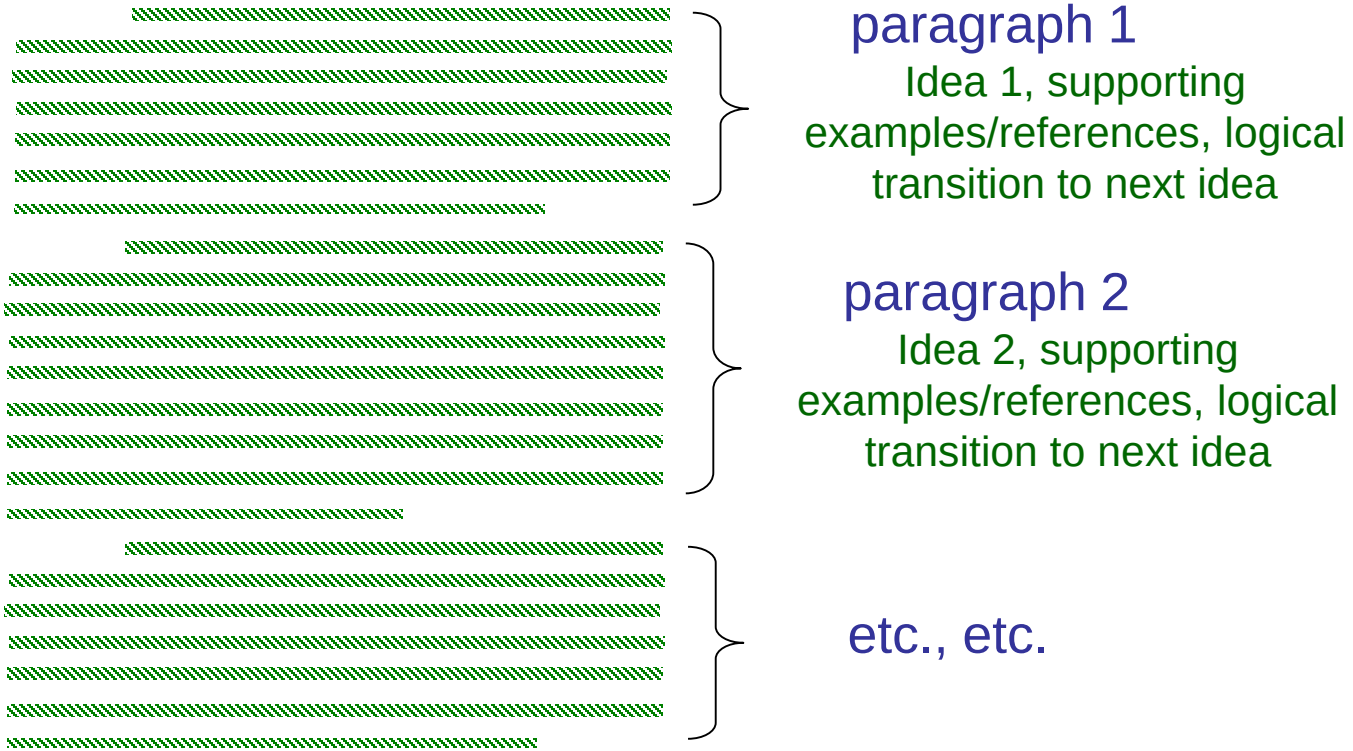
Things to keep in mind so that your scientific writing is logically structured, precise, and concise:

Paragraphs are the “building blocks” of your paper:

(i) Each paragraph should contain roughly one idea + supporting evidence for that idea; (ii) the sentences in the paragraph should be as concise as possible; (iii) the paragraph building blocks should be organized in a logical flow.



Common Questions When Constructing Your Paragraphs

(i) What is the organization of a paragraph?

Celia's foolproof, four-step SEES* method to construct a paragraph:

1. State the topic sentence first
2. Explain it
3. Give an example, expand, or present evidence
4. Summarize it in a way that leads logically to the next topic sentence

*State → Explain → Exemplify → Summarize

Tip: Use the same construction paradigm for paragraphs, subsections, and sections of your paper

Common Questions When Constructing Your Paragraphs

(ii) How much information should be provided in the body of the paragraph to support the topic sentence?

The body of your paragraph is where you provide evidence and support for your “assertion”, i.e., the topic sentence:

(1) References to literature supporting the topic sentence

(2) Figures/data supporting topic sentence

(3) Quotes from experts

Common Questions When Constructing Your Paragraphs

(iii) What kinds of paragraphs and topic sentences can you have?

Write with purpose: what do you want your paragraph to do?

Purpose	*Paragraph Breakdown*
ARGUE A paragraph can be used to argue for or against a point of view. Each paragraph should focus on developing one main point for or against the position.	**Topic Sentence -** introduce the argument and position for or against **Supporting Sentences –** develop the reasons for your position and presents facts and examples to support this; address any counter-arguments **Conclusion –** restate position
Useful transitional words and phrases **For giving reasons:** first, second, third, another, next, last, finally, because, since, for **For counter-argument:** but, however, of course, nevertheless, although, despite **For concluding:** therefore, as a result, in conclusion, thus	
CLASSIFY This paragraph structure can be used to organise information, items, or ideas into categories. The organisation of information will depend on your purpose and subject area.	**Topic Sentence -** Introduce the items being classified and/or the categories for classification **Supporting Sentences –** provide more information about the items, and how their characteristics fit into a particular category **Conclusion –** repeat what classification the item or category belongs to
Useful transitional words and phrases Can be divided, can be classified, can be categorised the first/second/third	
COMPARE or CONTRAST Use this paragraph structure if you need to examine similarities and differences. This paragraph structure is useful for literature reviews and reports.	**Topic Sentence -** introduce the items to be compared or contrasted, noting similarity or difference **Supporting Sentences –** identify, describe, and discuss any similarities or differences **Conclusion –** summarise and interpret the similarities and differences discussed
Useful transitional words and phrases **For comparison:** similar to, similarly, in the same way, like, equally, again, also, too **For contrast:** in contrast, on the other hand, different from, whereas, while, unlike, but, although, however, conversely, yet, unlike	

From: Centre for Teaching and Learning, University of Newcastle

https://courses.physics.illinois.edu/phys595/sp2023/paragraph_guide.pdf

DEFINE

Use this paragraph structure when you need to define a concept, and demonstrate an understanding of how it relates to a particular context or discipline.

Topic Sentence -
provide a simple definition of a concept

Supporting Sentences –
provide more information through description, explanation, and examples; makes links between the concept and how it applies to a particular context or field

Conclusion –
not necessary; can transition to the next paragraph if related to the concept

Useful transitional words and phrases

for example, for instance, an illustration of this, another example, firstly, the first step, secondly, the second step, finally, the final step

DESCRIBE

Use this paragraph structure if you are asked to provide information about something.

Topic Sentence -
introduce the item to be described

Supporting Sentences –
provide specific and detailed information about the item's characteristics and functions

Conclusion –
not necessary; can transition to the next paragraph if related to the item described

Useful transitional words and phrases

In the foreground, in the middle distance, in the background, in the far distance, next to, near, up, down, between, beneath, above, below, on top of, beneath, left/right, centre, front, back, middle, in the interior, on the exterior, on the inside, on the outside, surrounding

EXPLAIN

Use this paragraph structure if you need to explain how something works or the steps in a process.

Topic Sentence -
introduce what will be explained

Supporting Sentences –
explain each of the steps involved in the process, in the order that the steps are to be performed. Includes information about how something happens and why

Conclusion –
provide a brief summary of the process

Useful transitional words and phrases

At first, initially, the first step, while, at the same time, the second/third/next step, after, next, finally, eventually, the final/last step.

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Common Questions When Constructing Your Paragraphs

(iv) How should you organize your building blocks/paragraphs?

(1) Raw results, then processed data, then models (Results section)

(2) "Inverted pyramid" organization (Introduction section)

(3) Chronological organization?

Writing Workshop #1: Paragraph Structure

The high-pressure and temperature phase transition of dioxides is of fundamental interest in solid-state physics, chemistry, and geosciences. In many dioxides, TiO_2 is well known as an important wide-gap oxide semiconductor with various industrial applications such as electrochemical solar cells and photocatalyst due to the characteristic high refractive index [1–9]. Apart from those technological aspects, high-pressure transformations of TiO_2 have attracted special attention as a low-pressure analog of SiO_2, the most abundant component of the Earth's mantle. A number of experimental and theoretical studies have revealed many crystalline polymorphs of TiO_2 at high pressures and high temperatures [10–14]. At ambient conditions, rutile is the most stable phase of TiO_2. Anatase and brookite are also known as natural minerals. All of these phases transform to an α-PbO_2-type, to an orthorhombic-I-type, then finally to a cotunnite-type structure at approximately 50 GPa [11,14]. The cotunnite-type polymorph is identified as the highest-pressure phase, as in many dioxides [15]. Although the analogy of the phase change to the cotunnite structure was applied to TiO_2 [16,17], a very recent *ab initio* study predicted a different phase transition from the pyrite-type structure to an unexpected Fe_2P-type structure (hexagonal, space group *P*62*m*) (Fig. 1) at 690 GPa, bypassing the cotunnite-type phase stability at low temperature [18]. Since no dioxides or difluorides with this crystal structure were reported, physical and chemical properties of this new class of oxide are still unknown. Although the extremely high transition pressure predicted in SiO_2 seems unreachable in the laboratory, TiO_2 shows significantly lower transition pressures. For instance, the α-PbO_2 phase stabilizes at ~10 Gpa in TiO_2, while the same phase at 100 GPa in SiO_2. High-pressure behavior of TiO_2 is therefore a key to understanding the rich polymorphism in the metal dioxide systems, in particular, the post-cotunnite phase relations. However, all the studies performed on TiO_2 were limited below 100 GPa, and no post-cotunnite phase has been identified. In this study, we investigate the applicability of the Fe_2P-type structure to TiO_2 both theoretically and experimentally.