

Personal Project Report

How can scientific material be communicated through fiction novels to educate 10–11-year-olds?

Criterion A: Planning

Personal Interest

Throughout my academics in the MYP, I have battled with my passion for the sciences, mainly in the classes which I often associated my learning of the subjects in general, thereby losing self-motivation and subsequently falling behind on the courses. However, my passion for learning continues science was recovered last summer when I expressed my creativity and learning principles by studying on my own. While studying, I adopted a passion I never truly had throughout my MYP course after watching many videos and documentaries on the subjects. So, when I had the opportunity to educate others who may lack extensive knowledge of Physics and Chemistry which are not taught in the PYP, I was eager to take the initiative of sparking the same interest in the sciences that I grew to adopt this past year. This led me to think that fiction novels could potentially be used to communicate the sciences in an accessible manner that engages audiences such as myself.

I originally drew inspiration for my product idea from a ted talk by Dominic Williams, I found that I could relate a lot to his belief that our passion in a topic depends on the way the knowledge is communicated which made me wonder if we could use fiction to teach science for more imaginative interpretations.



**Fig. 1. Dominic Williams at TedTalks:
“Quantum Physics for 7 Year Olds.”**

[Quantum Physics for 7 Year Olds | Dominic Walliman | TEDxEastVan](#)

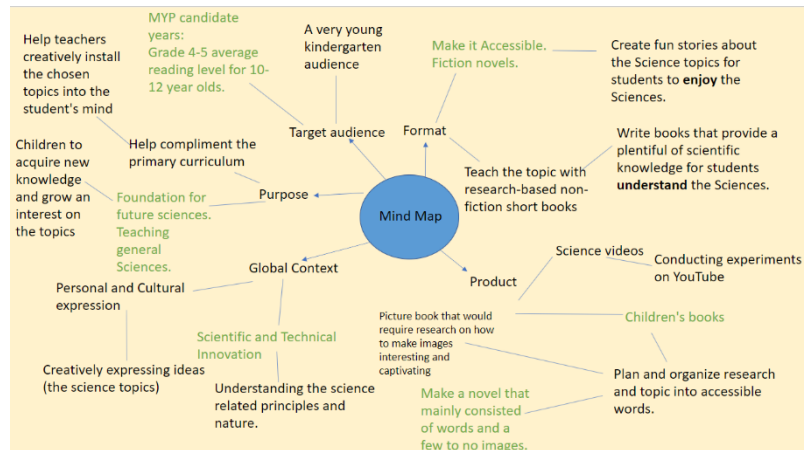


Fig. 2. Mind map showing early brainstorm in September 2021, of potential inclusions and aspects of my product.

Goal

Originally, my goal was to write two short science novels that would appeal to the general public. However, upon revising my goal for submission, I decided to incorporate the SMART goal template as requested by my supervisor as shown in figure 3 below. In order to follow the template and consequently elaborate on my intentions, I brainstormed potential material for my product by curating a mind map as shown in figure 2. I then chose the appropriate strands for my project by considering their feasibility and relation to my personal interests as well as their overall consideration of the design specifications. For example, when given the option of writing novels for kindergarteners or MYP candidate years (11–12-year-olds), I chose the latter from my personal belief that teaching science material is a lot more exigent for the age group as stated earlier. This would challenge my research process as I would need to develop a product specifically for my audience from direct research. For due to the audience's more relatively advanced level of education, it was imperative that I recorded the appropriate science content for the target audience while researching methods of writing fiction and scientific literature, encouraging me to apply social skills in seeking primary information from multiple social groups: teachers, experts, and students to name a few. The research points above were formulated into a concise topic question: "How can scientific knowledge be made accessible to children (ages 10-12) through fiction literature?"

Specific	Measurable	Achievable	Relevant	Time-bound
With my product, I plan to focus on a specific demographic of children ages 10-12. This will allow me to use specific data to achieve directed results.	My product is approved by the target audience and implements effective techniques from my research. My success criteria will also ensure the expected level of work for completion. Necessary? For example, I plan to dedicate more time to my process journal and research than my final product as those are the prominent parts of the project.	To ensure that my goal is achievable, I will write short books for children which means the requirements are a lot more achievable for novices. By doing so, the product is neither large in quantity nor advanced in quality. My prior literary skills and experience also allow me to develop the product independently.	My product will be justified with information on its exigency for the target audience. The personal significance of the product stems from the fact that my product would have benefited me in my previous learning experiences as a student.	I aim to complete my planning and research early on over available time periods like the mid-term holidays. Afterwards, I would like to start my primary research and to begin making the product over the second half of the term. Lastly, I will work on my report and presentation booth next term. It should be noted that the process journal will be worked on throughout all these timeframes so that the entire process is recorded.

Fig. 3. Table of SMART goal template completion.

Global Context

Due to the scientific nature of my stories, I categorized my product under “Scientific and Technical Innovation” as a global context based on my personal intentions of communicating the scientific content of physics and chemistry uniquely through fiction. When choosing my goal, I reflected on my personal life and searched for areas of improvement that I could explore further. I then thought of having a scientific intent behind my project which led me to explore technology such as electric cars and eco-friendly architecture before finally pursuing my present goal of educating science to students.

Research

I intend to gather primary accounts from teachers and students in my school so that I could relate my findings closely to my experiences and the local community. I plan to gather these necessary pieces of information through surveys which depict how students feel about subjects and certain methods used to teach them as well as an interview with teachers to discuss the struggles of providing both engaging and informative lessons. The goal behind seeking primary sources in the form of students and teachers within my own school is so that the success criteria better represent the expectations and necessities of my own community who will be key evaluators of my product in the end.

Moreover, throughout the project, books directed at aspiring writers were intended to be read in order to gather validated advice and adopt in-depth information not easily accessible via websites. I will also use secondary sources to reach experts and statistics on the matter to further develop my understanding, these sources will need to be verified against the CRAAP test for reliability. Furthermore, my supervisor can help guide me in research and product-development because of her experience in teaching.

Success Criteria

Considering that my action plan relies on me to correctly complete my tasks with substantial quality, I tenaciously ensured qualitative consistency by creating success criteria to judge my project's outcomes against. I did this by implementing my conducted research into each strand, allowing me to judge the effectiveness of my product against the appropriate rigor and justified inclusions discussed in my research. The design specifications were an effective method for me to measure the success of my product as I could relate the quality of my work to my considerations of the various components of my goal.

Learning Goal	Learning Experience	Success Criteria	Which ATL skill does it develop/enhance?	Grade Criteria
Aesthetics.	Creating interesting novels with effective features that entice audiences into reading the novel.	A: <ul style="list-style-type: none"> I use colors that are proven to be interesting for 10–11-year-olds for the background of the novels cover page. The book is printed with a hard cover for a sense of formality. Pages are printed in A5 page format. The book will be correctly assembled by a book publications shop. The books are written in an effective font found through research. Includes a blurb at the back which describes the events of the novel (50 words). The books consist of 20 chapters each. 	Creative thinking, language (communication) and information literacy.	Completion: November 25 th : D
		B: <ul style="list-style-type: none"> I have collected some primary information. The book is printed with a laminated mildly rigid cover. Pages remain in A4 page format. The book is adhesively assembled using strong glue. The books consist of 15 chapters each. 		December 15 th : D
		C: <ul style="list-style-type: none"> I am at an early stage of completion. The book is printed with a laminated flimsy cover material. 		December 25 th : B January 15 th : A

		<ul style="list-style-type: none"> • Pages remain as digital A4 copies. • The pages are stapled together. • The books consist of 10 chapters each. 		
		D: <ul style="list-style-type: none"> • I have yet to make progress towards the criterion above. • The book is printed with a non-laminated A5 paper as a cover page. • The book is weakly assembled (cheap glue; tape). • The books are written in one font (Arial). • The books consist of 5 chapters each. 		

Fig. 4. Table of success criteria for product with design specifications.

The criteria in figure 4 are also shown to include multiple assessment dates to enable me to score my progress at different phases of the project as shown in the image above, this allowed me to compare my progress within each strand to the criteria, thereby helping me work towards a well-rounded quality of work rather than adopting a narrow approach towards my product. In the criteria, the research done through primary and secondary sources were used to fill in the design specifications: aesthetics, audience, function, cost and resources. For example, aesthetical preferences in font and page size along with color schemes were determined from a survey question sent out to my school's PYP department. Furthermore, after speaking with a librarian and the PYP teachers in interviews, it became quickly evident what kind of book I wanted to make, specifically two short comprehensible novels with easy-to-read font and coloring.

Action Plan

In order to effectively organize my work, I used a progress manager as a table which recorded the assignments with their respective criterion and any key dates of completion. I found that the manager helped me remain motivated and aware of the work that was yet to be completed in comparison to my previous progress by constantly engaging and checking my action plan. The timeline attached to the table created a reference source for when certain tasks are expected to be completed in specific relation to my project; thus, eliciting self-management throughout my project.

Action Plan

Task	Task Name	Assignment	Start Date	Final Date	Duration (Days)	Working Days	Expected start date	Expected end-date
1	Brainstorming.	1.- Create a learning- and product goal that has one global context focus.	15/06/2021	12/09/2021	8	4	15/06/2021	12/09/2021
		2.- Organize the first meeting with the supervisor and discuss/share the goals and plans for the entire project.	21/09/2021	21/09/2021	1	1	21/09/2021	21/09/2021
		3.- Take notes in the process journal on the feedback provided in the meeting as well as any information on the next steps of the project.	21/09/2021	21/09/2021	1	1	21/09/2021	21/09/2021
		4.- Brainstorm the feedback given and finalize ideas to move forward with throughout the project.	21/09/2021	02/10/2021	12	3	21/09/2021	29/09/2021
		5.- Write a SMART goal that includes all the imperative ideas and requirements set for the project while explaining the personal significance of the SMART goal.	17/10/2021	18/10/2021	2	2	21/09/2021	28/09/2021
2	Planning.	1.- Using a table format, create an action plan that includes the preliminarily planned tasks to be completed throughout the project.	16/10/2021	17/10/2021	2	2	28/09/2021	1/10/2021
		2.- Write success criteria that detail the expected quality of the tasks found in the action plan.	02/10/2021	19/10/2021	17	4	28/09/2021	1/10/2021

Fig. 5. Action Plan highlighting key sections of planning phase.

My action plan was designed to be flexible and appropriate to my schedule, for instance, considering that I had exams in December, I set goals for myself to achieve a few weeks earlier, contingent that the tasks were appropriately completely. Furthermore, the action plan was broken into sections of the project to simplify the working process: brainstorming, planning, journal, research, product making, finalizing, evaluating and reflecting. This way I was able to manage which parts of the project I was working towards and provide deadlines for each working phase.

Criterion B: Applying Skills

Awareness skill in achieving the Learning Goal (Thinking)

Awareness skills are thinking skills which correlate to the mindfulness and realization of other perspectives and the target audience. Personally, when working towards learning to making science writing accessible for PYP students, I chose to gather direct information from the target audience in my local community through various mediums. For example, in order to gather the preferences of the grade 4 and 5 students on the aesthetic and type of book, I created a survey that was sent out to both grade levels for responses. The image above shows the survey being comprised of questions based on my design specifications and success criteria. The survey is a great method of research for my product as I had already planned to provide the finished books to my school's PYP. Therefore, it was important that I knew how to write science books for them, especially which is exactly what a survey allowed me to do. The responses were surprisingly varied but were found to have noticeable themes for me to highlight in my work. I used the responses to make critical thinking decisions on the aesthetic and form of the books. In retrospect, the agglomeration of responses provided by the target audience may not have been my only research method but

preceded much of my working process as a catalyst for my open-minded learning which I would apply to my product making.

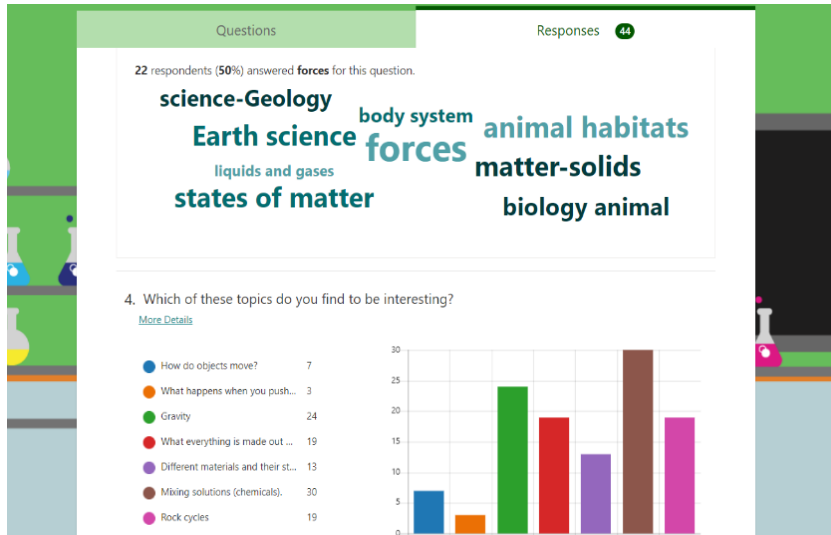


Fig. 6. Survey on science-fiction reading send to Grade 4s and 5s.

Information & Media Literacy Skills

To ensure that the information collected from other sources is reliable, a CRAAP test was rigorously implemented into my search process. As provided by the name, the CRAAP checklist enabled me to verify the currency, relevance, authority, accuracy and purpose of the information recorded. This prompted an effective evaluation of my research which I used as validation of the advice provided by relevant authors on writing books. Such advice would center around the story structure, form, and aesthetics of my books which I would focus on depending on the reliability of the source of information against the CRAAP test. When studying, I came across a former science writer and communicator, Elizabeth Preston. Elizabeth's website based her tips for making science comprehensible on her previous experiences as a writer (Preston). And, since her source graded well on the CRAAP test, I made sure to thoroughly implement her advice into my product. As shown in the image above, I implemented the test by creating a table, in which I would list the purpose, origin and context of the source before giving it a source on each of the CRAAP strands. As a whole, my media and information literacy skills have been built upon as my ability to thoroughly grade the reliability of a source is imperative in all my subjects. It should also be mentioned that the search for reliable resources is what led me to reading science communication starter books such as "Creative Writing" by Adele Ramet. Hence, I am now able to apply a similar template in my research projects with a stricter basis for validating uncovered information. Overall, the CRAAP test allowed us to verify information and correctly identify valid advice for training to be an author for a certain target audience.

Author	Title	Date Published	Link	Format	Author's Expertise
John Mathew Fox	How to write a children's book in 12 steps (From an Editor)	Prior to 22/2/2019	https://thejohnfox.com/2019/02/how-to-write-a-childrens-book/	Website page	Book editor

Important Information

- According to a professional book editor for multiple age groups including ages 10-11, they recommend thinking about the following questionnaire for entertaining the audience:
 - What is the desire of the main character?
 - What is the main character's best/worst desire?
 - Is the main character an extrovert or an introvert?
 - How is the main character's speech unique?
 - Is the main character doubtful or confident?
 - Does the character have pets?
 - What makes the character happy?
 - Are there any secrets?
 - What would be out-of-character for them?
 - What does the character like that everyone else doesn't?
- It is recommended by Mathew Fox-a children's book author-to write 10k-30k words in a normal book as it is the most common word range for that age group.
- Mathew Fox also recommends starting the story early on page 1-2 to engage the audience quickly, this was from his experience with unpublished books that could not captivate the audience rapidly enough.

Fig. 7. Research document with records of information.

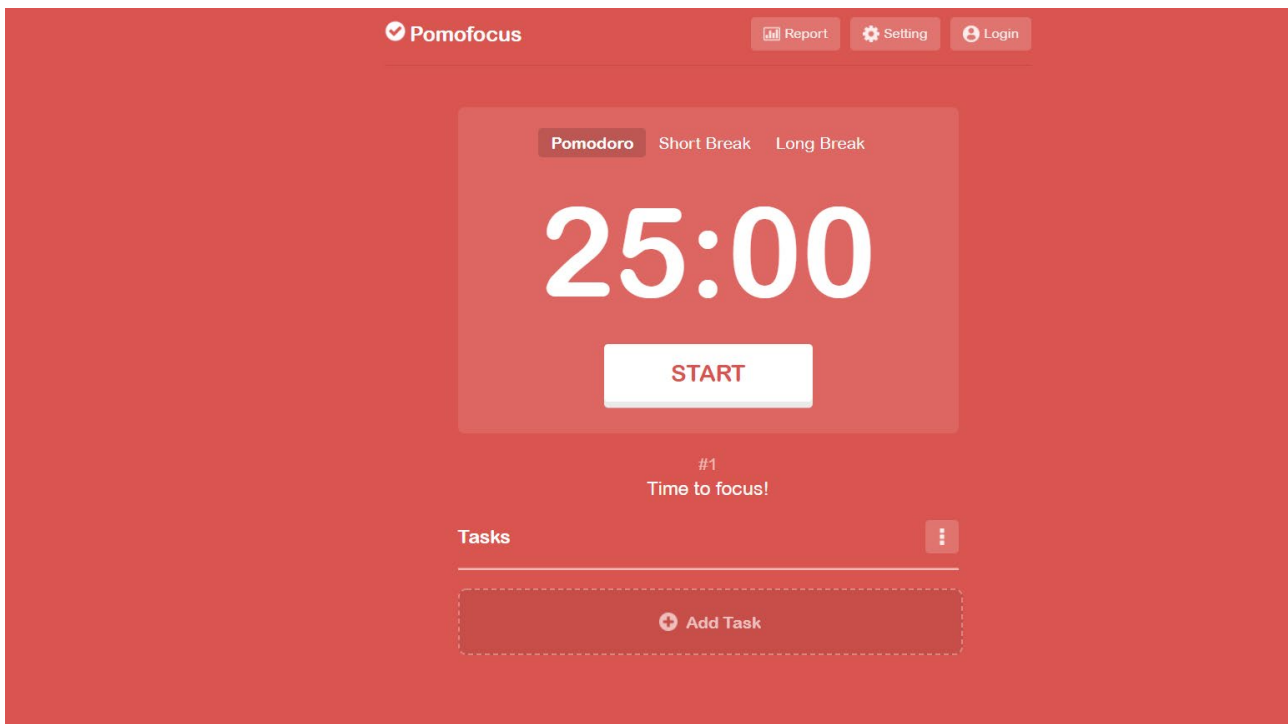


Fig. 8. Pomofocus website used for retaining concentration. <https://pomofocus.io/>

Affective Organizational Skill in completing the Product

During the project, I found that as the year progressed, my workload exponentially increased. This stress would force me to cram parts of my project in small pockets of time which had a noticeable effect on the quality of my work while the success criteria was being met slowly. To solve this issue, I followed a range of different techniques in order to effectively organize my book writing process. Firstly, I created a plan for each of my two books. The plans consisted of story outlines and character behavioral descriptions as suggested by my local librarian and “Creative Writing” by Adele Ramet (Ramet). The plans were written on a word document which would make them easily accessible as shown in the image to the right. Furthermore, I followed concentration techniques when making progress in writing my books, namely the pomodoro technique which works as an arrangement of time periods as breaks or working periods. Personally, I applied the skill through a website called (pomofocus), in which a 25-minute working timer would be set, as shown in the image above, followed by a 5-minute break repeating consecutively. I found the technique useful as it allowed me to designate enough of my attention span while retaining concentration which became progressively more imperative as I approached the submission date. The combination of these organizational methods freed me from remaining passionate for my work without the need to rush any parts of my project. Prior to the beginning of the project, I mostly relied on myself to make productive use of my time which while did usually completion of my work, enthusiasm and commitment was noticeably limited. Hence, the application of my organizational skills in the project was important for me to personally connect with my work and provide the best quality possible for my target audience.

Book #1: 11/22/2021

- Atom (thief) steals electrons from other
- Mr. Chloride
- Quantum Realm
- Theme: Do not be greedy
- Scientific theme: Understanding the chemical behaviors of atoms.
- Beginning: Mr. Chloride is doing his practice of stealing electrons
- Mid: Mr. Chloride

Mr. Chloride info:

Purpose: Wants to have an ionic bond.

Characteristics: Mean, rude, impatient, misunderstanding, greedy, self-centered and delusional.

General Characterization: Teaches to not be greedy and to care for what you have (Fluorine).

Physical features: Small, short but has many electrons (rich)

Strengths: Cool and popular

Flaws: Easy to convince and entice. Lack of awareness.

Growth: Grows to care a lot more about his son Fluorine and spends time with him at the end after being humbled by the experience at the metal junkyard, in which he helps the metals build businesses and find alloys.

Connection to others: Doesn't care about others unless they are period 1 metals (Alkali metals).

Flouride's info:

Purpose: Wants to have a true father figure.

Characteristics: Kind, caring, sad, but forgiving.

General Characterization: Is put in harm's way by a gang of noble gases.

Physical features: very small but rich.

Strengths: usually with friends.

Flaws: Weak; very reactive.

Growth: Stays consistent.

Connection to others: Is picked on for being small and rich.

The Metals info:

Purpose: Want to have an ionic bond as well.

Characteristics: sad and exhausted, yet strong as a team.

General Characterization: Forgotten.

Physical features: Large bland compounds of metals.

Strengths: Large

Flaws: brittle without alloys

Growth: Grow to work together more.

Connection to others: not cared for.

Fig. 9. Planning document for book #1 including characters, themes and general storylines.

Active listening and Interaction Skills (Communication)

Lastly, regarding the finalization of the books, I applied my communication skills to employ the help of other facilities and resources. Initially, I booked for three interviews with teachers and my local librarian to gather feedback on the pragmatics of my product. During these interviews, discussion points were posed such that any potential hindrances and resources are informed about prior to beginning the book making progress. The image shown below is of a transcript of an interview done with a librarian. The discussion delved into what my books may potentially resemble in relation to their form, function, and aesthetic. The discussion was ongoing, and I found myself beginning to communicate and pose questions outside of the written script – this confidence later carried out in conversations with book publishers to print my product. Furthermore, the interview allowed me to spawn multiple ideas such as creating a digital copy of the books for accessibility or writing a take on the ‘Choose Your Own Adventure’ genre. I can then say that the interviews allowed me to grow and apply my communication skills by enabling an informative feedback loop between myself and professionals.

Interview: Librarian/Teacher.

Question: What books do you find children (Grades 4-5) reading?

Librarian: They tend to like a mix of graphic novels and chapter books like ‘Diary of the Wimpy Kid’.

Question: Why?

Librarian: The students tend to read by imitation. There’s the fact that ‘Wimpy Kid’ was made into a movie. There’s been a lot of marketing for all of these books. Usually, they go for the series.

Question: What do they lean towards?

Librarian: They like to read series.

Question: Which genre?

Librarian: They love the ‘Choose Your Own Adventure’ books. They like humor a lot, so it has to be funny. It has to have a little bit of technology in it, so like use of cellphones, etc.

Question: Non-fiction?

Librarian: Non-fiction, in a way, goes out a lot more in a science sense. A lot of students don’t take it for their subjects but also for their own interests.

Question: Which science topic do students read?

Librarian: They love reading about inventions. Things on physics and chemistry not so much.

Question: How should I approach writing my book?

Librarian: You can go either way (continuous narrative or short stories); they are grade 4 or 5, so they can technically read a novel.

Fig. 10. Interview transcript with school librarian.

Criterion C: Evaluating

Impact of the Project

When approaching my learning goal, I learnt that a highly effective strategy to encapsulate the creative mindset of a writer was to actively engage in the work of other authors. This realization led me to expand my book catalogue dramatically. Not only had the catalogue grown from one or two books but also diversified it. For example, I began to read sci-fi novels for inspiration regarding the development a

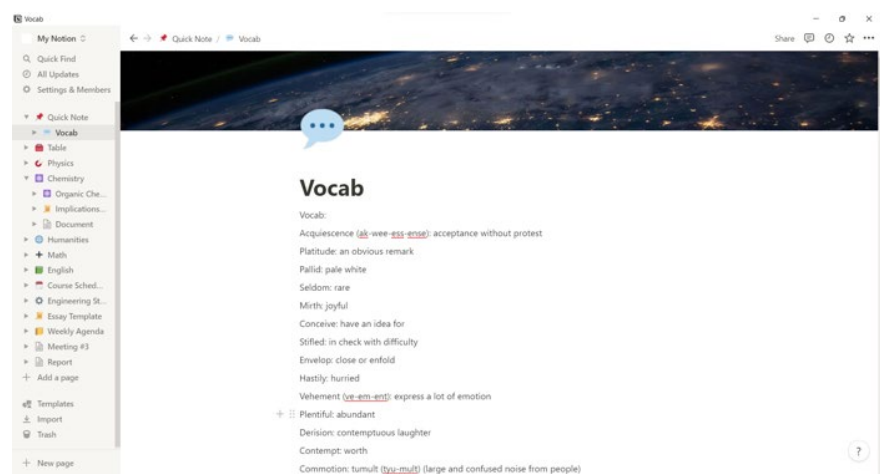


Fig. 11. Vocabulary sheet on Notion app.

narrative surrounding science, specifically “The Hitchhiker’s Guide to the Galaxy” by Douglas Adams as shown in the image below. On the other hand, I chose to compliment my fiction reading with non-fiction literature such as “Six Easy Pieces” by Richard Feynman which enabled me to understand how science is introduced and expanded upon. I would later apply my understanding of both types of literature into my product. However, the benefits of my new reading habits continued beyond my personal project and into my everyday personal and school life. Specifically, my understanding of science had grown similarly to my learning in the summer, this had broadened my thinking skills and consequently enhanced my confidence and participation in class. Moreover, my literary skills had naturally been developed with a wider range of vocabulary which I would record and apply in all my subjects as shown in the image to the right. In addition, I have gained a personal passion for reading, contrary to the fact that I have never enjoyed reading novels in my spare time.



Fig. 12. Image of books read during project: “Creative Writing” – Adele Ramet, “The Hitchhiker’s Guide to the Galaxy” – Douglas Adams and “Six Easy Pieces” – Richard Feynman.

In the future, I would like to continue reading and expanding my knowledge of literature. This will be helpful in the future during my 'English Language and Literature' class in which I am constantly applying my literary skills. This growth has also seen an increase in enjoyment and dedication to the course as stated previously.

Aesthetics & Function (strengths, weaknesses and reasoning)

In comparison to my success criteria, my product manages to meet the basic expectations in regards to the overall formatting and quality of work. Figure 13 shows that when evaluating the product with the target audience, it was found that the A5 page size and large text fonts made reading the text easier to read which also achieves my primary goal of making the information as accessible as possible for the audience.

Chapter 1

Mr. Chloride had been grumpy for the entirety of the previous weeks – his wife, Ms. Lithium insisted that he'd make it up for her today. He exits his house and begins this 35-page monologue.

A

toms. Atoms. Atoms. How I wish I could join an acidic mixture or join my friends at the glucose assembly over at the “cell” territory. Anywhere but this wretched, annoying,

Fig. 13. Document of books in completion.

Audience & Function

In my success criteria, the level of reading difficult was to be decided based on the noted reading levels of the classes in the survey, online information on writing comprehensibly and my own experiences in the program. Unlike the aesthetics portion of the books, the effectiveness of the books for readers needed to be determined by the target audience themselves. To receive this feedback, two meetings were set-up with grade 4 and 5 students as shown in figure 14. The students noted that they were personally in the more advanced reading group in their classes and therefore, reading the novels were notably easy. However, the effectiveness of the books with a weaker group was never realized; thus, the extent to which the success criteria was met for the general audience is unknown.



Fig. 14. Interviewing Grade 5 students.

Resources & overall product

Finally, the printed copies of the books in figure 15 were finalized at a local book publisher in the highest possible quality listed in my success criteria. Furthermore, my success criteria also took into consideration accessibility with the inclusion of online copies in a website made using wix editor as shown in figure 16 below. However, the website is flawed in the fact that the success criteria never considered the promotion of the websites through social media or poster rather than simply word-of-mouth. However, despite these disadvantages, the link was sent to the PYP department along with six printed copies of the books for students to read and take home.

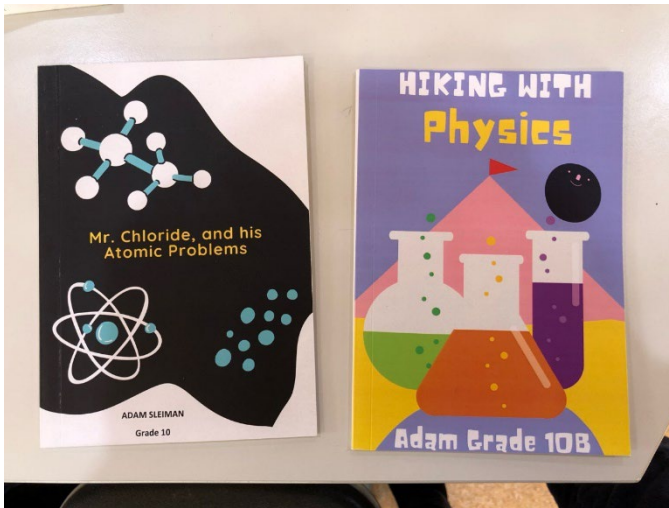


Fig. 15. Both written books printed.

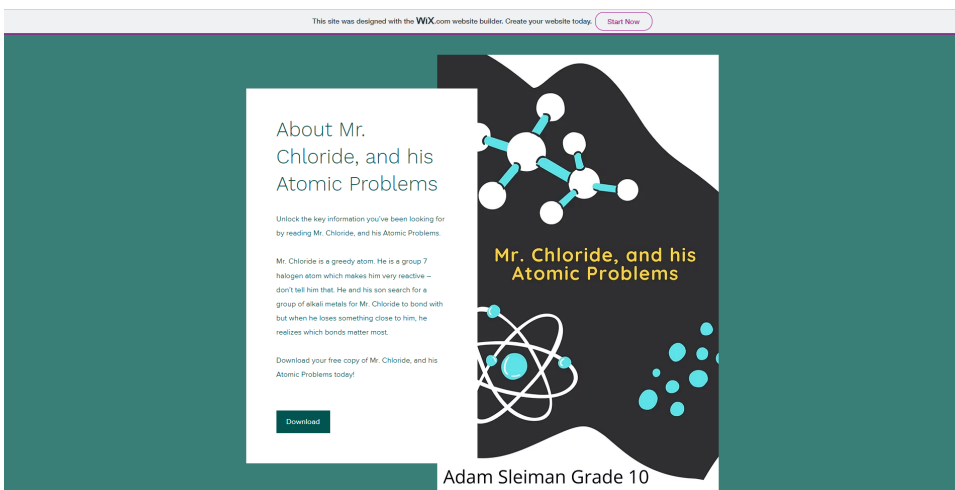


Fig. 16. Website of online book copies.

Improvements

Though the final product was met with very positive feedback, when sitting down with the target audience, constructive criticism and weaknesses in my product design were found. Specifically, it was noted that though my books were intentionally written for PYP reading levels, it was impossible for the books to meet the reading level requirements of students in the class with one of the students saying, “I would not recommend them to non-self-readers.” Therefore, the only plausible solution would be to write for multiple skill groups or dedicate one of the two books made for beginners or advanced readers. Lastly, due to the nature of my product, it would also make sense to publish the books to students outside of my community. However, by expanding my target audience, I need to adapt to the preferences of different readers and vocabulary levels. Therefore, I could have collected primary information from experts and readers outside of my school in order to make a product that is universally accessible by the youth.