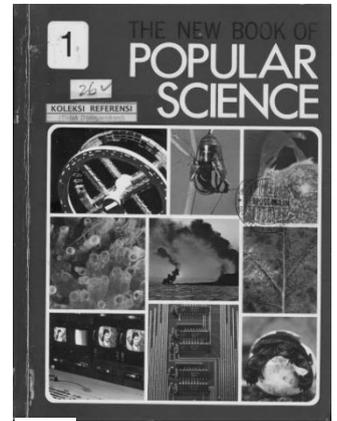


Vocabulary Focus: Communicating With The Scientific Community  
Writing Focus: Writing a Science lab report

## THE SCIENTIFIC COMMUNITY



a



c



d



e



f

a. Match the methods of communication (1 - 6) to the pictures (a—f).

- |                                    |                          |                               |                          |
|------------------------------------|--------------------------|-------------------------------|--------------------------|
| 1. An academic journal             | <input type="checkbox"/> | 4. A popular science magazine | <input type="checkbox"/> |
| 2. A conference                    | <input type="checkbox"/> | 5. A popular science book     | <input type="checkbox"/> |
| 3. An online forum or science blog | <input type="checkbox"/> | 6. A newspaper                | <input type="checkbox"/> |

b. Read the following statements and say which form(s) of communication from Exercise “a” the speakers should use to find the information they want.

I'm trying to learn more about the Hadron collider because it's big news, but it's not even close to my area so I'm finding the papers on it heavy-going.

I'm having a problem with one of my protocols. I've tried a few different things, but with no luck- I could do with some suggestions from other people of what to try next.

At my university, I don't meet enough people in my field - I really need to network and build some connections with people working around the world.

Read the following five extracts and then say which form (or forms) of communication from Exercise “a” each one comes from. Which form(s) of communication are not included in these extracts?

- A. ... More people were pain-free when using the handheld device than those who had used an identical dummy device. Although the study by Lipton *et al.* (2010) has reliable results, there are some points to consider when putting these findings into context. Importantly, the results will need to be verified in larger trials that directly compare...
- B. Tea and coffee drinkers have a lower risk of developing type 2 diabetes, a large body of evidence shows. And the protection may not be down to caffeine since decaf coffee has the greatest effect, say researchers in *Archives of Internal Medicine*. They looked at...
- C. ... can be rapidly generated by lentivirus-mediated transgenesis. RNAi also holds great promise as a novel therapeutic approach. This report provides an insight into the current gene silencing techniques in mammalian systems.
- D. Hi! Has anyone had any experiences with nano-particles sticking to glassware: - (? If so, does anyone know if there’s a suitable silylation protocol to pre-treat the glassware to do something about this annoying non-specific adsorption? Thanks!
- E. Animal and *in vitro* studies suggest that aspirin may inhibit breast cancer metastasis. We studied whether aspirin use among women with breast cancer decreased their risk of death from breast cancer. This was a prospective observational study based on...

The language we use changes according to why we are writing the purpose and who we are writing for the reader. It is important to notice the different styles of language used in English. Complete the second column of the table below, carefully reading the appropriate extract (A-E).

Feature	Examples	Extract
1. Asks the reader questions	Has anyone had...? _____	D D
2. Uses multi-word verbs (a verb with an adverb or a preposition)	do something about _____	D B
3. Uses exclamation marks and emoticons	Hi! _____	D D
4. Uses non-specific references to the work of other researchers	_____ _____	B
5. Uses specific references to the work of other Researchers	_____ _____	A
6. Uses impersonal phrases to avoid saying 'You' or 'We'	there are some points to consider _____	A E
7. Uses passive verbs to avoid saying who carries out a process	can be rapidly generated _____	A C
8. Uses Latin language expressions	<i>et al</i> _____	A E

Which of the features in the table (1-8) are appropriate for formal for scientific research papers? Which are appropriate for personal communication (such as email)?

Read three recent posts from an online forum (A-C) below. Imagine you belong to the forum where these questions are asked. Which questions could you answer? Which answers could you guess?

**A**

**Subject:** Filovirus Host Range?

- (1) Does anybody know what the host range is for filoviruses (i.e. Ebola and Marburg)?
- (2) I know that they can infect most (all?) types of mammals and several species of birds, but I can't find the actual host range anywhere.
- (3) Any help here would be appreciated.

**B**

**Subject:** materials which x-rays can't pass through?

- (1) I've been looking for a while now, but I can't find anything telling me what the radiopaque materials are.
- (2) In other words, which materials can't x-rays pass through?
- (3) Thanks in advance.

**C**

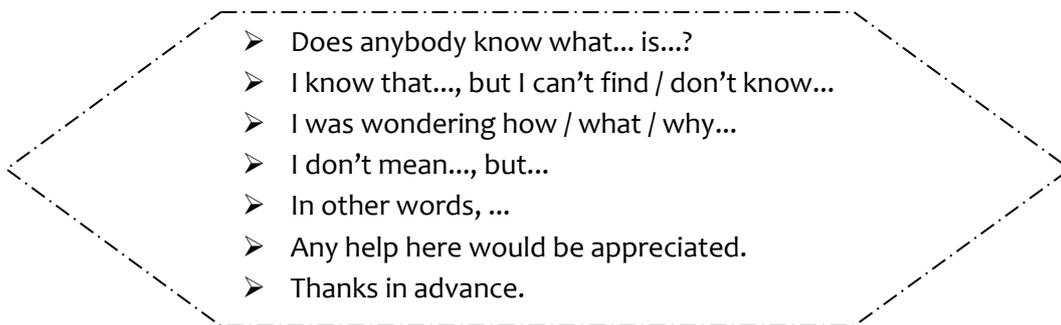
**Subject:** Quality of scientific writing considered in peer review?

- (1) I was wondering how important the quality of the writing of a submitted paper is in the peer review process.
- (2) I don't mean the quality of the data, but the actual writing.
- (3) In other words, will a nicely written paper with the same data be more likely to be accepted?

Read the posts again. For each post, say which sentence or sentences (1 - 3) in each one the writer uses to:

- a. ask the question
- b. say what the problem is
- c. thank the reader

Think of a question related to your own research. Then write a three-sentence post for an online forum in an appropriate style using the phrases in the box to help you.



- Does anybody know what... is...?
- I know that..., but I can't find / don't know...
- I was wondering how / what / why...
- I don't mean..., but...
- In other words, ...
- Any help here would be appreciated.
- Thanks in advance.

---

---

---

---

---

## WRITING

### Writing a Scientific lab report

The purpose of writing reports you've performed is to communicate exactly what occurred in an experiment or observation and to clearly discuss the results.

#### Title

Each piece of scientific work should include a concise but descriptive title. The title should reflect exactly what you did in your study. This is also your first shot at grabbing the reader's attention. The title is phrased in a similar way to the research question, also known as the operational question. Clearly identify the independent variable (IV) and dependent variable (DV). Recall that the independent variable (IV) is the part of the experiment that you are changing and the dependent variable (DV) is what is being measured as a result of that change.



**HINT: Use this formula to create a scientific title.**

The Effect of \_\_\_\_\_ [IV] on \_\_\_\_\_ [DV]

For example: *The Effect of Exercise on Heart Rate*

#### Abstract

A good Abstract is a miniature version of the lab report in one concise paragraph and labeled Abstract.

If you are not sure what should be included in each summary sentence, use the following list as a guide:

- Introduction: the main focus of the lab (scientific concept or lab procedure the lab is about) and the main objective(s) of the lab
- Methods: a quick description of how the lab was done
- Results: statement of the overall findings
- Discussion: statement explaining the findings of the lab and their relationship to the scientific concept or lab procedure
- Conclusion: what you learned about the scientific concept or lab procedure

If your Abstract is too long, look carefully at each summary sentence and take out any information that is not essential to that section of the report.

#### Introduction / Purpose

Usually, the introduction is one paragraph that explains the objectives or purpose of the lab. In one sentence, state the hypothesis. Sometimes an introduction may contain background information, briefly summarize how the experiment was performed, state the findings of the experiment, and list the conclusions of the investigation. Even if you don't write a whole introduction, you need to state the purpose of the experiment, or why you did it. This would be where you state your hypothesis.

#### Note on Verb Tense

Introductions often create difficulties for students who struggle with keeping verb tenses straight. These two points should help you navigate the introduction:

- The experiment is already finished. Use the **past tense** when talking about the **experiment**. "*The objective of the experiment was...*"
- The **report**, the **theory** and **permanent equipment** still exist; therefore, these get the **present tense**: "*The purpose of this report is...*"



**HINT: Use this formula to write your hypothesis:**

If \_\_\_\_\_ [IV] is \_\_\_\_\_ [describe how it was changed], then \_\_\_\_\_ [DV] will \_\_\_\_\_ [describe the expected effect].

For example: "*If the antibiotic cleaning agent is placed on a bacterial colony, then growth of the colony will be inhibited.*"

#### **Must Have:**

1. Purpose of the experiment
2. Important background and/or theory

#### **May include:**

1. Description of specialized equipment
2. Justification of experiment's importance

## Methods and materials

The method section is where you describe what you actually did. It includes the procedure that was followed. A typical procedure usually includes:

-  How apparatus and equipment were set up including a diagram.
-  A list of materials used.
-  Steps used to collect the data.
-  Any experimental difficulties encountered and how they were resolved or worked around.



**HINT:** in the procedure section you should use the past tense when you are reporting on something you did.

## Results and analysis

In this section, you present the main data collected during your experiment. Each key measurement needs to be reported. Data are often presented in graphs, figures or tables

## Discussion

The discussion section is where you:

-  Comment on the results you obtained
-  Interpret what the results mean.
-  Explain any results which are unexpected.

Your discussion section should demonstrate how well you understand what happened in the experiment.

You should:

-  Identify and comment on any trends you have observed.
-  Compare the experimental results with any predictions.
-  Identify how any resources of error might impact on the interpretation of your results.
-  Suggest explanations for unexpected results.
-  Suggest how the experiment could have been improved.

## Conclusion

The conclusion section should provide a take-home message summing up what has been learned from the experiment:

-  Briefly restate the purpose of the experiment.
-  Identify the main findings.
-  Note the main limitations that are relevant to the interpretation of the results.
-  Summarize what the experiment has contributed to your understanding of the problem.



**HINT:** note that a conclusion should never introduce any new ideas or findings, only give a concise summary of those which have already been presented in the report.

## References

When in-text citations are incorporated into your lab report (introduction or discussion sections), you must always have the full citations included in a separate reference list. The reference list is a separate section that comes after your conclusion and before any appendices.

## Appendices

An appendix (plural → appendices) contains material that is too detailed to include in the main report, such as tables of raw data or detailed calculations. Each appendix must be:

-  Given a number (or letter) and title.
-  Referred to by number (or letter) at the relevant point in the text.

## Let's practice

Review the components of the science laboratory report. Circle the report section that relates to the statement.

- Precisely identifies the focus of the lab.

**Introduction                      Title                      Abstract**

- Provide an overview of the report content, including findings and conclusions
- Usually the last part of the document to be written.
- May not be required in a short lab report.

**Conclusion                      Results and Analysis                      Abstract**

- Provide appropriate background to the experiment and briefly explain any relevant theories.
- State the problem and/or hypothesis and.
- Concisely stats the objectives of the experiment.

**Discussion                      Abstract                      Introduction**

- Describes equipment, materials and procedures used.
- May include flow charts of procedures, or diagrams of experimental set-up.
- Outlines any processing or calculations performed on the collected data.

**Method                      Introduction                      Results and Analysis**

- Present results of the experiment graphically or using tables, figures may include error bars where applicable.
- Discusses how results were analyzed, including error analysis.

**Results and Analysis                      Method                      Discussion**

- Interprets key results in relation to the aim/research question.
- Summarizes key findings and limitations.
- Makes recommendations to overcome limitations and indicate future directions in research.

**Conclusion                      Results and Analysis                      Discussion**

- Reminds the reader what problem was being investigated.
- Summarizes the findings in relation to the problem/hypothesis.
- Briefly identifies big-picture implications of the findings.

**Results and Analysis                      Abstract                      Conclusion**

- Lists the publication details of all sources cited in the text allowing readers to locate sources quickly and easily.
- Usually follows a specific referencing style.

**References                      Abstract                      Appendices**

- Additional information that is relevant but not necessary. For example, detailed collection of data and/ or calculations.

**Method                      Results and Analysis                      Appendices**

### Complete the following paragraph by using either the active or passive form

Preparing to take the TOEFL can be a painstaking task. First, the student should (register) \_\_\_\_\_ by sending in an application form along with a registration fee. On the application form, the student's name and address (enter) \_\_\_\_\_, along with his native language. The student's preferred test center (indicate) \_\_\_\_\_, too. When the application form and fee (receive) \_\_\_\_\_ by the Educational Testing Service, in New Jersey, the agency (send) \_\_\_\_\_ an admission ticket to the applying student. If this ticket (receive - not) \_\_\_\_\_ five days before the test, the student should (report) \_\_\_\_\_ this fact to the ETS. A recent photograph of the student must (attach) \_\_\_\_\_ to the admission ticket. On the day of the test, this admission ticket must (present) \_\_\_\_\_ at the door of the testing center, or the student will (refuse) \_\_\_\_\_ admission to the test. The student must (bring) \_\_\_\_\_ identification, such as a valid passport. A driver's license will (accept - not) \_\_\_\_\_. The student must also (bring) \_\_\_\_\_ two pencils with him, but no other materials may (use) \_\_\_\_\_.