THE DESIGN PROCESS

Designing and making a TOY

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LESSON 1 (Definition)

The teacher introduces the unit by presenting **the power point: the design process** (slides 1 to 6, supplementary material L1) in order to look for the definition of the process.

Students are expected to participate. The teacher can write the different options on the blackboard.

Little vocabulary is introduced.

Activity one

- Give instructions to work in suitable groups of three.
- Give the **Activity one handout** (page 1, student's activities)**.** Ask them to argue, discuss and to write down in the table the stages involved in the Design Process.
- Exchange decisions with the rest of the class.

Activity two

- The teacher suggests making new groups of 3 or 4.
- Give the **cards** (Supplementary material-L1) to each group (A, B, AB).

- They all have five to ten minutes to:

    - **Groups A**: They are given only stages cards and are expected to put in the correct order the stages of the design process.

    - **Groups B**: They are only given the definition cards and are expected to put in the correct order the definitions or explanations of the stages of the design process.

    - **Groups AB**: They are given all the cards and are expected to match the stages of the process with the suitable definition. They don't have to put them in the correct order.

- One person of each group joins together to pool their decisions. The new groups A/B/AB are expected to agree with order, stages and definitions given.
- Give the **handout activity two** (Supplementary material-L1) to write down their decisions.
- All the class participate to correct the activity, with the help of the teacher and the **slide 7** of the power point.
- The teacher explains the definition of each stage (slides 8 to 17, supplementary material L1)
- Students are given finally the **handout of power point.**

LESSON 2 (Introduction)

- Students are given the **Design Process Guide: Index and Introduction** (pages 2-8, student's activities)
- The teacher explains the aims of the project, what are they expected to do and some safety rules in the workshop, in case they didn't know some specific machinery instructions. It is possible to do an activity related with safety rules.
- The teacher explains too the assessment table that the teacher will use to award the marks.
- Students might ask what they need to clarify doubts.
- **Forming groups**. Teacher oversees the groups formed.
- From now on they will always work in groups

LESSON 3 (Design Brief)

- The teacher starts the class with a brief about what they remember from the last two lessons.
- Students are given the handout of the first part of the process: **the brief handout** (pages 9-10, student's activities).
- Teacher explains what is expected at this stage.
- They begin to work in groups following the instructions.
- The teacher oversees the whole work in the class.
- At the end of the class, all the groups should have the design brief done. Alternatively, they can finish it as homework.

LESSON 4 (Analysis)

- The teacher gives the learners the **Analysis handout** (page 11, student's activities).

- Students must start with the 5WH questions and then design a suitable Mind map. It is possible to do it in **ICT classroom** (using Free Mind or Inspiration for example).

LESSON 5-6 (Research)

LESSON 5

- The teacher starts the class with the **preview of the analysis stages** (Wh-questions and Mind map) in each group. He asks for any doubts and gives some advice to each group.

- The teacher introduces the Research stage asking to the learners about how they think they could do suitable research for their specific project. He motivates them and presents the stage as an important step to really know the problem. Once they have done an individual oral contribution, they are given the **Research handout** (page 12-14, student's activities).

- From now on, the teacher can show or give the students the **posters 1, 2 and 3** (supplementary material, L5-L22), in case the learners need to know specific words.

- The teacher explain the different research techniques and encourages them to read the examples given. Then he gives them the instructions to do their research. They must **choose and elaborate at least two different research techniques** to check that users actually want their product and to find out what makes an existing product good or bad and what materials, pre-manufactured components, techniques they can use.

- They are given half an hour to prepare the research and they will have one week time to finish it in case they need to do questionnaires or disassembling objects or experimenting or media research.

LESSON 6

- The students continue with the research and when they finish they come to their **conclusions** to decide how to use the information to help their design
- The teacher is always overseeing groupwork and giving them the necessary advice.

LESSON 7 (Specification)

- The teacher asks the students what they think that secondary functions are. They can give some examples of secondary functions in some objects and how these functions are important when somebody want to buy the object.

- The teacher gives them the **Specification handout** (pages 15-18, student's activities) and explains what they are expected to do in this stage. First of all, to decide their toy **primary and secondary functions.**

- Afterwards, the teacher explains the **design specification points.** Each group has to make a decision in each of the eight points and to give reasons for their decisions.

- Finally the teacher shows how to use a **radar chart** and teaches why this chart is a good tool to have a quick view of the performance of the specification points. Groups have to use the radar chart to evaluate their toy against their Design Specification.

- The teacher is always supervising and giving advice the groups.

LESSON 8-9 (Alternative Solutions)

LESSON 8

- The teacher introduces the Alternative solution stage as the most creative and practical one.

- He gives the students the **Specification handout** (pages 19-21, student's activities) and asks them to ask two peers from other groups to improve their design specifications (they will need to show them the handout with their specification points and their radar chart) in the handout Design Specification Checking (page 20, student's activities) and to reflect the improvements in their radar chart (using different colours to differentiate the opinions).

- Secondly, the teacher proposes to take into account the colleagues' checking and to do a **brainstorming on a mood board.** They should write down any idea related with their toy.

- The teacher supervises the group work and helps the students if it is required.

- The work that hasn't been finished has to be finished as homework.

LESSON 9

- The teacher has a look to the previous work (handout Design Specification Checking and mood board)

- The teacher explains the learners that the aim of the lesson is to reach **three alternative proposals** that match the specification points. Each solution has to be drawn, has to have the necessary **notes** to clarify the most important items (size, materials, colours….). They are recommended to use **different techniques** to represent the toys and the materials they are made of. It is recommended the use of Computer Aided Design and perspective drawing.

- The teacher is constantly supervising the workgroups.

LESSON 10-11(Realistic Solution)

- The teacher introduces next stage, realistic solution, as a decision to make and justify.

- He gives them **the Realistic Solution handout** (page 22, student's activities). The students have to evaluate the range of proposals they did and to choose one of them to make. They must give reasons for the choice.

- Afterwards, the teacher asks them to develop the design in different ways:

    - **orthographic projection** (plan, front elevation and side elevation) of each piece **to scale.**

    - work out exactly what sort of **materials** they will use, how many **pieces** will be needed, their exact **dimensions**, fittings and components.

    - **methods of construction** and **assembly**.

    - **Test,** if necessary**,** different aspects of the design in order to help to solve potential problems.

- The teacher makes sure that the students are expected at the end of this stage to know **exactly what they are going to do**.
- The students are expected to give the realistic solution work to the teacher next lesson.

LESSON 12-13 (Planning)

- The lesson begins with the teacher asking the learners to give him the realistic solution.

- The teacher gives them the **Planning handout** (pages 23-24, student's activities) and introduces next stage by explaining how to plan a process with the **work chart and/or the flow chart (optional).** They have to organise the different steps of the making and arrange what materials, tools, machines and time they are going to need in each step.

- The teacher encourages them to discuss their ideas with him.

- The students are informed that next lesson they have to be prepared to begin the construction.

LESSON 14-20 (Making)

- The teacher is ready to advise the students with all the process. They've already worked in the workshop and therefore they know very well where the tools and materials are and which are the safety rules.

- The teacher gives them the **Making handout** (page 25, student's activities). The students have to follow the work table designed and to note down all the problems they have during the making process.

- The teacher thoroughly recommend them to:

    - be accurate in the making process
    - distribute the different tasks between the persons of the group in order to do more effective work
    - take pictures of the different steps of the making
    - ask any question the teacher
    - use a log book to note the problems and the solutions chosen

- The making process will last many lessons, consequently the work in the workshop has to be constant and the workshop rules have to be followed in all the times.

LESSON 21(Testing)

- The teacher asks for students' opinion about how to test a toy. They spend five minutes approx. talking about the subject.

- He gives them the **Testing handout** (page 26-27, student's activities). They are encouraged to begin planning the testing. After having planned it they are expected to do the **testing and to get an objective assessment**.

- Pictures can be taken too during the testing process.

LESSON 22 (Evaluation)

- The teacher ask for the testing results and students are expected to explain their main results orally.
- The teacher suggests the evaluation of their toy. He demands the different groups' opinion and they discuss about the topic.
- Afterwards, learners are given the **Evaluation handout** (page 28, student's activities)
- Students have to do the tasks showed in the handout.
- When they finish the whole evaluation they have to order all the materials and handouts that they have being working with. They have finished the design process and already have **their toy and their portfolio**.
- But, they have to be prepared to ….

LESSON 23-25 (Presentation)

LESSON 23

- The teacher will introduce the students to the oral presentation of their Design process.
- Learners are given the **Oral Presentation handout** (page 29, student's activities)
- The groups have to :
    - **Design a power point** with all the stages they have followed and with the most important pictures and information they have to explain to the rest of the class.
    - Prepare a suitable **oral explanation.**
- The teacher recommends them to begin the power point with an introduction, secondly with a summary of the stages, including the main difficulties they've had and to finish with a conclusion. The slides have to be clear and accurate.
- With reference to the oral presentation, the oral skills and the balance in the group presentation have to be taken into account.
- The students begin with the PowerPoint presentation in the ICT classroom.

LESSON 24

- The students continue with the PowerPoint presentation in the ICT classroom.
- The teacher gives them the order to present the work for next lesson and encourages them to be confident.

LESSON 25

- The students are given an **Oral Presentation Assessment handout** (supplementary material L-25) to assess the peers' presentation.
- The teacher explains how to correctly assess the rest of the groups.
- The groups begin with the PowerPoint presentation in the ICT classroom.

- At the end of each presentation, each group is expected to formulate a question for colleagues, and they have to answer as well as they can.