

Student Design Process Guide

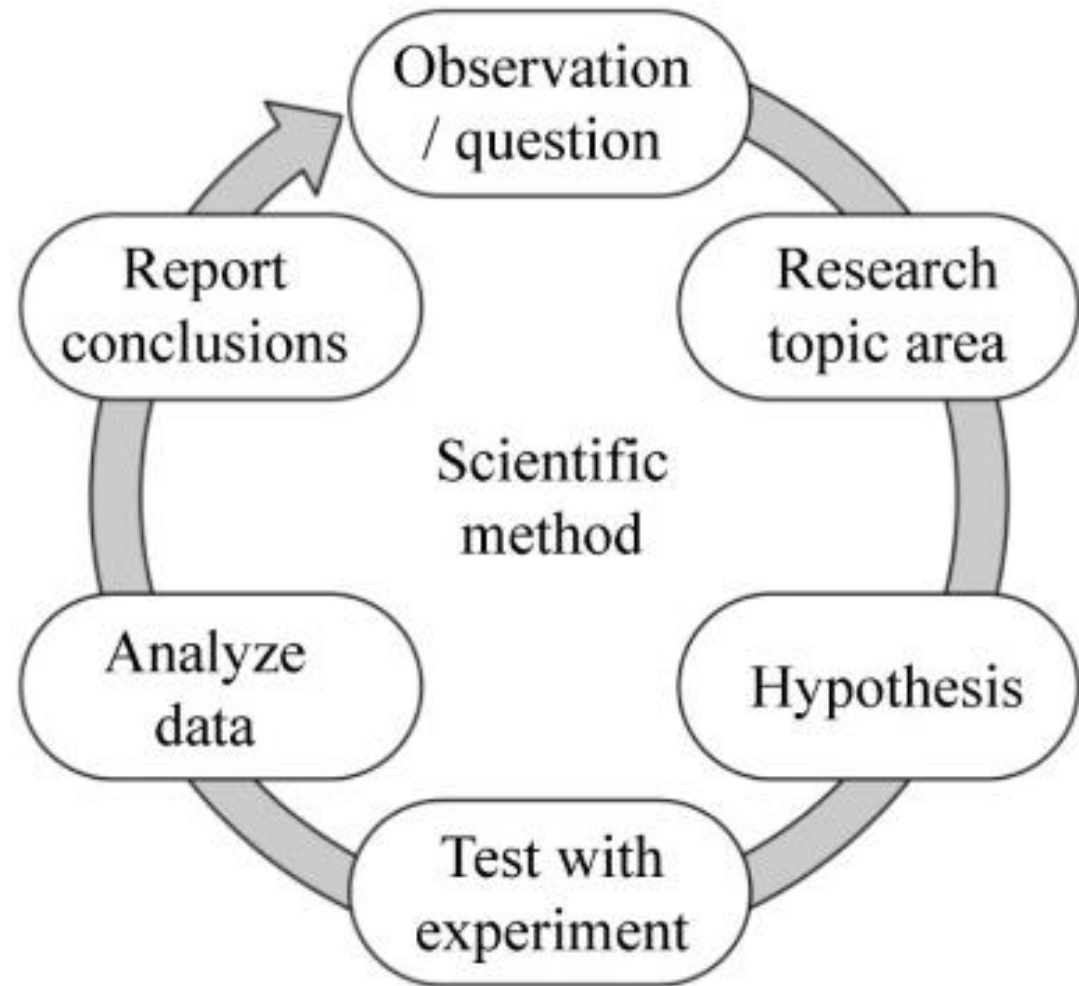
Health Innovation Challenge



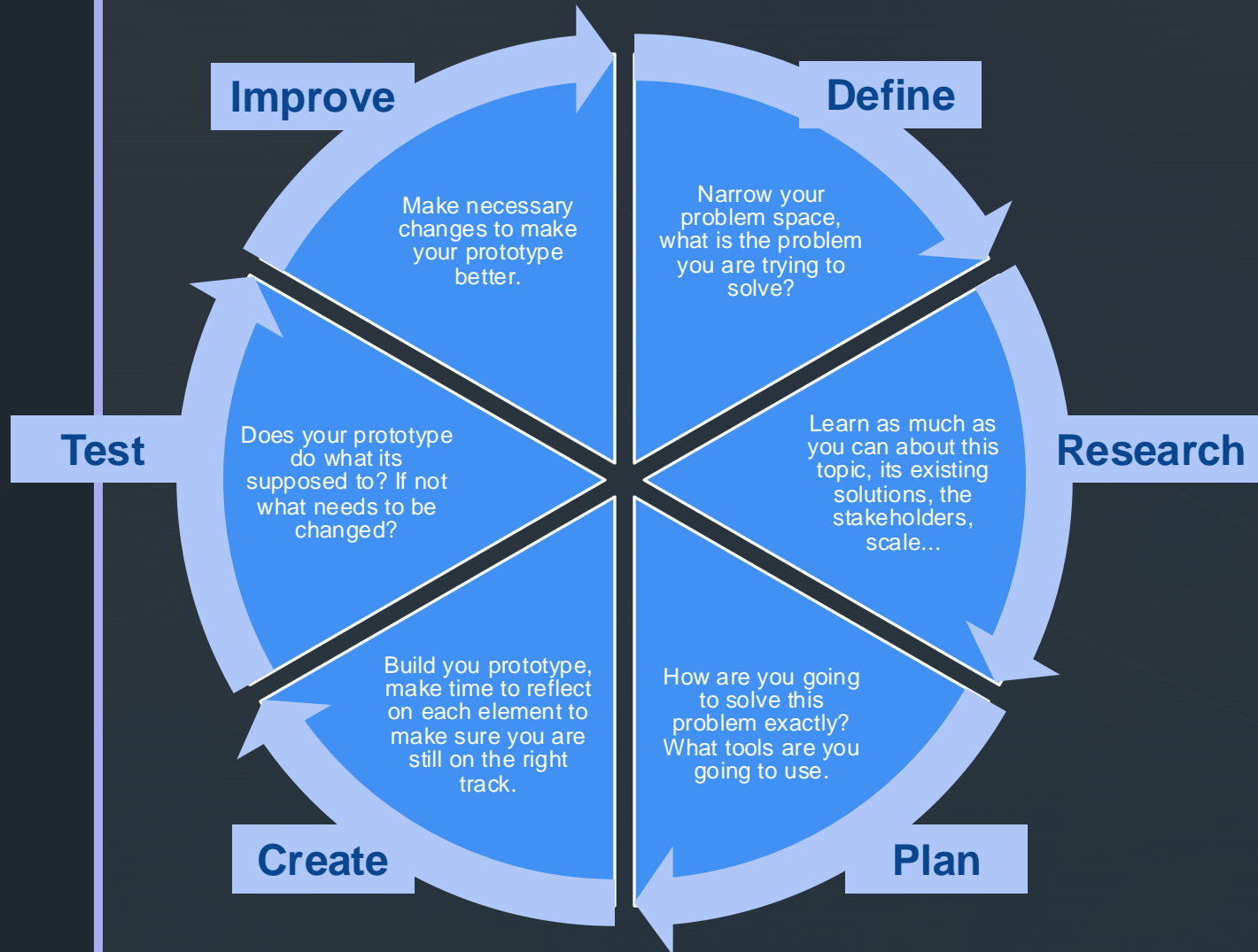
The Scientific Method

The most common way we approach problems in the scientific community is with the **Scientific Method**.

The same skills can be applied into engineering design with a more iterative approach.



The Engineering Design Process



There are many different variations of the engineering design process, but they all break down to similar key features.

Some other variations that are used:

- Iterative Design Process
- Design Sprint
- Double Diamond Design Process

How to Use This Resource

Using your knowledge of both the scientific method and the engineering design process, work through your chosen problem to create a functional prototype!!



Follow this slideshow to guide you through the design process.



Keeps notes on each slide to organize your thoughts.



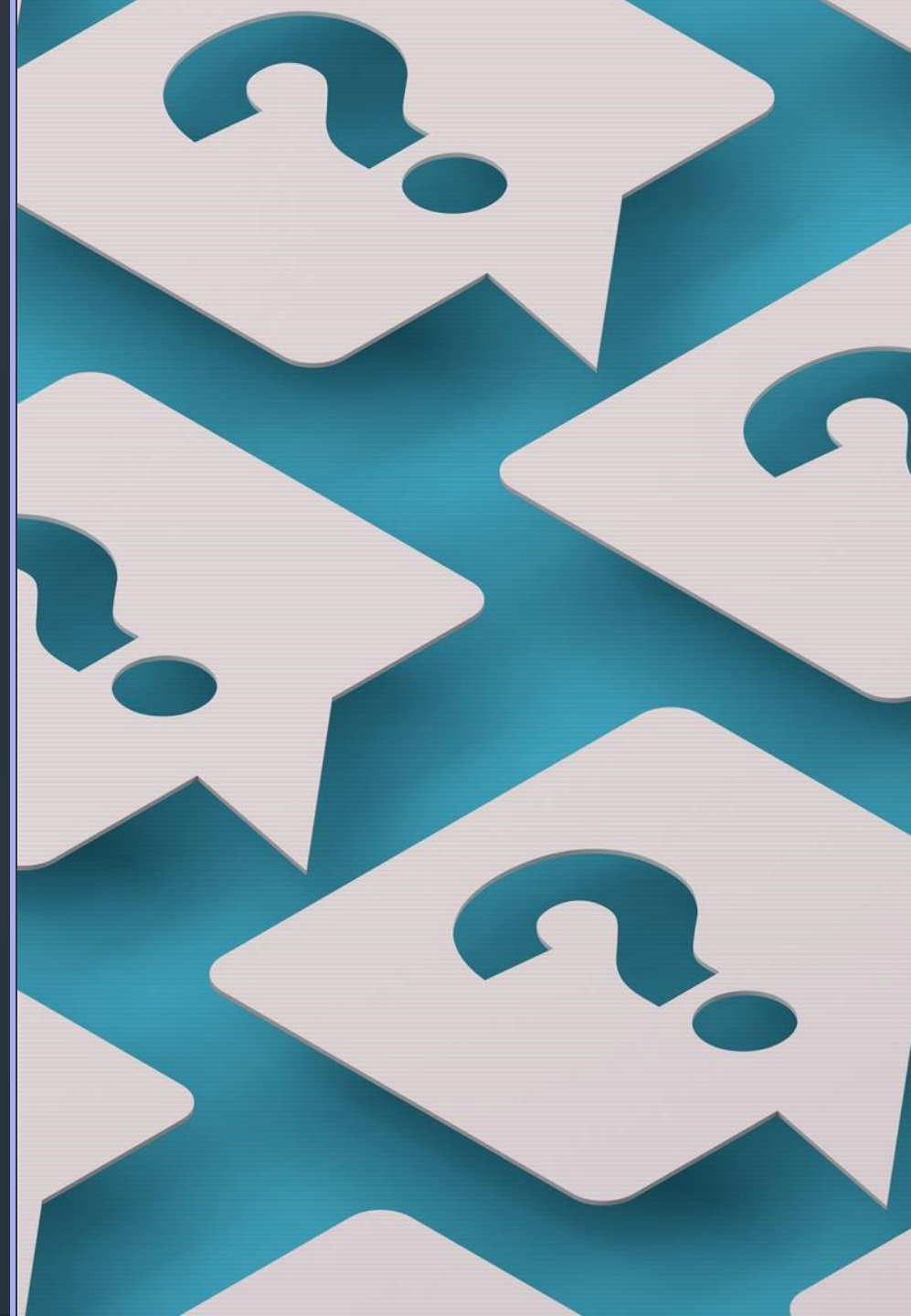
Use your responses from these slides in your presentation



Let's Get Started!!

What Problem Are You Solving?

- Pick one of the pre-defined problems or find another that works within the problem space.
- Ideate more specific topics within that problem space to narrow the scope.



What Do You Need To Research?

What is relevant to your problem space?

What research studies have been done in this problem space?

What are different ways to approach this problem?



Who Is Affected By This Problem? (Stakeholders)

- Who is meant to use/ directly benefit from this solution? (primary stakeholder)
- What is the scale of the problem? (# of people affected)
- Who else holds stake in the success/ failure of this solution? (secondary stakeholder)

What Solutions Already Exists In This Problem Space?



How do Hospitals currently attack this issue?



What solutions in your problem space already exist?



What are common flaws in these solutions?

Write Your Problem Statement

Now that you know what you want to solve, who it affects, and the scope of the solution, create a problem statement.

- Write one sentence declaring your specific goal within the problem space.

Ex. Design a device that allows children to safely reach kitchen objects on shelves between 5ft and 7ft high.



Skills Assessment



WHAT ARE YOUR INDIVIDUAL
STRENGTHS?



WHAT KIND OF SKILLS DO YOU
WANT TO DEVELOP WITHIN THIS
INNOVATION CHALLENGE? WHAT
DO YOU WANT TO LEARN?



WHAT MAKES YOU PASSIONATE
ABOUT THIS PROBLEM SPACE?



How Are You Going To Approach The Problem?

- Do you want to create a new solution? Make an existing one better?
- Do you want to use this opportunity to learn how to do something new? (electrical prototyping, webdev, user interface, AI chatbot)
- Are you going to talk to stakeholders? Who?

How Will It Work?



What exactly is your solution going to do?



What elements are needed in your solution to make this happen?



What tools are you going to use to build it?
Software? Hardware?

What Regulations Does It Need To Meet?

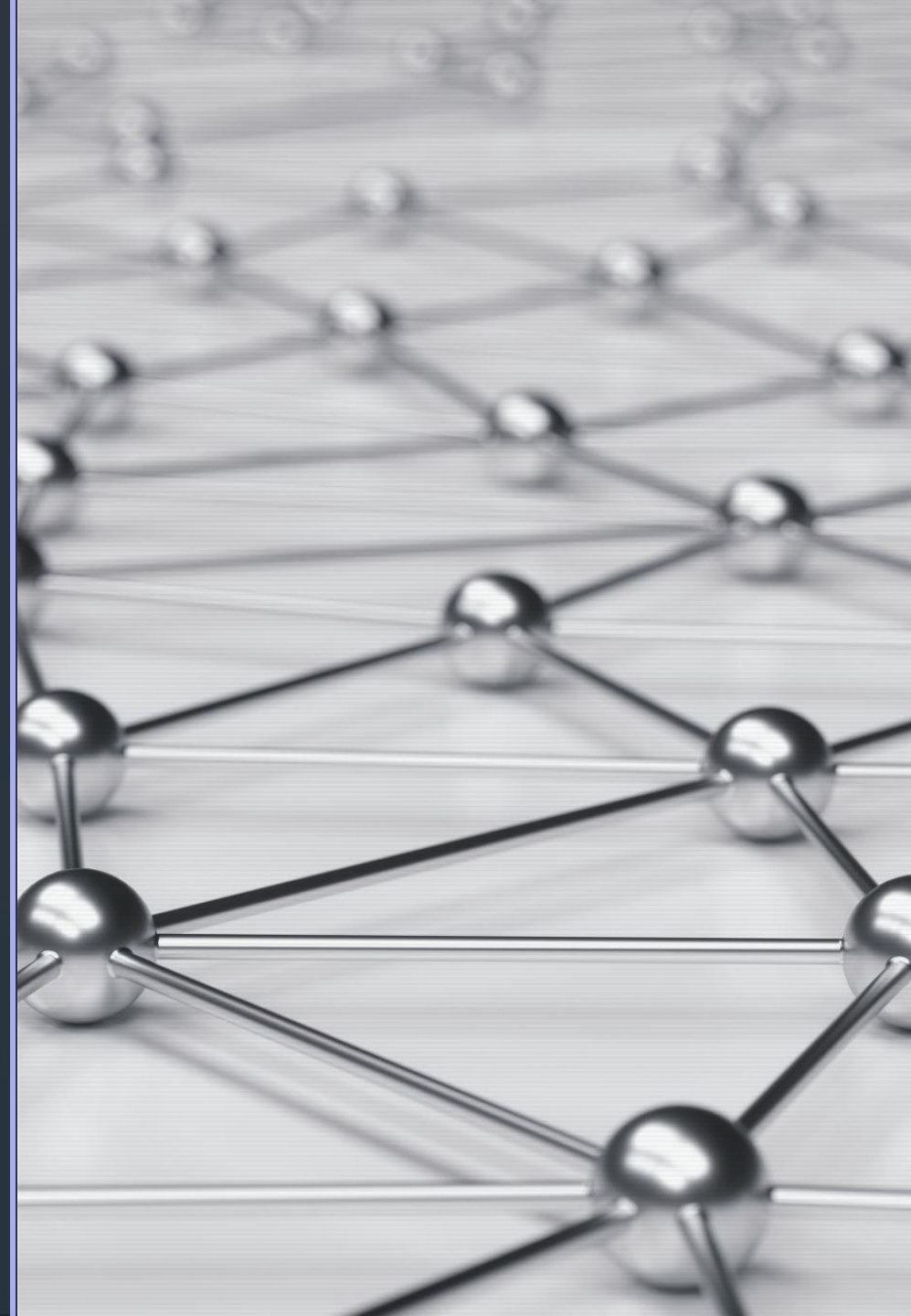
Now that you have a better idea of what you are making, and how it is going to work, you can determine what kind of medical device you are creating.

- Class 1 medical device (Low risk: i.e. thermometer)
- Class 2 medical device (Med risk: Not allowed)
- Non-medical device

In all of these cases there will be privacy regulations and construction regulations to be considered.

What Materials/ Tools Will You Need?

- What method of prototyping would be the best way to showcase your idea?
- What tools/ materials do you need to build it? (More specific)
 - What do you have access to?
 - Which of those do you know how to use/ are comfortable with?
- What level fidelity prototype are you making?



Is It Practical To The Target Audience?

Is it user
friendly?
Intuitive?

What does
the flow of
use look like?

Is it time-
consuming to
use?



What Is Its Impact?

- Does it work how it was supposed to?
- Realistically, what will this solution do for your stakeholders?
- How will it improve their way of life?
- What is the scale of this impact
- What are its limitations?

How Does It Prioritize Patient Wellbeing?

- Is the solution safe? Even when used incorrectly?
- What is the risk vs benefit analysis of the solution?
- What risk factors does the solution take into consideration?



What Are Its Ethical Implications?

- How is privacy addressed?
- How are patient risks addressed?
- Are there any ethical obstacles?
- Are there individuals that this solution does not cater to? (gender, race, age, build...)





Next Steps

- What could you do better if you were to re-do this design challenge?
- What were your areas of strength? Weakness?
- How could you further develop this idea with more time and resources?