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DCG

How to get an O1 in the Leaving Cert DCG Exam and Project

by Val Connell

Val is a teacher at Newpark Comprehensive School in Dublin for the last 8 years. He loves DCG because it is so rewarding and useful in everyday life whether it be in the home or out on the farm

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Introduction

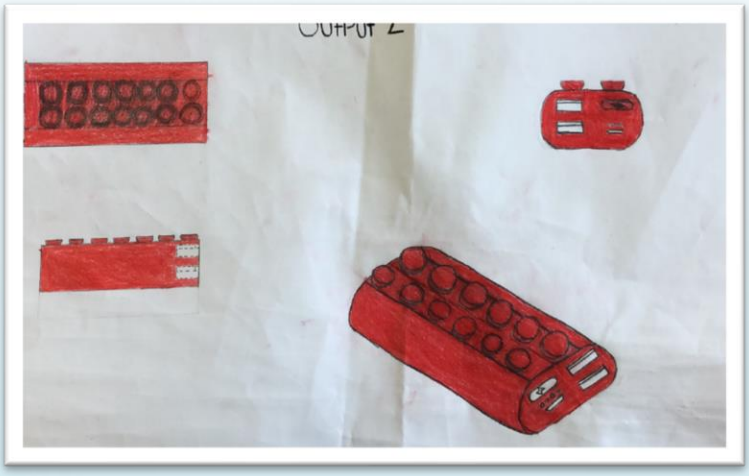
Welcome to your guide to help achieve a H1 in DCG. This guide will teach you the layout of the course. The structure of the project and exam will be discussed. Tips for the project will be given along with useful tips on how to study for the exam

Course structure

The project (40%)

This is a design-based project that involves an investigation of how an existing object is designed. The project gives you an opportunity to modify or come up with a completely new design for the object in question. In addition, you create a computer model of the existing object and your new/modified object. The object in question changes each year and the design brief is released by the state exams each year.

Here are some examples of the projects and design briefs:

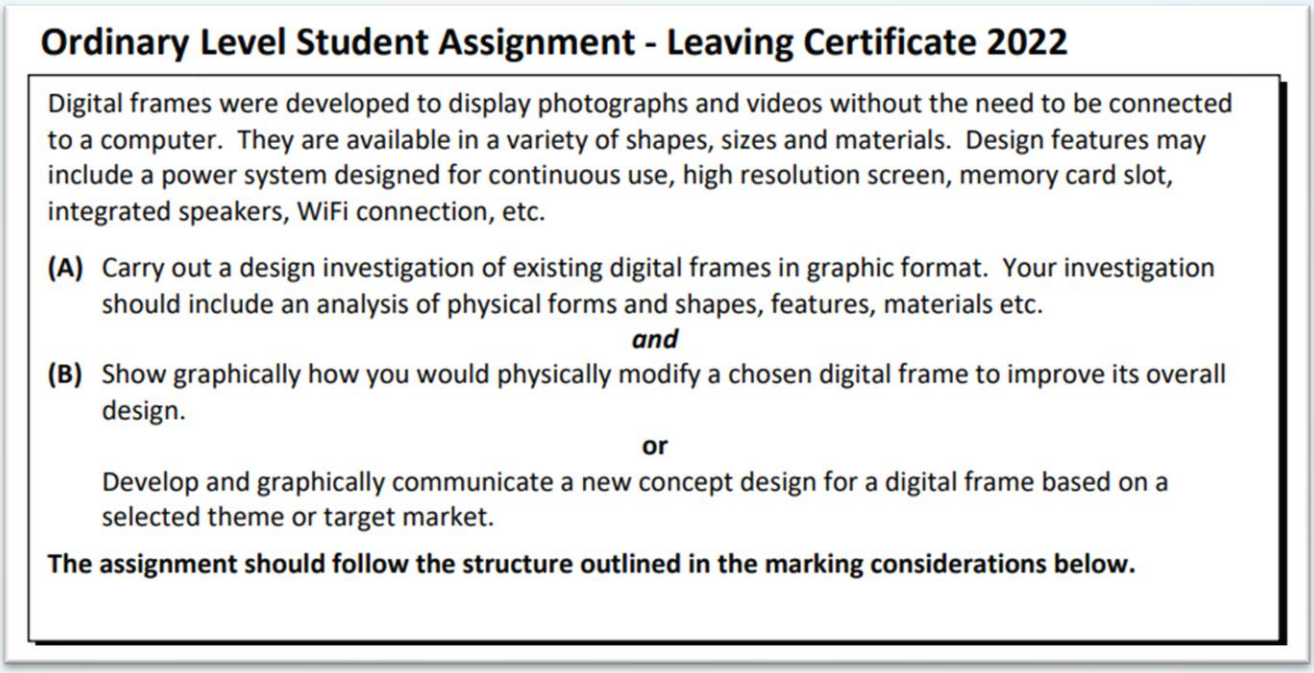


2021 project example

Project examples 2020

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	base		1
2	Plastic Casing		1
3	rubber grip		1
4	Water spouting component	Top Down Assembly Modelled	1
5	Dusket	Top Down Assembly Modelled	1

2017 Project example



Ordinary Level Student Assignment - Leaving Certificate 2022

Digital frames were developed to display photographs and videos without the need to be connected to a computer. They are available in a variety of shapes, sizes and materials. Design features may include a power system designed for continuous use, high resolution screen, memory card slot, integrated speakers, WiFi connection, etc.

(A) Carry out a design investigation of existing digital frames in graphic format. Your investigation should include an analysis of physical forms and shapes, features, materials etc.

and

(B) Show graphically how you would physically modify a chosen digital frame to improve its overall design.

or

Develop and graphically communicate a new concept design for a digital frame based on a selected theme or target market.

The assignment should follow the structure outlined in the marking considerations below.

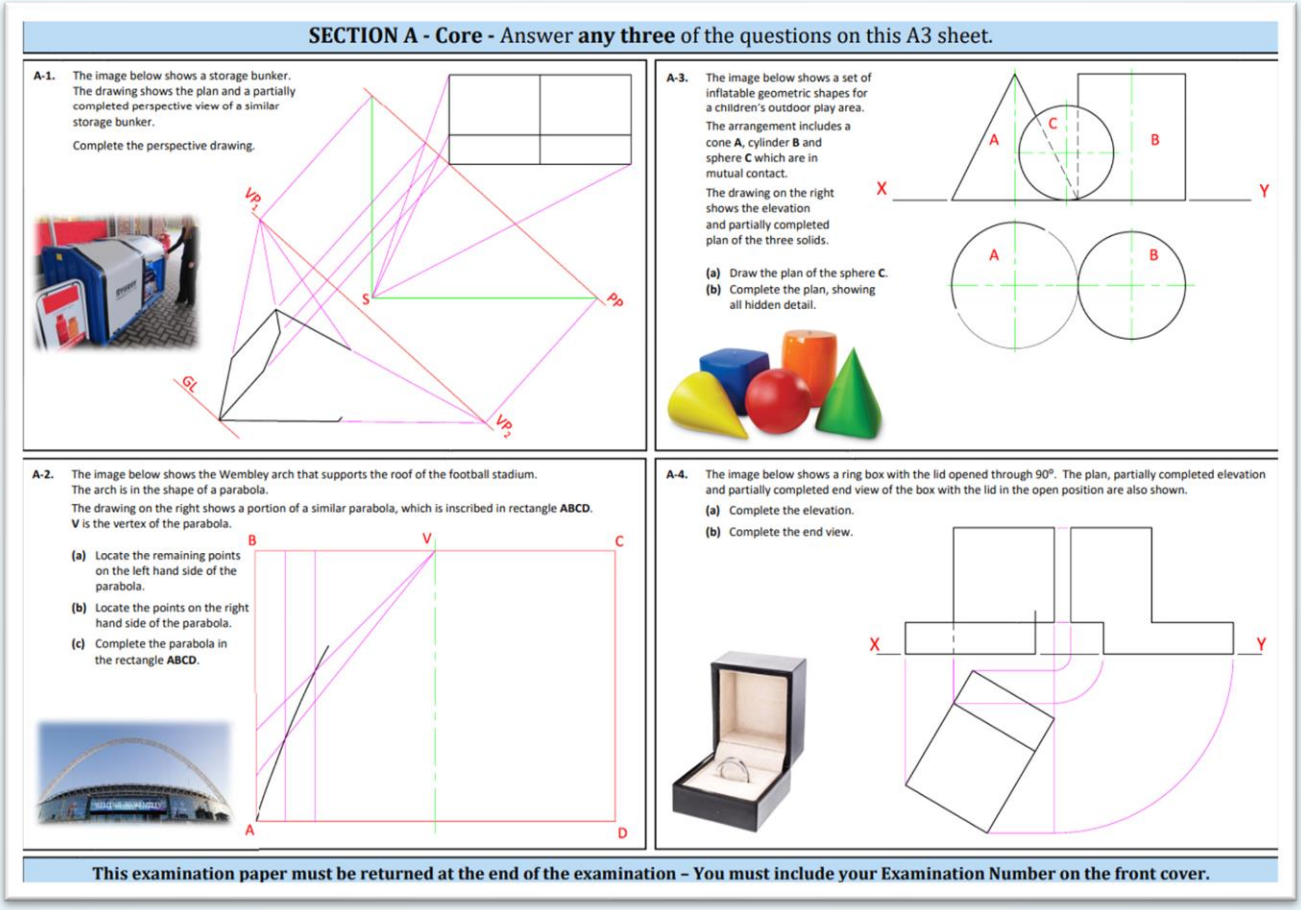
The Exam (60%)

The exam consists of three sections. Section A,B,C

Section A:

Section A is worth 60 marks and consists of four short questions that examine you on the "Core" aspects of the course. These short questions are partially completed and really test your understanding and skills of a topic. You must answer three questions. You must answer these questions on the sheet itself. A common mistake in the mocks at ordinary level is to try and draw this page out from scratch in the exam.

2022 Section A Ordinary level exam



SECTION A - Core - Answer any three of the questions on this A3 sheet.

A-1. The image below shows a storage bunker. The drawing shows the plan and a partially completed perspective view of a similar storage bunker.

Complete the perspective drawing.

A-3. The image below shows a set of inflatable geometric shapes for a children's outdoor play area.

The arrangement includes a cone **A**, cylinder **B** and sphere **C** which are in mutual contact.

The drawing on the right shows the elevation and partially completed plan of the three solids.

(a) Draw the plan of the sphere **C**.
(b) Complete the plan, showing all hidden detail.

A-2. The image below shows the Wembley arch that supports the roof of the football stadium. The arch is in the shape of a parabola.

The drawing on the right shows a portion of a similar parabola, which is inscribed in rectangle **ABCD**. **V** is the vertex of the parabola.

(a) Locate the remaining points on the left hand side of the parabola.
(b) Locate the points on the right hand side of the parabola.
(c) Complete the parabola in the rectangle **ABCD**.

A-4. The image below shows a ring box with the lid opened through 90°. The plan, partially completed elevation and partially completed end view of the box with the lid in the open position are also shown.

(a) Complete the elevation.
(b) Complete the end view.

This examination paper must be returned at the end of the examination – You must include your Examination Number on the front cover.

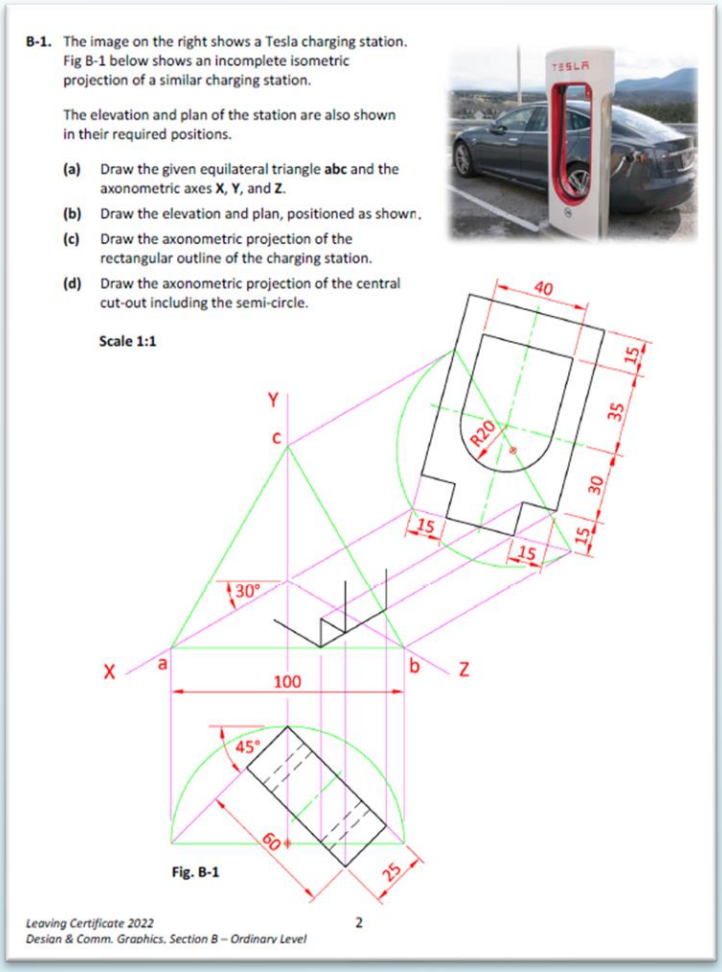
Section B

Section B is worth 120 marks and consists of three long questions that again examine you on the "Core" aspects of the course. The long questions are drawn by you from scratch on A2 paper and completely test your in-depth knowledge of a topic. Answer any two questions (2023 LC Exams-Covid 19 amendments). Each question is worth 60 marks.

Tip

Section B of the exam is currently very predictable. The same three topics are asked every year. They have been repeated in this section for nearly ten years

Isometric/Axonometric Projection



B-1. The image on the right shows a Tesla charging station. Fig B-1 below shows an incomplete isometric projection of a similar charging station.

The elevation and plan of the station are also shown in their required positions.

(a) Draw the given equilateral triangle **abc** and the axonometric axes **X**, **Y**, and **Z**.

(b) Draw the elevation and plan, positioned as shown.

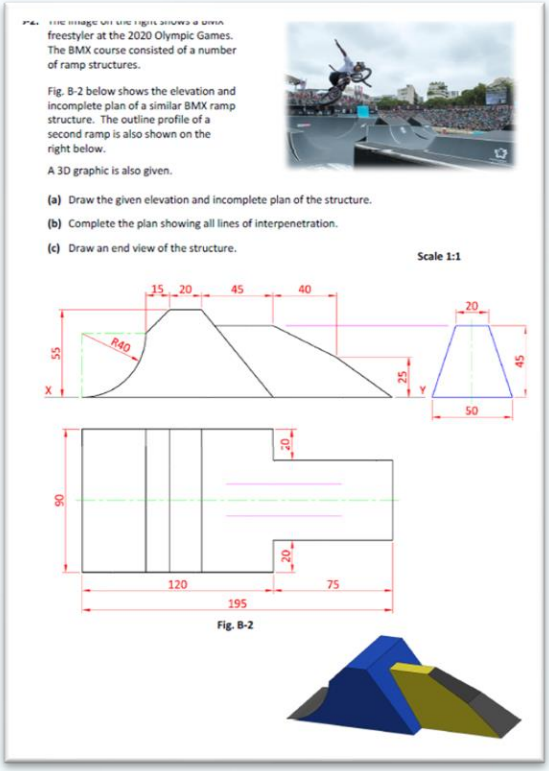
(c) Draw the axonometric projection of the rectangular outline of the charging station.

(d) Draw the axonometric projection of the central cut-out including the semi-circle.

Scale 1:1

Fig. B-1

Orthographic Projection of Intersection Solids



freestyler at the 2020 Olympic Games. The BMX course consisted of a number of ramp structures.

Fig. B-2 below shows the elevation and incomplete plan of a similar BMX ramp structure. The outline profile of a second ramp is also shown on the right below.

A 3D graphic is also given.

(a) Draw the given elevation and incomplete plan of the structure.

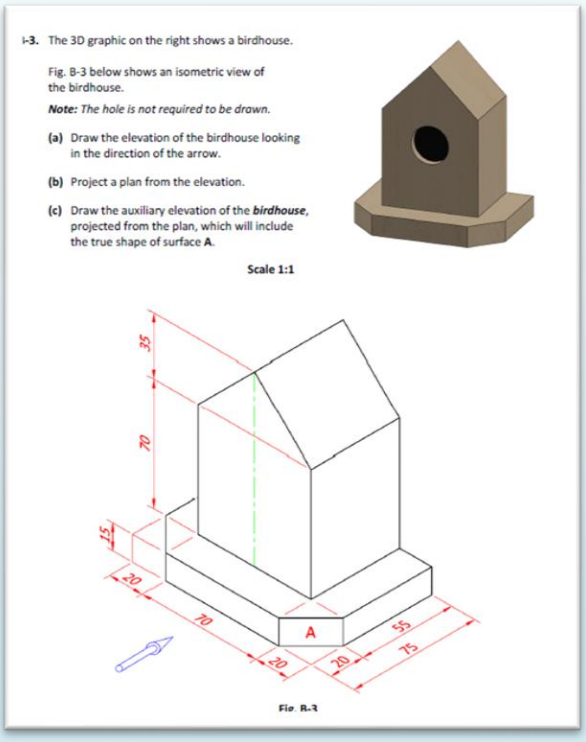
(b) Complete the plan showing all lines of interpenetration.

(c) Draw an end view of the structure.

Scale 1:1

Fig. B-2

Orthographic and Auxiliary Projection



I-3. The 3D graphic on the right shows a birdhouse.

Fig. B-3 below shows an isometric view of the birdhouse.

Note: *The hole is not required to be drawn.*

(a) Draw the elevation of the birdhouse looking in the direction of the arrow.

(b) Project a plan from the elevation.

(c) Draw the auxiliary elevation of the ***birdhouse***, projected from the plan, which will include the true shape of surface **A**.

Scale 1:1

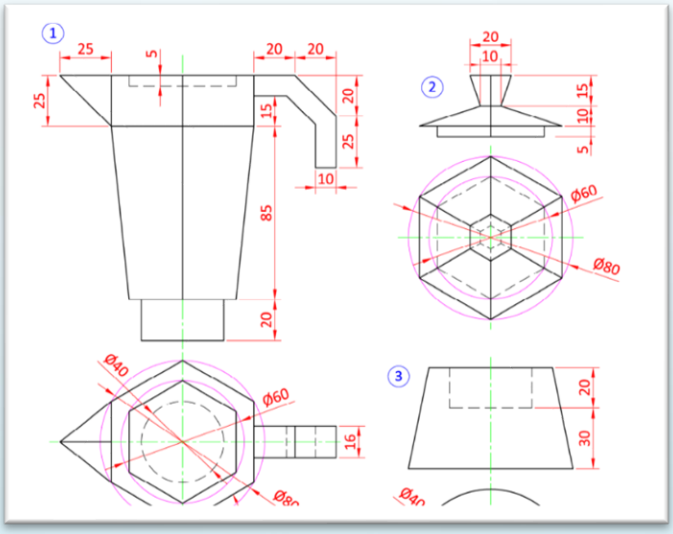
Fig. B-3

Section C- Applied Geometry

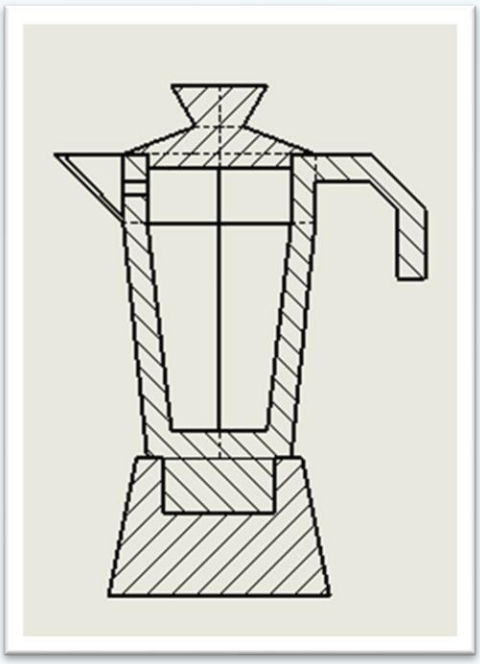
This section is worth 60 marks. You are presented with five questions drawn from the following areas that have a greater relevance in everyday life.

1. Geological Geometry
2. Structural forms.
3. Surface Geometry
4. Dynamic Mechanisms
5. Assemblies

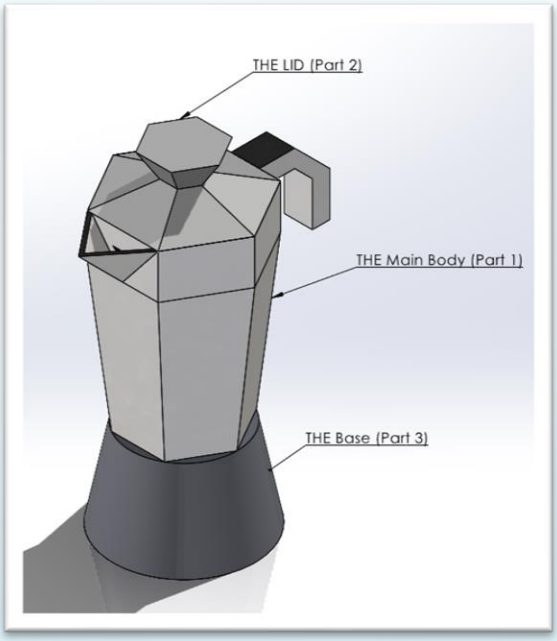
These are long questions like section B. You must answer one question and is answered on A2 paper. Each question is worth 60 marks.



Example of a Section C question (2022 C5 OL)



2D Drawing-students do in the exam



3D Model of the question

The Project

The project is worth 40% which is 160 marks out of 400 marks.

The project is divided into two parts A and B

Part A is a design investigation into an existing object and is divided into the following format:

Ordinary Level Student Assignment 2023

Money boxes are designed to store and save money. The design of money boxes is influenced by their target market and they come in a variety of shapes, sizes, materials and colours. Some money boxes have innovative ways to place money in the box and features to encourage saving.

(a) Carry out a design investigation of existing money boxes in graphic format. Your investigation should include an analysis of physical forms and shapes, features, materials etc.

and

(b) Show graphically how you would physically modify a chosen money box to improve its overall design.

or

Develop and graphically communicate a new concept design for a money box based on a selected theme or target market.

Part B is divided into the following outputs:

Presentation, thought process, refl	Part (B) Design Modification or Concept Design	**5**	Graphical exploration of design solutions	Analysis of brief and graphical illustration of possible solutions. Justification for chosen solution(s) including aesthetics, functionality and environmental sustainability.	1-3	60
		6	Presentation of Modification/ Concept Design	Detailed graphical presentation of the design Modification/Concept Design. This should include a rendered freehand presentation quality drawing in 3D format.	1	
		7	Hardcopy output from Solidworks	CAD Model (Part/Assembly & Drawing) and associated hardcopies to include appropriately detailed orthographic, rendered pictorial and photorealistic views to communicate your chosen design.	1-3 (Plus Electronic SolidWorks files)	
					Total 10	**160**

If you want to get a O1 you need to follow this instruction in the design brief to the letter of the law.

The maximum length of the project is 8 A3 pages-if you exceed this you will lose marks. (Covid-19 amendment)

In total there are 7 outputs to the project. (Covid-19 Amendment)

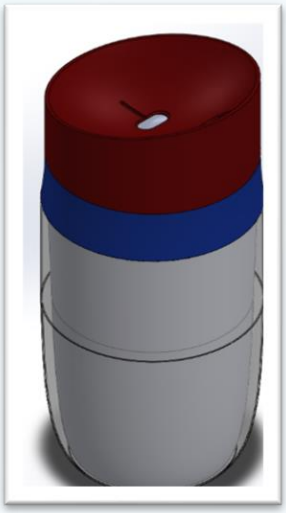
At the end of the project, you must hand up a bound and printed portfolio with a USB enclosed in the portfolio that contains all your files i.e. CAD files and a soft copy of your project.

Top tips for the project

Start the project immediately-stay back after school every week and work at it. It can be very overwhelming in November/December if you leave yourself with too much.

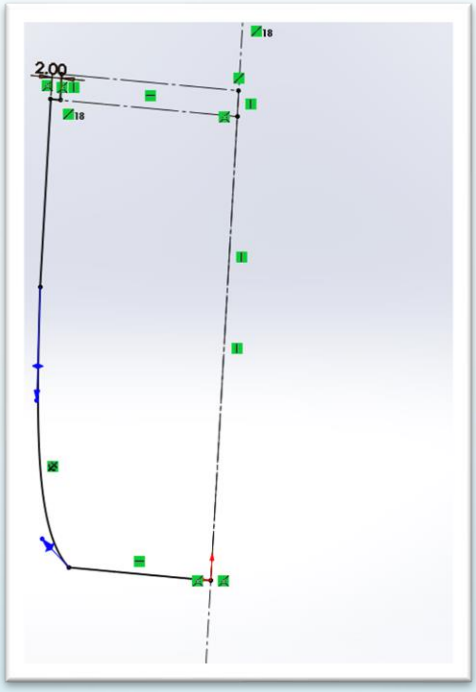
Pick a simple object to model in Solidworks-it will gain as many marks as an object with extremely difficult geometry.

Simple Geometry



Complex Geometry

Keep all your sketches fully defined from the beginning.



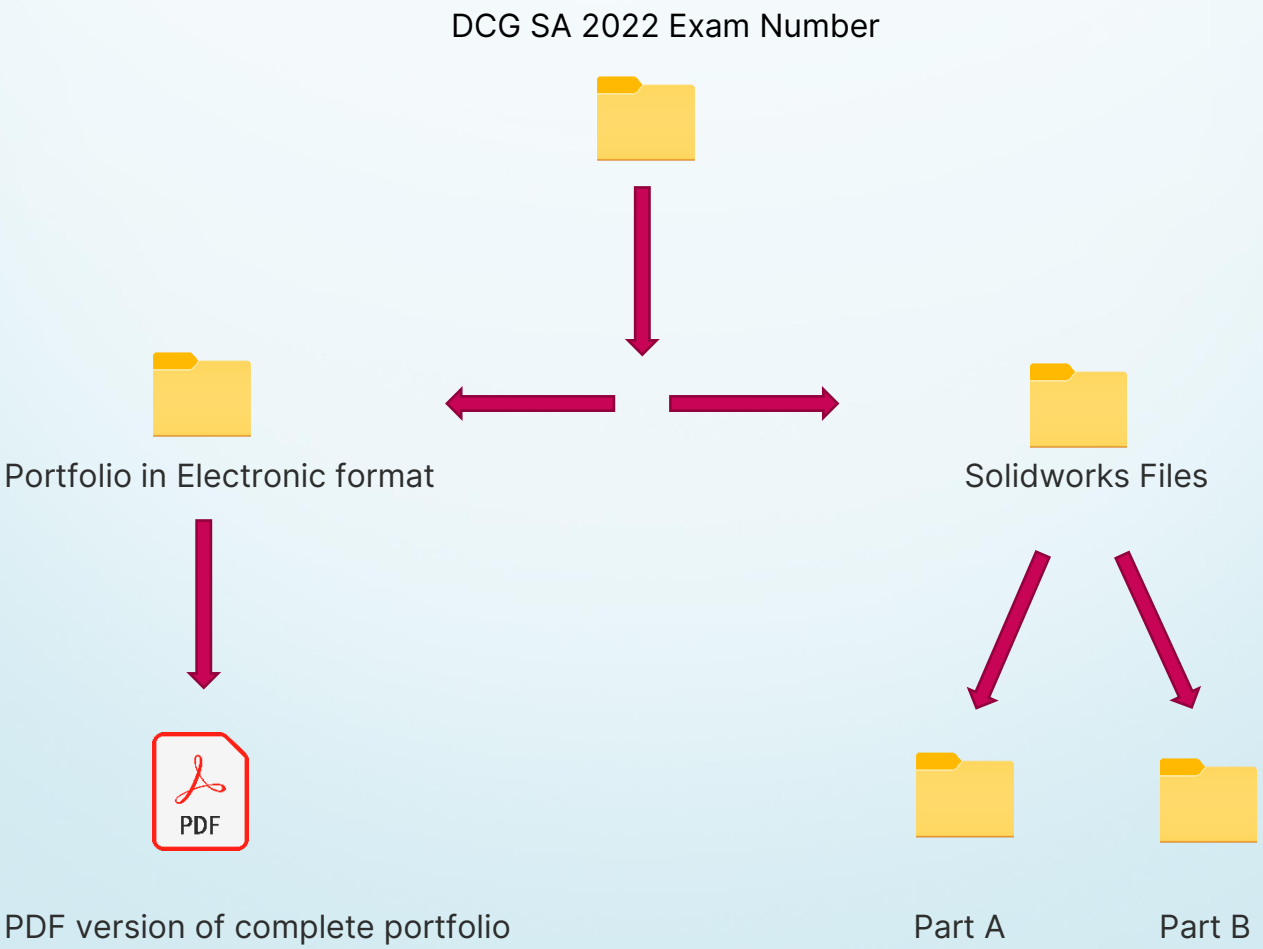
Use Output 3-your electronic model to help you improve output 2 if needs be.

Get your hands on a physical example of the object you have picked to model in Part A-don't use pictures from the internet

Saving your progress

Keep regular backups of your project. Save the to a cloud server, and regularly save Solidworks modelling. Do not under any circumstances submit practice Solidworks material that was modelled outside of school. Anything you submit must be completed in school.

Adhere to the filing structure of the project as shown below:

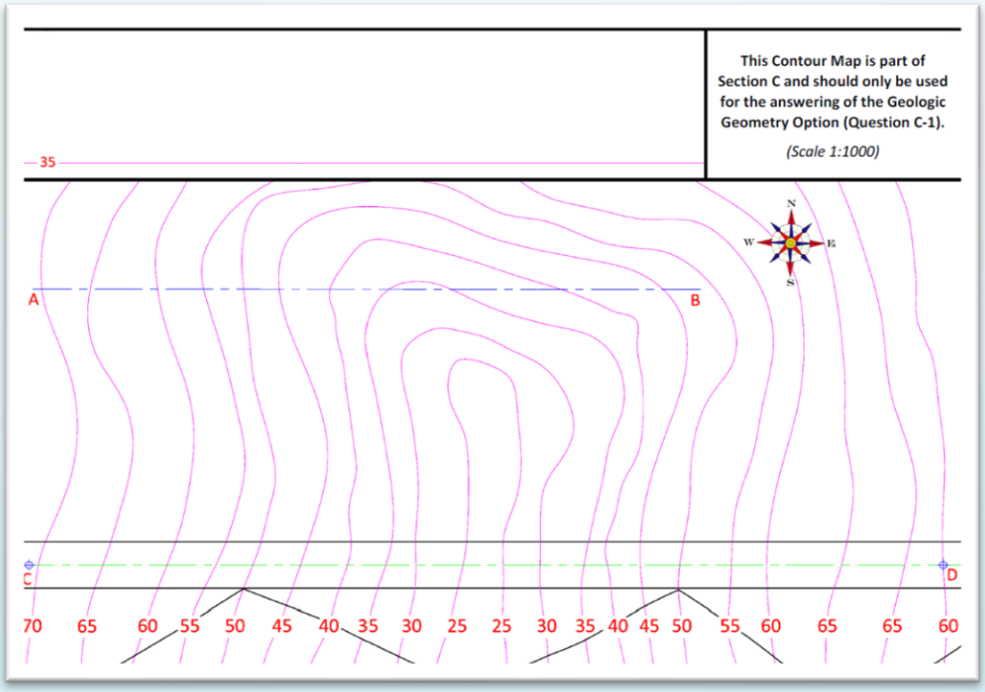


Adhere to the design brief, to the letter of the law

How to study

As discussed before. The exam consists of three sections

- Section A is Core Geometry-You have 4 incomplete short questions-you must complete any three. Answer each question on the sheet
- Section B is Core-Geometry long question- Answer on A2 paper.
- Section C is Applied Geometry-all answer on A2 paper, except for QC1 which is answered on the back of Section A. Like the example below:



To study for DCG/Achieve a O1 in the exam you need to:

1. Practice drawing exam questions-looking at online solutions will only help so much.
2. Master the basics of the subject. The 15 key principles (https://www.t4.ie/Resources/DCG_Resources/Geometry_Principles/Principles%20of%20geometry-poster-r14.pdf. Orthographic Projection and Auxiliary Projection. In truth the whole course is underpinned by Orthographic Projection.
3. The questions in Section A are quite predictable. Orthographic Projection, Conics, Perspective, Solids in Contact frequently come up. Section B has had the same questions asked repeatedly every year for a long while. While Section C is guaranteed.

Exam Timings

Section A	Section B	Section C	Reading Questions	Making corrections
36 minutes X 12 minutes per question	66 minutes X 33 minutes per question	66 minutes X 33 minutes per question	6 minutes	6 minutes

The above table represents a suggested time limit per question pre Covid-19 exams. Essentially when there was no reduction in questions required to be answered.

The best advice I can give if you have extra time would be to answer additional questions rather than spending a large amount of time on one question.

The Exam is very predictable-master Elevations, Plans and End Elevations and you will do very well.

Have your best questions picked for Section B on the day.