

OxfordAQA International

**International Extended Project
Qualification (9695)**

Example response 2

For teaching from 2023 onwards
For assessment from 2024 onwards

Contents

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Introduction

This guide includes a student's project that has been assessed by a senior examiner using the International Extended Project Qualification (9695) criteria. You can see the EPQ Assessment Objectives used to score the project below, including the weightings in % and a raw score (in brackets) per Assessment Objective.

Please see page 33 for the detailed breakdown of how this project was graded for each Assessment Objective for the International EPQ (9695) qualification, including a final mark given out of 60 and the senior examiner's commentary.

Please note this project was originally assessed using different Assessment Objectives and weightings, hence why some annotations and comments reflect this.

Assessment Objectives

Please note this project was originally assessed using different Assessment Objectives and weightings, hence why some annotations and comments reflect this.

- **AO1: Selection of topic**
Identify and select an area of interest, devise aims and objectives and establish a working title using a selection of appropriate sources.
Weighting = 10% (6)
- **AO2 Planning, monitoring and developing**
Produce a project plan which incorporates a time schedule and monitor progress against objectives.
Weighting = 20% (12)
- **AO3: Demonstration of research skills**
Research, select, organise and scrutinise a range of information and resources, justifying the selection of any secondary and primary sources used.
Weighting = 20% (12)
- **AO4: Analysis and application of research**
Implement the project plan, analyse the findings of the research and arrange these findings into a Project product with references and bibliography. Include a conclusion and communicate outcomes in both a report and a presentation.
Weighting = 40% (24)
- **AO5: Evaluation of product, process and self**
Evaluate the strengths and weaknesses of the project process (including review of own learning arising from it) and product.
Weighting = 10% (6)

Example response 2

Title

Electric Vehicles: a fad or the future?

Response 2

Please turn the page to see the student's project.

Moderator Standardisation

Summer 2023

L3 Extended Project Qualification

Project 2

Please note this project was originally assessed using different Assessment Objectives and weightings, hence why some annotations and comments reflect this.

Please see page 33 for the marks and commentary awarded for the International EPQ 9695 qualification.

Part A: Candidate proposal

To be completed by the candidate

Working title of my Extended Project

Present the topic to be researched in the form of a short statement/question/hypothesis with clear focus
How electric cars have evolved into what they are today and how will they fare in the future.

• my initial resources will be

Internet, books, podcasts, magazines. I listen to a podcast which is hosted by Chris Harris who is regularly joined by guests by the likes of Ben Collins and Tiff Needell, in which they discuss the pros and cons of living with electric cars and other related topics. I own countless Top Gear, Evo, Auto Express books and magazines, many of which are dedicated entirely to electric cars, new and old. I have a book too about Elon Musk, the CEO and founder of Tesla and SpaceX. Being an individual with a company in the electric car market, he will be knowledgeable on how the market has changed, how to create a class leading car brand and what the future holds for the electric car.

• the courses of study or area(s) of personal interest to which the topic relates

I am interested in all of the topics which I have considered but particularly the one that I have chosen. My widest range of knowledge is about cars, therefore, that is the topic I intend to write about. None of the courses I study relate in any way to my EPQ project ideas.

• my intended product

5,000 word essay.

Provide details of the courses that you are currently studying

Qualification type	Awarding body & subject
eg A-level, Modern Apprenticeship, BTEC	eg AQA Mathematics, OCR Computing, WJEC English
BTEC	Public services
BTEC	Sports studies
Click here to enter text	Click here to enter text

Qualification type	Awarding body & subject
Click here to enter text	Click here to enter text
Click here to enter text	Click here to enter text
Click here to enter text	Click here to enter text
Click here to enter text	Click here to enter text
Click here to enter text	Click here to enter text

Notice to candidate You must not take part in any unfair practice in the preparation of project work required for assessment and you must understand that to present material copied directly from any book or any other sources without acknowledgement will be regarded as deliberate deception. If you use or attempt to use any unfair practice you will be reported to AQA and you may be disqualified from **all** subjects.

Candidate declaration

I certify that I have read and understood AQA's Regulations relating to unfair practice as set out in the notice to candidates above.

Date

25

October 2021

Part B: Supervisor's comments on candidate proposal

To be completed by the supervisor

Please comment below on the validity and feasibility of the candidate proposal (Part A) as an Extended Project

	Supervisor's comments
Indicate the relation to, and development/extension outside of, the main course(s) of study or interest	This is a personal topic for E . He wishes to work with cars in some way in the future and it is a topic he feels comfortable with.
Comment on the suitability of the proposed initial sources and research base	There is a wealth of information on this topic and it is indeed a current topic in relation to environment and climate change. E has already read widely in this area and is very interested in electric vehicles and their history.
Confirm that the project is feasible in the proposed timescale and/or indicate any potential difficulties that may prevent the candidate from meeting the assessment objectives	There should be no issues with timescales as E has been meeting deadlines so far and is already completing 2 coursework dominated Btec courses

Indicate the expected format of the project product that will be submitted for assessment

☒ Research based written report

☐ Artefact (for example prototype, model, artwork, scientific investigation, creative writing) plus written report

Is the project a contribution to a group exercise? ☐ YES ☒ NO

If Yes, confirm that there is a defined individual contribution by the candidate ☐ YES ☒ NO

List the **other** group members below

Candidate [Click here to enter text](#) Candidate Name [Click here to enter text](#)

No Candidate [Click here to enter text](#) Candidate Name [Click here to enter text](#)

No Candidate [Click here to enter text](#) Candidate Name [Click here to enter text](#)

No

Signature

Date

4.10.21

Candidate number

Candidate's full name

Part C: Centre coordinator's approval of candidate proposal

Supervisor's name

[Click here to enter text](#)

To be completed by the centre coordinator

If you are acting as both the Centre coordinator and the supervisor, please seek counter signature from a senior colleague

Centre coordinator's comments on the feasibility and acceptability of the proposal (parts A & B) as an Extended Project

This is a feasible and acceptable project for the EPQ. It should allow him to gather a lot of information and come to conclusions by the end of the project

He needs to remember to keep up to date log books and to constantly be researching and reading articles to add to his project. He should make sure that his source evaluation document is also up to date

☒ Approved

☐ Approved subject to the implementation of the centre coordinator's recommendations

☐ Resubmission required

Centre coordinator's name

Indikah Smith

Centre coord

Date 06 December 2021

Candidate number

Candidate's full name

Planning review

To be completed by the candidate

This page records your outline plan once your proposal has been approved.

My next steps in planning, researching and deadlines that I will set myself. What I intend to do, by when, what resources I will use and how I will implement the recommendations of the centre co-ordinator (where appropriate)

I intend to look for new sources of information at least once a week and note them on my planning log, although I think during mock exams, research may slow down while I revise for them as they will be of higher priority. My supervisor introduced me to Google Scholar, which I have found to be very useful when looking for information, and the specifics, such as the author and the date produced, which are relevant because both those factors may affect the bias of the writing. But otherwise, I have a variety of books, magazines etc. which will aid in my research. I will soon begin to think about how I will structure my project.

My summary of the comments and advice from my supervisor

My supervisor has advised me to remember to stay on top of research and source evaluation. I agree with this recommendation and will put every effort in to regularly update not only my planning log, but also my source evaluation prior to researching.

Modifications I have made as a result of my discussion with my supervisor and/or the comments from my centre coordinator

- ✓ I am yet to make any modifications regarding my supervisor's comments, although I will keep in mind that I must remember to frequently update my planning log as well as my source evaluation.

Date

29.11.21

Mid-project review

To be completed by the candidate

This page records your outline plan when you have completed your research.

Is my project following my original plan? How has my plan developed?

My project was initially going to be based around current EV's and how they evolved into what they are today - more of an explanation - which would not be as entertaining as a read. Therefore, I decided that I wanted to debate on whether EV's *are* actually the future as everyone likes to believe. I will consider environmental friendliness, convenience and owner satisfaction among other things to conclude whether EV's, or their alternatives, are the superior form of propulsion in motor vehicles.

My summary of the comments and advice from my supervisor

The advice my supervisor has been generally very useful. She has advised me to ensure that I have enough information to answer my initial question, and produce a quality debate for and against electric vehicles and their competitors. She has encouraged me to keep my source evaluation and planning log up to date so that my essay is credible, avoids plagiarism and is backed up with as much evidence as possible. She has also given me suggestions on how I can come up with a final title for my project, as it is something that I have struggled with.

Modifications I have made as a result of my discussion with my supervisor at this stage

I have changed the topic on which I can write about so that it is more discussion based. This means the research that I am conducting has also changed to suit the updated topic and I will also need to decide on a new title. A lot of these updates were recent, so I am still in the process of implementing these changes like thinking of a final title and completing extra research.

My final title has been influenced by the debate on which I will be debating, and is the question I will be answering throughout. I will eventually conclude whether I believe electric vehicles are the future or just a fad using the evidence that I have collected.

My final title and agreed form of project product

EVs: A Fad or the future?

5000 word essay

My planned next steps to complete my project

The next steps are to continue my research and make sure that I have an abundance of information that I can use in my writing. I will start to plan how I will structure the essay and how I can start it off. I will look at ways in which I can develop and conclude my arguments, whilst also avoiding plagiarism. If my conclusions are not my own, I must refer to whoever came to the conclusion before me. I am confident that I have researched a sufficient amount of material to help me answer my own question and to back up any points that I may make, however I will continue reading, watching and listening to content that will assist me in building my knowledge.

Date 07 March 2021

Project product review

To be completed by the candidate

This page records the (near) completion of your project product. Outline the successes, failures, additions and/or changes you made as you followed the plan in your mid-project review.

Did my project follow my revised plan (from the mid-project review)?

Yes, my project has followed the initial plan from the start, and continued subsequent to the mid – project review.

My summary of the comments and advice from my supervisor at this final stage:

Comments have been helpful throughout and made the objective clearer. I implemented all of the advice regarding scheduling, planning and ensuring that I answer the question that my title asks. At the final stage, I have received no comments to indicate that anything is lacking or inadequate, and I have made sure that my planning log/bibliography is up to date and complete.



Modifications I have made as a result of discussion with my supervisor at this final stage:

Do I need to do anything else to complete my product?

Subsequent to completing my presentation, I was told to update my bibliography and planning log, as well as source evaluation. Upon completing those tasks, I was finished and no further modifications had to be made.

Some simple comments regarding plans & development

Date

Candidate number

Candidate's full name

Presentation record part A

To be completed by the candidate

This page records your presentation and its preparation.

Planned format of my presentation (eg timing, audience, use of visual aids, slides, use of notes, etc.)

A03
PowerPoint. Included images which allowed the audience to visualise what I was talking about and added context when referring to certain models of cars. Occasionally went off-script to provide further information or to answer questions that an audience member might have had.

Planned content of my presentation

A03
+
(review)
I planned to highlight the issues of plug in electric vehicles in my presentation, as well as how fuel celled vehicles are superior in terms of environmental friendliness, the sole purpose of any EV. It was more or less a summary of my entire essay, and therefore similar to my conclusion.

Modifications I have made as a result of rehearsal and/or discussion with my supervisor

I was confident about what I wanted the topic of my presentation to be, therefore I did not request any suggestions from my supervisor. I stayed true to my initial idea and didn't make any changes to what the title implies.

Date

[Click here to enter a date](#)

Presentation record part B

To be completed by the supervisor

Record and comment below on the delivery of the presentation

	Supervisor's record/comments
The nature of the audience (include numbers of staff, students and others present)	2 members of staff and 4 students
The nature of the presentation (include use of notes, use of display items, and use of presentation software)	E used PP to help in his delivery of his project
Comment on the content and delivery of the presentation (for example clarity of ideas, structure of presentation, pace, engagement with audience)	E mainly read from the PP as this helps with his confidence and his ability to interact with his audience. He was softly spoken but knew his topic well and was comfortable talking to his audience and fielding questions. Pace was ok, as would be expected of E
Comment on the response of the candidate to questions that demonstrated understanding and grasp of the project and/or its production. Give examples of questions asked and answers given.	He knew this topic and was clearly interested in it and could talk at length about aspects of it Q: So if hydrogen is the future what sort of infrastructure would be needed? A: There are only 15 filling stations in the UK compared to 1000s for electric even though this is still cheaper than electric or diesel. If you have a Tesla then the charger is free, but if you use hydrogen from the house then it is more expensive but the benefit is all environmental. Q: How do you encourage petrolheads to convert? A: Probably can't convince them to change. More likely to have a 'fun' car and then a daily EF one Q: Obviously this is going to be difficult for larger vehicles like trucks and good vehicles. How will that be done? A: Tesla working on this already. And if they do it, others will follow Q: Would you say there needs to be another pioneer for hydrogen cars? A: Needs a brand to popularise it and then once a few celebrities do it, it will increase in popularity

nature

Date

8.6.22

Summary and reflection

To be completed by the candidate

This page records your summary, reflection and evaluation when you have completed your project product and given your presentation.

Some questions you may wish to answer in this section include, what have I learned from completing this project? What new knowledge or expertise have I enjoyed or found valuable? What are the strengths and weaknesses of my project (including planning and organisation)? What skills have I improved? What changes would I make if I undertook such work again? What advice would I give to others undertaking such a project?

A 34
conclusion
I learned a lot regarding the history of electric vehicles, how they evolved into what they are today and their surprising ability to pollute the environment. Before starting the project, I had my doubts that electric vehicles would be the future of transport. I now know that our planet is incapable of forgiving all of the greenhouse gasses we are pumping into its atmosphere, and that, for this reason, is why EVs are not sustainable in the long term. Their production consumes too much energy and expels too many emissions into the air.

learning
I have always questioned my work ethic and motivational ability when faced with a hefty workload, however, subsequent to completing my essay I have proved to myself that I can efficiently and confidently complete a sizeable amount of planning, research and writing, and do so with relative success. This knowledge has been of great value to me, as I can take it into the future and apply it where necessary.

learning
I would argue that I could've put more effort into keeping track of my progress, and that I occasionally went off on a tangent when describing cars in my essay, but otherwise, I feel as though I told the story of EVs effectively and that I answered my original question in detail, with the opinions of the automotive industries' greatest minds.

learning
I have definitely improved my planning and organisational skills, and found that I was much more motivated to write than I first anticipated. I used to put things off and leave them until last minute, but for my project I decided that doing work in smaller segments with breaks was not as stressful and allowed me the time to make any improvements if needed. For this reason, my work was of higher standard and was not as rushed as it once would have been.

reflecting
If I were to undertake this work again, I would be more aware of the time that I had to plan out my essay and include additional sources to avoid me going off on a tangent. I would make more of my work dedicated to answering my initial question, and would ensure that my planning log was more developed.

reflecting
I would advise anyone else who was working on the project to ensure that they are writing about something that they are knowledgeable and passionate about. This means that the individual will know exactly who to consult where to find valuable information and will be able to base their essay around a fascinating question regarding their topic in question.

AD1 + 3

Planning log. Simple, sets out what was done.

Date	Sources	What has happened	Challenges
11/10/2021	N/A	Create a powerpoint regarding how to pass your driving test.	Research on what I can write about for my main project.
18/10/2021	N/A	Completed part of my production log; gathered ideas for what I could write my essay on.	Evaluate my ideas, which idea I am more knowledgeable on, sources more readily available etc. Come to a conclusion regarding which topic I should use for my main project.
25/10/2021	N/A	Completed candidate proposal on production log.	Consider sources I could use for research
1/11/2021	Futurelearn.com	Completed a course on futurelearn.com	Consider ways in which I could manage my time so that I can fit researching EPQ into my timetable
8/11/2021	N/A	Had a lesson regarding time management.	Think about what books, podcasts, people I can consult to help.
15/11/2021	N/A	Look for ways in which to research your topic and look for content to write about.	Think of what to title the project.
22/11/2021	'History of electric cars' – M Guarnieri 'Electric cars. Advantages and disadvantages' ZS Gelmanova	Research and read articles to find content to write about.	
29/11/2021	N/A	Produced a working title for my project.	When I receive my work back I must summarise the comments from the co ordinator and make any modifications based off the comments.
24/1/2022	'history of the electric car' – energy gov	N/A	Research, begin mid project review.
28/2/2022	N/A	Started mid project review	Must think of final title.
3/3/2022	N/A	thought of a final title for the project	Finish off mid – project review.

7/3/2022	N/A	Mid project review completed, received comments from supervisor.	Think of how to begin essay and structure it etc. Research.
21/3/22	University of York	Read about tips on how to avoid plagiarism, and how to reference effectively.	Research
28/3/2022	www.scribbr.com	Debate on how I will develop and structure my essay and how I will incorporate my ideas and research, starting with the introduction.	I must soon start writing my essay once I have decided on the introduction to it.
26/4/2022	<u>A Brief History and Evolution of Electric Cars</u> (interestingengineering.com)	Writing project has commenced, started the introduction.	Finish introduction, plan rest of project and
27/4/2022	N/A	Introduction completed	continue. Continue writing essay while researching for
10/5/2022	N/A	A sizeable portion of the essay has been written	additional content. Compose a schedule that will allow me to write as much as possible while also being able to spare
24/5/2022	N/A	70% of the way through. I have planned how to draw the main essay to a close and am in the process of doing so.	time for other work. Plan a conclusion to sum up what my beliefs are on the future of electric cars, based on the facts I have presented.
27/5/2022	N/A	Essay section of my EPQ has been completed including the conclusion.	Must complete my bibliography, as well as attempt to condense my conclusion down into a small paragraph for my presentation.
5/5/2022	N/A	Bibliography completed in around 2 hours, presentation completed after 2 days	N/A

A02

Some key quotes for source analysis
 D or source by quotes + analysis
 lacking
 be used

Quote	Author	Date accessed
'Yes, they're extremely simple compared to cars today, but Ford made them to be incredibly durable and rugged'	Steven Symes	10/05/2022
'Motor and battery technology was really not much more advanced than EVs from 70 years earlier'	Mal Pearson	12/05/2022
'It steers okay despite its skinny Michelins, and because of its 3000-pound weight, there's a fair bit of body roll.' 'Best of all is the constant torque, and we soon come to appreciate the precise accelerator pedal and gearless operation'	Barry Winfield for <i>caranddriver</i>	20/05/2022
'It's quiet, comfortable and good to drive'	<i>WhatCar</i>	20/05/2022
'We've sold out of next year's production in advance'	Elon Musk	21/05/2022
'the best car you could buy for the money'	Elon Musk	22/05/2022
'Tesla's public image has been plagued by build-quality issues in recent years, with customers using social media and other public forums to flag issues including varying widths of panel gaps and water ingress' '90's KIA'	Felix Page	24/05/2022
'Steam reforming or Steam Methane Reforming (SMR) reacts methane with steam at high temperature in the presence of a catalyst to give hydrogen and carbon monoxide. From an environmental position this method is still generating unacceptably significant quantities of greenhouse gases'	N/A – www.azonano.com	24/05/2022

Source	Author	Date published	Date accessed	Evaluation
'Looking back to electric cars'	M. Guarnieri	September 2012	22/11/2021	Explains the earliest examples of electric cars
'Electric cars. Advantages and disadvantages'	ZS. Gelmanova	2018	22/11/2021	Explains how electric cars may and may not be the future of the automobile
ICE vs EV: are electric cars worth it	MER energy UK	11 November 2021	31/01/2022	Describes the advantages of EV's over internal combustion engine cars
Electric Vehicles and Their Drawbacks	Geoffrey Pohanka	December 29 th 2020	31/1/2022	Explains the disadvantages of electric vehicles
It doesn't end at electric 5 alternatives to electric cars	Katie Rees	November 22 nd 2021	31/1/2022	Gives alternatives to electric cars
A brief history and evolution of electric cars	Christopher McFadden	July 01, 2020	14/02/2022	Explains how electric cars have evolved into what they are today and how internal combustion engine vehicles caused them to die out for decades.
Electric cars V. hydrogen cars: which is more sustainable?	N/A (youmatter.world)	May 02, 2019	14/02/2022	Debates whether hydrogen fuel celled or electric vehicles are superior in terms of convenience, sustainability and environmentally friendliness.
Alternative fuels and advanced vehicles	Afdc.energy gov	N/A	09/03/2021	States other alternatives to electric vehicles such as nitrogen, biodiesel, ethanol, and natural gas vehicles. Gives a car
Jeremy Clarkson reveals which car	DRIVETRIBE on Youtube	24 Feb 2021	28/03/2022	<u>enthusiasts</u>

he regrets selling the most.				opinion on electric cars.

Lots of writing - Read from slides
but also added in own comments,
talking to audience, not simply
reading to them.

EPQ PRESENTATION

EVS: A FAD OR THE FUTURE?



WHY I CHOSE THIS TOPIC IN PARTICULAR

Cars in general have always been an interest of mine, and watching them progress, even just from when I was a child, has been fascinating. No longer would you find an executive saloon powered by a formula 1 derived V10, as you would have in the BMW M5 from 16 years ago. Today, the powertrains of cars are viewed as slightly mundane in comparison, as the pursuit of lower emissions has caused engines to shrink in capacity, and rely on forced induction or electric assistance to provide power. Manual gearboxes have been swapped for faster shifting, dual clutch automatics. Tiny engines which are restricted by a series of particulate filters and catalytic converters mute any noise, causing their sound to be reminiscent of a vacuum cleaner. Car enthusiasts are now being deprived of the factors that sparked their interest; driver enjoyment. Despite all this I want to know what the future might look like for the car enthusiast, and what they might be drawn to in cars.

It is important to embrace change and accept that huge, wasteful engines in cars won't always be a viable option for our environment, however exciting they may be. This is why I am making an effort to increase my interest in electric vehicles and what they may evolve into in the future.



CHALLENGES I ENCOUNTERED DURING MY PROJECT

Avoiding plagiarism was the biggest challenge while writing the essay, due to the countless articles that have already been published regarding the topic of electric cars. I had to ensure that, when describing models of vehicles mentioned in the essay, I was not repeating anything another author had previously said to describe the same vehicle.

Making sure specifications for vehicles were correct was also quite difficult, considering different sources often contradicted one another. Also, different physical and environmental factors could have altered results for different people. For example if one magazine tested a cars 0-60 time on a rainy day, it would be slower than another magazines time who tested it on a clear day. Mainstream manufacturers often quote official figures on their own website, however the majority of the manufacturers I discussed were quite obscure and didn't even have a website. If I found that there was a broad range of results, I found an average, meaning some facts might not be totally accurate.



WHAT DID I LEARN?

The conclusion I came to was that EVs are likely only going to be a phase; a stepping stone to another propulsion method which is less pollutant. This is because the ways in which the precious metals used to compose the battery are extracted from the earth consume a huge amount of energy. As well, transporting these materials around the globe on diesel freight ships, so that they can be refined and assembled, pollutes the air even further. The result of this is that the average electric car has a larger carbon footprint than a Land Rover Discovery, before it has even left the showroom. Charging the car is another matter, as the majority of the electricity generated for use in electric cars, is done so at a fossil fuel power station.

Hydrogen fuel cell vehicles are superior in terms of environmental-friendliness, due to their lack of battery and ability to generate their own electricity through a chemical reaction between oxygen and hydrogen. Of course, hydrogen production does consume energy, although not nearly as much as it takes to fabricate and power Evs. Therefore, I predict that FCEVs will be the successor to the plug in EV.



Questions?

In the early 1900's, streets were unclean and diseases were rife as horse drawn carriages were used as the transport of choice for the majority of people. Horses were viewed as outdated, dirty and bad for the environment subsequent to the industrial revolution, which saw the replacement of humans and animals for machines. Cars were modern, clean and high-tech, propelled by machine rather than animal. Due to this modern technology, they were also expensive and only attainable for the wealthy minority, meaning the poor were forced to keep their polluting animals to get them from A to B.

Manufacturers of cars knew that something had to be done to lower the price of their vehicles, and therefore began experimenting with various forms of propulsion. This would allow them to gauge which method was the cheapest, meaning they could put them into production and clean up the busy city streets, cease the spread of diseases among our communities and depollute the environment.

Every time a new idea was introduced in regards to powering the motor vehicle, it was either massively flawed or just too expensive. Ideas included steam powered cars, which took 10-45 minutes to build up enough steam pressure to operate, electric cars, which failed because 'a lack of electrical infrastructure held back their mass adoption by consumers' (Christopher McFadden, 2020). Electric vehicles were also over double the price of their alternatives, so were far from affordable.

However there was one form of propulsion which prevailed over the rest – the internal combustion engine. Oil was in abundance and inexpensive, they could be conveniently refuelled in a short space of time, they were simple to maintain and repair and were fairly straightforward to operate for the time.

This was especially true subsequent to the introduction of the Ford Model T in 1908, which pioneered the idea of the rolling production line, in which the car was assembled by machines rather than by hand. This cut costs massively and was widely regarded as the first affordable car. The internal combustion engine took the world by storm.

Over a century later, the combustion engine is still dominating the competition, although it is facing a similar dilemma as our horses did all those years ago. Amidst a climate change crisis, fossil fuel burners are viewed with similar displeasure, due to them polluting our atmosphere with greenhouse gases. Our government has ordered a ban of all combustion engine using vehicles by 2030, meaning we are forced into more eco – friendly transport. So, how will we go about this drastic change? How will the motorisation of our cars differ in the future and is it for the better or for the worse?

The electric car was first introduced in 1890 by William Morris, as a cleaner, quieter and more refined alternative to it's rivals. 'Electric cars didn't have any of the issues associated with steam or gasoline. They were quiet, easy to drive and didn't emit a smelly pollutant like other cars of the time' (Rebecca Matulka – 2014) It was fair to say that electric cars built themselves up an impressive reputation, especially with the female consumer, who drove them only short distances around town. In fact, around 1/3 of all vehicles on the road were electric by 1900 due to various manufacturers warming to the idea and creating their own.

Porsche – the world's most renowned maker of high performance, driver focused sports cars – began when Ferdinand Porsche dreamt up the P1 in 1898. Thomas Edison, the man who invented the incandescent lightbulb, the motion picture camera and the phonograph, vowed to study and

improve the electric car. Even Henry Ford debated upon making an electric car for the people, a more affordable user- friendly vehicle.

A selection of the world's greatest minds were in favour of the EV's success, it was almost destined to be the future of the motor car. All that it called for was a reduction in cost, which could have been a guarantee as long as Henry Ford and Thomas Edison's collaboration continued. However, Henry Ford had other ideas, in the form of the Model T. The Model T revolutionised the way in which cars were produced. They weren't built solely by hand, like every other car of the era. Instead, they were constructed with the help of machines on a rolling production line, which cut labour costs and time. As a result, the Model T was priced at an attractive £650 – almost a third of an equivalent electric powered automobile.

By 1914, 9/10 of all cars in the world were Fords; none of which were electric. Alluring pricing caused individuals in the market for a motor car to flock to the Model T. 'Yes, they're extremely simple compared to cars today, but Ford made them to be incredibly durable and rugged' (Steven Symes – November 14, 2021) meaning that the car was dependable and reliable, unlike many cars of the same era. On the topic of being easy to live with, the Model T was even fairly uncomplicated to drive. This was, of course, in comparison to cars of its time (which is to say high impossible when compared to modern cars, as seen in *Top Gear: The Perfect Road Trip* – 2013)

Soon, near enough every single car on the road was internal combustion engine, influenced by the innovative ways in which Henry Ford produced the T. They became increasingly cheaper and increasingly popular. More and more money was invested into making them more efficient, refined, comfortable and practical. All the while, the electric automobile had been completely forgotten about. No money or time or thought was spent on electric propulsion. It was a thing of the past; constrained to the history books. The oil industry was booming. Roads were becoming longer, wider, more populated. By the 1960's the average car could exceed speeds of 70 mph with ease and travel hundreds of miles on a full tank of fuel. People needed faster, comfortable cars that could be refuelled in minutes and battery technology would not support these demands.

Milk floats and golf caddies were the only remaining electric vehicles until the 1970's, which saw a devastating oil crisis which crippled the automotive industry. The price of oil based fuels skyrocketed, forcing car manufacturers to rethink the efficiency of their vehicles. The steep prices also re-ignited an interest in electric vehicles, which required not even a drop of oil to function.

Cars were now expensive and underpowered so there was no longer as much of a trade off for having a petrol equivalent. One such product in response to the fuel crisis was the Sebring – Vanguard. 'Motor and battery technology was really not much more advanced than EVs from 70 years earlier' (Mal Pearson 2019 – www.makesthathadntmakeit.com) This basically meant that their Citicar was incapable of exceeding speeds of 30mph, and was only really a viable option for short urban commutes. Surprisingly enough, Sebring – Vanguard earned the title as the sixth largest car

manufacture in the US by 1975. It wasn't groundbreaking. But it was a start. The Citicar was in production until 1982, which was the last electric vehicle of the 80's, the calm before the storm.

Fossil fuels burnt during the operation of ICE vehicles was, by now, really taking its toll on the environment. Carbon dioxide and nitrogen oxides which are expelled from the exhausts of these vehicles, began to build up on the ozone layer, causing a greenhouse effect and warming our planet exponentially. Our governments became increasingly aware of this issue, calling for a series of restrictions and regulations to be introduced as an effort to slow down the warming. Now, efforts were again being made to update the car and move it into a future of less pollution and eco-friendliness. The first of these large scale efforts began with the General Motors EV – 1 in 1996,

otherwise known as the first purpose built electric car built for the masses. In 1997, the *Car and Driver* magazine stated that 'The EV1 feels remarkably normal to drive, with a good ride if you discount some corkscrewing motions on certain surfaces. "It steers okay despite its skinny Michelins, and because of its 3000-pound weight, there's a fair bit of body roll." (Tested: 1997 GM EV1 Proves to Be the Start of Something Big) Best of all is the constant torque, and we soon come to appreciate the precise accelerator pedal and gearless operation' — an astronomical leap from the previous best — selling electric car, the Citicar!

The absence of any form of electrically propelled vehicle during the 80s from GM was perhaps due to the development of the EV — 1. Battery technology from the introduction of the Citicar, to the EV — 1 had clearly made monumental progress, despite being less than 20 years apart. Both cars even used lead acid batteries, which is dated by today's standards, but made impressively versatile by General Motors. Their lead acid battery allowed the EV — 1 to achieve a respectable 80 mph top speed and a maximum range of 60 — 80 miles (when driven very cautiously). For the first time, the electric car actually worked... as a car.

Range was evidently an issue for the EV — 1, which meant that General Motors had to incorporate a multitude of energy preserving measures. These measures included: a compact, streamlined body with rear wheel arch covers, smoothed alloy wheels, thin tyres and a lightweight aluminium construction. A drag coefficient of 0.195 (an excellent figure even now) reclaimed some of the miles lost from the aging battery technology. The fact that the car could comfortably travel at motorway speeds, albeit only for a moderate distance, with ease was ground-breaking for an electric automobile. Reducing our carbon footprint was no longer as much of an inconvenience as we once thought, and the future looked bright as we moved into the 21st century. Unfortunately, the EV — 1 had to be removed from production due to manufacturing costs. GM lost money on every car they sold. There was still a way to go before the electric vehicle became not only cheap to buy, but cheap to produce as well. This would call for another advancement in battery technology and the ways in which they were fabricated.

The next big leap in the EV market came in the form of the infamous Toyota Prius in 1997. Nowhere near as radical as the EV-1, the Prius was visually just another Japanese economy hatchback, which would typically found being driven to the garden centre, at 20 mph below the speed limit by an OAP. Powering the Prius was a sluggish 1.5 litre 4 cylinder petrol with variable valve timing and 76 horsepower, mated to a 67 horsepower electric motor. The first mass produced hybrid. The Prius was regarded highly, from the general public and celebrities alike. 55mpg and emissions as low as 120g/km were attractive numbers for the climate change activists of the period. The Prius didn't move mountains, which was the exact reason it was so popular. There was nothing particularly experimental or unique about the Prius, it was just a regular hatchback with no frills. It was easy to live with, and there were no compromises which were present in the EV — 1, such as range or practicality. It was just a reliable, relatively cheap means of transport with reduced emissions and excellent fuel economy. Sure, it wasn't emission free although it did spare the owner some of the guilt of owning an exclusively ICE vehicle — another major step in the right direction.

It could be said that the Prius and how painfully average it was, brought the idea of the electric or hybrid car down to Earth in most people's eyes. Previously, hybrids or EV's would've been viewed

as exotic and slightly alien, now it was just a method to get you from point A to point B. Between 1997 and 2003 there were around 123,000 Priuses were produced. They were a common sight particularly in urban locations, in which they were used as mini cabs and ways in which people could avoid paying recently introduced congestion charges

A tidal wave of PHEV's (Plug-in Hybrid Electric Vehicles) followed in response to the Prius due to its success; everyone wanted a share of the publicity and income. Hybrid vehicles have sold consistently with impressive popularity ever since, and have proved to be every bit as easy to live with and efficient as the Prius. Near enough every car manufacturer nowadays has at least one hybrid in its range of models thanks to Toyota, making them accessible regardless of how loyal you are to a particular company. Hybrids will never be completely sustainable though and are unable to take the crown from ICE cars as they operate on fossil fuels themselves and are pricier than their exclusively combustion engine counterpart. To sum up the hybrid car, they are an effective and less intimidating bridge that crosses the gap between combustion engine and fully electric vehicles and one that will hopefully encourage people into EV ownership.

Returning to electric vehicles now, the mid early 2010's saw another huge milestone for the EV. The motorway capable electronic car had already been conceived in the form of the GM EV-1. Its limited success had been mainly down to production cost and inexistence of any form of practicality. Mobile phones, tablets and other electronic devices were using lithium ion batteries – a compact battery with the ability of charging rapidly, maintaining battery life for extended periods of time, all while remaining lightweight. These qualities were ideal for use in cars and had been previously implemented in hybrid cars as early as 2002 in the Toyota Vitz CVT although never effectively. Nissan decided to change this when they introduced the Leaf EV in late 2010.

The Leaf's story was not dissimilar to the Prius, in that it made modern, revolutionary technology unintimidating and convenient. It came in hatchback form and although its appearance divided opinions like the Prius, it was in pursuit of aerodynamic efficiency. Otherwise though, it was fairly unremarkable, which people liked. It's quiet, comfortable and good to drive according to *WhatCar* – high praise for the first real attempt at an electric car for the people. The Leaf was the best selling electric car for years until Elon Musk decided against it and over 500,000 examples have found owners since it was introduced. Range is still compromised at 80 miles, although these 80 miles can be achieved with the car containing 5 people and their luggage – a feat which had never been accomplished before the Leaf. It would be a nonsensical decision to buy the Leaf if your lifestyle required you to travel out of town or on the motorway of course, so sales were diminished slightly due to this. Most Leafs were and still are seen creeping around heaving urban streets at sub 20 mph where they can get at home and achieve their highest range. Charging stations are in abundance in these locations too which is a positive.

Lithium ion batteries were what made the Leaf successful. Lead acid batteries were heavy and consumed space. If the Leaf was to adopt the lead acid battery, passenger and cargo space would have been robbed. The weight would have caused the car to feel unsettled over bumps and would have required a less than frugal amount of throttle to even get the car up to speed, so the range could have potentially halved. So the Leaf was a valiant effort at an electric car for the people and a useful base for others to copy from and improve. Which they very much did.

Tesla placed itself on the map in June 2012, after previously making a laughing stock out of themselves with their Roadster in 2008, which was a £100k+ sports car based on a Lotus Elise. The Roadster flopped, and was built for a year before production ceased. After all, an Elise cost less than half of the Tesla with none of the compromises and was only a second slower to 60 mph. Elon Musk, founder of Tesla and SpaceX, was displeased with journalist's comments on the Roadster and vowed to make a return. His promise was understandably scoffed at by the press. The same people were monumentally taken aback when the Model S was revealed. A sleek 5 door fastback, which was claimed to be able to cover 300 miles on a full charge was beyond all expectations. The lithium ion battery had progressed to a new level. Even the base model which started at less than £50,000 after government's grants was capable of 160 miles - double that of the Leaf.

What's more, the Model S visually tolerable, whereas the Leaf looked slightly awkward and strangely proportioned. Finally, someone with eyes could be content with their electric car. This sleek design language did not, however, come as a sacrifice to aerodynamic efficiency, as the Model S possessed an impressive drag coefficient of just 0.42, which is an even more formidable figure considering the magnitude of the car and its frontal surface area. In the Model S' most popular guise, the mid-level trim, range was increased to 230 miles for an excess of £8,000, another £8,000 for the 300-mile variant. The range increase in comparison to prior electric cars was drastic, and almost eliminated range anxiety. Range anxiety was a huge factor in whether or not people were willing to invest in an electric vehicle or not, which proved much less of an issue in the Model S, peaking interest greatly.

Another reason the public were so highly anticipating the S was the tech. Musk teased the potential self-driving capabilities, the minimalist dashboard with the huge centre screen and the generous list of standard equipment, which again, perked the ears of potential consumers. And consumers there definitely were. Tesla received a backlog of pre-orders for the Model S, the majority of whom were new to the electric car market. We've sold out of next year's production in advance, reported Musk in 2011 - long before the car was even launched and out of beta form. And staggeringly, the pros didn't stop there. Claimed 0-60 time for the cheapest model was 5.6 seconds from its 362 horsepower motor, which, already was more than adequate for most people. Quicker versions followed with dual motors and longer range in the subsequent years. The Model S was undoubtedly very expensive, especially when compared to cars such as the Leaf but the investment was worthwhile due to the advancements that Tesla implemented on the electric car as we know it. Their dedication revoked interest and raised the bar in terms of what can be done with essentially a laptop battery. Tesla's battery was the most versatile ever seen and opened new doors for the car industry as a whole. Now, the EV was not only convenient but desirable, which is exactly what we needed for them to progress.

When the S launched and was delivered to buyers, Tesla surprised people that much with their unexpected brilliance that advertisement was completely unnecessary. Everything Tesla promised - and more - was discovered to be true. Word of mouth was enough to promote the tech, range, luxury and driving experience of the car, so much so, that in Europe, sales outweighed that of the Mercedes-Benz S-Class, the former best-selling car in the luxury saloon segment. The brand as a whole gained a worldwide fanbase, who are notoriously loyal and dedicated to everything Musk and Tesla do as a whole. Tesla more or less became a household name within a few years, joining the likes of BMW and Mercedes-Benz. It was a legitimate car company, and their overnight

success influenced rivals to invest some of their own money into developing their own EV's. Not only did Tesla reinvent the electric car, but the infrastructure to support them as well. Superchargers were placed in a multitude of locations all around the globe, at which Tesla owners could recharge their vehicles with no strings attached. The superchargers were capable of charging a Model S by 136 miles in the space of just 15 minutes, which would take several hours if a three pin socket were used to recharge the car to the same amount. To top it off, Superchargers were 100% free of charge.

All while the Model S was raking in huge profits, and being continuously enhanced Musk was developing a higher production EV, which suits people with a more sensible budget. The car in question would be called the Model 3, and rivalled those such as the BMW 3 Series and Mercedes C-Class, essentially an entry level luxury saloon. Prices started at a competitive \$35,000 – which was, according to Musk, the best car you could buy for the money. This claim was, of course, a matter of perspective, although a series of facts and figures to reinforce the claim were released: 0-60 below 6 seconds, at least 215 miles of range and ground breaking tech. Without a single option box ticked.

It goes without saying that the release of the Model 3 was highly anticipated. Pre-orders exceeded 160,000, which is more impressive knowing that every person who placed a pre-order had to pay a deposit of £1k. Tesla even released a Performance version of the Model 3, which could achieve 0-60 in a neck breaking 3.1 seconds – an entire second quicker than a Mercedes C63 AMG saloon, despite it having a 73-horsepower disadvantage. To put that into perspective, a 5.2 litre Lamborghini Gallardo is more than half a second slower to 60 mph than the Model 3. A purpose built, focused supercar that had been meticulously tuned to squeeze as much horsepower as possible from its naturally aspirated V10 didn't have the pace to keep up with a 4 door, mid-size saloon which was a fraction of the price and could comfortably seat a family and all the shopping. Sheer acceleration was very much viewed as one of Tesla's (many) party tricks. Model 3's and S' would line up alongside the very best of whatever pedigree, precisely engineered supercar Germany or Italy could knock up and utterly decimate them.

The countless YouTube videos of Tesla's demolishing supercars was great publicity, and sales just increased and increased. Battery tech was progressing rapidly, Tesla began introducing SUV's to their line-up, their range increasing. Nothing is perfect though. 'Tesla's public image has been plagued by build-quality issues in recent years, with customers using social media and others public forums to flag issues including varying width of panel gaps and water-ingress. Felix Page 2021 ("Elon Musk warns customers against buying his cars-AutoDaily"). Early examples of Cars appeared to be worse off though, and build quality, according to Sandy Munroe is comparable to 'a 90's KIA' even on more expensive models. Styling, particularly on the interior has been critiqued for being unnecessarily simplistic with a distinct lack of buttons and switches; everything is controlled via that central screen. Even the speed is displayed on the central screen, forcing you to look away from the road every time; undoubtedly hazardous.

Quality control was certainly an issue, far from unusual for an American car. Those who are in pursuit of a more substantial and premium feeling fast four door are more likely to opt for a Porsche Panamera or something similar. This is understandable though, for the plentiful environmentalists of the modern day who weren't in favour of the combustion engine. Porsche knew that the market was there, which prompted them into developing their own

rival to the Model S, with a more athletic quality. Porsche was already renowned for their sharp handling and solid feeling build quality, pair that with zero emissions and a blistering 0-60 time of 2.4 seconds in its quickest guise (as tested by MotorTrend), and you have the perfect Model S beater. The Taycan, as it was named, outsold the Tesla Model S, thanks to its very minor price difference, and drastic contrast in quality and brand image. The Model S is, in fact, superior to the Taycan from 0-60, especially subsequent to the introduction of the Model S Plaid (0-60 in 2.1 seconds compared to the Taycan Turbo S 2.4 seconds), as well as range and price. Evidently though, the slight differences in these numbers aren't enough to entice buyers back to the Model S, its sub-par feeling build quality and slightly gimmicky nature.

Worryingly for Tesla, rival manufacturers have been now well caught up in terms of battery tech. Audi have e-tron, BMW have BMW i, Mercedes have their EQ line-up, Volvo have Polestar and so on. All are able to do 200 miles on a full charge, many exceeding 300. It wouldn't be unreasonable to say that EVs now provide worthy competition to their fossil fuelled counterparts; the majority of people don't exceed their claimed range on the daily anyway. For this reason – along with our governments plan to abolish new combustion engine cars by 2030 – EV's have seen an immense increase in sales in the last few years. Since just last year, electric car sales have gone up by a whopping 108%, hugely respectable. ✓ regarding the fact we are not even mid-way through 2022.

There is no doubt in anyone's mind that electric cars will, one day, outsell combustion engine vehicles. ✓ Today, we experience what our ancestors did, when their roads became polluted and diseased, and their horses were replaced for machine. ICE vehicles consume oil, which is depleting at a rapid succession. They burn fossil fuels, damaging our climate and planet. ✓ Soon, they will be a thing of the past. All while EVs become increasingly competent, and remain 100% emission free.

Or do they? 'Another question is how these batteries will be charged, since electricity mostly comes from non-renewable energy sources such as coal, natural gas, and nuclear energy' – Geoffrey Pohanka, December 2020. ("The Charging Challenge: Electric Vehicles and Their Drawbacks"). This quote raises a good point, with fossil fuels being the primary fuel used when generating the energy to propel the electric car. To summarise: the electric vehicle is not carbon neutral, and won't be until 100% of the electricity we consume is the result of non-pollutant sources. Additionally, coal is non-renewable, meaning a drastic change will have to be arranged regarding where our electricity comes from, otherwise not only will electric cars be left redundant, life will change as we know it.

A plan to combat the energy crisis has been devised, however, with a car that needs not to be recharged, but refuelled. The car in question is powered by a fuel cell, which itself runs on hydrogen gas. The idea of the hydrogen car was pioneered by Swiss inventor, Francois Isaac de Rivaz in 1807. The hydrogen car had never seen commercial production until modern day due to scarcity of fuel. It was, instead, Hyundai who introduced the concept to the general ✓ public in 2013. FCEVs (Fuel Cell Electric Vehicles) perfectly counter any issue that may arise with the ownership of a conventional electric vehicle. Charging times are a thing of the past, as hydrogen can be refilled in a matter of seconds – like a petrol or diesel vehicle. Range is

dependant on how much hydrogen is remaining in the tank, meaning over 400 miles on a full tank can be achieved, with even more possible from further funding. Electricity is produced from within, the car does not need plugging into the mains, meaning no carbon footprint. This is because the only thing emitted from the rear of the FEV is water.

So, why don't we all just go and buy hydrogen vehicles? The answer is simple. There is a lack of awareness surrounding hydrogen cars. Minimal marketing and the small number of manufacturers building these cars are leading factors – plus the majority believe that EVs are 100% carbon neutral and it is not necessary to make the change. Insufficiency of hydrogen filling stations also requires you to live in very specific locations. This means buying one in the UK is completely illogical, unless you live in close proximity to one of the only 15 which are publicly available. This is tremendously inconvenient and rules out the prospect of owning a hydrogen vehicle for most people.

Typically, though, the extraction of any form of energy is the product of heat or combustion, both of which give off greenhouse gases. The extraction of hydrogen from naturally occurring gases is no different. Steam reforming or Steam Methane Reforming (SMR) reacts methane with steam at high temperature in the presence of a catalyst to give hydrogen and carbon monoxide. ("How efficient is steam methane reforming? – Pville.org") From an environmental position this method is still generating unacceptably significant quantities of greenhouse gases – www.amazon.com 2007. By-products of methane reforming include carbon dioxide, as well as carbon monoxide, both of which damage the ozone layer. Once extracted, the H₂ must be stored in cooled cylinders due to its unpredictable nature and combustibility. The cooling of these cylinders, of course, uses lots of energy in addition to the initial creation of the element.

To conclude, the future of the automobile is stuck in the same dilemma as it was 100 years ago; it is uncertain. The fate of the ICE vehicle is inevitable, as is the complete takeover of the EV. However, we can not expect the EV to be permanent, as the means in which they are fabricated are far from eco-friendly. Our planet does not have an infinite supply of materials and its atmosphere will not always be so forgiving. Experimentation is detrimental to the progression of the automobile and the maintenance of our planet. Electrification of our vehicles is just a stepping stone and a representation of humanity's journey to carbon neutrality. So, EV's – a fad or the future? EV's have a lot of evolving to do before their successor takes over, although EV's will one day become old tech due to their untold uncleanness. Perhaps the ways in which we produce hydrogen and electricity will one day be a result of renewable, clean sources, although this seems unlikely, particularly the production of hydrogen. So yes – EV's are the future, just not for long.

Answers the question at the end.
Some analysis of A02 although mostly used to
add info to the essay.
Generally well written, interesting, answers the Q.

AO1: Selection of topic

There is consideration of the initial idea, and the candidate weighs up three options for his project. He decides to look at electric cars and has identified some initial research with a number of sources identified in Project Proposal Part A. The aims and objectives are not clearly stated in the early stages of the project and there is a basic outline of the intentions for the project. The preliminary research identified is just enough to raise this into the mid band for AO1.

AO1 Score: 3

AO2: Planning, monitoring and developing

The production log is completed, but it is not detailed or precise. There is some evidence of the plan being developed and at MPR there is evidence of some changes to the title and reasons for the development. However, overall, the planning lacks detail on how things will be achieved, and the aims lack clarity. There is an additional “planning log” submitted, but this is correctly identified as “simple” by the supervisor. When judged holistically there is just enough evidence to meet the mid band, but insufficient evidence to move the mark up the band.

AO2 Score: 5

AO3: Demonstration of research skills

There is no bibliography at the end of the report, but a table of nine sources is included together with a list of quotations. The source table does not include scrutiny of the sources, rather just giving a brief summary of what they contain. There is no evidence of the candidate considering reliability or possible bias, for example Elon Musk is quoted without any consideration of his vested interest in electric cars. The evidence for research skills is limited as a result.

AO3 Score: 4

AO4: Analysis and application of research

The project plan does not develop to give clear and detailed aims and objectives. Nevertheless, it is clear that the candidate is a car enthusiast, and he has carried out some research that is presented in the report. A large portion of the report is a descriptive history of the motor car. There is an attempt to link the developments from horse and cart to motor cars and the start of cleaner transport, but the writing lacks clear statistics on emissions. The candidate moves on to look at electrical cars and other possible alternatives, such as hydrogen, but it all lacks clear evidence to support the points made. The candidate has developed a response to the title and produced an appropriate outcome with sound communication. There is also a conclusion presented based on the evidence found in the report. However, the inadequacies are significant enough to mean that the mark cannot be placed highly in the mid band and this outcome is a good example of how the limitations of the planning and research impact on the quality of the outcome.

AO4 Score: 10

AO5: Evaluation of product, process and self

The candidate makes a good attempt to reflect on his own personal learning in the summary and reflection. Certainly, the candidate has benefited from the EPQ process and learnt some valuable skills. There was also some useful evidence in the presentation slides and there is some reflection on aspects of the report findings, although this could have been addressed in greater depth.

AO5 Score: 4

Total mark

26/60

Commentary

This candidate has produced a project that fits the E grade descriptor. (*Please see page 16 of the EPQ specification for a full list of the grade descriptors.*)

Grade E

Students identify their project and produce a workable plan. They show some organisational skills in completing the project. There is some evidence that they have responded to guidance given. Students use a limited range of resources, analyse some of the data and apply findings. Some links are made between the sources of information and the themes of the project. Students partially implement the project plan. They demonstrate some knowledge of the project area. They give some thought to the way the final outcomes have emerged and to their own strengths and weaknesses in carrying out their project.

The questions and answers in Presentation Record Part B are entirely focused on the project topic. This was a missed opportunity to support the candidate. The questions and answers should also cover the project process and can therefore produce evidence to support marks for AO1, AO2 and AO3.