Boorowa Central School

Excellence through Respect, Responsibility and Participation

Assessment Task Notification

All tasks should be clearly outlined in the notice and give information pertaining to the nature of the task, the outcomes being assessed and the marking schedule giving individual component weightings.

Faculty: AMPS	**Subject:** *iSTEM – Science, Technology, Engineering & Mathematics*	**Topic:** CAD & 3D Printed Component
Teacher: Mr Corcoran	**Student:**	
Outcomes/Content Assessed: 5.3.1 – applied knowledge and understanding of STEM principles and processes. 5.3.2 – identifies and uses a range of technologies in the development of solutions to STEM based problems. 5.4.1 – uses mathematical, scientific and graphical methods related to technology and engineering. 5.5.1 – applies a range of communication techniques in the presentation of research and design solutions.		
Weighting(s): Part 1 10% of yearly grade. Part 2 15 % of yearly grade		
Date Given: 26th March 2019 (T1, Wk9)	**Date of Completion:** Stage 1: Friday 10th May 2019 (T3, Wk 2) Stage 2: Monday 27th May 2019 (T2, Wk 5)	

Description of task

This assessment task is staged in two parts. CAD and 3D Printing skills. This task will require the student to use learnt drawing conventions to convey their drawing concept in developing 3D printed components. In this task, a student must design and build a small-scale Product that will utilise multiple parts that display innovative design and function. The design must show a working functional form to gain full marks. Some examples could be: Mobile phone stand, a YoYo, Hamburger press, Paddle boat, a series of components based on a theme, Puzzle, etc. Research and creativity will be will allow you to design and print an object of your choosing.

Task Guidelines: (steps/marking scale/grid)

Part 1 – CAD & Drawing Conventions

In part 1, you are to research and innovate a design for 3D printing in part 2 of this task. Throughout part 1, you will demonstrate CAD skills and knowledge and document your design progress in the evolution of your product. The completion of a **Design Folio** will be required. In this Design Folio, you will complete the following areas:

1. Cover page
2. Introduction/Statement of Intent
3. Research of ideas, 3D Printers and materials (Printing filament)
4. Development of Ideas or problems that have arisen
5. CAD Development. A picture of the image with an articulation of the ideas behind each section of your design
6. Hand drawn Orthographic Drawings with 6 views of your design
7. Research Bibliography

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In completing your **CAD design**, to satisfy the marking criteria you will be required to showcase more than **ONE COMPONENT** for a minimum mark. You are restricted in size so you need to consider this constraint. This constraint will be **no dimension shall exceed 100 mm,** unless discussed and 2uthorized with your teacher.

Your final design for production will be drawn using **Tinkercad or other Computer Design Program** and transferred into a 3D printable file (STL). Then presented to be assessed. **THIS DESIGN MUST BE 100% YOUR OWN WORK**. This design file must be given to your teacher in your folio for assessment.

Part 2 – 3D Printed Component, Business Plan & Final report

In this part, you are to 3D Print your components and assemble your design if necessary. Here you will demonstrate your knowledge and skills in the use of the 3D Printer and your ability to take design form to function. This stage of the assessment task will be completed in school time, to allow you to access the 3D printers, out of class time to print can be arranged.

Included in this part of the assessment will be a **final written report** on the success of your project. It should also include possible **business plan** for your project discussion and future plans and opportunities that could arise.

Advice on Acknowledging of references, format and submission:

Completing the Bibliography

Complete the bibliography following the steps below. This is for any resource you have used, images, text, videos etc. You must include these details in your bibliography, it will be returned if it is not.

a. Authors name: Surname first, then first initial or name.
b. Title of document/website in 'single quotation marks'
c. Date of publication
d. (Online) Available
e. <full URL>
f. [Date of access in Brackets]

Assessment Expectations

It is expected that this research report, portfolio, should be a substantial document that will showcase your skills researching and using Information and Communication Technologies to compile a serious report on the topics highlighted.

You will need to use the
Remember that **Plagiarism** is not accepted and a **bibliography** is required to list your **references** that you sourced your information.

Assessment Format and Submission

You will use **Microsoft Word or like** to present your assessment. Task to be submitted on Google Classroom

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Part 1. Design Portfolio Scaffold Name …….

1. Introduction/Statement of Intent

What ideas have I thought about to design?

I choose this one because ..

Who have I discussed this with?

What difficulties do I think I may encounter? In designing, in printing? Can these be overcome, did you ask anyone for help? What did they say?

Date completed. **Teacher signature**

2. Research of ideas, 3D Printers and materials (Printing filament)

Either -Did you do any research on the Internet? If so did it help or hinder my design? How did it help or hinder?

OR- It was my idea or someone else come up with the idea? Did you modify it and if so what did you do?

What understanding do you have of how the 3D printer works? How does it print? Are there different types of filaments that can be used? List them. Do they cost different amounts? List them

Which one will be the best for you to use and why?

Date completed. **Teacher signature**

3. Identification of ideas. List, draw, paste the evolution of the design that you have created. Show the steps you used to create your design. How did you ensure the dimensions will fit the printer?

   Starting point

   Finishing design

Date completed. **Teacher signature**

4. Development of Ideas or problems that have arisen

How did you transfer the design into a 3D model that was able to be printed? What difficulties did you encounter and how where they solved? Did you ask for assistance with any problems that you had?

5. CAD Development.
   Insert a picture of your final design.

   Make a prediction about the possible sources of error that may arise during the printing process. Suggest ideas that may allow the process to run effectively.

6. Hand Drawn Orthographic Drawings with 6 views of each design

7. Research bibliography

At least 2 sources

1. 2.

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Marking Criteria **Folio** **Student:**

Component	Criteria	Marks
Cover Page & Table of Contents	• Students complete a cover page with Design Image and add an automated Table of Contents page that displays all sections of Design Folio. Each should be on a separate page.	3
	• Students have a cover page, with or without the design image, displays a basic Table of contents. On separate pages.	2
	• Students do not display a cover page or a Table of contents and/ or are not on separate pages.	1
	• Not attempted	0
Introduction/ Statement of intent	• A student demonstrates an exceptional understanding of **what, why, how and when** of their CAD project	5
	• A student demonstrates a comprehensive explanation of **what, why, how and when** of their CAD Project	4
	• A student demonstrates a sound level of explanation of what, why, how and when of their project.	2-3
	• Students displays a basic level of understanding for what, why, how and when for the Design Project.	1
	• Not Attempted	0
Research of ideas	• Student documents and collates exceptional level of research that displays many designs and options for their idea. The ideas are annotated with individual thought about each idea.	5
	• Student documents and collates excellent level of research that displays many designs and options for their idea. The ideas are annotated with individual thought about each idea.	4
	• Student documents and collates sound level of research that displays many designs and options for their idea. Limited annotation of ideas	2-3
	• Student displays limited to basic levels of research and understanding of Project. Basic comments about their research ideas	1
	• Not attempted	0
Development of Ideas	• A student complies and presents an exceptional collage of ideas with annotations highlighting positive and negative aspects of the chosen designs. Errors or problems are highlighted and solutions are clearly articulated.	5
	• A student complies and presents a high level collage of ideas with annotations highlighting positive and negative aspects of the chosen designs. Errors or problems are highlighted and solutions are clearly articulated.	4
	• A student complies and presents a collage of ideas with some annotations highlighting positive and negative aspects of the chosen designs. Some errors or problems are highlighted and solutions are clearly articulated.	3
	• A student compiles a series of design ideas and presents them with some positive and negative impacts. Errors or problems are identified.	2
	• A student presents 1 design with limited or no annotations	1
	• Not attempted	0

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Progression of Ideas, testing Evaluating	• Students will identify or show preliminary designs or trials to an exceptional standard • Students will identify or show preliminary designs or trials to an sound standard • Students will identify or show preliminary designs or trials to basic standard • Not Attempted	4-5 2-3 1 0

Orthographic drawings	Students orthographic drawings are to an exceptional standard with six views Students orthographic drawings are to a sound standard Students orthographic drawings are to a basic standard Not Attempted	4-5 2-3 1 0
Report & Business Plan	• Student produced an exceptional plan and report that highlights and discusses the potential of their Project and future plans and opportunities that could arise • Student produces a high level plan and report that discusses potential of their Project and future plans and opportunities that could arise. Some aspects of the project are not identified or evaluated • Student produced a sound plan that mentions potential of their Project and future plans and opportunities that could arise. Some aspects of the project are not identified or evaluated • Student demonstrated a basic plan that highlights some areas of potential of their Project and future plans and opportunities that could arise. Some aspects of the project are not identified or evaluated • Not Attempted	5 4 2-3 1 0
3D printed object	• Student produces object of exceptional standard with creativity, functionality and precise finish. The objects pieces fits together easily and shows impressive 3D printing skills and design • Student produces object of high standard with creativity and functionality. The objects pieces fits together with some play and shows great 3D printing skills and design • Student produces object of good standard with some creativity and functionality. The objects pieces fits together with force and shows some 3D printing skills and design • Student produces object of low standard with little creativity and functionality. The objects pieces don't really fit together. • Student produces object • Not attempted	9-10 7-8 5-6 3-4 1-2 0

Assessment Task Feedback

Student:_____ **Task:_____**

Teacher Feedback

STRENGTHS

AREAS TO STRENGTHEN

-
-
-
-
-

WHAT OTHER THINGS I COULD HAVE DONE - <u>Student Response</u>

-
-
-
-

Teacher Comment _____

_____

_____

_____

MARK

EFFORT & **DIFFICULTY OF THE TASK** NAME

Didn't try very hard and gave up	Put in a bit of effort	Worked OK but could have done more	Worked very well	Pleased with my effort
Too hard	Hard	Some parts were hard but achievable	OK	Easy