

Technical Writing and Speaking in English

Reviewing previous research: related work and Sustaining Energy

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Part A - Reviewing previous research: related work

Warm-up Exercise

- Open the document in Exercises/4-Related-Work-1.pdf and follow the instructions in **Exercise 3.1**.

Overview

What it contains?

- **Review of literature**
- Collection of **references** and **citations** to **other works**

What are the objectives?

- It starts giving background information needed to understand your study
- It assures the readers that **you** are **familiar** with the **important research that has been done** in your area
- It establishes your study as **one link in a chain of research** that is developing and enlarging knowledge in your field

Building block: citation

- Two types: **information prominent** and **author prominent**

Information Prominent Citation

Information

In most deserts of the world, transitions between topographic elements are abrupt

Reference

(Smith, 1968)

Information

The literature of teaching effectiveness has established few theoretical grounds to guide the selection of meaningful variables

Reference

[1, 2, 8, 9]

- In \LaTeX you can reference by using `\cite{}`. In practice the formatting will follow the \LaTeX template that you are using
- **Information prominent citations** are commonly used to signal the beginning of the related work, with citations referring to research in the **general area** of your study

Author Prominent Citation

Last name of author

Leopold

the \cite{

[25]

Information

listed foods, but gave no quantitative data.

Last name of author

Allen and Reiner

the \cite{

[1]

Information

described graphically the differences between the various vibration scales.

Last name of author

Edney *et al.*

the \cite{

[5]

Information

studied abundance and distribution of soil microarthropods in the Mojave desert in Nevada.

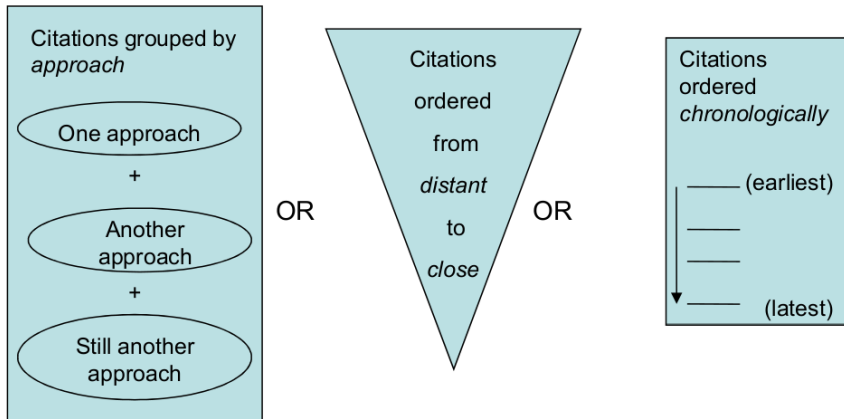
- The “*et. al*”: more than two authors. In the example above, it means “Edney and others”. We normally write “*et. al*” in italic
- As the literature review continues, the citations refer to **studies more closely related to your own**
- In this kind of citation, **the author’s name is given more emphasis**

Going back to exercise 3.1

- Look back at the article about desert ecosystems at the beginning of this class
- For each sentence (5 through 8) in Stage 2, indicate whether the writers used **information prominent** or author **prominent citations**
- Sentence 5
- Sentence 6
- Sentence 7
- Sentence 8

Order of Citations

ORDERING OF CITATIONS



Order of Citations: when to use each strategy?

- **Distant to close:** Can be seen as a “default” strategy
- **Chronological:** If you judge that it would be interesting to describe the history of research in an area in the literature review
- **Different approaches:** If you have a large number of citations to include in your literature review, as in a thesis or dissertation

In practice the choice is “free”, as long as you efficiently achieve the objectives of the related work section (slide 3).

Exercise 3.2

- Open the document in Exercises/4-Related-Work-1.pdf and follow the instructions in **Exercise 3.2**.

Exercise 3.2 Answers

- A: Different approaches, chronological
- B: Different approaches
- C: Distant to Close
- D: Different approaches and chronological

Exercise 3.3

- Open the document in Exercises/4-Related-Work-1.pdf and follow the instructions in **Exercise 3.3**.

Exercise 3.3 Answers

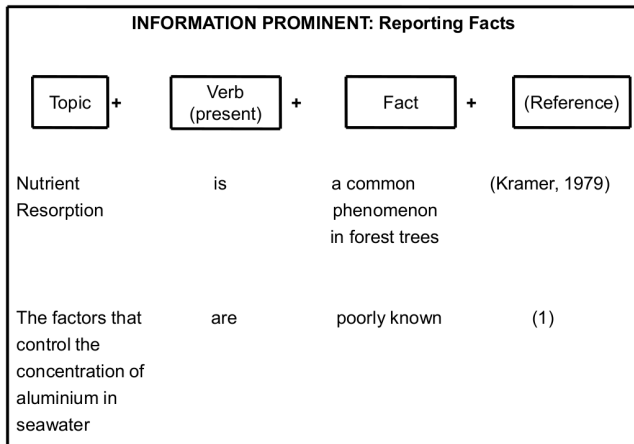
- A good answer: **D,C,E,F,B,G,A**
- Alternative arrangement: **D,G,A,F,B,C,E**
- Do the alternative have the same meaning?

Exercise 3.3 Answers

- A good answer: **D,C,E,F,B,G,A**
- Alternative arrangement: **D,G,A,F,B,C,E**
- Do the alternative have the same meaning?
 - **D,G,A:** Now it refers to similar habits between young adults and teenagers
 - **F,B,C,E:** Ends with young children yet the report concerns undergraduate students

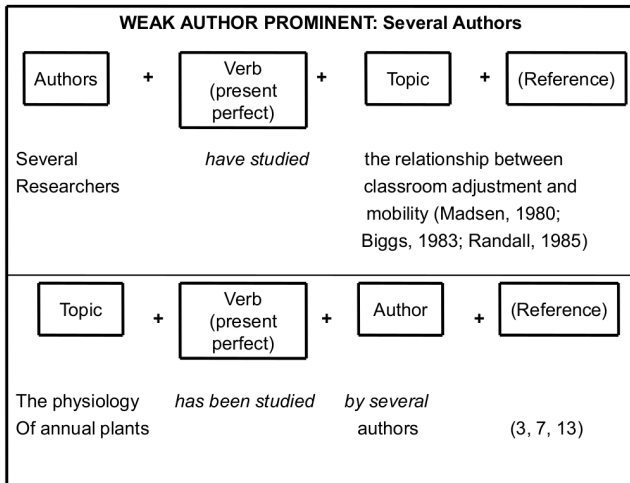
Tense in Information Prominent Citations

- When the focus of your citation is on the information, you should write the citation in the **present tense**
- The present tense is used when the information you are citing is generally accepted as **scientific fact**



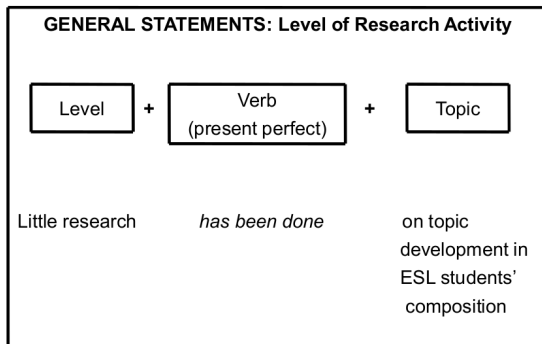
Tense in Weak Author Prominent Citations

- The **present perfect aspect** is used in citations where the focus is on the **research area of several authors**
- This kind of citation is called **weak author prominent**



General Statements about the Research

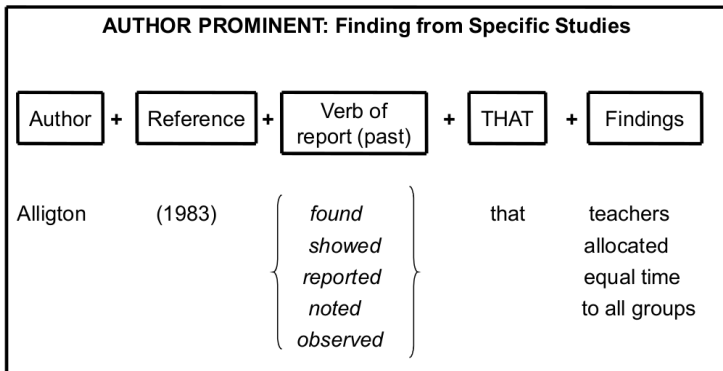
- The **present perfect tense** is also used in general statements that describe the **level of research activity** in an area. These statements are often written without citations



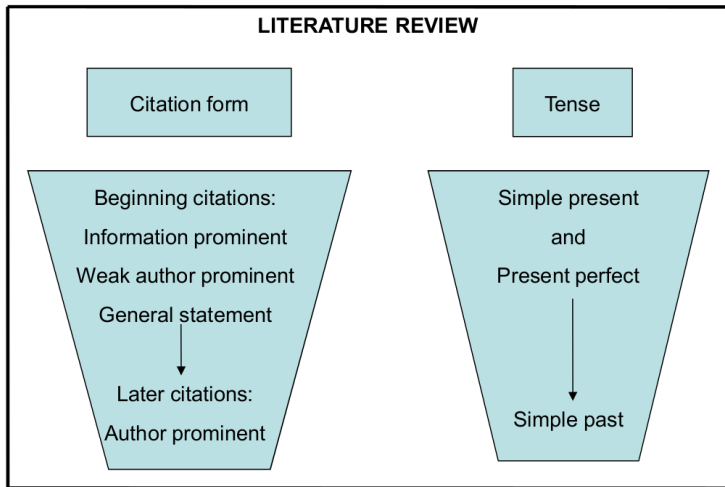
Information prominent citations, weak author prominent citations, and general statements are usually written at the **beginning** of Stage 2, or at **transition points** at the beginning of new sections within Stage 2.

Tense in Author Prominent Citations

- Later in Stage 2, you use author prominent citations to report the **finding of individual studies** related to your own. In these citations the **simple past tense** is used in the verb of report



Progression of verb tenses in the related work (Stage 2)



Exercise 3.4

- Open the document in Exercises/4-Related-Work-1.pdf and follow the instructions in **Exercise 3.4**.

Exercise 3.4 answers

- Sentence 3 – have advanced
- Sentence 4 – have shown
- Sentence 5– showed
- Sentence 6 – found
- Sentence 7 – studied
- Sentence 8 – noted

Part B - Sustaining Energy

Sustaining Energy

- Some engineers and scientists assume that because scientific writing should be precise and clear, it must be dull.
- That assumption is false. In fact, if scientific writing is to inform and to persuade effectively, **the writing has to be lively**.
- Put another way, the longer your document is, the more important that sustaining the writing's energy becomes.

Sustaining Energy: How?

We can sustain energy in our writing by:

- selecting strong verbs and concrete nouns;
- making the writing concise.

Select energetic verbs

Verbs provide energy in sentences. When your verbs are energetic, the writing moves.

What do you think about the following excerpt?

A new process for eliminating nitrogen oxides from diesel exhaust engines is presented. Flow tube experiments to test this process are discussed. The percentage decrease in nitrogen oxide emissions is revealed.

Select energetic verbs

Verbs provide energy in sentences. When your verbs are energetic, the writing moves.

What do you think about the following excerpt?

A new process for eliminating nitrogen oxides from diesel exhaust engines is presented. Flow tube experiments to test this process are discussed. The percentage decrease in nitrogen oxide emissions is revealed.

In this paragraph, no energy emanates from any of the three verbs: is presented, are discussed, and is revealed.

- the verbs occur at the end;
- the verbs are bloated;
- the verbs are passive.

Avoid having verbs occur at the ends of sentences.

In English, you can think of a verb as the engine for the sentence. Put another way, the verb is what injects energy into the sentence.

What do you think about the following excerpt?

In this study, the care given by a hospital and the medical outcomes of patients are compared. The effects of exogenous factors, such as the types of illnesses, are accounted for. Also, the opinions of both patients and physicians on the quality of health care are considered.

Avoid having verbs occur at the ends of sentences.

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In this paragraph, no energy emanates from any of the three verbs: are compared, are accounted for, and are considered. Let's modify them:

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In this paragraph, no energy emanates from any of the three verbs: are compared, are accounted for, and are considered. Let's modify them:

- This study compares the care given by a hospital and the medical outcomes of patients.

Avoid having verbs occur at the ends of sentences.

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In this study, the care given by a hospital and the medical outcomes of patients are compared. The effects of exogenous factors, such as the types of illnesses, are accounted for. Also, the opinions of both patients and physicians on the quality of health care are considered.

In this paragraph, no energy emanates from any of the three verbs: are compared, are accounted for, and are considered. Let's modify them:

- This study compares the care given by a hospital and the medical outcomes of patients.
- Accounted for in the study are the effects of exogenous factors, such as the types of illnesses.

Avoid having verbs occur at the ends of sentences.

In English, you can think of a verb as the engine for the sentence. Put another way, the verb is what injects energy into the sentence.

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- This study compares the care given by a hospital and the medical outcomes of patients.
- Accounted for in the study are the effects of exogenous factors, such as the types of illnesses.
- Also considered are the opinions of both patients and physicians on the quality of health care.

Avoid having verbs occur at the ends of sentences

In English, you can think of a verb as the engine for the sentence. Put another way, the verb is what injects energy into the sentence.

Bad example

In this study, the care given by a hospital and the medical outcomes of patients are compared. The effects of exogenous factors, such as the types of illnesses, are accounted for. Also, the opinions of both patients and physicians on the quality of health care are considered.

Avoid having verbs occur at the ends of sentences

In English, you can think of a verb as the engine for the sentence. Put another way, the verb is what injects energy into the sentence.

Bad example

In this study, the care given by a hospital and the medical outcomes of patients are compared. The effects of exogenous factors, such as the types of illnesses, are accounted for. Also, the opinions of both patients and physicians on the quality of health care are considered.

Good example

This study compares the care given by a hospital and the medical outcomes of patients. Accounted for in the study are the effects of exogenous factors, such as the types of illnesses. Also considered are the opinions of both patients and physicians on the quality of health care.

Tighten your verbs

Use the verbs directly and not turn them in nouns:

Bad example

- made the arrangement for
- made the decision
- made the measurement of
- performed the development of

Tighten your verbs

Use the verbs directly and not turn them in nouns:

Bad example

- made the arrangement for
- made the decision
- made the measurement of
- performed the development of

Good example

- arranged
- decided
- measured
- developed

Tighten your verbs

Use the verbs directly and not weak them with other constructions:

Bad example

- is beginning
- is dependent on
- is following
- is shadowing
- is a result from
- is used to detect

Tighten your verbs

Use the verbs directly and not weak them with other constructions:

Bad example

- is beginning
- is dependent on
- is following
- is shadowing
- is a result from
- is used to detect

Good example

- begins
- depends on
- follows
- shadows
- results from
- detects

Tighten your verbs

What do you think about the next excerpt?

The human immune system is responsible not only for the identification of foreign molecules, but also for actions leading to their immobilization, neutralization, and destruction.

Tighten your verbs

What do you think about the next excerpt?

The human immune system is responsible not only for the identification of foreign molecules, but also for actions leading to their immobilization, neutralization, and destruction.

Good example

The human immune system not only identifies foreign molecules, but also immobilizes, neutralizes, and destroys those molecules.

Tighten your verbs

An undesired use of the verb to be occurs in *there are* (or *there is*) constructions:

Bad example

In sub-Saharan Africa, there are more than 70 percent of the population who do not have access to electricity.

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In sub-Saharan Africa, there are more than 70 percent of the population who do not have access to electricity.

Good example

In sub-Saharan Africa, more than 70 percent of the population do not have access to electricity.

Tighten your verbs

An undesired use of the verb to be occurs in *there are* (or *there is*) constructions:

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In sub-Saharan Africa, there are more than 70 percent of the population who do not have access to electricity.

Good example

In sub-Saharan Africa, more than 70 percent of the population do not have access to electricity.

In this example, the revision consisted of simply removing three words: *there*, *are*, and *who*. In other cases, you will also have to insert a verb such as *exist* or *occur*.

Select the natural voice

Two main features distinguish the action of a verb: tense and voice.

- Tense refers to when the action occurs: past, present, or future;
- Voice, on the other hand, refers to the perspective for the action: who or what performed the action.

Select the natural voice

Two main features distinguish the action of a verb: tense and voice. Voice strongly affects the energy of the writing. Verbs can be either:

- **active voice**: the subject performs the action
- **passive voice**: the subject is acted upon

For example:

- The satellite was struck by orbital debris.
- Orbital debris struck the satellite.

Select the natural voice

There is a myth that all verbs should be passive voice, which is not true.

Select the natural voice

There is a myth that all verbs should be passive voice, which is not true. But, in a document, although some verbs are naturally passive, making all the verbs passive slows the writing and reduces its efficiency:

Bad example

The feedthrough was composed of a sapphire optical fiber, which was pressed against the pyrotechnic that was used to confine the charge. (22 words)

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Good example

The feedthrough contained a sapphire optical fiber, which pressed against the pyrotechnic that contained the charge. (16 words)

Select the natural voice

There is a myth that all verbs should be passive voice, which is not true. But, in a document, although some verbs are naturally passive, making all the verbs passive slows the writing and reduces its efficiency:

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The feedthrough was composed of a sapphire optical fiber, which was pressed against the pyrotechnic that was used to confine the charge. (22 words)

Good example

The feedthrough contained a sapphire optical fiber, which pressed against the pyrotechnic that contained the charge. (16 words)

Select the natural voice

Is all passive voice wrong? Certainly not. Although the active voice is stronger than the passive voice, occasions arise in which the passive voice is more natural:

For example:

On the second day of our wildebeest study, the herd migrated to the river. There, a calf wandered just a few yards from the herd and was attacked by painted dogs.

- the first two verbs (migrated and wandered) are active
- the third verb (was attacked) is passive

Using the passive voice in the third case is appropriate, because the passive voice keeps the focus on the subject of the study (wildebeests).

Select the natural voice

Which form is more natural? Most often, an active verb is more natural.

What do you think about the following excerpt?

A new process for eliminating nitrogen oxides from diesel exhaust engines is presented. Flow tube experiments to test this process are discussed. The percentage decrease in nitrogen oxide emissions is revealed.

Select the natural voice

Which form is more natural? Most often, an active verb is more natural.

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A new process for eliminating nitrogen oxides from diesel exhaust engines is presented. Flow tube experiments to test this process are discussed. The percentage decrease in nitrogen oxide emissions is revealed.

Now, imagine listening to a baseball game in which the radio announcers speak in an unnatural passive voice:

Bad example

The ball is pitched by Gibson. The bat is swung by Clemente. The ball is hit by Clemente. The outfield is covered by Brock. The fence is climbed by Brock.

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Good example

Clemente digs in. Gibson comes set, delivers. Clemente swings. He drives the ball to deep left field. Brock races back, way back. He climbs the wall. That ball is gone.

Select the natural voice

How to move from the passive voice to the active voice? One strategy is **to allow objects to act**.

Select the natural voice

How to move from the passive voice to the active voice? One strategy is **to allow objects to act**. But, be careful.

How does the following sentence can be rewritten?

The voltage was shown on the oscilloscope.

- The oscilloscope **calculated** the voltage .?
- The oscilloscope **displayed** the voltage .?
- The oscilloscope **measured** the voltage .?

Select the natural voice

In general, the active voice occurs in scientific documents as following:

- This paper *presents* ...
- Figure 1 *shows* ...
- The test setup *included* ...
- Experiments *yielded* results ...
- The results *indicate* that ...

Select the natural voice

A second strategy for transforming passive voice to active voice is to use the first person (I or we).

It saves us from examples such as:

- In this paper, the authors assumed that all collisions were elastic ...
- It was determined that ...
- It was decided that ...
- It was attributed to ...

In cases where we make an **assumption** or **decision**, the first person is not only natural but **expected**.

Select the natural voice

Consider an example in which the writers should have used the first person, but did not:

Bad example

In that an effort to identify a specific control circuit responsible for the failure of the gear box was unsuccessful, it was determined appropriate to resurvey the collector field for torque tube damage.

Select the natural voice

Consider an example in which the writers should have used the first person, but did not:

Bad example

In that an effort to identify a specific control circuit responsible for the failure of the gear box was unsuccessful, it was determined appropriate to resurvey the collector field for torque tube damage.

They shirked responsibility both for not finding what caused the gear box failure and for authorizing another survey of the field.

Good example

Because we could not locate the control circuit responsible for the gear box failure, we surveyed the collector field again for damage to the torque tubes.

Select the natural voice

When using the first person, how do you keep the emphasis on the work and not the person(s) doing the work?

- reserve the use of the first person for those occasions in which your role in the work is important: for instance, when you assumed, measured, or decided.
- avoid placing the first person (either I or we) as the beginning word of a sentence because that position receives heavy emphasis.

For example:

To test this process, we performed experiments in flow tubes.

Select the natural voice

Look yet again at the example that began this section:

Bad example

A new process for eliminating nitrogen oxides from diesel exhaust engines is presented. Flow tube experiments to test this process are discussed. The percentage decrease in nitrogen oxide emissions is revealed.

Select the natural voice

Look yet again at the example that began this section:

Bad example

A new process for eliminating nitrogen oxides from diesel exhaust engines is presented. Flow tube experiments to test this process are discussed. The percentage decrease in nitrogen oxide emissions is revealed.

Good example

This paper presents a new process for eliminating nitrogen oxides from diesel exhaust engines. To test this process, we performed experiments in flow tubes. These experiments revealed a 99 percent decrease in nitrogen oxide emissions.

Be concise

Being concise not only sustains the energy but also clarifies the meaning. Some ways to achieve conciseness in scientific writing are:

- eliminate redundancies;
- eliminate writing zeroes;
- reduce phrases to simplest forms.

Eliminate redundancies

Being concise not only sustains the energy but also clarifies the meaning.

- already existing
- alternative choices
- at the present time
- basic fundamentals
- completely eliminate
- continue to remain
- currently being
- currently underway
- empty space
- had done previously
- introduced a new
- mix together
- never before
- none at all
- now at this time
- period of time
- private industry
- separate entities
- start out
- still persists

Eliminate writing zeroes

A second way to become concise is to eliminate writing zeroes, which are empty phrases that provide no information to your readers.

What do you think about the following excerpt?

It is interesting to note that more than 90 incidents of satellite fragmentations have produced more than 36,000 kilograms of space debris.

Eliminate writing zeroes

A second way to become concise is to eliminate writing zeroes, which are empty phrases that provide no information to your readers.

Bad example

It is interesting to note that more than 90 incidents of satellite fragmentations have produced more than 36,000 kilograms of space debris.

Eliminate writing zeroes

Sometimes, writing zeroes raise undesirable questions. Consider the following example:

The requirements to be met for the detection system of plastic explosives include a detection rate of at least 95 percent and a false alarm rate of less than 5 percent.

The writing zero “to be met” is dangerously superfluous. It implies that requirements exist which will not be met.

Eliminate writing zeroes

Some common writing zeroes are

- as a matter of fact
- I might add that
- it is noteworthy that
- it is significant that
- it should be pointed out that
- the course of
- the fact that
- the presence of

Eliminate writing zeroes

Consider the following example:

What do you think?

Vibration measurements made in the course of the rocket's flight test program were complicated by the presence of intense high-frequency excitation of the vehicle shell structure during the re-entry phase of the flight. (33 words)

Eliminate writing zeroes

Consider the following example:

Bad example

Vibration measurements made in the course of the rocket's flight test program were complicated by the presence of intense high-frequency excitation of the vehicle shell structure during the re-entry phase of the flight. (33 words)

Eliminate writing zeroes

Consider the following example:

Bad example

Vibration measurements made in the course of the rocket's flight test program were complicated by the presence of intense high-frequency excitation of the vehicle shell structure during the re-entry phase of the flight. (33 words)

Good example

Vibration measurements made during the missile's flight test were complicated by intense high-frequency excitation of the vehicle shell during re-entry. (20 words)

Exercise

- Open the document in `Exercises/4-Sustaining-Energy.pdf` and follow the instructions.