MARCONI
ISTITUTO TECNICO | SETTORE TECNOLOGICO

S.P.E.E.D.

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What is our school in charge of in the S.P.E.E.D. project?

# THE DESIGN PROCESS

A PRESENTATION BY:

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THE DESIGN PROCESS

The design process generally consists of 5 steps:

1. **define the problem**
2. **collect information**
3. **brainstorm and analyze ideas**
4. **develop solutions and build a model**
5. **test, evaluate and improve your design**

**1) DEFINE THE PROBLEM** by Davide Sandrin

**TIPS:** *Before beginning the design, sort out what problem you are trying to address. Write a short statement giving the general outline of the problem to be solved*.

**Let's see what we have done!**

We have reduced the problem into 2 main questions:

- What is the final product we want?

- What characteristics must the product have?

The first questions helps focus on the target we want to realize, which in this case is a charging station for electric bicycles. . The second question helps us focus on the most important characteristics which we have to improve on our final product; in fact our product has to charge different types of models, be safe and be modulating and be aesthetically appealing .

**2) COLLECT INFORMATION** by Dario Varotto

**TIPS:** *Sometimes a problem can be solved "straight out of your head," but in most cases you will need to gain some new information and knowledge. Ask for details, this will spell out what the design must achieve and what limitations will affect the final solution.*

**Let's see what we have done!**

We asked the Manufacturing Department (Germany) the following questions:

1) What's the most common model of bicycles used in your school/area?

2) How do you want the power station supply to be powered? By photovoltaic panels only, or by any other sources?

3) How many bicycles do you suppose to provide the station for?

4) What materials would you prefer for the realization of the station?

5) What has the administration department budgeted for the project?

The Manufacturing Department:

1.*We have all types of electric bicycles here:from very powerful with big potential (50%) and many of the average power potential (ca. 30%). Just take the average electro bicycle in Europe, but I think that we should consider their potential development in a period of time ox two years seen from now.*

*2. The power station supply will be powered by our photovoltaic panels covering the roof of the building nearby.*

*3. The number of electric bicycles is steadily growing in Germany and in our region. For the time in two years we expect and want to be ready to provide electricity for the bicycles in the region and the tourists travelling through our town whose number we expect to be at least at about 1000 at that time.*

*4. Because of practical reasons we would prefer stainless steel: completely or in combination with plastic panels but the basis/ fundamental part should be made of stainless steel.*

*5. The prices are decreasing with the steady development of this technology, we would be happy to realize the technical equipment with a budget of 3500-4000 euros.*

## 3) BRAINSTORM & ANALYSE IDEAS by Sara Quartesan

**TIPS:** *Combine your ideas with information obtained from your research to suggest several possible design solutions. Sketch several possibilities on paper.*

**Let's see what we have done!**

The aim of this project was to design and manufacture a recharging station for electric bikes. I've been assigned to the design sector and now I'm going to tell you in which way we have carried out our activities.To start with, we focused on the **identification of the characteristics** that our product was supposed to have, then we concentrated on the **creative aspect**, namely the design of the product. Now I' m going to explain the different stages in more detail.

Firstly, we have done a research on the net about the different **operating procedures** to make the single parts of the station, a rack for example; after a while we realized that it would have been more useful to visit a factory operating in the business **to have a general idea** and learn about their production techniques.

Following this stage devoted to the **collection of technical information**, we **discussed** and **gathered** our key ideas; our activity of brainstorming was carried out with the open mind of those who are not familiar with the technical constraints.

Afterwards, we selected the team members with the right skills to work on the design department; at first we worked alone drawing some drafts based on our **individual ideas**, then we presented our finished work to our team and teachers. In my opinion this was the heart of the whole project: with the aim of selecting the best features of each draft we **worked together as a team** by discussing the different options and cooperating to find the best solution.

At the end of this creative process we agreed on the procedure to follow and we loaded the drawings on the 3d computer programs.

## 4) DEVELOP SOLUTIONS/BUILD A MODEL by Giovanni Maggioni

**TIPS:** *Decide which solution to develop. Although the chosen solution should, ideally, be the one that best satisfies the specifications, other constraints such as time, cost, or skills may limit the decision. Draw the chosen design including all the details that are important to its construction. Create a prototype of your new product. In industry a model is usually built first and the final product is developed from it, but in most classrooms, the model is the final product.*

**Let's see what we have done!**

We took some parts from every draft and mixed them together. We took the **mobile arm** from the first draft; the **platform roof** from the second; the **design of the recharging station** from the third; and **the solar panels** for using sustainable energy.
So, starting from this base, we added the all best ideas and after, the singular prototype was shown to the whole group who approved the product.
For showing it better, our mechanic teacher realised a **3D model** of the "filling station".

## 5) TEST, EVALUATE AND IMPROVE YOUR DESIGN by Daniele Vellar

**TIPS:** *Testing is ongoing as the construction progresses, but a final test of the entire system or model proves if the project does the job for which it is designed. Look back at the specifications and check the requirements carefully. Ask such questions as: How well does the design function? Does the design look good? Is the product safe to use? Were suitable materials used? How could I have improved on my design?*

**Let's see what we have done!**

Our task is about a real station that a factory can achieve. First of all we have decided to build this recharging station starting from the most suitable materials to be used in order to create an efficent structure that will be easy, fast and safe for a clever user. For clever usage we intend: "**Don't waste energy and try to use all power produced!**". Besides, we have tried to have special consideration for the look of the station, it has to have an appealing design also because it has to invite you to move by bike and when it's possible, without using a car or a motorbike.

| The Design Process | |
|---|---|
| **1) DEFINE THE PROBLEM** | **1) DEFINE THE PROBLEM** |
| What is the final product we want? | What is the final product we want? |
| | |
| What characteristics must the product have? | What characteristics must the product have? |
| | |
| **2) COLLECT INFORMATION** | **2) COLLECT INFORMATION** |
| Question n. 1: | Question n. 1: |
| Question n. 2: | Question n. 2: |
| Question n. 3: | Question n. 3: |
| **3) BRAINSTORM & ANALYSE IDEAS** | **3) BRAINSTORM & ANALYSE IDEAS** |
| Individual ideas: | Individual ideas: |
| Team's idea: | Team's idea: |
| **4) DEVELOP SOLUTIONS/BUILD A MODEL** | **4) DEVELOP SOLUTIONS/BUILD A MODEL** |
| | |
| **5) TEST, EVALUATE AND IMPROVE YOUR DESIGN** | **5) TEST, EVALUATE AND IMPROVE YOUR DESIGN** |
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