

CHECKPOINT 4: Background Research Plan, Part B

For this portion of the research, you will be conducting interviews (optional but great for qualitative data), completing historical research, and finishing up with reflective ideation research.

Checkpoint 3: Part A is complete!			Checkpoint 4: Part B		
1	2	3	4	5	6
Define your target users. 	Figure out your research details. 	Create interview questions. 	Interview and log the results. 	Complete your historical research. 	Complete your ideation research. 



Part 4: Interview Your Target Users

This is an exciting time when you get to collect real-time data from your target users. This is your chance to ask, “How can I improve my idea?” “Am I really solving the original problem?” Plan at least five days to complete these interviews. The number of people you interview will determine your sample size. **The number of people you interview is called your sample size.** For our time constraints, try to interview at least six subjects and no more than thirty.

The people you interview are the users who experience the problem. They are not content experts. Interview people who would benefit from your product. For example, if my problem is that my cleats keep getting stuck on the synthetic turf, then my users are soccer and football players who play on this turf and also experience this problem. If my problem is protecting dogs from the heat then I will interview anyone with a dog from a hot region.

Recording Interview Results

As you begin to interview your classmates, friends, and/or family, make sure you keep track of interview responses. Determine what works best for you. Some options include notetaking on paper, notetaking in a Google Doc, providing a Google form for participants to complete, writing your notes in your Google form for individual interviews, record the audio or video of the interview (most phones have an app for this) to be able to go back to later. Choose what works best for you.



Use the Google Sheets option to sort and organize your information.

- Create a [Google form](#).
- Extract the data into a [Google sheet](#).
- Add links to your Google docs, forms, and/or sheets here.

My Google Link(s)	
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Qualitative Data

Share any trends, patterns, or key takeaways that you heard or read in your research responses. (3–5 sentences)

Did this qualitative information impact your design? How? (2–4 sentences)

Quantitative Data

Share any numbers, percents, or ratios that you discovered in your interviews. Did this information impact your design? How? (3–5 sentences)

Did this quantitative information impact your design? How? (2–4 sentences)



Design Iteration

Based on your interview research, draw or insert an image of your most updated engineering project idea below.



Part 5: Historical Research

Historical research is where you will answer those great background questions to help you truly understand everything about prior development, product makeup, and where the original ideas stem from.

Cite your resources by adding in the title and links. Note the resource title, along with the website or video link you got your information from. **6th–8th grade students, please note the proper format for MLA below.*

Questions to ponder	My research answers
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Select at least seven questions to answer: 1. What is the history behind this product? 2. Who originally invented ___? 3. How does a ___ work? 4. What are the different parts of a ___? 5. What are the important characteristics of ___? 6. How is performance measured from or using ___? 7. Where does ___ get used? 8. What is ___ made of? Why? 9. What is the best material, component, or algorithm for building ___? 10. How has the system or process evolved over time? 11. What are the engineering concepts behind this project? 12. How does this design impact everyday life? 13. What is the importance of this topic?	Answer logistical questions here.
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Historical research

Summarize at least three key points from your historical research. Then share how this information affirmed your design or caused a productive change in your design. (4–6 sentences)



Part 6: Ideation Research

Ideation research is where you will determine if you are truly creating something new or if you are redesigning a product/system enough to call it your own. Cite your resources. **6th–8th grade students, please note the proper format for MLA below.*

Ideas to get you started	My research answers
Answer these seven questions: 1. What product(s) or system solves a similar problem as your idea? 2. What is the history of this product or system? 3. What are the strengths and weaknesses of a product/system that solves a similar problem? 4. What are the key, must-have features of products that solve a similar problem? 5. Why did the engineers design the similar products the way they did? 6. How can I measure my design's improvement over existing designs? 7. Is my idea unique or original? Or did I redesign this product/system enough?	Answer your ideation questions here.

Ideation research

Summarize at least three key points from your ideation research. Then share how this information affirmed your design or caused you to change your design. (4–6 sentences)



Final Design Iteration

Based on all of your research, draw or insert an image of your most updated engineering project idea below.



OPTIONAL

Compile from above (copy and paste) all of your summaries you wrote into one larger summary that walks the audience through your user testing information, how your historical research impacted your project, how your ideation research caused you to think deeply about the solution, and what changes were ultimately made to your project design. Add an introduction that includes your problem statement and a conclusion paragraph. Wow! Look at all that hard work. You are more than ready for the report part of this project.

Please note: The following rubric is intended to support students in determining their quality of work. Rubrics help students understand what success looks like and what they should strive for in order to excel in the state Science and Engineering Fair. The results of this rubric are not to be used toward grade-level content grades.

BACKGROUND RESEARCH: PART B RUBRIC

	4 points	2 points	0 point	Total Points
Interview artifacts 	The student has artifacts prepared to show interview data collection on 6 or more users.	The student has artifacts showing interview data collection on 2–5 users.	The student has limited or no artifacts showing interview data collection.	
Interview summaries 	The student is able to explain how data collected from user interviews changed or affirmed their design ideas.	The student is somewhat able to explain how data collected from user interviews changed or affirmed their design ideas	The student did not complete this activity.	
Historical research 	The student has answered 7 or more historical research questions.	The student has answered 2–6 historical research questions.	There is no evidence of student responses.	
Historical research summary 	The student is able to find 3 key points from their research and reflect on how this information will impact their design.	The student is unable to find at least three key points and/or is unable to make clear connections between this information and their design.	The student did not complete this activity.	
Ideation research 	The student has answered 7 ideation research questions.	The student has answered 2–6 ideation research questions.	There is no evidence of student responses.	
Ideation research summary 	The student is able to find at least 3 key points from their research and reflect on how this information will impact their design.	The student is unable to find at least three key points and/or is unable to make clear connections between each point and their design.	The student did not complete this activity.	
Design sketches 	The student's drawing or image of their idea shows evidence of iterations and/or intentional consistency from before the historical and ideation research phases to after those research phases.	The student's drawing or image of their final design idea is the exact same drawing or image from before the historical and ideation research.	The design idea drawings or images are missing.	
Total for Research Summary				/28 pts



Works Cited information

Your list of Works Cited details the resources that you used in your research. It is very important to give credit to the resources you have found, and the Works Cited will help you do that in an organized way.

8th graders will receive a grade for this portion. 6th and 7th grade students are encouraged to practice using MLA, but will not be graded on the accuracy of the formatting. 4th and 5th graders are encouraged to keep a list of references.

Works Cited:	Works cited examples (MLA format)
• Works Cited lists the sources you used in your research. • You must have at least three sources. • These sources can be found in physical form (e.g., books, magazines, encyclopedias) or in digital form (e.g., newspapers or science journals). • Make sure these sources are credible (not Wikipedia). • Use MLA format and keep the works cited on a separate sheet from the research paper. • If you have questions on how to properly cite your sources, ask your science or ELA teachers. • Remember to keep a complete list of all sources used to conduct the research (<i>even if you don't think you'll use the source in the end</i>).	Woodwell, George M., et al. "Plant." <i>Encyclopedia Britannica</i>, 15 June. 2021, https://www.britannica.com/plant/plant. Accessed 21 July 2021. Schons, Mary. "Sweet Secrets. <i>National Geographic</i>, 21 Jan. 2011, https://www.nationalgeographic.org/article/sweet-secret/7th-grade/. Accessed 24 July 2021. For more MLA resources, check out this folder and on slides 50–51 of Science and Engineering Practices Presentation.

6th–8th Grade Works Cited Template

Source 1

- Title:
- Main Idea:
- MLA Citation:

Source 2

- Title:
- Main Idea:
- MLA Citation:

Source 3

- Title:
- Main Idea:
- MLA Citation:

Source 4: Optional

- Title:
- Main Idea:
- MLA Citation:

Source 5: Optional

- Title:
- Main Idea:
- MLA Citation:

WORK CITED RUBRIC (4th–7th Grade)				
	2 points	1 point	0 points	Total Points
Title	Three credible sources with titles are cited above.	Three sources are listed above, with some errors.	Fewer than three sources are listed above.	
Grade 4–7 Total for Works Cited				/2 pts

Grades 4–7 Checkpoint 4 total points: 30

WORKS CITED RUBRIC (8th grade only)				
	2 points	1 point	0 points	Total Points
Title		Titled "Works Cited"	Incorrect or missing title.	
Source 1 Credibility		Source 1 is a credible source.	Source 1 is not a credible source (or is missing).	
Source 2 Credibility		Source 2 is a credible source.	Source 2 is not a credible source (or is missing).	
Source 3 Credibility		Source 3 is a credible source.	Source 3 is not a credible source (or is missing).	
Source Formatting	Sources are correctly formatted.	Some sources are correctly formatted.	Sources are not correctly formatted.	
Grade 8 Total for Works Cited				/5 pts