Design Research

Suggested Layout for Output 1 Page 1

Official DCG Student Assignment Brief		Key Word 1	Key Word 2
Key Word 3	Key Word 4	Key Word 5	Key Word 6

Suggested Layout for Output 1 Page 2

Key Word 7	Key Word 8	Key Word 9	Key Word 10
Key Word 11	Key Word 12	Key Word 13	Key Word 14

Primary Research

Observation of relevant objects in you immediate environment or locality, for example:

- Photographing objects
- Measuring objects
- Describing objects
- Sketching objects

Secondary Research

- Websites
- Books
- Magazines
- Surveys
- Interviews

SEC Output Requirements

1. Exploration of main design features using primary and secondary research.
2. Selection of appropriate graphics
3. Effective layout and presentation of information combining images, sketches and annotations.

OUTPUT 1

2 Pages

15 Marks

9% Overall

Key Point

You are trying to show the examiner all of the research you have done so make sure that no white space is left on these pages.

Why Reference?

Using someone else's work without referencing is plagiarism.

You will get more marks if you reference correctly as:

1. It proves that you've done research.
2. It proves that you can integrate some else's work into your own effectively.
3. Emphasises your own work.

Example

Ergonomics

"Ergonomics is the study of how equipment and furniture can be arranged in order that people can do work or other activities more efficiently and comfortably." 1
"That is, ergonomics promotes a holistic approach in which considerations of physical, cognitive, social, organizational, environmental and other relevant factors are taken into account." 2

Having researched ergonomics I have found that its largest effect on mouse design is in the size and shape of the mouse body. This means that when designing a mouse you need to take into account that it needs to fit comfortably into the users hand. Most mice are designed to fit the average user's hand but when designing for a specific demographic the ergonomic design can be altered to better suit their needs. It would be alomost impossible to design a computer mouse without taking ergonomics into acount.

Bibliography

Text

1. Collinsdictionary.com. (2017). Ergonomics definition and meaning | Collins English Dictionary. [online] Available at: https://www.collinsdictionary.com/dictionary/english/ergonomics [Accessed 11 Sep. 2017].
2. Irishergonomics.com. (2017). What is Ergonomics. [online] Available at: http://www.irishergonomics.com/about-ies/what-is-ergonomics [Accessed 11 Sep. 2017].

Images

1. Traderscity.com. (2017). 3d Wow Pen Joy Mouse. [online] Available at: http://www.traderscity.com/board/userpix50/30998-3d-Wow-Pen-Joy-Mouse-Vertical-Computer-Mouse-Ergonomic-Design-From-Chinawholesale365-1.gif [Accessed 11 Sep. 2017].

Referencing Suggestion

1. Text from primary or secondary source
2. Original Image
3. Image from primary or secondary source

Bibliography

Text

The DCGist. (2017). Home. [online] Available at: http://www.thedcgist.ie [Accessed 11 Sep. 2017].

http://www.citethisforme.com/harvard-referencing

Checklist

Design Brief ☐

	Key Words													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Definition	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
How Key Word Effects Artefact Design	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Sketch	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Image	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
References	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Design Feature Comparison

OUTPUT 2

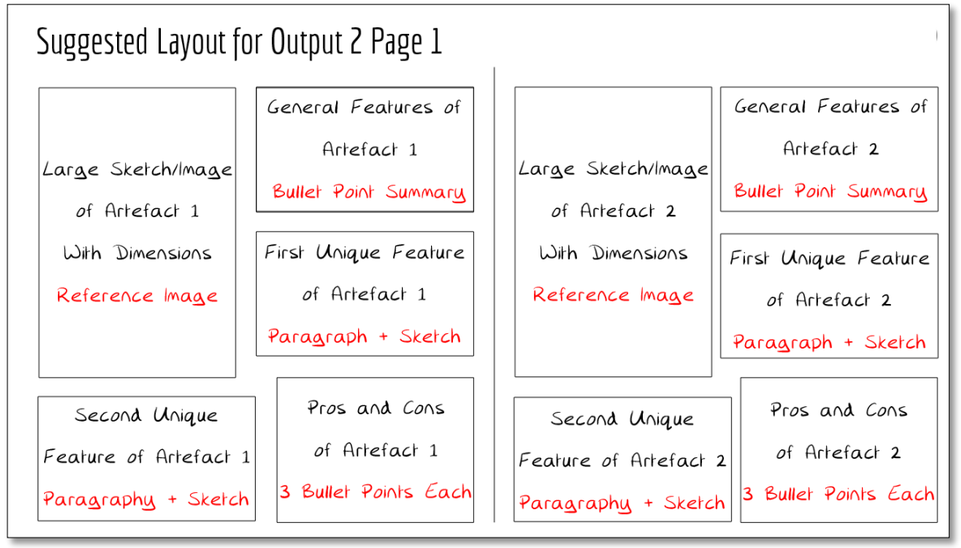
2 Pages

15 Marks

9% Overall

Page 1 – Individual Artefact Details

- Talk about the artefacts individually.
- Ensure that you include the main dimensions in the large sketches using correct drawing conventions.
- If there is a history consideration in the brief ensure to include the year of design/manufacture.
- Sketches should back up the point you are making.
- Reference all images and information found online.



SEC Output Requirements

1. Selection of 2 appropriate images
2. Main dimensions inserted
3. Comparison of main design featu
4. Contrasting of main design featu
5. Effective layout and presentation of information combining images, sketches and annotations

Key Point

During this Output it is important that you show the examiner that you able to analyse existing designs effectively. You should always be trying to explain <u>why</u> you are making your points to show off this skill.

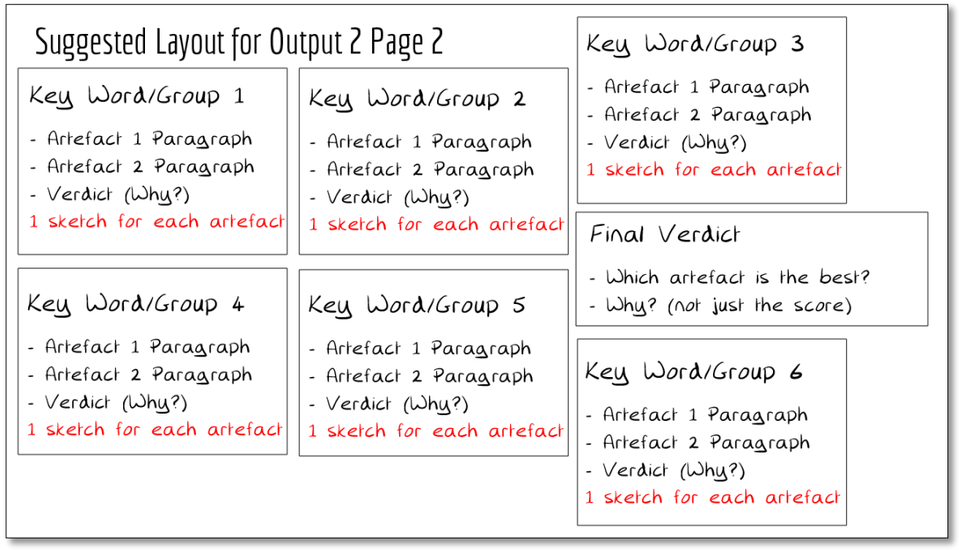
Checklist

Page 1

	Artefact 1	Artefact 2
Large Sketch	☐	☐
General Features	☐	☐
Unique Feature 1	☐	☐
Unique Feature 2	☐	☐
3 Pros	☐	☐
3 Cons	☐	☐

Page 2

	Comparison Heading 1	2	3	4	5	6
Artefect 1 Explanation	☐	☐	☐	☐	☐	☐
Artefect 2 Explanation	☐	☐	☐	☐	☐	☐
Artefact 1 Sketch	☐	☐	☐	☐	☐	☐
Artefact 2 Sketch	☐	☐	☐	☐	☐	☐
Verdict	☐	☐	☐	☐	☐	☐
Final Verdict	☐					

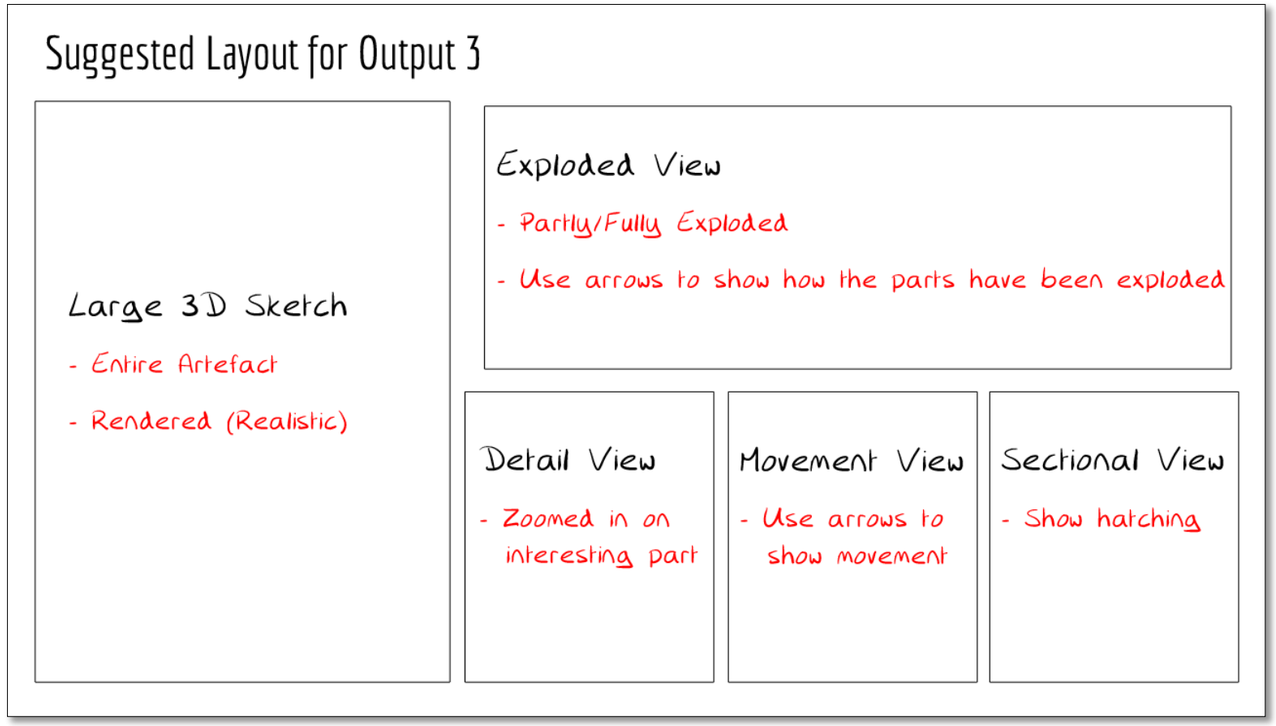


Page 2 – Comparison of Artefacts

- Your comparison headings come from your key words in Output 1.
- Speak about the artefacts individually first and then compare in the verdict section.
- Sketches should back up the point you are making.
- The most important thing to explain is “Why?”.
- In the final verdict you explain which artefact is better and why. You use your comparison headings to back up your decision.

Freehand Graphical Representation

Suggested Layout for Output 3



SEC Output Requirements

1. Freehand Graphical Representation
    1. Proportion
    2. Form/Volume
    3. Use of Tone/Line for Effective Rendering
2. Detailed Treatment of Main Design Features
3. Excellent Layout and Presentation

OUTPUT 3

1 Page

20 Marks

12.5% Overall

Sketching Tips

- Take a picture of your artefact to work from.
- Use colouring pencils.
- Sketch and stick onto final sheet.
- Do each sketch many times and choose best.
- Use good quality paper.

Annotation Tips

- Clear and concise (no extra words/sentences that aren't vital to your explanation)
- Hand written with upper and lower case letters.
- Use black pen/marker.
- Annotations should always be very close to the sketch.

Checklist

	Outline	Rendered	Annotated
Large 3D Sketch	☐	☐	☐
Exploded View	☐	☐	☐
Detail View	☐	☐	☐
Movement View	☐	☐	☐
Sectional View	☐	☐	☐

Types of Sketches

Large 3D Sketch

This sketch should be drawn in a Pictorial View in order to show the overall artefact to the examiner. It is required that you render and shade this sketch.

Exploded View

This sketch shows the artefact taken apart so that the examiner can see all of the parts. Pictorial or Orthographic views may be used.

Detail View

In this sketch you will zoom in on what you consider to be an important aspect of your artefact. You do not need to draw the entire artefact, only the specific aspect you are trying to describe. Pictorial or Orthographic views may be used.

Movement View

The aim of this sketch is to show the examiner how your artefact moves. This may be the entire artefact moving or a part of the artefact moving. Pictorial or Orthographic views may be used in partnership with movement arrows.

Sectional View

The aim of this sketch is to show the examiner the inside of your artefact when assembled. You cut the front/top off of your artefact to reveal the workings on the inside. Pictorial or Orthographic views may be used.

Key Points

- The artefact you sketch in Output 3 must be one of the artefacts that you compared in Output 2.
- The goal of your sketches and annotations are to explain your artefact to somebody who has never seen it before.
- Annotation is as important as sketching in explaining your artefact and gaining marks.
- Every sketch should show something different. You don't have much space so don't repeat yourself.
- All sketches must be original. They may not be scanned.

Media You May Use

- 2B and 3B Graphite Pencils
- Polychromos Pencils
- Markers
- Chalk Pastels
- Felt Tip Pens
- Watercolours

THE DCGIST

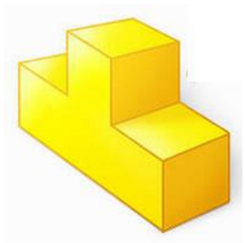
Solidworks Parts, Assembly, Drawing and eDrawing

OUTPUT 4

0 Pages

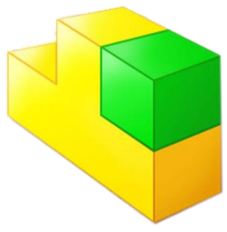
28 Marks

17.5% Overall



Completing Part Features/Surfaces

1. Choose best Profile.
2. Choose best Plane.
3. Sketch (look for symmetry).
4. Add Relations and Equations.
5. Fully define sketches.
6. Create Feature/Surface.
7. Rename sketch/s.
8. Rename feature.



Completing an Assembly

- Insert first part (sets the planes of reference)
- Insert subsequent parts. If parts do not fit change the easier part to fit.
- Create 3 mates per part.
- Drag parts to check that each part is fully mated.

SEC Output Requirements

Solidworks Parts	Solidworks Assembly
- Economy of design	- Accuracy of parts to facilitate assembly
- Design intent	- Correct mating of parts
- Selection of most appropriate profiles	- Application of materials/textures/colour
- Sketches fully defined	- Save as eDrawing
- All features renamed	
- Use of linked values/equations	
- Appropriate types of extrusions	
- Appropriate end conditions	

Saving as an eDrawing

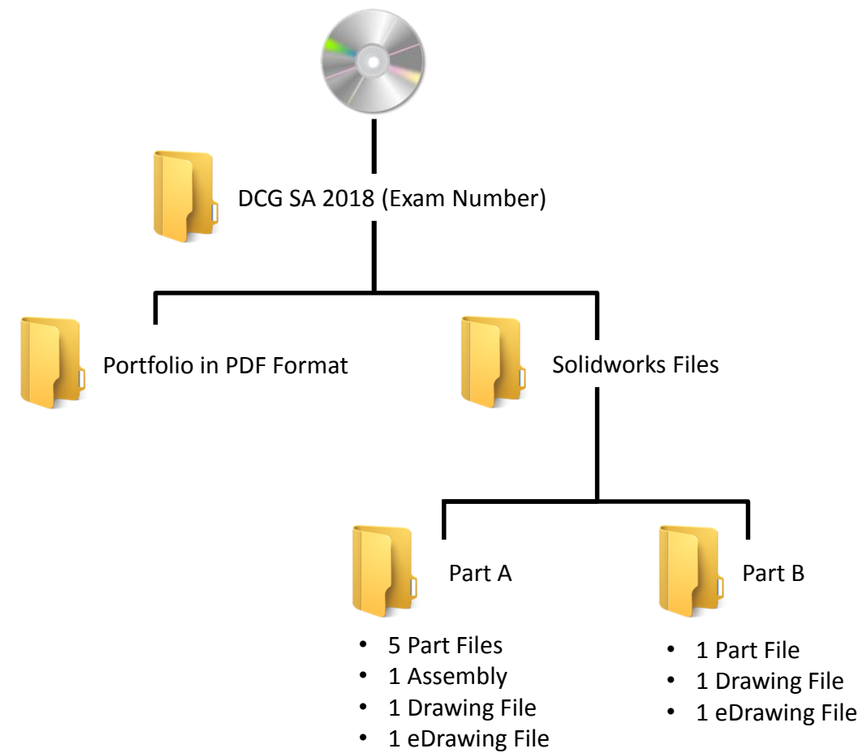
Once you have completed your Assembly you must save it as an eDrawing, to do this follow the steps below.

1. Hover over the Solidworks branding in the top left of your screen.
2. Click on “File”.
3. Click on “Save As”.
4. In the drop down menu choose “eDrawings (*.eprt)”
5. Save the eDrawings file into your Part A folder.

Key Points

- Output 4 is the only output which is not a page in your portfolio.
- Output 4 is marked by the examiner opening up your Solidworks Parts, Assembly and eDrawing and checking that their requirements have been met.

File Structure



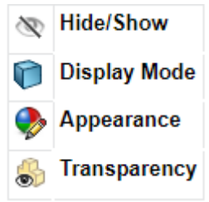
Checklist

	Part					Assembly
	1	2	3	4	5	1
All Sketches Fully Defined	☐	☐	☐	☐	☐	
All Features Renamed	☐	☐	☐	☐	☐	
Linked Values/Equations Used	☐	☐	☐	☐	☐	
3 Surface Features Used	☐					
Correct Principal Planes						☐
No Overlapping Parts						☐
3 Mates per Part						☐
Saved as eDrawing						☐

Hardcopy Outputs from Solidworks

Display States

- The Display States menu is located in the “Configuration Manager” section of the Design Tree)
- Display States allow you to change how your Assembly appears in order to show the aspects of your model that you think are important in Output 5.
- Display States are particularly useful for creating sub assembly views, detail views and part views.



SEC Output Requirements

1. Detailed Orthographic Views of selected artefact
2. Section and Detail Views as appropriate
3. Rendered Pictorial View of the Assembly
4. Exploded View of CAD model
5. Inclusion of main dimensions, notes and symbols
6. Appropriate Scaling
7. Effective layout and presentation

OUTPUT 5

2 Pages

15 Marks

9% Overall

Checklist

	Page 1	Page 2	Annotated
Border and Title Block	☐		
Projection Symbols	☐		
Dimensioned Orthographic View	☐		☐
Sectional View	☐		☐
Exploded View	☐		☐
Detail View 1	☐		☐
Detail View 2	☐		☐
Rendered Pictorial View		☐	☐
Detail View 3		☐	☐
Detail View 4		☐	☐
Sub Assembly/Part View 1		☐	☐
Sub Assembly/Part View 2		☐	☐
Part View		☐	☐

Key Points

- Output 4 is the only output which is not a page in your portfolio.
- Output 4 is marked by the examiner opening up your Solidworks Parts, Assembly and eDrawing and checking that their requirements have been met.

Choosing Views

- Write list of the artefact details you want to show.
- 6 comparison headings from Output 2 must be included.
- Choose the views which best show above.
- Create Display States and Configurations of your Assembly for chosen views.

Annotation

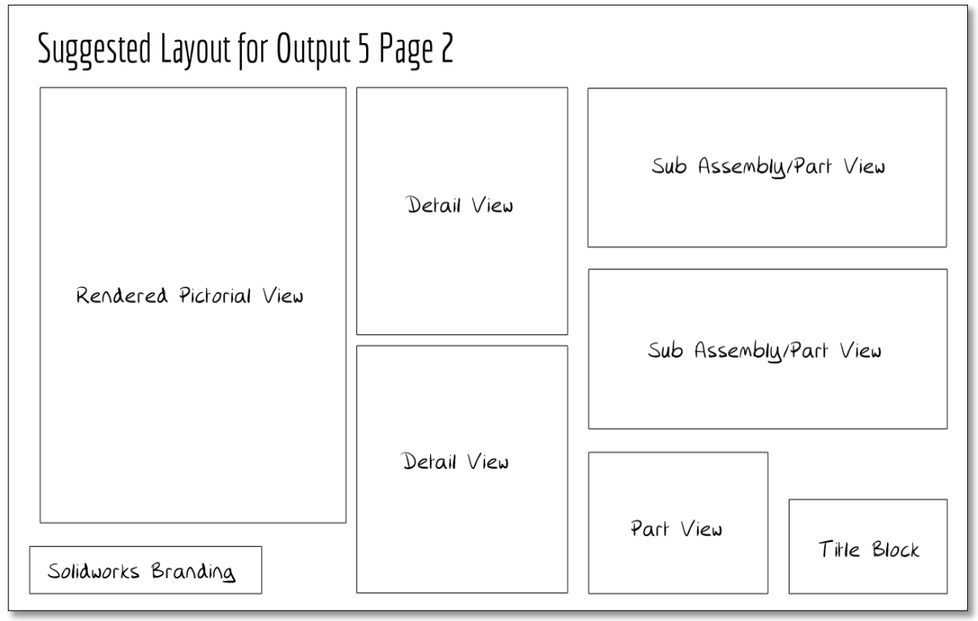
Type of view directly underneath.
Use arrow annotation to justify your chosen artefact detail and view by explaining:

- What the view is showing.
- Why the artefact detail important.
- How the shown artefact detail links to points made in previous outputs (especially Output 2)

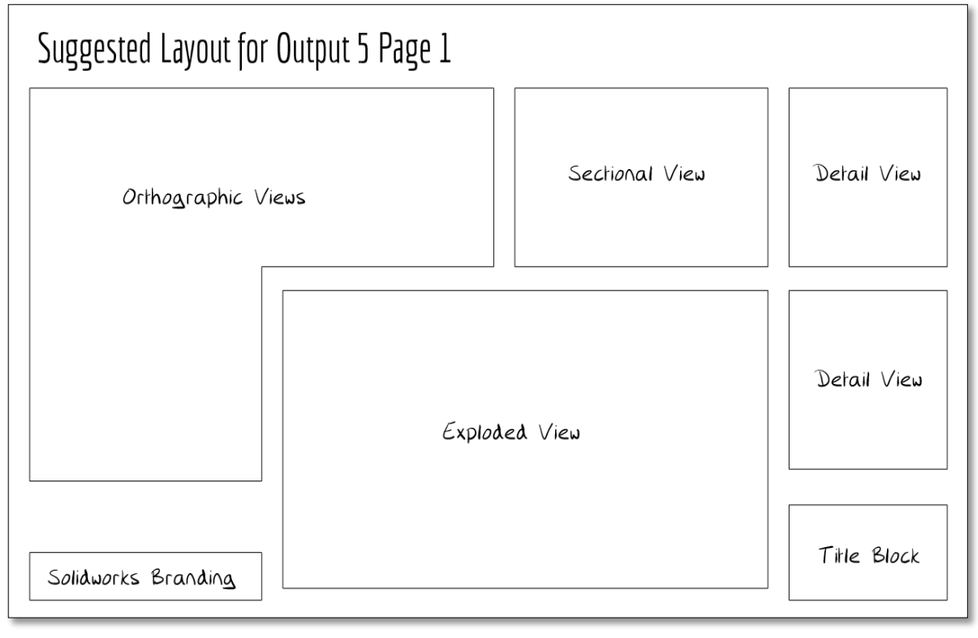
Configurations

- The Configurations menu is located in the “Configuration Manager” section of the Design Tree.
- Configurations allow you to create multiple variations of a part or assembly model within a single document.
- You can use Configurations to show parts in your Assembly in different positions. This is particularly useful if your artefact can open/close.

Suggested Layout for Output 5 Page 2



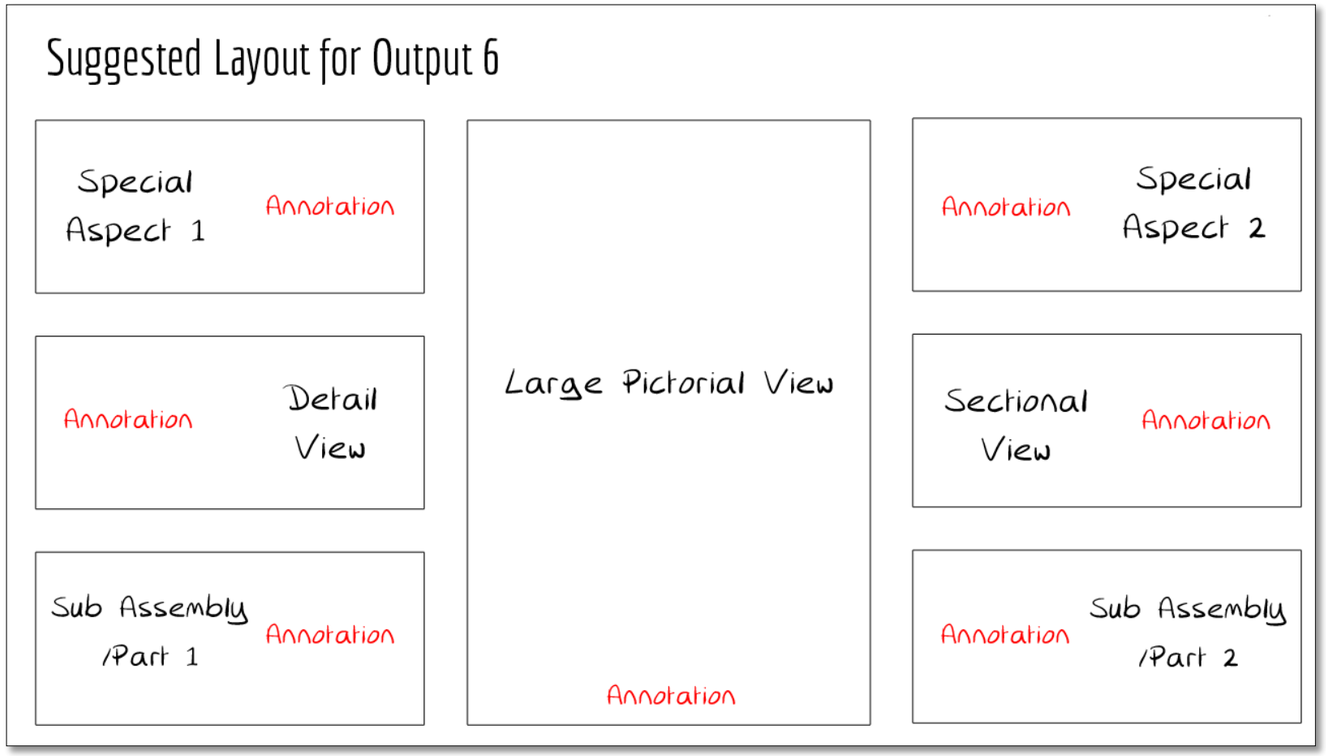
Suggested Layout for Output 5 Page 1



THE DCGIST

Photorealistic Representation

Suggested Layout for Output 6



OUTPUT 6

1 Page

7 Marks

4% Overall

SEC Output Requirements

1. Produce photorealistic computer generated Images of the artefact

Photoview 360 Tips

Adjust image quality

- Make sure that your image quality is set to a high draft quality.

Adjust the appearance

- Make sure that all of your materials look the way you want them to. Sometimes lighting can change how a colour appears.

Adjust the Scene

- This adds an environment and background to your rendering. I would recommend Black with fill lights, Grey with Overhead Lights, and Soft Spotlight.

Adjust the View (Camera/Perspective)

- The best way to add realism to your image is to simply enable Perspective and Shadows.

THE DCGIST

Checklist

	JPEG	Laid Out	Annotated
Large Pictorial View	☐	☐	☐
Special aspect 1 of artefact from Output 2 Page 1	☐	☐	☐
Special aspect 2 of artefact from Output 2 Page 1	☐	☐	☐
Detail View used in Output 3	☐	☐	☐
Sectional View used in Output 3	☐	☐	☐
Sub Assembly/Part 1 used in Output 5	☐	☐	☐
Sub Assembly/Part 1 used in Output 5	☐	☐	☐

Output 6 Tips

- Photorealistic Images created using Photoview
- Further editing in Photoshop or GIMP (optional)
- Multiple Views must be used to fully describe of your artefact
- No white space
- Image quality/resolution is vital
- eDrawings iOS/Android App for Augmented Reality
- Configurations and display states from Output 5

Annotation Tips

- What is the image showing?
- Why is the aspect that the image is showing important?
- How does the image link to points made in previous outputs?

Key Points

- The goal of your sketches and annotations is to explain your artefact to somebody who has never seen it before.
- Annotation is as important as sketches in explaining your artefact and gaining marks.
- Every sketch should show something different. You don't have much space so don't repeat yourself.

Image Resolution

- Images should be as large as possible to prevent pixilation when inserted into your portfolio.
- Always insert large image and make smaller.
- Never insert small image and make larger (see example below)

Graphical Exploration of Design Solutions

OUTPUT 7

2 Pages

25 Marks

16% Overall

Checklist

Page 1

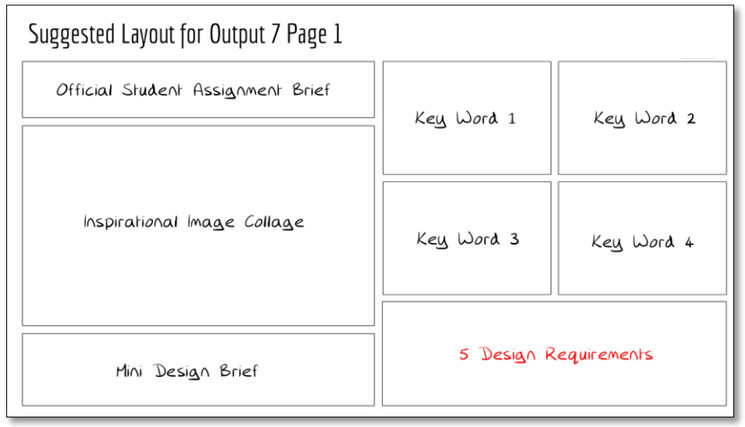
Official Student Assignment Brief	☐			
Inspirational Image Collage	☐			
Mini Design Brief	☐			
	Keywords			
	1	2	3	4
Definition	☐	☐	☐	☐
Effect on Design	☐	☐	☐	☐
Sketch 1	☐	☐	☐	☐
Sketch 2	☐	☐	☐	☐
References	☐	☐	☐	☐
Concept Design Requirement 1 - Output 1	☐			
Concept Design Requirement 2 - Output 2	☐			
Concept Design Requirement 3 - Output 4	☐			
Concept Design Requirement 4 - Output 7	☐			
Concept Design Requirement 5 - Output 7	☐			

Page 2

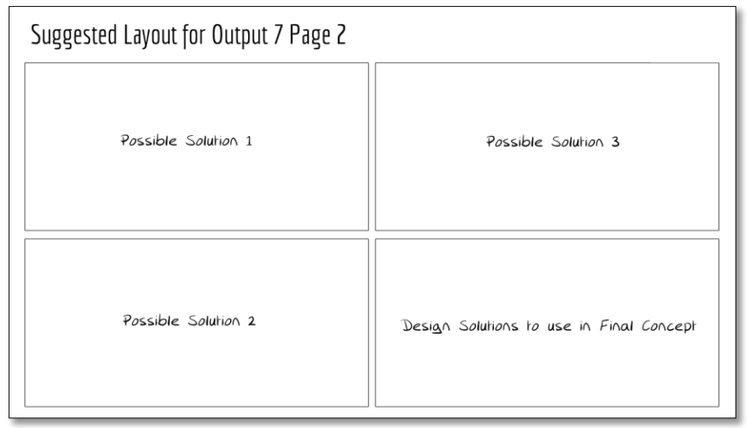
	Possible Solution		
	1	2	3
3D Sketch	☐	☐	☐
Detail Sketch	☐	☐	☐
Explanatory Paragraph	☐	☐	☐
How the solution fulfils Design Requirement 1	☐	☐	☐
How the solution fulfils Design Requirement 2	☐	☐	☐
How the solution fulfils Design Requirement 3	☐	☐	☐
How the solution fulfils Design Requirement 4	☐	☐	☐
How the solution fulfils Design Requirement 5	☐	☐	☐

	Design Solution	
	Chosen	Why?
Design Requirement 1	☐	☐
Design Requirement 2	☐	☐
Design Requirement 3	☐	☐
Design Requirement 4	☐	☐
Design Requirement 5	☐	☐

Suggested Layout for Output 7 Page 1



Suggested Layout for Output 7 Page 2



SEC Output Requirements

1. Exploration of theme/possible solutions.
2. Justification of chosen solution(s).
3. Use of appropriate images/graphics.
4. Effective layout and presentation of information combining images, sketches and annotations.

Mini Design Brief

Define theme/target market and set a number of design goals

- First Sentence – Broad sentence on theme/target market
- Second Sentence – More detailed, including at least 4 key words to research

Example:
Restaurant kitchens are some of the busiest and most pressurised workplaces in the world. Design and graphically communicate a new concept design for a tap to be used in industrial kitchens including details on durability, ease of cleaning, water efficiency and consistency of hot water.

Concept Design Requirements

Outline 5 design requirements for your concept design using the below to justify their inclusion:
Requirement 1: A group of key words from Output 1
Requirement 2: One or more decisions from Output 2
Requirement 3: A practical issue you encountered while modelling your existing artefact in Output 4
Requirement 4: One or more of your keywords from Output 7
Requirement 5: One or more of your keywords from Output 7

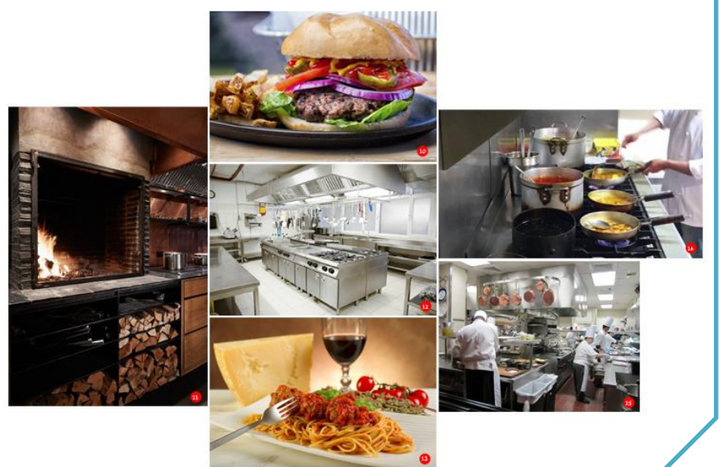
Key Word Analysis

4 Key Words from you Mini Design Brief Including:

- Definition
- How the Key Word effects YOUR concept design.
- 2 sketched design ideas specific to each Key Word.

Inspirational Image Collage

- Images relevant to theme/target market, not artefact
- Shows theme/target market's key traits without words
- Reference images



Possible Solutions

3 Possible Solutions including:

- 3D annotated sketch.
- Small annotated detail sketch showing the most interesting part.
- Short explanatory paragraph.
- 5 bullet points explaining how the possible solution fulfils your 5 Design Requirements.

There are 2 different layouts for your 3 Possible Solutions:

1. Each Possible Solution takes an aspect of the previous solution to show design progression.
2. Each Possible Solution is completely different. You then choose the best parts of each to include in your Final Concept Design.

Key Point

Your final design does not need to be shown in Output 7. It is explained in detail in Output 8.

THE DCGIST

Presentation of Modification/Concept Design

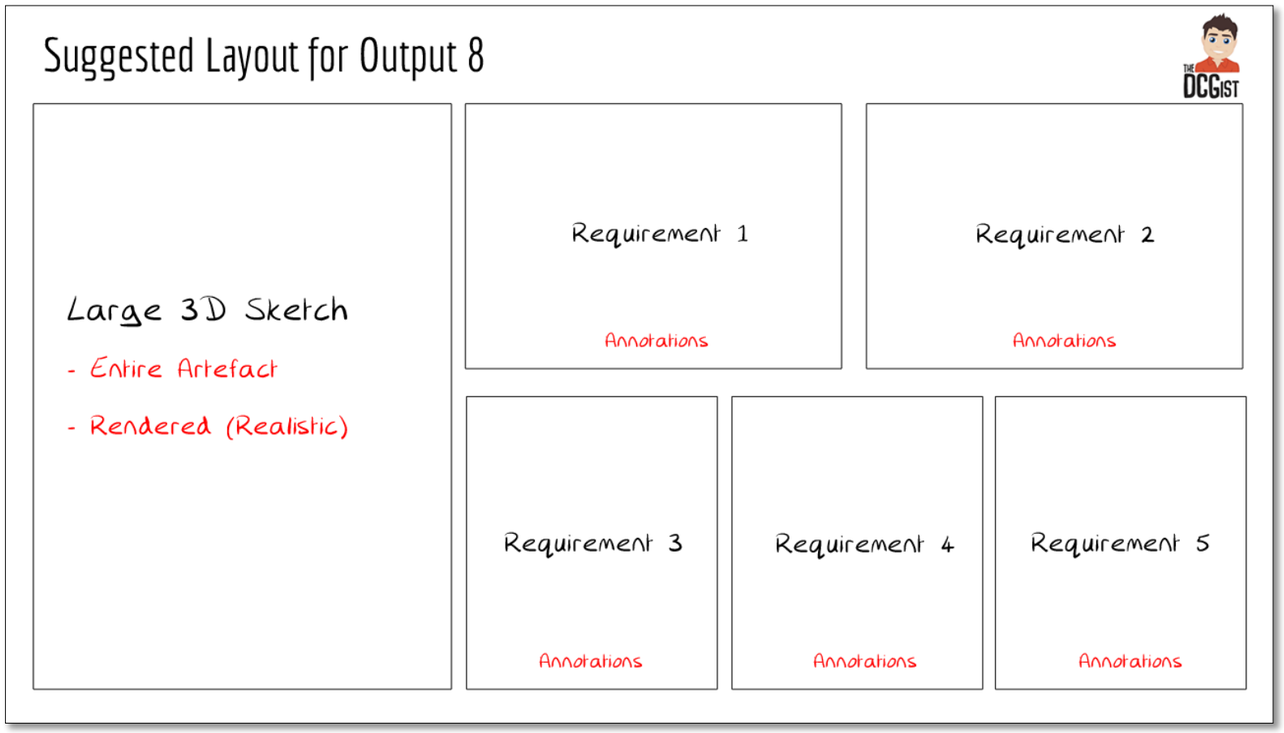
OUTPUT 8

1 Page

10 Marks

6% Overall

Suggested Layout for Output 8



SEC Output Requirements

1. Freehand Graphical Representation
    1. Proportion
    2. Form/Volume
    3. Use of Tone/Line for Effective Rendering
2. Detailed Treatment of Main Design Features
3. Excellent Layout and Presentation

Sketching Tips

- Take a picture of your artefact to work from.
- Use colouring pencils.
- Sketch and stick onto final sheet.
- Do each sketch many times and choose best.
- Use good quality paper.

Media to Use

- 2B and 3B Graphite Pencils
- Polychromos Pencils
- Markers
- Chalk Pastels
- Felt Tip Pens
- Watercolours

Checklist

	Outline	Rendered	Annotated
Large 3D Sketch	☐	☐	☐
Exploded View	☐	☐	☐
Detail View	☐	☐	☐
Movement View	☐	☐	☐
Sectional View	☐	☐	☐

Types of Sketches

Large 3D Sketch

This sketch should be drawn in a Pictorial View in order to show the overall artefact to the examiner. It is required that you render and shade this sketch.

Exploded View

This sketch shows the artefact taken apart so that the examiner can see all of the parts. Pictorial or Orthographic views may be used.

Detail View

In this sketch you will zoom in on what you consider to be an important aspect of your artefact. You do not need to draw the entire artefact, only the specific aspect you are trying to describe. Pictorial or Orthographic views may be used.

Movement View

The aim of this sketch is to show the examiner how your artefact moves. This may be the entire artefact moving or a part of the artefact moving. Pictorial or Orthographic views may be used in partnership with movement arrows.

Sectional View

The aim of this sketch is to show the examiner the inside of your artefact when assembled. You cut the front/top off of your artefact to reveal the workings on the inside. Pictorial or Orthographic views may be used.

Annotation Tips

- Clear and concise (no extra words/sentences that aren't vital to your explanation)
- Hand written with upper and lower case letters.
- Use black pen/marker.
- Annotations should always be very close to the sketch.

Key Points

- The goal of your sketches and annotations are to explain your artefact to somebody who has never seen it before.
- Annotation is as important as sketching in explaining your artefact and gaining marks.
- Every sketch should show something different. You don't have much space so don't repeat yourself.
- All sketches must be original. They may not be scanned.

Hardcopy Outputs from Solidworks

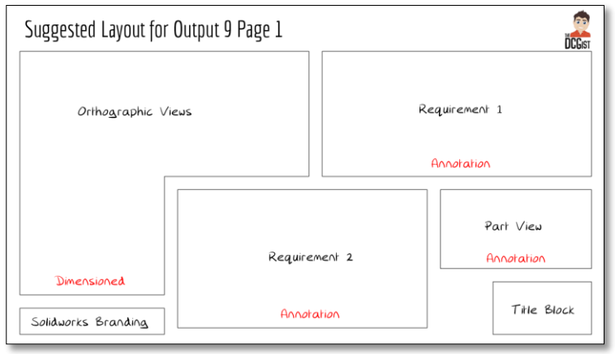
OUTPUT 9

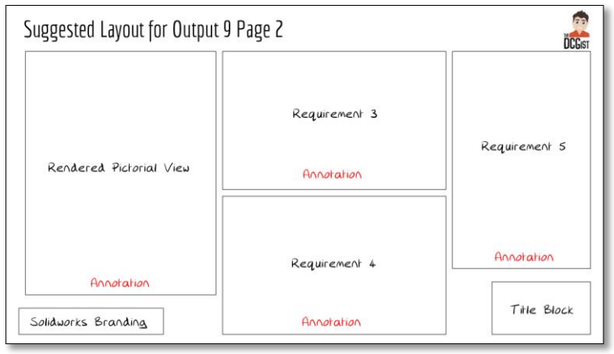
3 Pages

25 Marks

16% Overall

Solidworks Drawings



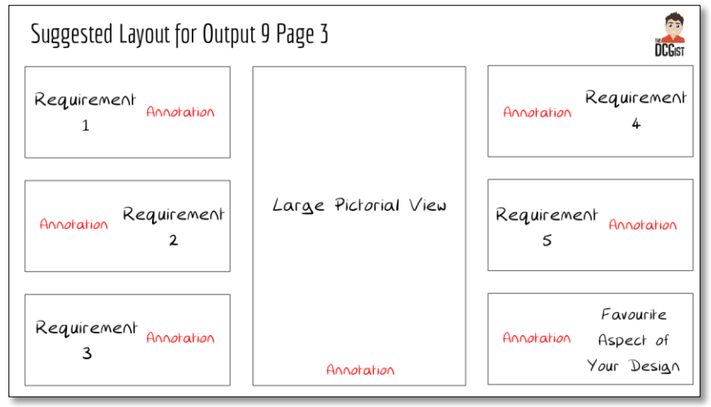


Border and Title Block	☐		
Projection Symbols	☐		
	Page 1	Page 2	Annotated
Dimensioned Orthographic View	☐		☐
Design Requirement 1 View	☐		☐
Design Requirement 2 View	☐		☐
Part View	☐		☐
Rendered Pictorial View		☐	☐
Design Requirement 3 View		☐	☐
Design Requirement 4 View		☐	☐
Design Requirement 5 View		☐	☐

SEC Output Requirements

1. Detailed Orthographic Views of selected artefact
2. Section and Detail Views as appropriate
3. Rendered Pictorial View of the Assembly
4. Photorealistic Image
5. Inclusion of main dimensions, notes and symbols
6. Appropriate Scaling
7. Effective layout and presentation

Photorealistic Images



	JPEG	Laid Out	Annotated
Large Pictorial View	☐	☐	☐
Design Requirement 1 Image	☐	☐	☐
Design Requirement 1 Image	☐	☐	☐
Design Requirement 1 Image	☐	☐	☐
Design Requirement 1 Image	☐	☐	☐
Design Requirement 1 Image	☐	☐	☐
Image of Favourite Aspect of Design	☐	☐	☐

THE DCGIST

Key Point

Output 9 is a combination of Output 5 and Output 6 but for your design rather than an existing artefact.