

Sample Journal 5

Year: 2024-2025

Grade: G10

Semester: 2nd Semester



Question 1: If a friend is suffering from organizing their timeline during Ramadan, suggest three strategies they can follow to help address this issue.

Unequivocally, time management is essential in STEM school, since it is a boarding school, thus most of the time we are in the dorm. Therefore, following a time management strategy is crucial to adapt with Ramadan periods. The strategies that have to be followed are sleeping for three periods, studying after Suhoor, and Pomodoro technique.

First, sleeping for three periods, healthy sleeping is when we sleep about 3 to 4 periods, the period is about 90 minutes (1.5 hours). Waking in half of a period causes insomnia and restlessness. According to Harvard University, the best sleeping strategy during fasting is intermittent sleeping, sleeping after school and waking before Breakfast (from 1:30 pm to 4:30 pm) then studying till 4 am. This guarantees enough sleep and plenty of time to study.

Second, studying after Suhoor, according to several researchers studying during the dawn, is the best time for studying, the brain will be at its best performance in this period.

Third, the Pomodoro technique, the Pomodoro technique is dividing study periods into stages to reduce stress on the students studying. The best Pomodoro technique according to modern studies is studying for 45 minutes and taking a break for 15 minutes or studying for 30 minutes and taking a break for 5 minutes.

Grade: Green

Feedback:

Strengths:

- 1- The response follows a clear essay structure, with an introduction and a body divided into multiple paragraphs.
- 2- There is good spacing, and the content is clear and ordered.
- 3- It answers the question directly, covers all required points, and presents three distinct strategies — each summarized in the introduction.
- 4- It balances clarity and depth, switching between using simple basic English and advanced connectors and vocabulary like: “Unequivocally”, “thus”, “Therefore”.
- 5- Each point is explained in detail and has examples like the best Pomodoro technique (45 minutes then a 15-minute break.)
- 6- It adds credibility to some statements by citing the source like “According to Harvard University” or “according to several researchers”.

Weaknesses:

- 1- Some grammar and phrasing can be improved. For example: “to adapt with” → “to adapt to”, “The strategies that have to be followed are” → “The recommended/best strategies are”, “sleeping for three periods, healthy sleeping is when we sleep about 3 to 4 periods, the period is about 90 minutes (1.5 hours).” → “It’s best to split sleep into three 90-minute cycles.”
- 2- Some points can be explained more precisely. For example, in the first point, “sleep cycles” is a better phrase than “sleep periods” which is a bit general. Also, more context should be added to the second point. For example: talking about how quiet and productive working during dawn is. Or how finishing tasks early in the morning gives motivation for the rest of the day.

General Notes:

A personal example of how these strategies helped the writer would be great and relatable.

Question 2: You have chosen your challenge problem and researched previous trials to solve similar issues. Explain three modifications you made to the selected prior solutions to meet your design requirements.

The team after the step of the research chose Pumped Hydro Storage (PHS) AS THE solution that deals with the problem of “lack of usage of renewable energy” and “climate change”. The prior solution that the team chose was Pumped Hydro Storage in California, Florida and others.

Unquestionably the prior solutions did not fit all the design requirements and the challenge we had, so the team made the subsequent modifications:

1) First, the way of pumping water, most of the prior solutions use a Horizontal axis wind turbine to produce energy that is used afterward to pump the water, this method wastes the energy in an unavailing way.

The team prefers to use Multiplate wind turbines also known as ‘Windmills”, these old inventions that was used since the Middle Ages to pump water from wells, they can pump water to about 60 meters which is suitable for our solution.

2) Second, the Height between the upper and lower reservoirs, the prior solution we selected make the difference in Height between the upper and the lower reservoirs about 80 to 90 meters, but according to recent studies, from the 50 to 70 meters will perform the same function, this will reduce the cost of the project make more economical.

3) Ultimately, the number of turbines, all the prior solutions have only one turbine that rotates to produce electricity, the decide to make two turbines to increase efficiency, more turbines mean more electricity.

In conclusion, using windmills will reduce the energy wasted, the height difference will reduce the cost of the project, and using more than one turbine will increase the productivity of the project. These modifications guarantee the feasibility and efficiency of our project and achieve the design requirements.

Grade: Green

Feedback:

Strengths:

- 1- The response is divided into an essay: introduction, body, and a conclusion.
- 2- It covers all aspects of the question, and presents three specific modifications, explaining the reasoning behind each (even providing a bit of credibility “according to recent studies”).
- 3- It demonstrates strong use of academic vocabulary and additionally, concepts related to the capstone project, especially the challenge problem or solution.

4- It clearly identifies the solution and links the current step to the previous one.

Weaknesses:

- 1- While the modifications themselves are valid and thoughtful, they aren't clearly tied back to how they help meet the design requirements, which was the core of the question.
- 2- Grammar and phrasing issues like: "AS THE solution" → Unnecessary capitalization, "these old inventions that was used" → "these old inventions that were used", "reduce the cost of the project make more economical" → "reduce the cost of the project and make it more economical", "the decide to make" → "they decided to use".

General Notes:

Some statements are inaccurate. For example: the word "unavailing" in "... energy in an unavailing way" is uncommon. An alternative like "unhelpful" or "useless" would be more suitable.

The statement "more turbines mean more electricity", while it's generally true, it's professionally imprecise, as more turbines would mean more costs and maintenance. Both the advantages and disadvantages of the modification should be mentioned.

Lastly, phrases like "according to recent studies" are too vague. Quoting specific organizations or studies is stronger.

Question 3: In (PH.1.09) you have studied the principles behind general properties of fluids, continuity equation, Bernoulli's equation, and others. Explain two different benefits you have got from your study in designing your challenge "Harvest and store clean energy."

The fluid mechanics deals with fluids at static (rest) and at dynamics (motion), our solution (Pumped Hydro Storage) is involved in such sciences.

First, the continuity equation that shows the relations between the velocity and the area of the tube: $A_1 \cdot V_1 = A_2 \cdot V_2$ (where A is the area and V is the velocity).

The team benefits from this equation by reducing the area of the tube, this according to the continuity equation will increase the velocity thus the energy produced will increase.

Second Bernoulli's statements and equation, Bernoulli's statements state that "if the velocity at any point in the fluid increase, the pressure will decrease and vice versa" and Bernoulli's equation: $P + \frac{1}{2}\rho v^2 + \rho gh = \text{constant}$ (where P is the pressure – ρ is the density – v is the velocity – g is the acceleration due to gravity – h is the height)

This law is essentially in dealing with fluid, the mechanism of the turbine is depend on increasing the velocity on the one side of the blade, thus the pressure will decrease, hence the plate will move to produce electricity (the turbine moves with the difference in the pressure).

Ultimately, the viscous flow, we study that if the fluid was more viscous (coefficient of viscosity) the volume flow rate will decrease yield to less energy production.

$Q = \frac{\pi r^4 \Delta P}{8 \eta L}$ (where Q is the volume flow rate - r is the radius of the tube - ΔP is the difference between the pressure - η is the viscosity coefficient – L is the length of the tube)

Grade: Green

Feedback:

Strengths:

- 1- The response is divided into an essay: an intro and a body. The body is divided into multiple paragraphs, each one about a particular equation.
- 2- Each point is explained using clear and easy language.
- 3- It introduces not just one, but three written equations, explains them in a simple way and uses scientific terms when necessary.

Weaknesses:

- 1- The question asks about two different benefits from studying the principles of this learning outcome. While the response includes relevant benefits, it may seem more like a general explanation of the equations and their use rather than emphasizing two specific learning benefits.
- 2- The response addresses three main points, even though the question asks for two. It would be better to remove the third point and instead summarize the first two in a brief conclusion.
- 3- Phrasing and grammar improvements: "Bernoulli's statements state that" → "Bernoulli's principles that", "vice versa" → "vice versa", "...= constat (where P .." → "...= constant (where P", " of the turbine is depend on increasing" → "of the turbine depends on increasing".

General Notes:

Punctuation is generally great, but there's room for improvement.