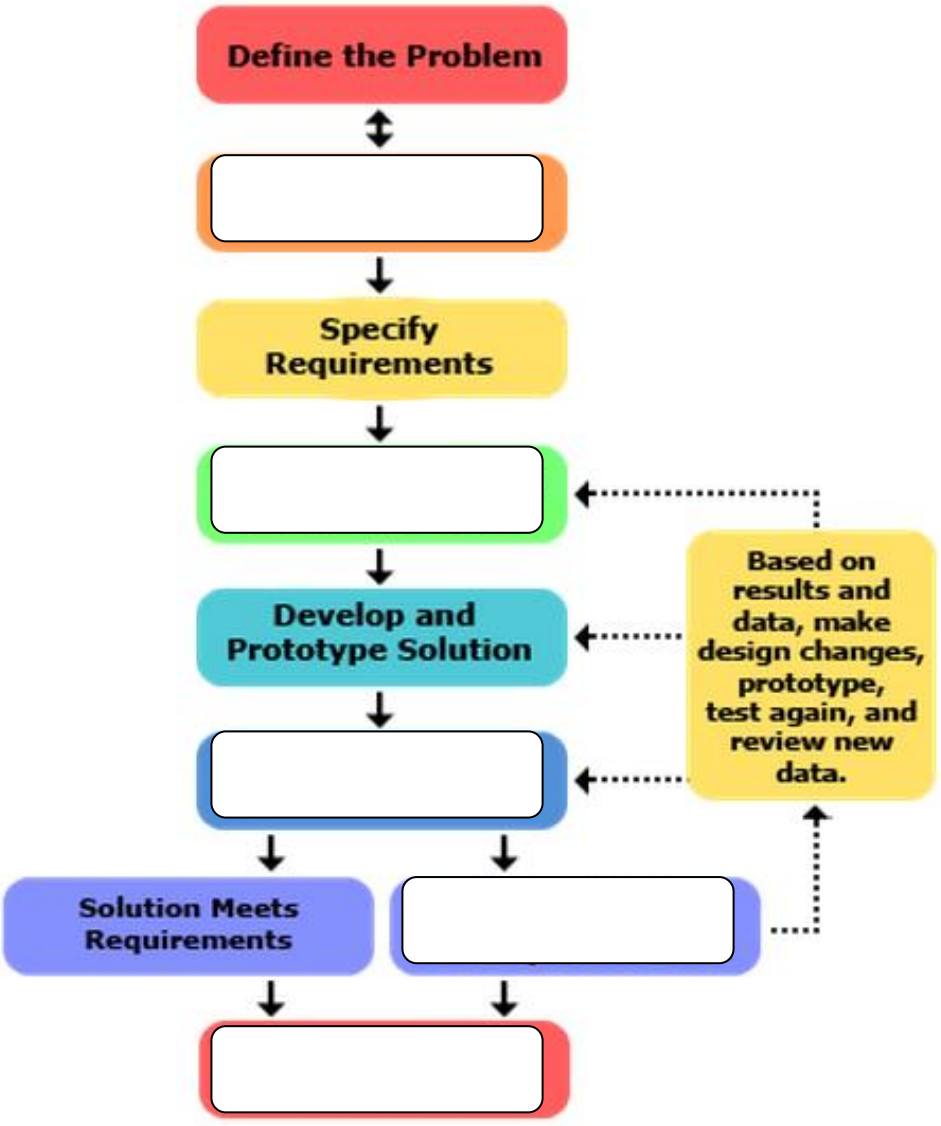
Engineering design process

Switch on

The engineering design process is the set of steps that a designer takes to go from first, identifying a problem or need to, at the end, creating and developing a solution that solves the problem or meets the need.

Put the following elements on the right place on the graph:

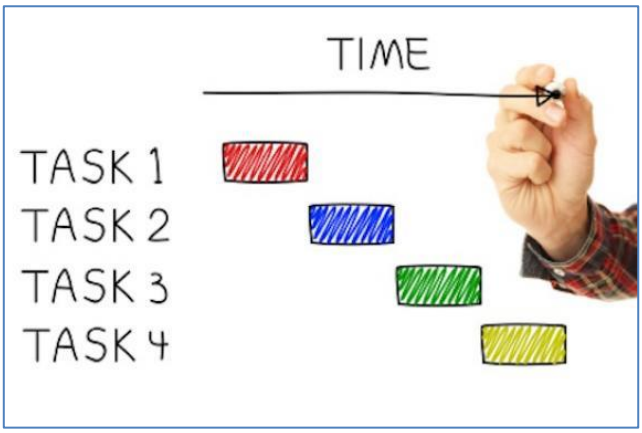
Solution meets requirements partially or not at all
Do background research
Communicate results
Brainstorm, evaluate and choose solution
Test solutions



Vocabulary in action

The key to a successful project is in the planning. Creating a project plan is the first thing you should do when undertaking any kind of project. Below, you'll learn about two tools that will be useful for your project.

A **Gantt chart** is a graphical representation of the duration of tasks against the progression of time.
A Gantt chart is helpful when monitoring a project's progress. A Gantt chart is a type of bar chart that illustrates a project schedule. Gantt charts illustrate the start and finish dates of the tasks.



	TASK 1	TASK 2	TASK 3	TASK 4
	✓		✓	
	✓			✓
		✓		✓
		✓		✓

The **Responsibility Matrix** is used to show the connections between work that needs to be done and project team members. It is especially useful when activities require coordination between several people.

Complete the following sentences:

a) The _____ helps to ensure that work gets done on time and in the proper order.

b) In addition to having something for everyone to do, everything has to have someone. Work distribution should remain as even as possible and a written _____ will help keep the assignments clear to avoid confusion.

Exercise n°1

Answer this quiz and then you'll know if you are a good and worthy team member

1. Why is planning important?
    a) It ensures nothing goes wrong
    b) It will take less time to do the project
    c) It helps you manage your work and get through the project efficiently

3. Which one is NOT part of the planning process?
    a) Identifying all key tasks
    b) Allocating sensible times to each task
    c) Evaluating the effectiveness of the final publication

4. When do you produce a project plan?
    a) In the middle of the project
    b) At the start of the project
    c) At the end of the project

5. A diagram that shows the tasks order and the length of time it should take is called:
    a) a GANTT chart
    b) a GANT chart
    c) a project plan

7. Why is it important to save your work regularly?
    a) So you have different versions of the work you have produced
    b) It will help prevent losing work if the computer crashes
    c) It will make it easier to locate documents

8. Why is it important to give your documents sensible file names?
    a) It will make it easier to locate documents
    b) So you have different versions of the work you have produced
    c) It will help prevent losing work if the computer crashes

Exercise n°2

M. Jones works in an industrial bakery. He's explaining how the machines are making bread:

I work in a large plant bakery. We make bread for supermarkets. Most of the bread people eat in the UK comes from plants like this.
My job is to keep the plant running, to maintain all the machinery.
The entire process is computer-controlled. These are the main stages.

First, 225 kilograms of flour, water, yeast, fat, and other ingredients are mixed in a steel mixer for three minutes to make dough. Then the dough is cut into loaves, it takes one minute, put into tins and left for 54 minutes in a prover for the yeast to work. After that, the loaves are baked in giant gas ovens for precisely 21 minutes. Next, they're left to cool for 110 minutes, and then taken out of their tins using suction. Then they're sprayed with a chemical during a whole minute to keep them fresh longer. Next, the loaves are sliced in a high-speed slicer with giant saw blades. Finally, they're wrapped by the wrapping machine and sent to the supermarkets. The slicing and wrapping actions last 2 minutes.

The process never stops. Our bakery produces 10,000 loaves per hour – that's 240,000 per day!
Make the Gantt diagram of this process

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Project task n°1

You have to create a slide show with your team.

The structure of the slide show has to be as described below:

1st slide: name of the project, picture of it, names of the team members
2nd slide: the function of the device and the context in which it will be used
3rd slide: the design task and the goals to achieve for each team member (you can use a responsibility matrix)
4th slide: the Gantt chart

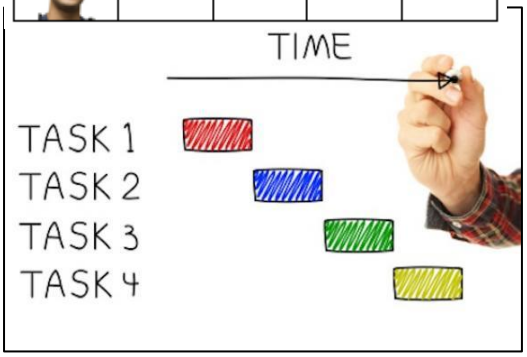
You'll have to present your document to the class

For your own project, follow the steps below and create a **responsibility matrix**:

- identifies all key tasks
- breaks tasks into sub-tasks
- allocate each task and sub-task to team members
- establish clear goals for each team member

For your own project, follow the steps below and create a **GANTT chart**:

- puts all tasks and sub-tasks into sensible order
- allocates sensible times to each task
- includes some time for 'contingencies' (events that could happen in the future, but that aren't planned for)



Revising your plan

No matter how good your plan is, it's unlikely your work will go exactly as you intended. It's a good idea to set two or three key dates during your project where you go through your plan and match up what you have actually done with what you said you would do.
If you are behind, this is a good time to change your plan and set new deadlines and objectives. You may need to be less ambitious about what you hope to achieve.