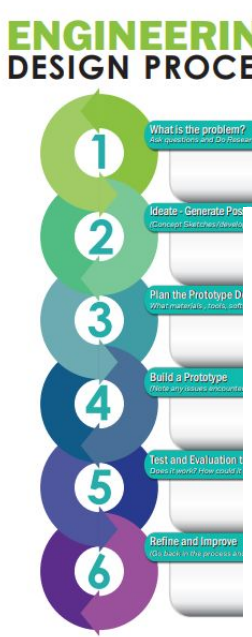
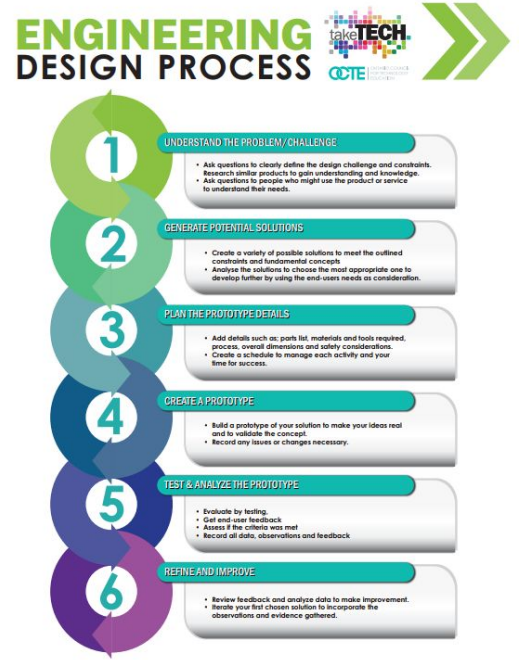
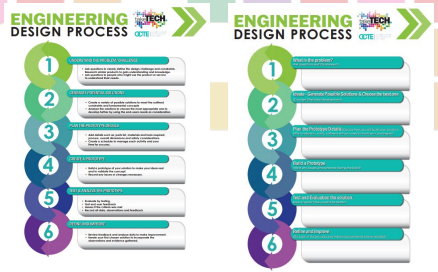
The Engineering Design Process (EDP)







How to use this resource

The following slides can be used in the classroom to help guide you and your students through the Engineering Design Process (EDP). It is a step-by-step deck with prompting questions for each phase of the EDP. There are 3 documents that are included beyond the PowerPoint.

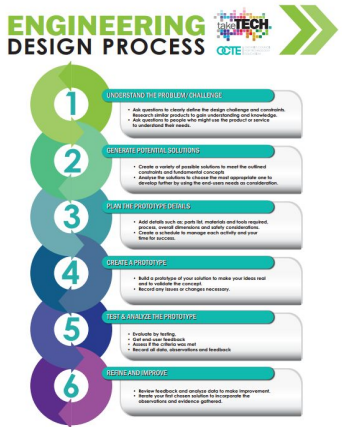
1. Poster - intended to be displayed in the classroom.
2. Pencil/paper placemat (can be laminated and reused) for students. It is consistent with the poster for ease of use.
3. The online fillable document that can be used digitally.(duplicate of the pencil/paper placement but it is fillable)

Please use, modify, and/or change to suit your classroom.

The Engineering Design Process (EDP)

The EDP is a sequence of steps that engineers follow to guide product and process development. Each step is iterative, meaning you can go back to revisit and make changes multiple times.

The EDP provides students with the opportunity to learn from incremental successes and failure. The engineering design process promotes innovation by encouraging students to apply problem solving, creative and critical thinking skills.



EDP Poster

You may print and use this poster to have in your school.

Communicating and Documenting

Engineers use communication and documentation skills to:

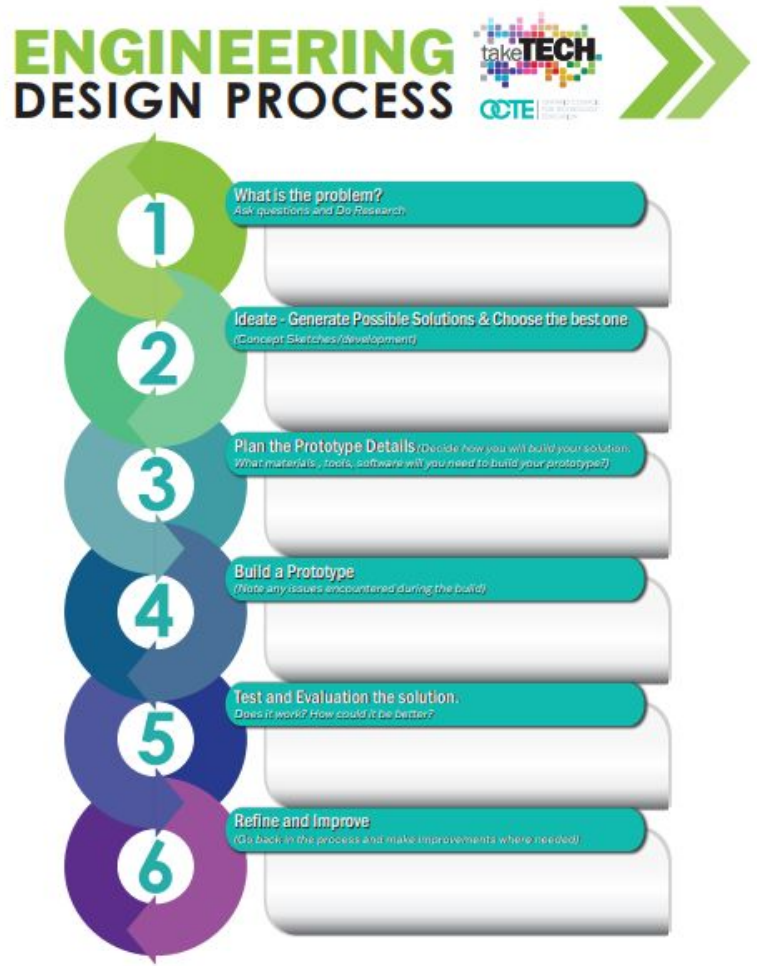
- Document all work, observations, discussions, and test data throughout the EDP process
- Ensure to document your research, sketches, observations, conversations and data to create a portfolio
- Take note of the phase of the EDP you are/were working on and date it for later reference

Student EDP

To support the documentation of all work through the EDP, this graphic organizer, can be used.

It can be a resource to be used on it's own or in conjunction with this slide deck to support student learning.

Printing on 11x17 paper is recommended to provide students with adequate space. You can also use this digital fillable copy.



How to use these slides

Display the slides following the steps. Students can use the following slides for a more in-depth version of each step.

OR

Use the modified version in the graphic organizer.

- What is the design problem criteria you need to know?

- What are the constraints your potential solutions must included? (Cost, size, safety etc)

- What fundamental concepts must you consider when developing solutions?
  - Aesthetics
  - Safety
  - Environmental Sustainability
  - Ergonomics
  - Creation
  - Function
  - Innovation
  - Material
  - Mechanism
  - Power & Energy
  - Control
  - Structure
  - Systems

What are the end-users' needs?

-
-
-
-

What products exist that can help guide your understanding for a solution? Use Reverse Engineering to help you develop potential solutions.

Duplicate as needed

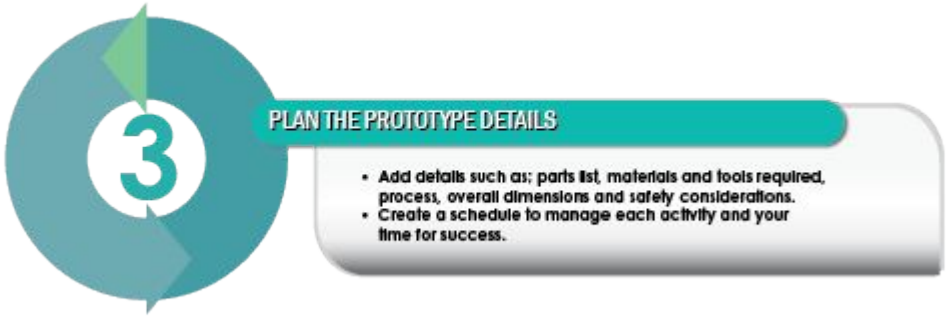
Ideate! Create as many different solutions you can think of.

Concept #1	Concept #2
Concept #3	Concept #4

Duplicate as needed

Evaluate all your ideas and choose the best solution using a pros and cons list by comparing your concepts to the design challenge criteria outlined in step 1

Concept 1		Concept 2	
Pros	**Cons**	**Pros**	**Cons**
•	•	•	•
•	•	•	•
•	•	•	•
•	•	•	•



Duplicate as needed

Create a parts list of all required components including overall dimensions/process flow chart

Materials required:

Material	Size
1	
2	
3	
4	
5	
6	

Tools required:

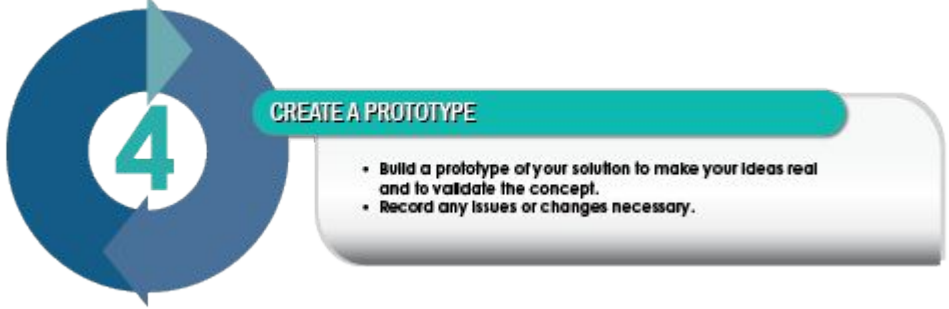
1
2
3
4
5
6

3. Plan the Prototype Details

List all safety considerations that need to be considered when working with the tools, chemicals or other materials for this project

Tool / Chemical	Safety Consideration:
1	
2	
3	
4	
5	

Duplicate as needed

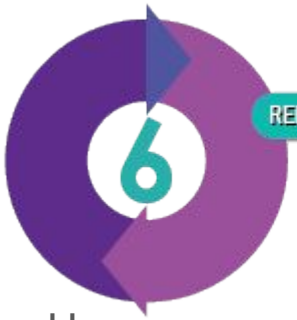


Create a physical/computer model of the chosen design solution to verify the functionality and feasibility of the concept. Consider which type of prototype will work best for your project?

- ❑ A 3D CAD model
- ❑ A 3D printed part
- ❑ Cardboard model
- ❑ A Storyboard/ Website or Photograph
- ❑ A robot / Schematic / get specifics from specialists
- ❑ Plants / An indoor grow kit
- ❑ Process sheets
- ❑ Videos to show techniques
- ❑ Home / Classroom / workshop Landscape layouts
- ❑ A marketing campaign or information session
- ❑ A hairstyle, arrangement, or product

Assess your working prototype in one of the following ways:

1. Test and collect data.
2. Assess if the prototype meets the specified criteria from step 1
3. Get user feedback. Ask Questions like:
    - Does it work like it is supposed to?
    - Does it meet the end-users needs?
    - Is it safe to use?
    - What would you change? Why?
    - What might you add or take away?
    - What other thoughts do you have now?



REFINE AND IMPROVE

- Review feedback and analyze data to make improvement.
- Iterate your first chosen solution to incorporate the observations and evidence gathered.

How can you improve your design?
Use testing, feedback, conversations and observations to guide iterative improvements.
Here is an example of how you can document changes.

Duplicate as needed

Design Issue: Details of Possible Improvements:	Add image or sketch of potential design improvement.

References

Free images from Vecteezy

Download Free Vectors, Images, Photos & Videos | Vecteezy

Ministry of Education Curriculum of TAS10

Technology and the Skilled Trades (gov.on.ca)