Reflection

How would you find out what modifications could be made next in order to keep improving your design?

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What would you modify next to try to keep improving your design?

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What else could your design be used for? What other problems could it help solve?

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got problems?

let's solve 'em.

_____

Engineer's Name

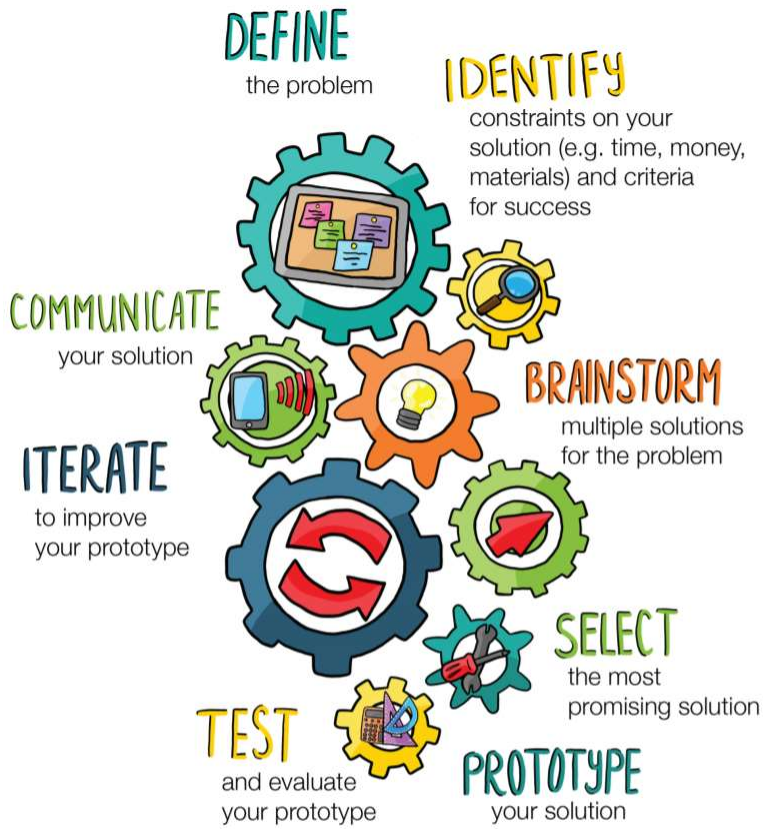

Image Source: https://az.pbslearningmedia.org/resource/eg-design-process/et-design-process/

DaNel Hogan – STEMAZing.org
Brooke Meyer and Sherrie Dennis – SARSEF.org

Notice Problems

Describe problems you notice that a person (could be you) or an animal or a plant has. This problem could be something that is difficult for them to do, puts them in danger, makes their day harder, or causes them to struggle. It could also be something that would make their life better – more fun, easier, happier, etc.

For each problem, identify who has the problem and describe what it is.

Who? _____

Problem _____

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_____ ☐ STEM Solvable

Who? _____

Problem _____

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_____ ☐ STEM Solvable

Who? _____

Problem _____

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_____ ☐ STEM Solvable

Website Design for Product

Make a sketch of what the homepage for this product would look like. Be sure to include your product logo and slogan on the site.

Marketing

Name of Product _____

Slogan _____

_____

Company or Product Logo

Key Features _____

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Notice More Problems

Who? _____

Problem _____

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_____ ☐ STEM Solvable

Who? _____

Problem _____

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_____ ☐ STEM Solvable

Who? _____

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_____ ☐ STEM Solvable

Who? _____

Problem _____

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_____ ☐ STEM Solvable

Brainstorm Solution

Imagine a STEM solution for one of the problems you identified. Draw and describe the solution below. Don't worry about whether the solution seems possible or not. Just think of ways you could make life better for the person, animal, or plant.

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Draw and label final prototype/model.

Final Prototype/Model

Who? _____

Problem _____

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Description of Final Prototype/Model

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How does it solve the problem?

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How will your solution help the person/animal/plant with their problem?

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How will you know if it is doing what you want?

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What challenges do you think you will have when trying to design a prototype/model of your solution?

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Can you think of modifications to your idea, which would make it more likely to solve the problem? Describe them.

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Brainstorm Solution

Imagine a STEM solution for one of the problems you identified. Draw and describe the solution below. Don't worry about whether the solution seems possible or not. Just think of ways you could make life better for the person, animal, or plant.

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Data Table

Independent Variable:	Dependent variable:_____ Units:_____				
Units:	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5

Prototype/Model is: Better / Same / Worse
(circle one)

Observational or Quantitative Evidence

From the test you did, describe either observational data or quantitative data to support your claim that the prototype model is better, the same, or worse.

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Modification: Keep / Kick
(circle one)

Describe a modification can make to your prototype/model.

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Make the modification.

Describe the procedure for a test you will conduct to determine if the modification has made the prototype/model perform better, the same, or worse than before. How will you know if it is better?

Test Procedure: _____

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How will your solution help the person/animal/plant with their problem?

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How will you know if it is doing what you want?

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What challenges do you think you will have when trying to design a prototype/model of your solution?

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Can you think of modifications to your idea, which would make it more likely to solve the problem? Describe them.

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Brainstorm Solution

Imagine a STEM solution for one of the problems you identified. Draw and describe the solution below. Don't worry about whether the solution seems possible or not. Just think of ways you could make life better for the person, animal, or plant.

Draw and label modification idea.

Fellow Engineer or Customer Critique: Let another engineer or a customer use your current design and give you feedback. Either you or your fellow engineer can record feedback to the following questions:

- What do you like about this design?
- How could this design be improved?
- Are you having any trouble using it? If so, what is frustrating about using the prototype/model?
- Do you have any other suggestions for modifying this the prototype/model to make it better?
  - How could it be more fun?
  - How could it be easier to use?
  - How could its performance improve?
  - What could be done to make it look incredible, or sleek, or cool?

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How will your solution help the person/animal/plant with their problem?

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How will you know if it is doing what you want?

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What challenges do you think you will have when trying to design a prototype/model of your solution?

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Can you think of modifications to your idea, which would make it more likely to solve the problem? Describe them.

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Solution Prototype/Model Research

Research other solutions that exist for the problem you identified. Describe them below. How will your solution be better than solutions that already exist or have been tried by others? How can you improve upon these solutions?

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Data Table

Independent Variable:	Dependent variable:_____ Units:_____				
Units:	Trial 1	Trial 2	Trial 3	Trial 4	Trial 5

Prototype/Model is: Better / Same / Worse
(circle one)

Observational or Quantitative Evidence

From the test you did, describe either observational data or quantitative data to support your claim that the prototype model is better, the same, or worse.

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Modification: Keep / Kick
(circle one)

Describe a modification can make to your prototype/model.

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Make the modification.

Describe the procedure for a test you will conduct to determine if the modification has made the prototype/model perform better, the same, or worse than before. How will you know if it is better?

Test Procedure: _____

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Criteria

Describe the desired features of your solution. What will it do? How will it work? What features will it have? How does it eliminate the problem or make it better?

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Draw and label your prototype/model.

Constraints

Describe the limits you will face when making a prototype/model and testing it. What materials do you have available? How much time do you have? How much will it cost? What tools do you have access to for building a prototype/model? Can you reuse or upcycle materials that are available for free? What safety considerations should be considered?

Draw and label modification idea.

Fellow Engineer or Customer Critique: Let another engineer or a customer use your current design and give you feedback. Either you or your fellow engineer can record feedback to the following questions:

- What do you like about this design?
- How could this design be improved?
- Are you having any trouble using it? If so, what is frustrating about using the prototype/model?
- Do you have any other suggestions for modifying this the prototype/model to make it better?
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Build It and Test It

Build a prototype/model of your most promising solution and test it. Describe your procedure for testing it below.

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Independent Variable:	**Dependent variable:**_____ **Units:**_____				
Units:	**Trial 1**	**Trial 2**	**Trial 3**	**Trial 4**	**Trial 5**

Did it meet the criteria? In other words, does it help solve the problem you identified? How?

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Describe a modification can make to your prototype/model.

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Prototype/Model is: Better / Same / Worse
(circle one)

Observational or Quantitative Evidence

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Modification: Keep / Kick
(circle one)

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Modification: Keep / Kick
(circle one)