

Scientific writing

Writing is a very important part of science; it is used to document and communicate ideas, activities and findings to others. Scientific writing can take many forms from a lab notebook to a project report, to a paper in an academic journal.

Characteristics of good scientific writing:

- **clear** - it avoids unnecessary detail;
- **simple** - it uses direct language, avoiding vague or complicated sentences;
- **impartial** - it avoids making assumptions (Everyone knows that ...) and unproven statements (It can never be proved that ...). It presents how and where data were collected and supports its conclusions with evidence;
- **structured logically** - ideas and processes are expressed in a logical order. The text is divided into sections with clear headings;
- **accurate** - it avoids vague and ambiguous language such as about, approximately, almost;
- **objective** - statements and ideas are supported by appropriate evidence that demonstrates how conclusions have been drawn as well as acknowledging the work of others.

Developing good scientific writing:

1. Choosing the words

To make your writing clear, accurate and concise you should consider carefully the words that you use, and the ways in which you use them.

2. Use objective rather than subjective language

objective – The car travelled at 38 km/h (a clear, objective statement of fact).

subjective –The contents of the test tube turned a beautiful blue colour (uses beautiful in a way that is subjective because it cannot be measured or accurately explained to the reader).

Always use language that is specific rather than vague and personal.

3. Choosing a 'voice'

Scientific writers have a tendency to use *passive* rather than *active* expressions. The passive voice is particularly useful when:

a) you wish your writing to be formal and depersonalised:

passive *It was agreed that the experiment should be...*

active *We agreed that the experiment should be...*

b) information about the agent is obvious or unimportant:

passive *Extra solvent was added to the flask*

active *The technician added extra solvent to the flask;*

c) You do not know the identity of the agent:

passive *The water pipe was broken in three places*

active *Something/someone had broken the water pipe in three places*

4. Personal or impersonal?

Scientific writers often try to avoid the use of personal expressions or statements in order to make their writing seem more impartial and formal.

Impersonal The explanation for this phenomenon may be found in...

Personal We/I believe that the explanation for this phenomenon may be found in...

- **Impersonal & passive**

It was decided that the temperature should be raised → gives no information about the identity of the people who made the decision.

- **Personal & active**

We decided that the temperature should be raised → avoids ambiguity and makes the sentence sound more direct, but uses the personal and rather informal we.

- **Impersonal & active**

The research team decided that the temperature should be raised → clear and direct but still formal.

5. Using tenses:

Scientific writing frequently uses the **past tense**, particularly when the main focus of the writing is to describe experiments or observations that took place prior to the time of writing.

However, the past tense may not be appropriate for everything that you write and sometimes you will need to combine different tenses in the same piece of writing.

Example:

The experiment **was carried out** in a sterile environment (**past tense for a statement of what happened**). It **is** particularly important to avoid contamination (**present tense for a statement that is a general 'truth'**). It **will be** necessary to ensure that the same conditions are replicated in future experiments (**future tense for a recommendation for the future**).

6. Sentence length:

Sentences that are too short and poorly connected can be irritating to read. Conversely, sentences that are too long and rambling are difficult to follow and are likely to be confusing. As a general rule there should be no more than 20-25 words in any one sentence.

Example:

If a breakdown occurs it is important that alternative supplies are available and the way that this is done is for the power stations to be linked through the high voltage transmission lines so that all of them contribute to the total supply of energy and an unexpectedly large demand can be handled.

Can be re-written as:

If a breakdown occurs it is important that alternative supplies are available; this is done by linking power stations through the high voltage transmission lines. All of them thus contribute to the total supply of energy and an unexpectedly large demand can be handled.

Exercise:

Write a short scientific report about an experiment you have carried out in the lab (e.g. in analytical chemistry practicals).

Examples from your reports:

- One day in analytical chemistry practicals, we have done an amazing experience...
- For the first time, I felt that I will be a futur pharmacist...
- The experiment was very easy and funny.
- In analytical chemistry practicals, I always live an enjoyable and nice experiment.
- Using the lab material was difficult at the begging but now, it can be easily manipulated...
- I have many difficulty in this experiment but I hope that I will be a good mark.

The examples above are all subjective.

Personal vs. Impersonal:

- I did... I titrate... I weigh
- They asked us to find the teneur

Compare to:

- First, the chemist taked arround 0,628 g of powdered tablets...
- The group C of pharmacy 2nd year students,..
- The pharmacist has to put some of HCl in a beaker (20 ml)...

Passive voice:

- To study a fungus, it recommends to start with the hat, the size must be noted.
- A botanic practical has been done last week.

Rule:

Active → Subject + verb + object

Passive → Object (of the active form) + to be (at the same tense used in the active form) + verb (past participle) + by subject (of the active form)

Exercise: active or passive?

- They often **listen** to music.
- She **is reading** the newspaper now.
- These cars **are produced** in Japan?
- Alan **teaches** geography.
- German **is spoken** in Austria.
- Lots of houses **were destroyed** by the earthquake in 1906.
- Henry Ford **invented** the assembly line.
- The bus driver **was hurt** yesterday.
- You **should open** your workbooks.
- Houses **have been built**.
- The mechanic **has not repaired** the DVD recorder.
- The teacher **is not going to open** the window.

Tenses:

- A botanic practical has been done last week.
- Weigh a quantity of citrique acid..... Put in round flask ...
- I did... I titrate... I weigh

Vocabulary and spelling:

- An indicator is added to the flask of NaOH solution which change her color to pink.
- Incolore → colourless
- Chutte of burette → titration volume, endpoint volume
- Entonnoir → funnel
- détermine, médicament, réactifs (→ reagents, reactants) !!!
- Unkowned concentration! Puted! Determinated !!!
- The metals can't be mixed with water because it will expose ..
- We have taken lot of experiences stil now...
- Fulfill the burette → fill the burette with titrant solution
- We verse → pour
- Next, agit it gently → agitate, shake
- Valeur → value
- Dosage → assay
- Teneur → concentration/ content
- dissou → dissolved
- Melang → mixture
- Principe active → active ingredient
- Week acid → weak acid
- Titrage → titration
- Étalonate a solution
- The robinet of the burette → tap
- Conform → in compliance/ accordance with
- Aspirine, tablette!!!
- Than/ then
- The characters organoleptic
- I'll never forget the practical of botanical next week....
- We made many **coups** to see more details → cuts
- We used so many utensil such as pipettes, fiole, burette and becher..
- until the indicator coloree changed colour.
- The first stape was to weigh... → step
- We wear our blouses → "lab coats"

Laboratory Glassware:

- Flask/ Conical flask/ Volumetric flask/ Round bottom flask
- Beaker
- Burette
- Measuring/ graduated cylinder
- Bulb/ graduated pipette
- Dropper/ Pasteur pipette

Chemistry:

- Hydrogyn chlorur → hydrochloric acid
- Hydroxyd of sodium → sodium hydroxyde
- Phenolphtalein