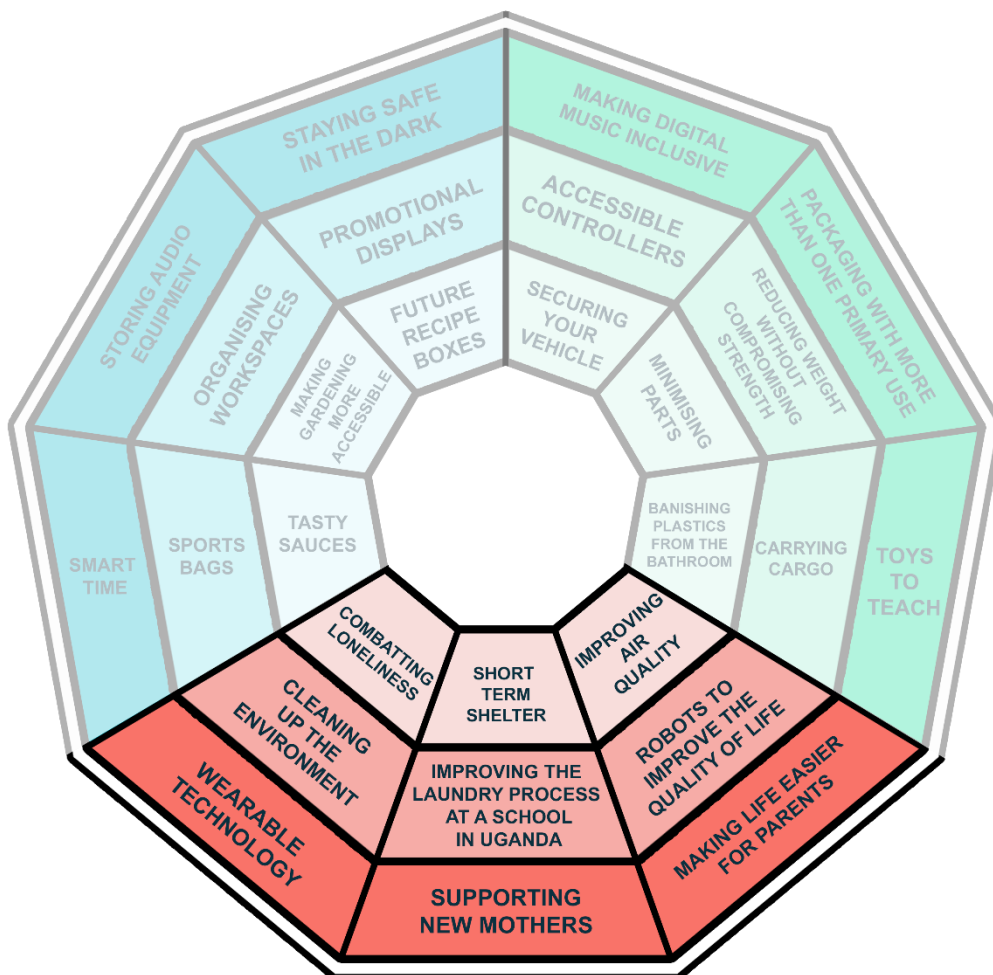


INSPIRED BY INDUSTRY

Making life easier for parents

#InspiredbyMamasandPapas



mamas
& papas®

Introduction

This context has been put together to allow for a range of opportunities for students to explore supporting new parents. Whilst parents are the audience, there are crossovers to disability also (use of only one hand whilst carrying baby).

Materials

As with Mamas & Papas, there is the scope to use a wide range of materials. Fabrics, metals and alloys, polymers, electronic products and more. There is the opportunity to look at scaled-down mechanical elements such as a collapsible buggy hood or adjustable seat. Depending on how confident the group are, it is advised to constrain it to potentially one sector – such as soft furnishings, or electronics, or possible give them a small range to work in. Similarly, group work may be possible.

Potential outcomes

The outcomes are prototypes are highly likely not to be suitable for use with a real infant. However, it is feasible that parents / adults will be able to test and simulate use with the prototype. At the same time, a teacher may decide to take a more conceptual route and look at a non-working prototype, exploring form, such as a bottle steriliser.

It is important that students are given some freedom within this context and so outcomes should vary between students / groups. You may decide to limit your class to 2-3 outcomes as mentioned above.

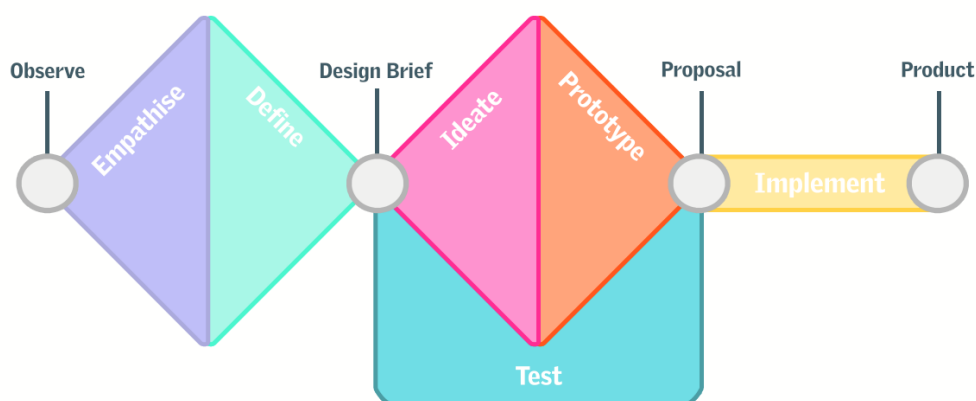
Examples may include (but not be limited to):

Add-ons for a pushchair/buggy (cup holder, mobile phone clip...), baby/toddler cutlery, one-handed gadgets, night lights, intercoms, mobiles / soothing music makers, parent bags for baby items, car/travel storage.

Consider sharing work on social media using the hashtag #InspiredbyMamasandPapas

Design cycle

The design cycle shown can be worked through in a range of orders. It's advised that the areas are revisited throughout the process depending on your time. We advise that a graphical representation of thinking convergent and then divergent may be shown to your students.



The following are some tips as to the type of activities you could do with your students.

Empathize stage

- Students should be introduced to this term if not already familiar.
- Access to parents of young children is useful if possible. Whilst this can be problematic, possible interviews with parents or getting them to film routines / activities may be useful. They could speak to their own, but non-family is often more useful to drive home the authenticity of the task.
- At the start of the context, students should be thinking wide with their thoughts, exploring the problem and not deciding too soon what they 'want to make', but observing what is happening and identifying problems.
- Trying various aspects as a group can also be useful – putting up and down a variety of pushchairs, assembling a highchair, product evaluations on nightlights, changing bags and more can give pain points and problems to tackle.
- The following videos from Ford are good examples of empathetic design in industry [VIDEO 1](#) [VIDEO 2](#)
- The Big Life Fix [HERE](#) is fantastic for showing empathetic designing. Throughout the process the designers try to immerse themselves in the problem and regularly get feedback from the clients. Observing others is really important rather than just asking people what they want as they may not know!
- Collaboration software such as Miro, or Google/Microsoft collaboration can be good to use to collate ideas from all.
- Students should get information to help them later on in the challenge. They may present this in any way they wish.
- Mamas & Papas have a YouTube channel [here](#) that may prove beneficial.

Define stage

- This is where students try to get the real root of the problem and decide what they are going to do.
- There may be a whole range of problems identified. Coming up with 'Concept strategies' is a good method to get students to think divergently (although at the end of this stage they need to be clear what they are looking to do). Aside from the example of violence in A&E in the slides, areas such as 'knife crime' can also draw out a whole range of different ways to tackle the problem – with no right or wrong answer (especially as we haven't managed to solve this yet)
- Get students to create a specification. Whilst templates / writing frames are fine at KS3, you will want to avoid this at KS4. Consider using columns such as 'Essential', 'Desirable' and 'Definitely not'. Get them to consider the features of a product. Don't worry what it may look like at this stage, but what should it be able to do/be e.g. lightweight, easy to clean, operated one-handed etc.

Ideate stage

- Getting ideas down quickly in the initial ideate stage is useful. There may be reluctance and apprehension. Drawing on existing ideas can be useful (e.g. improving an existing product) for many students.

- If students are reluctant to draw, consider other methods such as CAD, modelling and working in groups also.
- As identified in the video, try to use methods to get students to think of more creative ideas. Approaches such as listening to music, changing the working environment can help some students. There is the potential that some may not engage in this as wished is there, but worth a go?!
- Get students to keep sketching. It may not be the whole item, it may be parts of it – a fastening or ways to attach to a pushchair / highchair. This links in well to the element of 'break it down into features' and the potential of looking at handling collections in the class also.
- Encourage zoomed-in parts of the product to focus on details and annotation.
- Annotation may be things they like, things they are not happy with and explanation of parts that are not clear from the picture.
- A range of techniques such as 2D, 3D, Exploded and cross sections are good.
- Consider exploring AI. Programs are being developed all the time and text to image programs can help students focus their key words and the overall aesthetic they are aiming for.
- Moodboards can be hit-or-miss often. Consider using a moodboard with fabrics and materials if appropriate.
- CAD programs may be appropriate, again depending on the route taken. Many have easy-to-use simulation elements that can tell you the mass if you input the material. This can provide a useful task to get students to try and reduce weight by making walls thinner (for example) on a plastic product. There is also the opportunity to do renders adding in material details and even decals to act as company logos in the later 'Implement' stage.

Prototype stage

- Getting students to realise when and why to make a prototype is key. What are they looking to prove / disprove? Linking the prototype method with the problem is a good task.
- Prototypes may be card mechanisms, CAD models, fabric prototypes or an electronic breadboard.
- There are a number of videos by Jude Pullen from Big Life Fix [HERE](#) on how to create shapes in card. However, many may not have access to materials / tools and so C.A.D. may be more suitable.
- The following are all suitable CAD programs:
 - [AUTODESK](#) free for schools/students. Mac & Windows
 - [CREO](#) free for schools/students (PC only)
 - [FREECAD](#) free for schools/students
 - [ONSHAPE](#) free for schools/students
 - [SKETCHUP](#) free for schools/students
 - [SOLIDEDGE](#) free for schools/students
 - [SOLIDWORKS](#)
- Consider buying a toy baby(s) These can help with some testing and also for photos in the implement stage. It's hard/impossible to design without a user and will help to see where additional padding needs adding, where it will be tricky to get baby in/out etc.
- Throughout the process, ensure students follow procedures for health and safety and understand the process of risk assessment.

Test stage

- Although this is the final stage of the design cycle, encourage students to evaluate throughout and act on their feedback (and consider the feedback of others too). It is not a final thing, but a step to improve further.
- Integrity tests can be useful to discuss, even if their prototype isn't able to be fully tested in this way. Some elements such as no finger traps can be tested with a probe (a small item the size of a finger, to see if/where it can fit, and potentially be a trap hazard).
- You may want to create a QC stamp made from laserable rubber. Students can then check each others' work and endorse with a stamp on the bottom.
- Have a look at what safety rules and regulations are required for toys, games and baby-related products. There is an opportunity here to look further at quality marks and other information useful for consumers.

Implement stage

- The implement stage is when a prototype is put into production.
- This is an opportunity to reinforce that a prototype outcome is only one stage in the creation of a product.
- What processes are required to convert that prototype into a commercially available product?
- What manufacturing processes used to create the prototype would need to be re-evaluated for a larger scale of production?
- Would this involve reconsidering the materials and components used?
- This is a good opportunity to introduce industrial manufacturing processes that are not used in the classroom. It will undoubtedly need some support from you as a teacher.
- Reducing material is important to minimise environmental impact. Consider working in pairs / small groups to critique designs / prototypes and what could be done to make it lighter, smaller etc to potentially minimise environmental impact. You may want to look at a simple [Life Cycle Analysis](#) to assess the impact from material extraction to disposal.
- As a conclusion to the unit, you could get students to create an advertising campaign / promotional feature to sell their new product. Consider giving students free reign with regards to platform and media. They may surprise you with their ability to produce content!

Focused tasks

<u>'Collaborate'</u>	<u>'CAD choke tube'</u>	<u>'Mock ups'</u>	<u>'Road testing'</u>
Work as a group to create a mindmap for this context. Use software or post-it notes on a whiteboard to generate ideas.	Get students to draw (and then 3D print) an accurate testing choke tube to allow them to test any small parts to assess if they would be a choking hazard for babies/toddlers.	Between simple models and finished prototypes there are mock ups which are quickly made versions that can be tested and evaluated for further development.	We often make evaluative comments on the basic functions and general appearance of prototypes, but a baby product needs to be safe so test your prototype out as if it were being handled normally. This will likely mean testing it to destruction, but better to know how durable it is before a baby or child uses it.

Investigative and Evaluative Activities

<u>'Test real products'</u>	<u>'Competitor product audit'</u>	<u>'3D printed buggy hook'</u>	<u>'Smart materials'</u>
Older baby products are often discarded so try and get some to try out for yourself. Test them to destruction and evaluate how well they perform.	Look at what else is on the market. See what competitors are making and, if possible, try some of the products to see how they are designed and constructed. Evaluate their flaws and positive aspects to get a feel for what a good product is.	Design a simple S-shaped hook to go over a buggy handle to allow bags to be hung whilst still pushing the buggy. 3D print and test to destruction. What is the optimal amount of material needed to hold the required weight?	Explore the use of smart materials, such as thermochromic pigments and how they are a benefit to parents. If you could 'design' a new smart material, what would be the external stimulus and what would change?

