced every day by students at the university, three bins at different **locations** within one academic building (AC1) were selected.   The most logical order for the above sentences is:  1.  2.  3.  4.  5.  6. |

1. Text one below is a list of six sentences that come from the methods section of a research report on rubbish disposal at a Hong Kong university. The sentences are out of order. Arrange them according to what seems to be the most logical order.
2. The original text had two paragraphs. Where could the paragraph break be?
3. Find the sentence in which the writers use the verb *estimate*. How would the meaning be different if the writers had used the verbs *find* or *discover* instead of *estimate*?
4. All the verbs in this section are in past tense except in one sentence. Which sentence? Why are the verbs in this sentence not in past tense? Would it be possible to use past tense? What difference would it make?
5. All the clauses in the text that describe what the researchers did, are passive voice clauses using passive voice verb forms. For example:
   * 1. *Three bins at different locations within one academic building (AC1) were selected.*
     2. *The capacity of each bin was recorded using a tape measure.*
     3. *10 students chosen at random were interviewed.*
     4. *Each of the students was asked to answer questions.*

Try changing these passive voice clauses into active voice clauses. More than one researcher was involved in this research, so the subject of the active voice clauses will be “we”. Make sure that although you change the voice of these clauses, the tense will still be simple past.

1. *We ....*

2. *We ...*

3. *We ...*

4. *We*

In order to check for yourself that you are clear about the differences between the forms of active and passive voice sentences, cover up the four **passive** clauses from the text above, and rewrite the **active** voice clauses that you just wrote as passive voice clauses. Compare your passive voice sentences with the original sentences.

Use of active and passive voice

In the past, students learning to write scientific English were usually advised to use passive voice in writing the methods sections of research reports. However, these days scientists often also use active voice when describing their methods. If you use active voice, the text seems a little more personal and a little less formal. Of course, whether you use active voice or passive voice, your verbs should be in past tense, because when you write your final report you will have already finished the research.

Sometimes, writers may mix the two voices, for example:

*We selected 20 secondary school students to take part in our study* [ACTIVE]*. The students were first given a questionnaire to fill out [PASSIVE]. They were then asked to do task one [PASSIVE].*

This switching from active to passive works well. Using active voice in the first sentence makes it clear who the researchers were – the authors of the report - and introduces the information about the student participants. After that there is no need to mention the researchers and the following sentences in passive voice are all about the students, so they can be the subjects of each sentence. However, switching between active and passive voice needs to be done with care. If you are in any doubt, it is best to choose either active voice or passive voice to write your methods section, and to keep the same voice all the way through.

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VOCABULARY PREPARATION

Read through Task 2 below. Find the words that are in bold type and use these words to complete the following sentences.

1. The noun **\_\_\_\_\_\_** is related to the verb \_\_\_\_\_\_\_\_. When you **­\_\_\_\_\_\_\_** on something, you pay full attention to it without thinking about anything else.
2. The noun \_\_\_\_\_\_\_ is related to the adjective **\_\_\_\_\_\_**. Something that is \_\_\_\_\_\_ is true or correct.
3. The \_\_\_\_\_\_\_ of research are the people who are researched, i.e. the people who you get data from by interviewing them or asking them to do things. Often scientists prefer to use the word *participants* instead of\_\_\_\_\_\_\_, as this makes it clearer that the people are taking part in the research themselves rather than just been observed or experimented on.

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| **TEXT TWO**  Chewing Gum and Concentration     1. Find 8 male **subjects** of roughly the same age and divide them into two groups. 2. Ask the 4 members of the first group to play the memory game at <https://www.webgamesonline.com/memory/index.php> 5 times. 3. Record how long it takes each subject to complete each game. 4. Give the 4 members of the second group some chewing gum and ask them to play the same memory game 5 times while chewing the gum. 5. Record how long it takes members of this group to complete each game. 6. Analyse the results. Did chewing gum increase the subjects’ speed and **accuracy** in the memory game? 7. Now repeat the procedure with 8 female subjects of roughly the same age. 8. Analyse the results. Did the gender of the subjects make any difference to their speed and accuracy in the game? |

1. Text Two is a set of instructions for doing research into the effect of chewing gum on **concentration.** Imagine that you have done this research and are now writing a research report about it. Use the instructions below as the basis for writing the methods section of your report. Write the methods using the personal, less formal style.

You can number each step as is done in the instructions or you can write this section as one or two paragraphs. If you write it as paragraphs, you may need to add some sequencers, such as *first, then* and *after that.* Also note that you will need to find a way to change the questions in steps 6 & 8 into indirect questions and to include them in the sentences describing these steps. If you have difficulty doing this, look back at the text in Task 1 and find where the writers talk about the purposes of doing particular steps.

Begin *We recruited …*

2. Now rewrite the methods section you just wrote using the less personal, more formal scientific style.

Begin: *Eight male students of roughly the same age were recruited...*

3. Share both the versions that you have written with your classmates and give one another feedback. Think about the following.

* Is every step of the methods included?
* Are the right tenses used?
* Are the forms of the active voice clauses and the passive voice clauses correct?
* Are the questions in steps in steps 6 and 8 appropriately included?

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|  | ***Task 3*: *Reviewing your progress in data gathering*** |

Use any time left in this lesson to review the progress of your group in collecting data.

* How many interviews have you done?
* How many participants have taken part in your experiments?
* What problems or difficulties have you faced?
* Do you need to change any of your methods?
* If for any reason your group has not collected any data. Please ensure that each member conducts at least one interview and has at least one participant do the experiment before the next lesson.