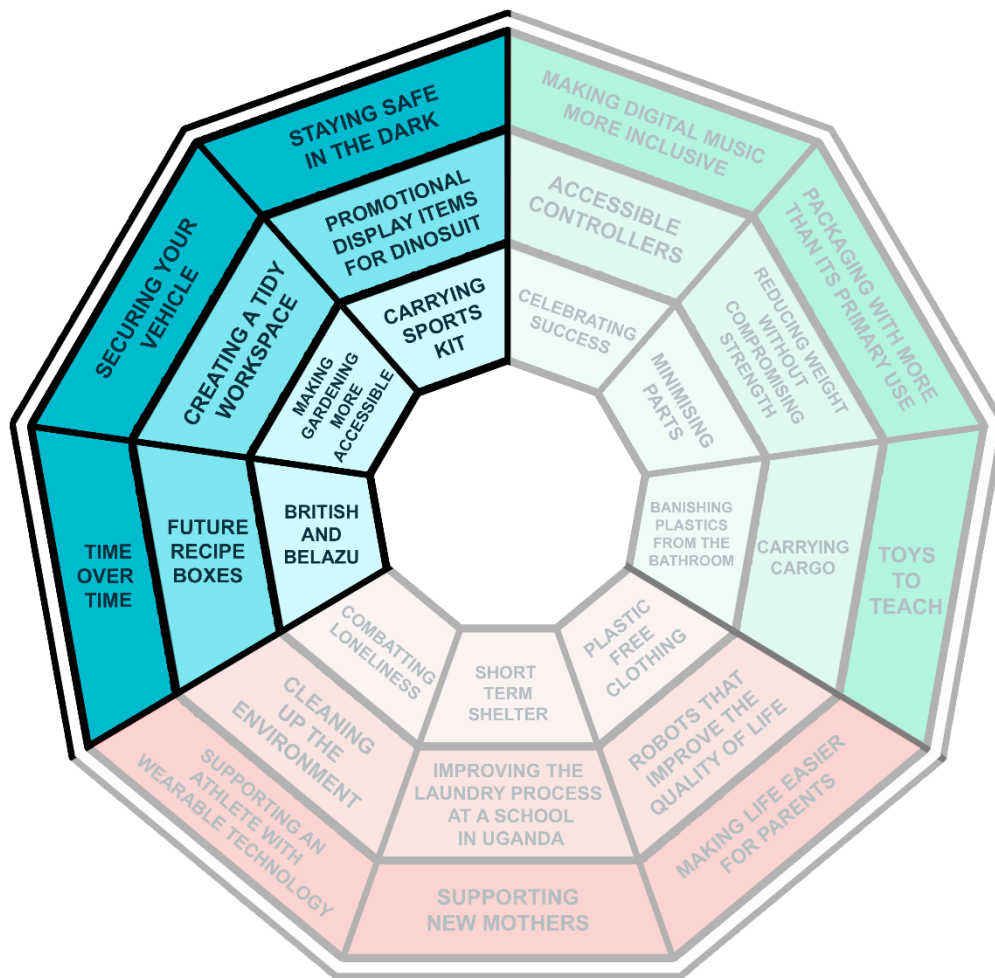


INSPIRED BY INDUSTRY

Making gardening more accessible

#InspiredbyLambIndustries



Introduction

This context has been put together to allow for a range of opportunities for students to explore the design of inclusive and accessible products. Whilst this context focuses on gardening, it could be adapted for a range of applications where an inclusive approach to design will benefit the user.

Materials

There is no particular material focus for this context, but given that gardening equipment will often need to be strong to function, it is likely that outcomes will be made from resistant materials such as metals, timbers, polymers. However, this does not exclude the use of modelling materials to create prototype proposals and even soft modelling tools to experiment with more organic forms to explore comfort and ergonomics. It also allows for textiles / mixed materials – think of knee pads etc.

Potential outcomes

Some outcomes at this level are likely to be conceptual and may not be fully working. For example, a modelled garden implement or storage system like the one seen in the supporting videos. Such concepts can often be tested without functioning as a working piece of equipment. You may stop at a 'works like' model for example.

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 a range of outcomes, applications, materials or components they need to incorporate.

There is also an opportunity to look at rapid prototyping here as well as more traditional methods of product development. You may wish to explore making a 'looks like' prototype with students – or may be an opportunity for introducing or developing 3D CAD work.

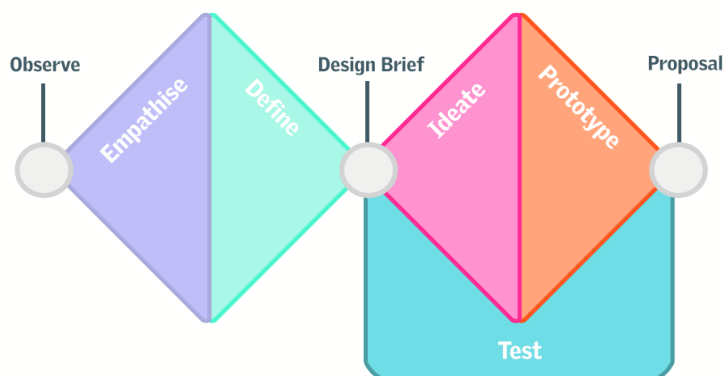
Examples may include (but not be limited to):

Adapted handles for shears, a bulb planter, child-friendly tools, a planting box for a balcony, watering devices, fold-up/roll-up kneeling pads, electronic moisture sensors, self-watering devices etc. It is a great opportunity to learn about anthropometrics and ergonomics in this context.

Consider sharing work on social media using the hashtag #InspiredbyLambIndustries

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 convergently and then divergently may be shown to your students, such as this example:



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.
- Ideally, students will have access to users who may be the ideal user-base for this context. This may be tricky to arrange and should be sensitively approached also. It may be preferable to consider elderly relatives who may have health conditions that may would restrict them from fully enjoying gardening. For example, their manual dexterity, eye site, pincer-grips etc.
- Gardening is likely to be an unknown area / experience for many students, and so provides a good opportunity to carry out some gardening tasks with students as a class activity. If you have access to a school garden / outside space, consider planting seeds, bulbs, bushes/shrubs, weeding, growing vegetables etc. If you are limited to indoor space, this also allows for gardening foci but with an added problem they may wish to tackle representative of limited indoor space. This could potentially be an ongoing element/project and could be incorporated into food and nutrition also by growing and using ingredients for use in food.
- You may wish to link with a local garden centre or gardening club/allotment and get students to perform tasks during a lesson that are dictated by the centre. They could also be interviewed/observed to see what elements they found tricky or limiting. This real-life client may also bring with it some additional marketing opportunities throughout the project to further promote the work you are doing in D&T.
- You may decide to have the class all focus on one user/tester for ease. Ideally this will be a real person, but for worst case scenario, this could be mocked up using a potentially crude method. For example, taping fingers together can replicate limited digit use, plastic HIPs (High Impact Polystyrene) strips can be incorporated into gloves to create something [similar to these](#) to replicate arthritis, an offset motor on the hand can replicate elements of Parkinson's disease. All of these should be done sensitively and with a knowledge and appreciation it is a crude representation.
- 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.
- 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 important rather than just asking people what they want as they may not know!
- Students should get as much information to help them later in the challenge, but also be aware the research can be done at any relevant point in the design process. They may present their findings in any way they feel appropriate or effective.

Define stage

- This is where students try to get the real root of the problem and decide what they are going to do. What aspect of inclusive design will be their focus? Maybe the 'accessible' element is more associated with the environmental aspect rather than personal? Such as growing plants indoors or in a limited outdoor space.

- Ensure students focus on the problem rather than the solution at this stage. If they are too narrow with their design brief they will likely have design fixation later on and designing will be hard. By focusing on what the problem is, they will likely consider a number of different approaches, materials and processes.
- There may be a whole range of problems identified. Identifying the user and their needs as well as constraints or barriers to gardening will help.
- You could even pair students up to work with each other at the define / empathy stage.
- This is a good opportunity to introduce contextual challenges to students and get them to consider all aspects of the problem. It will undoubtedly need some support from you as a teacher. Please get students to share their thinking as clearly as they are able.
- Get students to create a simple 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'.

Ideate stage

- You may want to consider listing the barriers to gardening that you have identified and consider ways to improve access to gardening to make it more inclusive.
- Encourage students to think wide initially. No ideas are too silly, or too big at this stage.
- Encourage the use of SCARED or SCAMPER to help develop ideas.
- Ideas can also be produced through making or modelling. Get students experimenting with sketch modelling early in the design development phase. Try them out where possible – consider having a mock-garden to test elements out quickly, recording all testing.
- Drawing some of the ideas may be tricky for some students, whereas a 'sketch model' may be more useful.
- The outcome can also be modelled using 3D CAD to help visualise colours and materials in a more realistic way and without the use of materials.
- There are a range of videos on YouTube to help students with sketching techniques. [HERE](#)
- Product design sketching tutorials can be found [HERE](#)
- The Design Museum have some nice, short, case-study videos [HERE](#)
- Students should be encouraged to sketch on anything to hand – envelopes, packaging etc. This may be a good method to stop students potentially being daunted by blank paper.
- You may want to look at some of the outcomes from Lamb Industries, especially related to gardening, to see the issues tackled and outcomes produced [HERE](#)
- Get students to make notes (annotate) as they design.
- Further research may be needed at this stage. Consider a handling collection such as basic gardening hand tools or adapted products to explore and evaluate. Consider buying/loaning different versions of gardening tools and evaluating which is easier. Consider asking your school community to loan gardening tools, or there are places such as '[Share Shed](#)' and '[Library of Things](#)' where you can loan tools and gardening equipment.
- See what is on the market (or don't!) For example [HERE](#) has some accessible gardening tools. You may want to leave any research so that students don't become

fixated on copying an existing design. As mentioned previously, it's likely that gardening is a new experience for many and so many students will not have preconceived ideas as to what to create. As a teacher you may want to familiarise yourself with some outcomes to potentially help direct those that are struggling.

- Ideas don't have to be revolutionary and completely new. They can be a development or addition to an existing product, but you may well see an opportunity for something totally new!

Prototype stage

- A nice video from BBC Bitesize is [HERE](#)
- This short video from The Design Museum looks at the journey a designer had to design and make a collapsible bottle. [HERE](#).
- 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](#) discounted for schools/students
- There are some good Autodesk Fusion tutorials [HERE](#) and TinkerCad [HERE](#)
- It is worth discussing with students why they create a model or prototype. What are they wanting to test or evaluate; function, comfort, aesthetics etc? Choosing the correct model or prototype for the correct test is important.
- Create prototypes throughout and get into the habit of students photographing / filming the testing of these.
- As above, consider creating ideas / prototypes as a mash-up of an existing product(s). A new handle, different shape, combination of different tools from unrelated areas...
- Exploring properties of materials is important and having the ability to select materials with informed decisions is vital. Consider some experiments / tests exploring stiffness, hardness, toughness etc. Even if these aren't used for the final prototypes, students can have informed judgements of what would ideally be used.
- Look at different joining techniques, especially in metal. Look at brazing vs pop rivets (for example). Which is easier? Which is quicker? Which is stronger? Which gives a better finish? Students can again make informed decisions when designing and prototyping and this theoretical knowledge is put into a real-life context for them.
- You may want to share this brief [video](#) from Reekon tools that show the variety and quantity of models that a company may produce.

Test stage

- Although this is the final stage of the design cycle, encourage students to evaluate throughout the process and act on their feedback (and consider the feedback of others too). Testing is not a final thing, but a step to improve your designs further.

- How can students get feedback from users? Could they use technology to get a wide range of feedback – e.g. a Google Form? A poll on twitter (X)? TikTok videos from users. If they used a garden centre / allotment earlier on in the process, use these again to get feedback. Ongoing feedback is essential, so building up relationships with these users and agreeing a way to provide feedback is very important.
- Get students to think about the main problem they identified earlier – does it actually do that? How successful is the outcome compared to the intention?
- Prompts for younger students e.g. ACCESS FM are suitable approaches. For older students they need to consider a wider range of aspects such as scalability, manufacturing techniques and limitations, ergonomics etc.
- Consider comparing their design to a 'standard' product and seeing where there are benefits / flaws.

Focused Tasks

'Thick and thin line sketching'	'Braille products'	'Adapted design'
In the ideation video, you can see James Lamb sketching with a range of fine liners. He uses a technique known as thick and thin line to enhance the sketches and define the shape. Try using this technique with pencil or pen sketching when developing ideas for your solution.	Visual impairment can be a major restriction to enjoying gardening, but it doesn't have to be. Look at how products can be adapted or redesigned to make them easier to use with the use of braille . This could be as simple as adapting seed labels to have braille as well as written text, or it could be labels and instructions as well as making tool simpler and safer to use.	Look at a range of existing products and discuss where they may be difficult to use by users with impairments or restricted access. How could you adapt an existing product to make it more inclusive? This might give you new ideas for new product designs! Consider anthropometrics and ergonomics and how they are important in this instance.

Investigative and Evaluative Activities

'Inclusive design'	'User experience'
Gather a range of products and evaluate how inclusive they are. You could use these with your target group and see what they think of the products. Observe how these might be difficult to use and how they would be adapted or redesigned. The cost of a product can also restrict its accessibility if customers cannot afford to buy it. Make a chart and rate the products in terms of cost, durability, inclusivity etc. This will help you to see what features make a product easier or more difficult to access and use.	It is difficult for a young and healthy person to understand the restrictions faced by those with impairments or disabilities, but you can try and simulate these to get a feel for the difficulties faced. Attaching an offset motor to your wrist can simulate the shakes associated with a range of conditions. Blindfolds can limit vision and taping fingers together can give a feeling similar to arthritis. While these can only 'approximate' the potential difficulties that may be encountered, they will still provide a feel for the user experience that students may not otherwise get access to.

