

Year 10 D&T – Term 4 – Mock Nea (Development)

Work to Complete	Is it done?
1.1 Explore the Contextual Challenges	<input type="checkbox"/>
1.2 Outline a Design Problem	<input type="checkbox"/>
1.3 Identify the needs of the End User	<input type="checkbox"/>
1.4 Investigate Existing Products	<input type="checkbox"/>
1.5 Further Research	<input type="checkbox"/>
1.6 Design Brief and Specification	<input type="checkbox"/>
1.7 Initial Ideas	<input type="checkbox"/>
2.1 Review of Initial Ideas	<input type="checkbox"/>
2.2 Develop and Refine Design Ideas	<input type="checkbox"/>
2.3 Communication of Design Ideas	<input type="checkbox"/>
2.4 Final Design Idea	<input type="checkbox"/>
2.5 Production of Prototype	<input type="checkbox"/>
2.6 The Finished Prototype	<input type="checkbox"/>
3.0 Test and Evaluate the Finished Prototype	<input type="checkbox"/>



When typing up your coursework – make sure to include the following information:

- *Strengths of the prototype – What went well? What parts/components will you be taking forward?*
- *Weaknesses of the prototype – What didn't go well? Are there any parts/components that need to be changed? Why?*
- *Feedback received*
- *What your next steps with this design/prototype will be.*

Use Modelling to Improve Your Design

- 1) Modelling is a good way to spot (and solve) **problems** with your design.
- 2) You can make models using materials that are **easy and quick to work with**, e.g. cardboard, balsa wood or high-density polystyrene foam.
- 3) Try out different aspects of your design. For example, you could model just one part of the product **separately**, to check it works, before going on to the rest.



You can also use **CAD/CAM** (see page 19) to help with the modelling process.

- You can make **virtual models** (in 3D) using **CAD** and **easily manipulate** things like shape, colour and texture.
- You can use **CAD/CAM** to do **rapid prototyping** — draw the design in CAD and use a **3D printer** to produce the model.

Test and Evaluate Each Model

After you've made each model, do some **tests** to check that it's how it should be. Get some **potential customers** to try it out and give you **feedback** too.

- 1) You'll probably find there are some things that **don't work out** quite how you'd hoped.
- 2) **Write down** what the problem is, suggest how to **fix it** and try out another version of the model.
- 3) Record how the design develops — **take photos** of your models.
- 4) You should also **evaluate** each model against the **design specification**. Take each point on the specification and see if your model is up to scratch.

Why is prototyping an important stage of the design process?

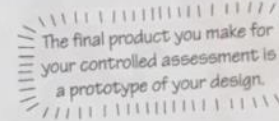
What's the point??

- Gives the designer/client a complete idea of how the final product will look and function.
- Cheaper than making out of main material straight away.
- Allows you to streamline the design development.
- Makes it easier to identify issues/unnecessary elements.
- Easier to evaluate the suitability of the product.
- Provides opportunity to gather more accurate feedback from clients to ensure a successful outcome.

Prototypes Help Manufacturers Avoid Big Mistakes

Prototypes are **full-size working products** made using the right materials and methods. They're made before **industrial production** to make sure the product is exactly right — so that money isn't wasted:

- 1) You can **test** whether the prototype **works** properly, is **safe**, and meets the **design specification**.
- 2) You can ask potential **end-users** (customers) for **feedback** on the prototype to see whether it **meets their needs**.
- 3) If the prototype **works well** and potential customers **like it**, a manufacturer would consider going into production on a **larger scale**.



Modelling can be time-consuming and expensive, but a physical model allows a person to see and handle a product unlike viewing it on a screen through **computer aided design (CAD)**. **Computer aided manufacture (CAM)** models made on a 3D printer using a CAD drawing are very accurate but also expensive, time-consuming and limited to 3D-printable materials. Product designers can use easy-to-form and easily accessible materials, eg **balsa** and cardboard, to create cheap models quickly and cheaply.

SCAMPER

Using SCAMPER to improve literacy in D&T when developing ideas.

- S - Substitute** (What else could be used?)
- C - Combine** (Put together differently)
- A - Adapt** (Adjust)
- M - Modify** (Change the form)
- P - Purpose** (Give another purpose)
- E - Eliminate** (Take part away)
- R - Rearrange** (Change layout)

Remember: The words above are **NOT** rules, make your own up and give it a go!

SCARED

- SCALE:**
Make something bigger or smaller
- COMBINE:**
Join 2 parts of your idea in a different way
- ADD:**
Put something new on your design
- REPLACE:**
Swap something on your design
- ERASE:**
Take something away from your design
- DESIGN:**
For a specific user



Remember to gather feedback on each of your prototypes! I would also recommend taking photos of each stage and of each prototype to document the process!

Modelling Materials

- Cardboard
- Clay
- Balsa wood
- Bamboo
- MDF
- Chipboard
- Card
- Plywood
- Polystyrene

Websites to help develop designs and build CAD prototypes:

- <https://www.tinkercad.com/>
- <https://www.onshape.com/en/education>
- <https://www.sketchup.com/plans-and-pricing/sketchup-free>