Background Research

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Senior Secondary

Effective background research will give you the necessary information to understand, design, and build the foundations of your project.

A **background research plan** will form a roadmap of the questions you need to answer to solve your problem. Your research plan will need to:

1. Identify the keywords in the problem you're trying to solve. *Brainstorm additional keywords and concepts.*

2. Use a table with the "question words" (why, how, who, what, when, where) to generate research questions from your keywords. For example:

   What is the difference between a series and parallel circuit?
   When does a plant grow the most, the day or night?
   Where is the focal point of a lens?
   How does a java applet work?
   Does a truss make a bridge stronger?
   Why are moths attracted to light?
   Which cleaning products kill the most bacteria?
   Throw out irrelevant questions.

3. Add to your background research plan a list of materials and digital technologies you might use to solve your problem.

4. You should also plan to do background research on the challenge problem and any previous similar problems.

5. Conduct surveys for potential user feedback.

Why the Need for Background Research?

To solve a problem, you need to first understand where the problem comes from and who/what it affects.

You also want to learn from the experience and mistakes of others – utilising your library and the Internet will give you a quick upper hand.

A scientist named Mike Kalish once said:

> *"A year in the lab can save you a day in the library."* *(Think about it...)*

"Question Words" Table

The secret is to use the "question words" (why, how, who, what, when, where) with your keywords. Ask why things happen, ask how things happen, ask what causes things to happen, etc. Filling in a table can help.

Question Word	Fill Your Keywords in the Blanks *These are just samples to get you thinking; there are always many more questions and the most important ones for your project may not be in the list!*	Relevant? Yes/No
Why	Why does _____ happen? Why does _____ _____?	
How	How does _____ happen? How does _____ work? How does _____ detect _____? How do I measure _____? How do we use _____?	
Who	Who needs _____? Who discovered _____? Who invented _____?	
What	What causes _____ to increase (or decrease)? What is the composition of _____? What are the properties and characteristics of _____? What is the relationship between _____ and _____? What do we use _____ for?	
When	When does _____ cause _____? When was _____ discovered or invented?	
Where	Where does _____ occur? Where do we use _____?	

You can always find more information to research, but some questions just don't have anything to do with your project or the problem you're trying to solve.

Are your questions relevant?

Questions that will help you design and understand your project are called *relevant questions*.

Questions that **will not** help you design and understand your project are called *irrelevant questions*.

Some of those irrelevant questions might be very interesting to you; they just don't belong as part of your project.

Sometimes you won't be sure whether a question is relevant or not, and that's always a good time to get the opinion of your teacher or mentor.

Background Research Plan Checklist

	Phase	What to do
1	Have you identified all the keywords in your project question?	Yes/No
2	Have you used the question word table to generate research questions?	Yes/No
3	Have you thrown out irrelevant questions?	Yes/No
4	Will the answers to your research questions give you the information you need to complete your project?	Yes/No
5	Do one or more of your research questions specifically ask about the needs of the end-user of your project outcome?	Yes/No

For a good Background Research Plan, you should answer "Yes" to every question.