

Pathway To Do Research:

- Choose a broad topic: First, you should choose a broad topic you are interested in, like biomedical engineering or cellular biology. You have to make sure the topic you choose to research is very interesting to you, as if it's not interesting to you then after some time you would lose the motivation to continue researching.
- Read several research papers aligning with that broad topic: Next, you should read many research papers that fall into the broad topic you chose. Suppose you choose biomedical engineering, then you could read a research paper that presents the idea of an innovative technology to lower healthcare costs by improving diagnostic accuracy, enhancing treatment outcomes, or developing more cost-effective medical devices. After you have read many research papers, select a few papers that you liked the most.
- Gaps in research: After selecting those research papers, try to look for gaps in the research. These gaps in the research that you find can be the sprouting seeds for a very good research idea. From these gaps in research you can create a research question.
- Hypothesis synthesis: After creating a research question, you will be able to do more literature review through more research papers aligning to that question and take notes on each paper. Once you have the notes and have gone through the literature review you will be able to make a hypothesis to your question.
- Experiments: After you have your hypothesis and research question ready, you will be able to start experimenting to get the required data needed to prove that your hypothesis was right. You can conduct lab experiments (through the usage of a mentor at an institution) or you can also conduct experiments at home (as long as it is safe and doesn't require advanced PPE and advanced technology. You can also conduct experiments through computer simulations. Computer simulations mimic what would happen during a real wet-lab experiment and provide pretty accurate results (however it is not always accurate).
- Analyzing the data: Once you have the data from your experiments, you will be able to analyze the data through either equations and other quantitative analysis methods, or qualitative analysis. When you analyze the data you receive, you can see whether your hypothesis was right or wrong. If your hypothesis was wrong, it's okay! Scientists always face obstacles along the way, but they always push through it and get beneficial results in the end. If your data didn't support your hypothesis, you can refine your hypothesis based on the new information and adjust your experiment to explore different variables or factors, which may lead to more accurate or insightful conclusions.
- Conclusion: Once you have your analysis of your data, it's time to put all of the hard work you've done in a published research paper, a poster (if you're competing for a competition), or even a video presentation.

I hope all of you are able to have much success with research!