

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

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&

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**Lesson 9: Writing Discussions and Conclusions**

**Introduction**

*Once you have presented your results, you need to move on to the final two sections of your report, the Discussion and the Conclusion. Without these sections, it is hard for other scientists to know what is worth paying attention to in your results or whether they have any value at all. In fact, other researchers will sometimes only read the Introduction, Discussion and Conclusion sections of a report, and sometimes only the Introduction and Conclusion!*

*This Discussion section normally says what the researchers think the results mean and draws attention to anything that seems important, interesting or surprising. It will also usually attempt to explain the results as far as is possible. This section will also sometimes to compare the results of the research with results from previous research.*

*The Conclusion section sums up what the researchers want other scientists to ‘take away’ from their research. It usually briefly summarizes the most important findings and may relate them to the initial research question(s) or hypothesis (hypotheses). This section also often suggests some* ***implications*** *or* ***applications*** *of the findings, or some* ***recommendations*** *about what should be done. It may also say something about the* ***limitations*** *of the research and give suggestions for further research.*

Vocabulary and Grammar

What four verbs are the nouns **implications, applications, recommendations** and **limitations** related to? Which of the following phrases are closest to the meanings of which of the three verbs?

1. To adapt and use something
2. To deal with only some things
3. To suggest that something is the case rather than actually saying so
4. To suggest that a particular action should be done

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|  | ***Task 1: Examining sample Discussions and Conclusions*** |

A. Read the following Discussion and Conclusion sections from a research report and answer the questions that follow it.

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| **Text One** |
| **Discussion**  As the data from the interviews show, people rely on mobile phones for many purposes, and they believe that they need to use them in public areas in order both to keep up with their work when they are away from their workplaces, and to keep in contact with their friends and family. This may be why people continue to use their mobile phones in public areas even though they are aware that when they are looking at their phones, or talking on their phones, they may **react** more slowly to **unexpected** events.  It is **notable** that about half the interviewees thought that they could multitask effectively using mobile phones. However, the results of the experiments show clearly that their ability to focus on other tasks while using their mobile phones was greatly reduced.  The findings from the experiments also show that **texting has the greatest impact on reaction times**. This can be explained with reference to research by Reed and Robbins (2008) that shows how texting increases **motor, visual** and **cognitive** demands.  **Conclusion**  Although most people understand that using mobile phones can influence their reaction times, they greatly **underestimate** the danger of using a mobile phone while walking or driving, and they are not aware of how a few seconds longer reaction time can make it much harder to avoid accidents. It is important to find ways to make the general public more aware of the dangers of using mobile phones in public places, and especially the danger of texting. |

1. Which of the following questions was the research designed to answer? Note that there may be more than one answer to this.
   1. How much time do people spend using mobile phones?
   2. Do people react differently to unexpected events when they are using their mobile phones?
   3. How important is it to use mobile phones to keep in contact with work, family and friends?
   4. How aware are the general public of the dangers of using mobile phones?
   5. How well can people do different tasks when they are using their mobile phones?
   6. Does texting increase motor, visual and cognitive demands?
2. What two kinds of methods did the researchers use to gather data?
3. Find parts of the text where some of the results from the study are summarized.
4. Find one sentence that generalises the results of the research as a whole.
5. Find parts of the text where explanations for the results are suggested. What words do the writers use to indicate how sure they are that the explanations are correct?
6. Find the recommendationthat the researchers give based on their research. Which words in the sentence make it clear that it is a recommendation?

Grammar & Vocabulary

1. How would you *react* if you were crossing a road and you saw a car coming towards you? What is the noun related to *react?*
2. What is the verb related to the word *unexpected*. Give an example of something *unexpected* that has happened to you. What is the opposite of *unexpected*?
3. Which of the following is closest in meaning to *it is notable* in this context?
   1. it is something that we should note down
   2. it is important or interesting
   3. it is well-known
   4. it is obvious
4. Which of the following is closest in meaning to *estimate*?
   1. carefully measure something
   2. calculate something approximately
   3. guess how big something is
   4. give your opinion about something
5. What does *underestimate* mean? What is the opposite of *underestimate?*
6. Do you remember *motor, visual* and *cognitive* from previous lessons? One has to do with seeing, one has to do with thinking and one has to do with moving. Can you remember which is which?

B. Now read the Discussion and Conclusion sections from another research report and answer the questions that follow it.

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| **Text Two** |
| **Discussion**  The results showed that chewing gum improved the concentration of most of the participants and increased their **short-term memory**. This may be due to an increase in activity in the hippocampus area of the brain, which is the key area related to **memor**y (Onozuka et al., 2008). When **memories** are first forming in the hippocampus, chewing gum helps speed up both the **encoding** and **rehearsal** of the new memories (Coon & Mitterer, 2015). The chewing process helps to achieve a positive mood and greater **alertness.** This allows the brain to focus on present tasks more easily with quicker information processing time.  **Conclusion**  Our research suggests that chewing gum can improve concentration It also to some extent confirms earlier research that concentration brings various benefits, including improved short-term memory, the ability to focus and increased alertness (Baker et al., 2004). The research, however, has several limitations. The sample size was small, consisting of only 32 participants. Also, only two methods were used to assess the relationship between chewing gum and concentration - self-report by the participants and a simple word test. Further research on the effects of chewing gum with students from different academic fields could be done using a wider range of methods. |

1. Which of the following questions was the research designed to answer? Note that there may be more than one answer.
   1. How are memories encoded in our brain?
   2. Does chewing gum help people to remember things?
   3. What helps the brain to focus more quickly?
   4. Does chewing gum help people to concentrate better?
   5. Does chewing gum increase activity in the hippocampus area of the brain?
2. What methods did the researchers use?
3. Find the two sentences in which the results of the study are summarized.
4. Find the part of the text where explanations for the results are suggested.
5. How certain are the writers that the explanations they give are the correct one. Which word tells you this?
6. What are the two limitations of this research?

Vocabulary and Grammar

1. Complete these two sentences:

One meaning of the noun *term* is “a period of time”. So short-term memory must mean “the ability to ……….”. The opposite of short-term memory is “………..”

1. Do you know what a *code* is? Can you give an example of a *code*? What do you think *encoding* of memories means in this text?
2. *Rehearsal* is a noun related to the verb *rehearse.* When you *rehearse* a play, a song, a dance etc. you practice usually many times in order to prepare for a performance. So what do you think *rehearsal* means when referring to memories in the brain?
3. What is the adjective related to the noun *alertness*? Which of the following is nearest to the meaning of *alertness* in this text?
   1. feeling very happy about something
   2. being fully concentrated on something
   3. doing things quickly and efficiently
   4. paying full attention to whatever is happening

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|  | ***Task 2: Softening Claims*** |

When you interpret your results, i.e. when you say what you think your results mean and what may be the reasons for them, you are making claims. When scientists make claims based on their research, they always do so carefully, taking care not to exaggerate. When you are interpreting your own results, you should also be careful about the claims that you make. You will often need to choose words and phrases that “soften” or “hedge” the claims. Even when you think that the results are very clear, you should avoid making claims that are too strong. For example, instead of saying that the results of your research ‘prove’ a theory, you can say that they ‘support’ it. Similarly, instead of saying that the findings “show” that something is the case (i.e. they are “true”), you can say that they “suggest” that something is the case.

1. The following are some verbs that can be used to make claims about the results of a study.

*confirm, show, suggest, support, indicate*

i. Which of these verbs can be used in sentence pattern one below and which can be used in sentence pattern two?

Pattern 1: Verb + *that* clause

The results …… that chewing gum increases short-term memory.

Pattern 2 Verb + object

The results ……. the hypothesis that chewing gum increases short-term memory.

ii. Which of the above verbs would you use to make a strong claim and which would you use to make a weaker (“softer” claim)?

2. Here is a sentence suggesting an explanation for some results.

It is likely that texting increases motor, visual and cognitive demands.

Although *likely* ends in *ly,* it is an adjective. Notice how it is used: *It is ADJECTIVE that …*

The following adjectives all follow this pattern and can be used to strengthen or weaken a claim. How would you rank them in terms of how strong a claim they make?

*obvious, possible, likely, certain, probable, clear*

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|  | ***Task 3: Reconstructing a Discussion and Conclusion Text*** |

1. Here are some notes for one of the Discussion & Conclusion texts that we examined earlier. Without looking back at the original, have a go at writing the two sections in full from the notes.

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| **Discussion**  Interview data: i. people rely on mobile phones for many purposes  ii. need to use in public areas to keep up with work and in contact with friends/family  Is this why they continue to use them? - they know likely to react more slowly to unexpected events  ½ interviewees thought they could multitask effectively using mp  BUT  results from experiment: much less focus on other tasks while using mp  result from experiment: texting has greatest impact on reaction times    Reed and Robbins (2008) texting increases motor, visual and cognitive demands  **Conclusion**  Most people understand using mp reduces reaction time BUT underestimate danger while walking, driving etc.  Should find ways to make public more aware of dangers – especially texting |

2. Now look back at the original text.

i. What are some of the differences between your text and the original text?

ii. Is there anything in your text you now think it would be better to change?