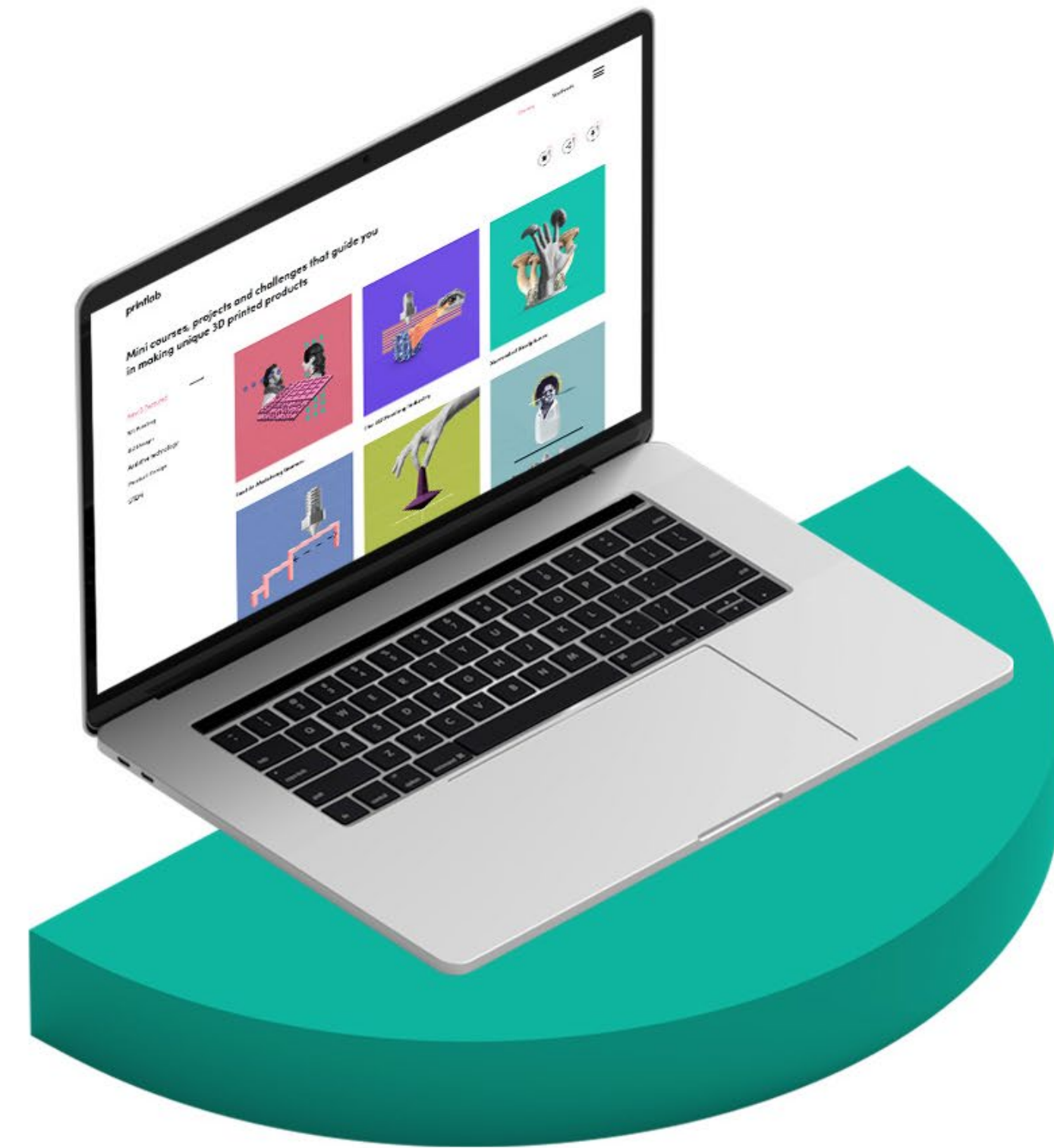


Hello! We are  PrintLab

PrintLab is a learning platform that teaches anyone how to design custom products with 3D printing.

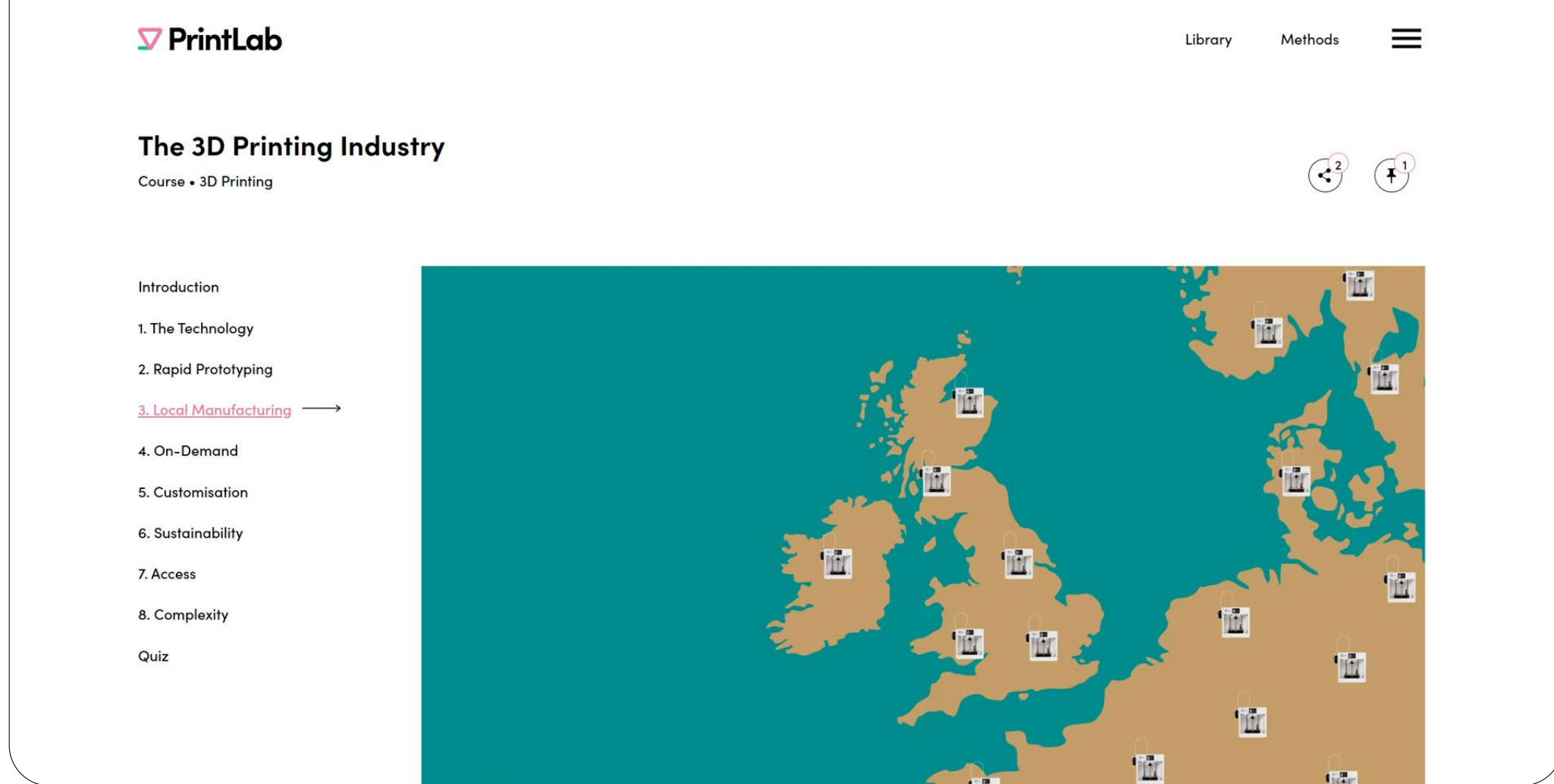
Our library is a toolkit of learning resources that fit into 3 categories

- mini courses to build technical skills and knowledge; guided projects to show people how to design specific types of products through an iterative process; and live challenges where people can use everything they've learned to tackle open-ended briefs for real people and organisations.



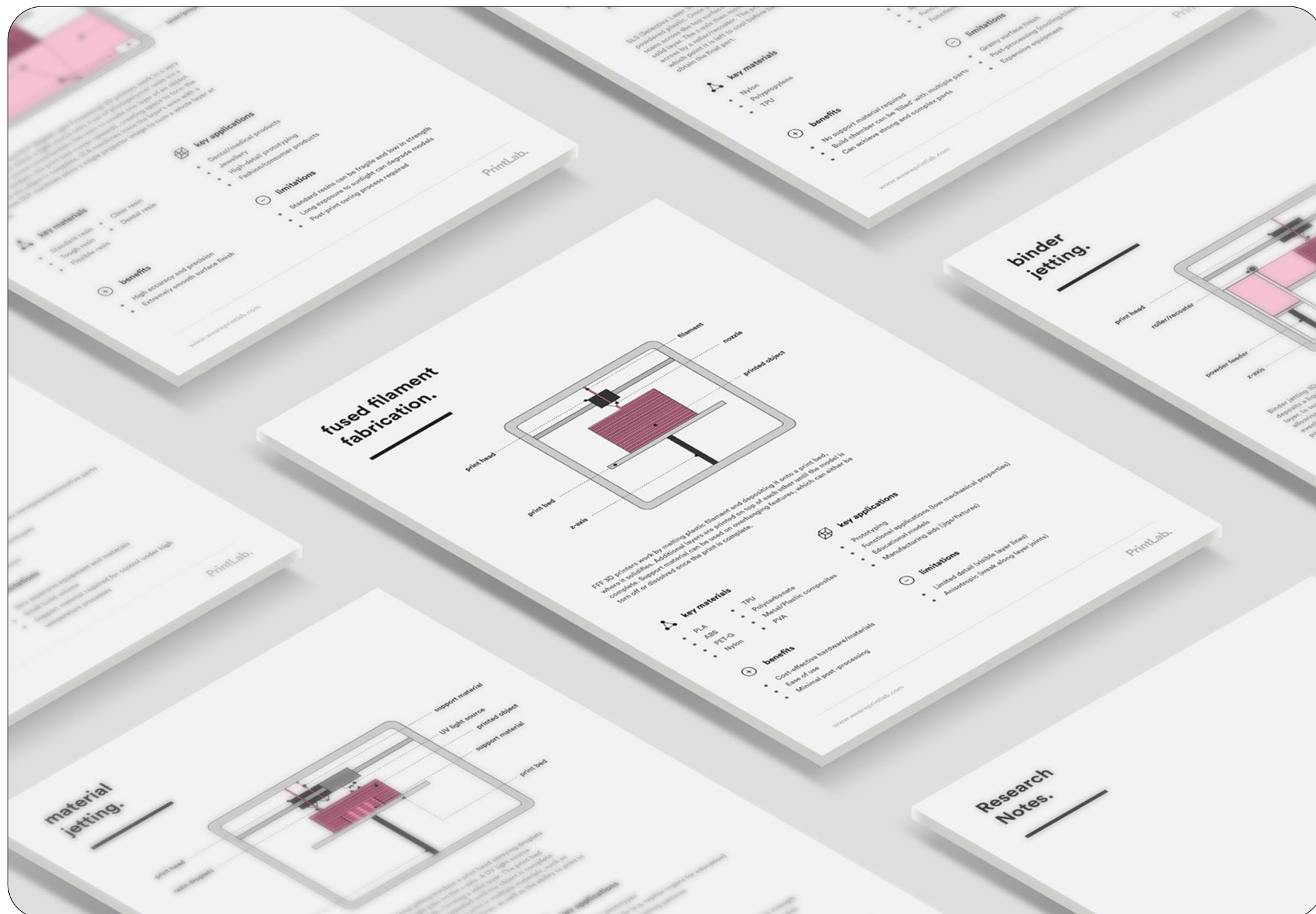
This guide outlines a learning pathway through PrintLab resources to help you prepare for the Make:able Challenge — building the technical and creative skills to design meaningful 3D printed assistive devices. Each step is optional, allowing you to follow as little or as much of the pathway as you wish, depending on the time available and the skills you already possess. If you're new to PrintLab, we recommend [signing up for a free trial here](#) as you explore the guide.





STEP 1 – Develop an understanding of the 3D printing industry and technologies.

Begin by participating in our [3D Printing Industry](#) mini course to learn about the key aspects of the 3D printing industry – from rapid prototyping and local manufacturing to customisation, sustainability and mass global access. Then go through the [3D Printing Technologies](#) resource to learn about 6 key types of 3D printing technologies.



STEP 2 – Select a 3D CAD software and learn the basic tools and functions.

The majority of PrintLab projects come with tutorials in both Tinkercad and Fusion 360 software (both free for educational and personal use) – allowing you to choose your preferred software package. We recommend Tinkercad for complete beginners, and Fusion 360 for those who have some 3D CAD experience or those who want to challenge themselves. Do a little research on both options. Then select one and participate in either our [Intro to Tinkercad](#) course, or [Intro to Fusion 360](#) course.

Intro to Tinkercad

Course • 3D Design

Introduction

1. Intro + Navigation

2. Placing + Moving Shapes

3. Scaling Objects

4. Grouping Objects

5. Rotating Objects

6. Making Holes

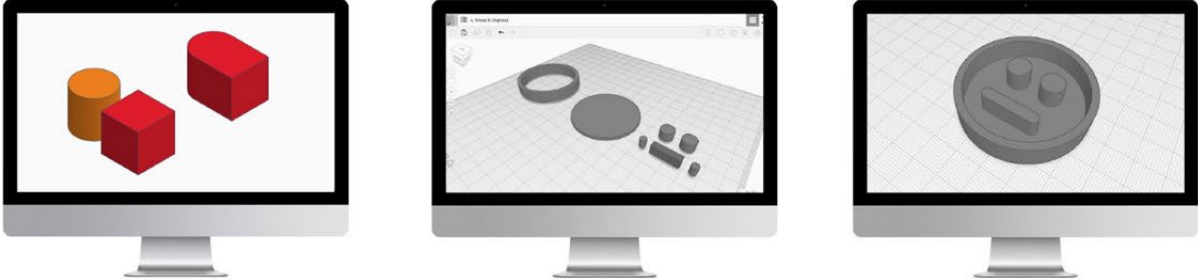
7. Duplicating Objects

8. Aligning Objects

9. The Flip Tool

10. Shape Generators

Overview



By using the 'Group' tool, you can combine multiple shapes into a single object! Grouping shapes can come in handy in various ways such as helping you to position objects and distinguish between different components in a model. You can also use the 'Group' tool to make holes, which we'll look at in a tutorial later on.

PrintLab

Library Methods

Intro to Fusion 360

Course • 3D Design

Introduction

1. Interface - Navigation

2. Sketch - Extrude - Cut

3. Fillet - Chamfer

4. Patterns

5. Revolve

6. Offset Plane - Loft

7. Sweep

8. Shell

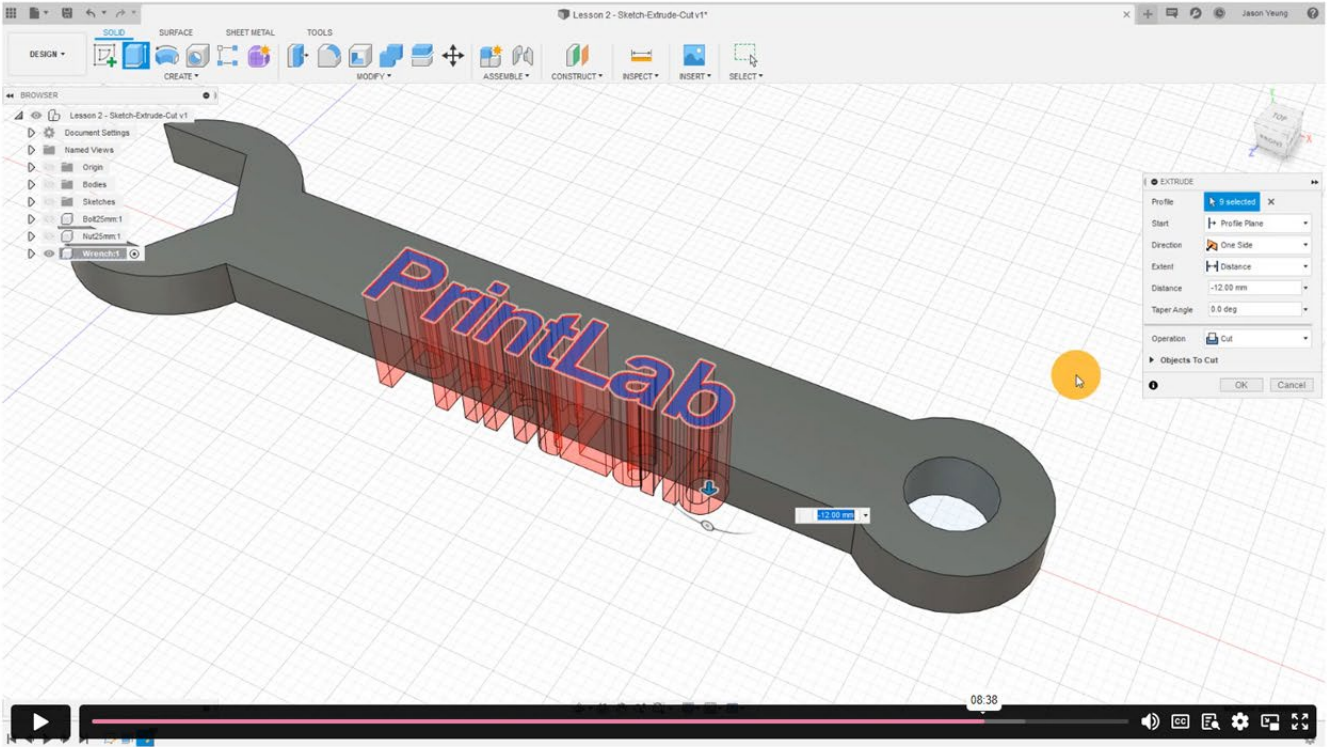
9. Mirror

10. Assemblies

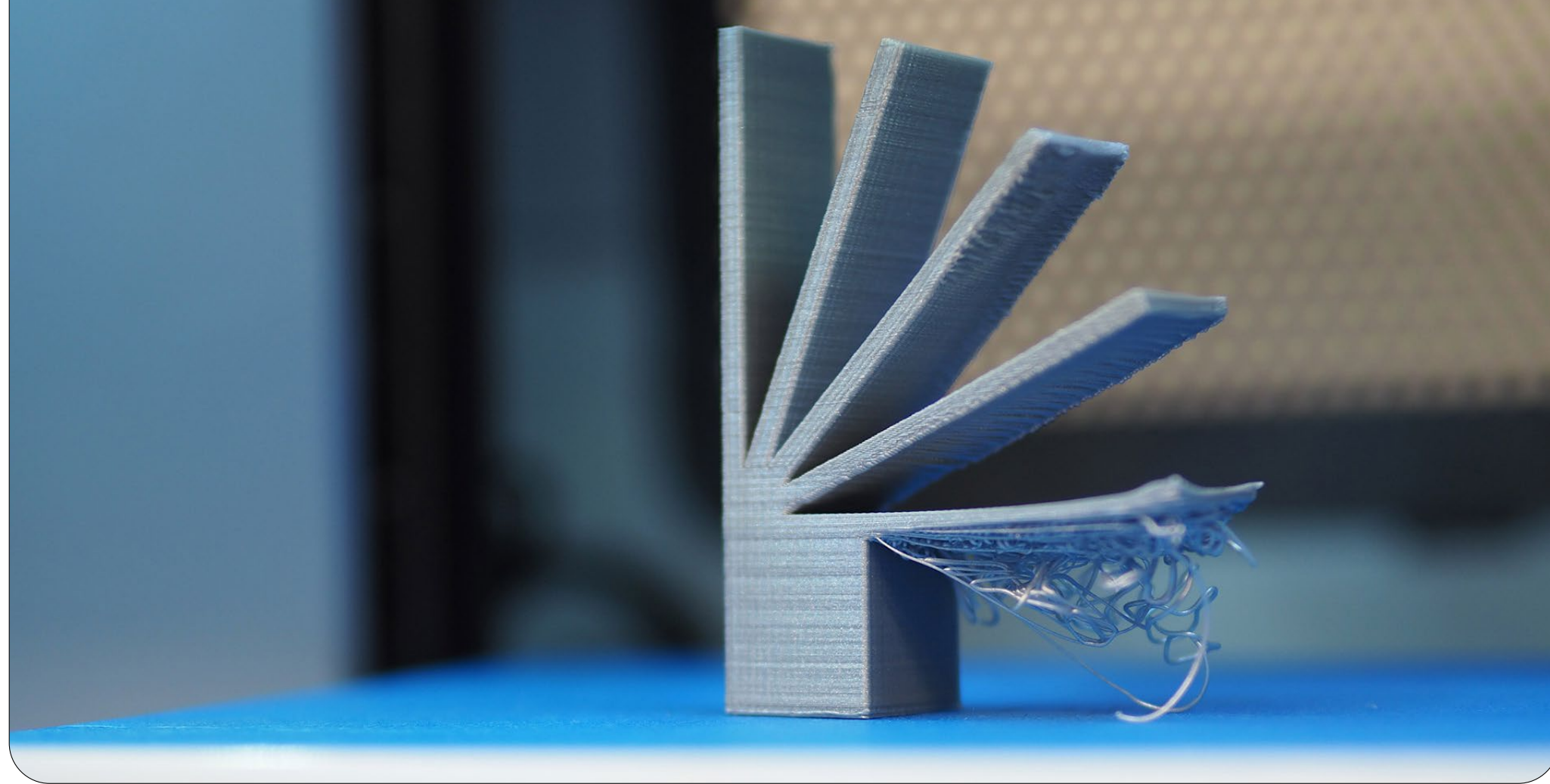
11. Render

12. Drawings

13. 3D Printing



Text Instructions Version



STEP 3 – Learn how to optimize 3D models and slicer software settings for quality 3D prints.

Our [Designing for 3D Printing](#) course covers the best practices for designing specifically for 3D printing. And our [Slicing for 3D Printing](#) course goes over 10 essential slicer settings to help get the most out of your 3D printer. Participating in both courses will provide you with key knowledge that can be applied to all your upcoming 3D designs.

LibraryMethods

Slicing for 3D Printing

Course • 3D Printing

2

1

Introduction

1. Print Speed

2. Print Temperature

3. Layer Height

4. Orientation

5. Outer Layer

6. Print Bed Adhesion

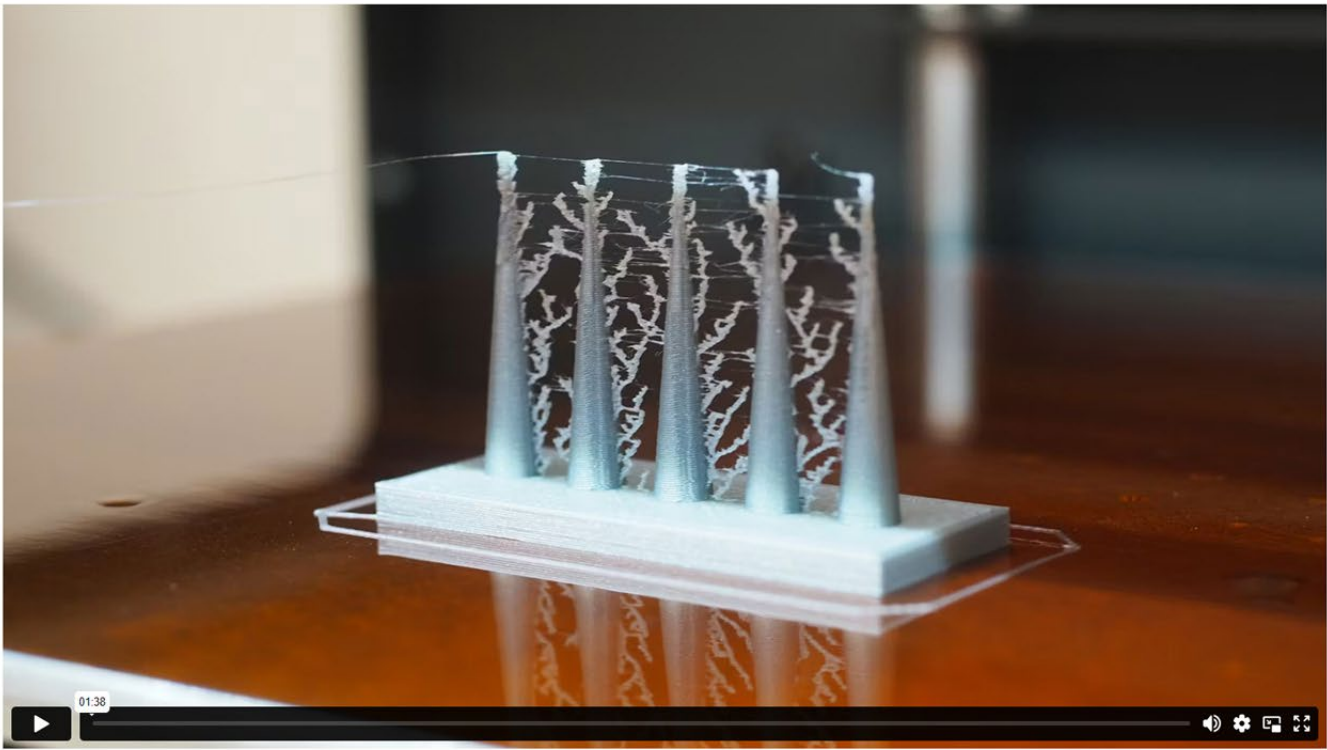
7. Retraction

8. Infill

9. Support Material

10. Cooling Fans

Quiz



Voice Narrated Version

+

STEP 4 – Understand the full creative process and the tools available to you.

Before you delve into design projects, it’s important for you to understand how designers approach creative challenges, and the techniques they use. PrintLab’s Design Method Toolkit provides a range of step-by-step problem-solving and design activities that can be used at each stage of the design process – whether it’s to research topics, generate ideas, design prototypes, evaluate solutions or present work. And by going through the [Design Method Toolkit](#) resource, you’ll learn how to plan and implement these activities in your own projects.

Design Method Toolkit

Course • 3D Printing

Introduction

[The Method Toolkit](#)

Design Process

Examples

Method Tips

We're now going to take a deeper look at the specific methods within the toolkit. Methods are split into 4 categories – Researching, Designing, Evaluating and Presenting. Whatever stage you are at in the design process, there will be methods that can support your journey. Below is an overview of each category. As you learn about the categories, feel free to click the links to view the methods within them.

wrist orthosis

about 50,000,000 results

Researching

Researching methods help you to learn and discover insights that can help drive your design decisions. Examples include user interviews, observation studies, simulations, photo diaries and online research.

No contact with food

1-2 year lifespan

What consumer products can we grow with mycelium?

Max size: 100x100x100mm

Designing

Designing methods help you to generate ideas and create prototypes. You will typically gain insights from methods in other categories first, which will then inform the decisions you make when implementing design methods. Examples include brainstorming, sketching activities

printlab

Library

Step-by-step design methods to help you solve creative challenges

All Researching **Designing** Evaluating Presenting

Split Model Testing

Exploratory Scale Drawing

Life Cycle Design

Icon Sk

Group Brainstorm

Feature Iteration Diagrams

Thumbnail Sketching

Constr

Evaluation Matrix

Methods • Evaluating

An evaluation matrix is used to analyse products and prototypes. It involves defining multiple criteria to evaluate, before mapping out positive and negative aspects of each one. Although a simple concept, it ensures your evaluation is thorough and not confined to a single area of the design.

Take a look at the method steps below. In our example, we are evaluating an assistive bottle opener design.

Resources: [Evaluation Matrix AI Template](#), [Evaluation Matrix Digital Image Template](#)

Step 1

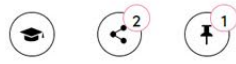
Identify a product or prototype to evaluate. Prepare the evaluation matrix template by

At this stage, you will have built a strong foundation of 3D printing knowledge and skills, which you can now put to the test in a series of assistive technology **design projects**.



Assistive Bottle Openers

Project • Assistive technology



Introduction

Levers

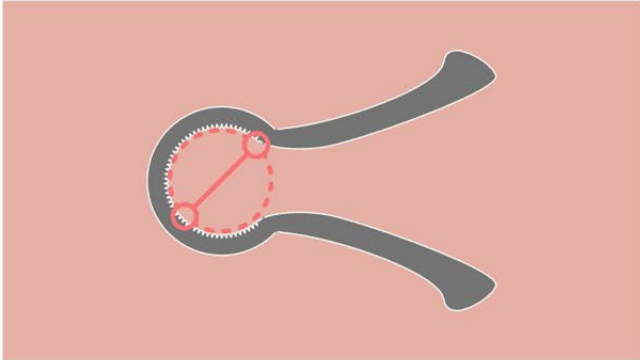
Design Considerations →

Skill Building

Evaluate + Iterate

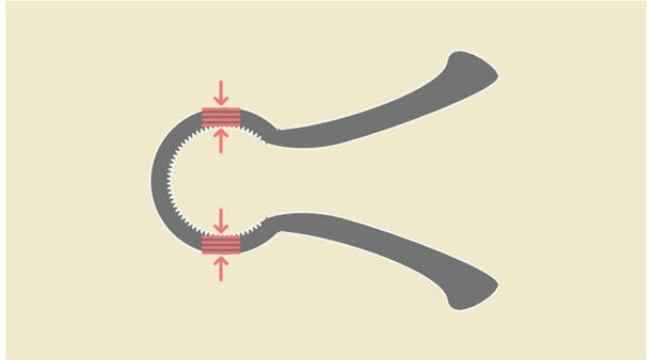
Submit

When designing 3D printed assistive bottle openers, there are many factors to consider. These will depend on the form and function of the bottle opener but in this section, we're going to take a look at some considerations for the design that you have seen featured throughout the videos in the previous sections of the learning platform. Go through the below considerations and refer back to them when you come to developing your own unique design.



Profile Diameter

Ensure the diameter of the profile opening is larger than the diameter of the screw cap. The flexibility and thickness of the device will play a part

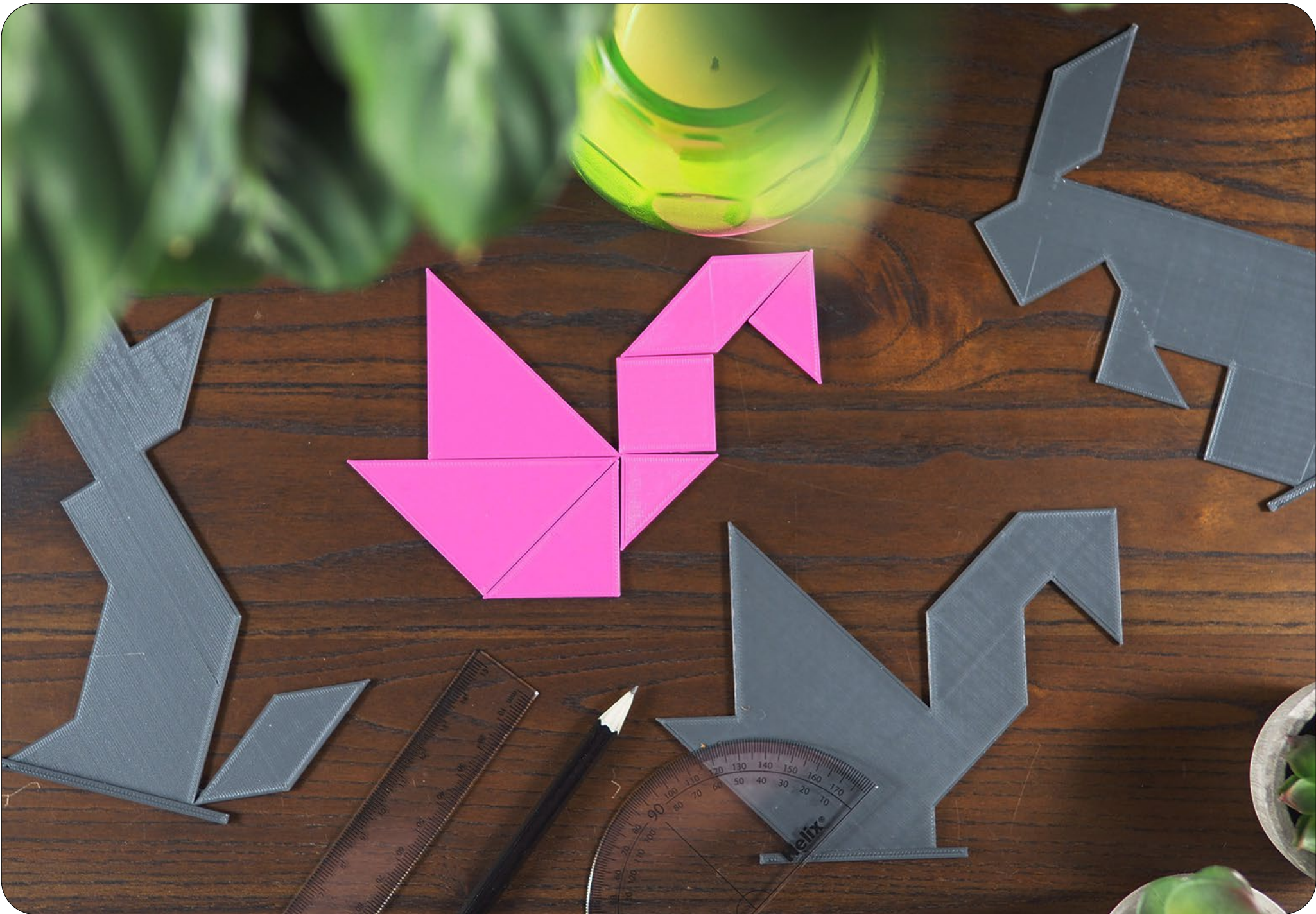


Material + Profile Thickness

The type of material and profile thickness will play a part in how flexible your bottle opener is. A thicker profile will give you less flexibility so bear

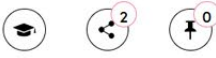
STEP 5 - Participate in beginner projects to adapt example designs.

Our [Assistive Bottle Openers](#) and [Tactile Tangram](#) projects are great starting points for beginners. They guide you through the full design process to adapt/modify existing designs. You'll also be introduced to various design methods, such as evaluation matrixes and real-time prototyping techniques. You may wish to select one or both of these to participate in.



Micro:bit Switch Access

Project • Assistive technology



Introduction

To begin your journey, you'll be jumping straight in and building your own Tap device. By assembling and using an example device, you'll better understand how adaptive switches work and the possibilities for customisation and innovation. Follow the steps below to build your switch. Then spend some time using the device on either a phone, tablet or Chromebook.

Switch Assembly



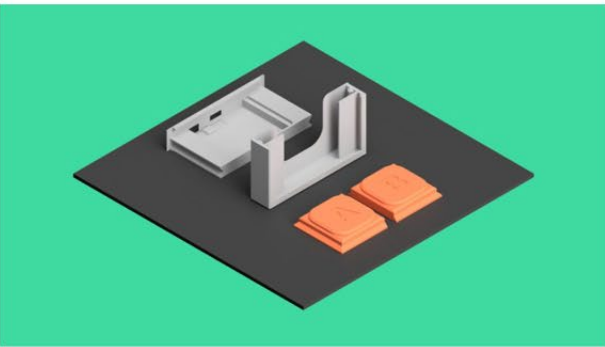
Skill Building



*Disclaimer – Due to the varying tolerances of 3D printers and material properties, we cannot guarantee the same functionality or tactile experience for each manufactured Tap device. If you have any issues with 3D printing or usage, please contact hello@weareprintlab.com and we will do our best to advise you with alternative print settings or design adjustments.

Customisation Options

Design + Make



STEP 1: 3D Print Components

Download the STL files for Tap and 3D print them using the orientations

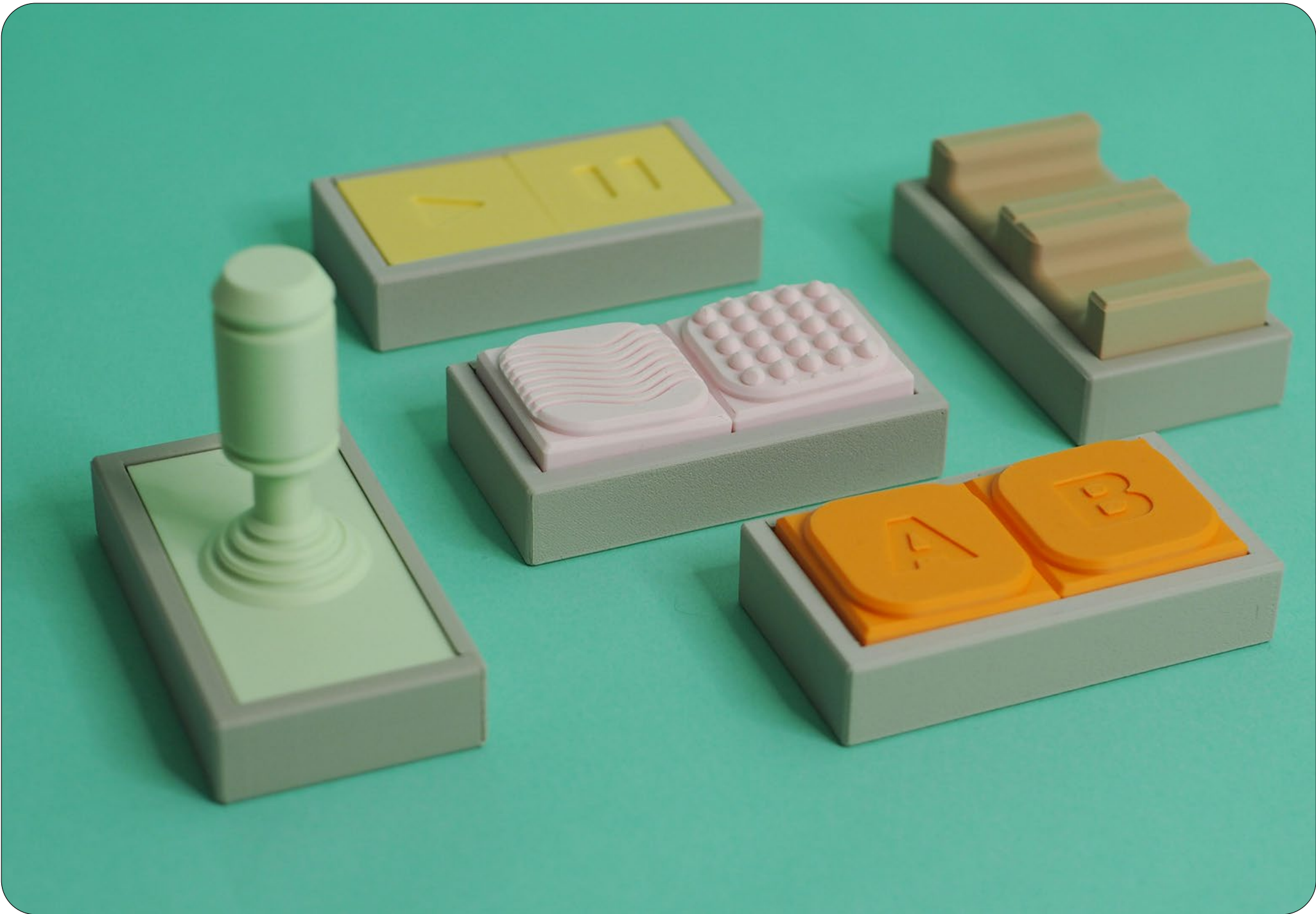


STEP 2: Upload Code to Micro:bit

Connect your micro:bit to a computer via USB connection. Then

STEP 7 – Learn how to integrate electronics and coding into your designs.

The possibilities with 3D printed assistive technology are vast – but when you combine it with electronics and coding, the potential grows even further. Our [Micro:bit Switch Access](#) project guides you through designing a Bluetooth dual-switch device that empowers people with disabilities to control phones, tablets, and computers. Along the way, you'll develop practical skills in coding, electronics, and inclusive design – taking your creativity and technical ability to the next level.



After participating in a series of projects,
we recommend spending some time further
developing your 3D CAD skills - enabling you to
bring any creative idea to life.

3D CAD Tutorials

Resource • 3D Design



Introduction

In this tutorial, you'll be designing an assistive bag carrier, which consists of a large ergonomic gripping handle, together with 2 hooks that allow users to hang multiple bags from. The device makes the task of carrying bags more comfortable and it evenly distributes weight to the handle.

Assistive Technology —

- Bottle Opener
- Tactile Tangram Puzzle
- [Bag Carrier](#) →
- Tactile Matching Game
- Finger Tools
- Writing Aid
- Key Turner
- Can Opener
- Cane Grip
- Head Pointer
- Orthoses

Product Design +

STEM +



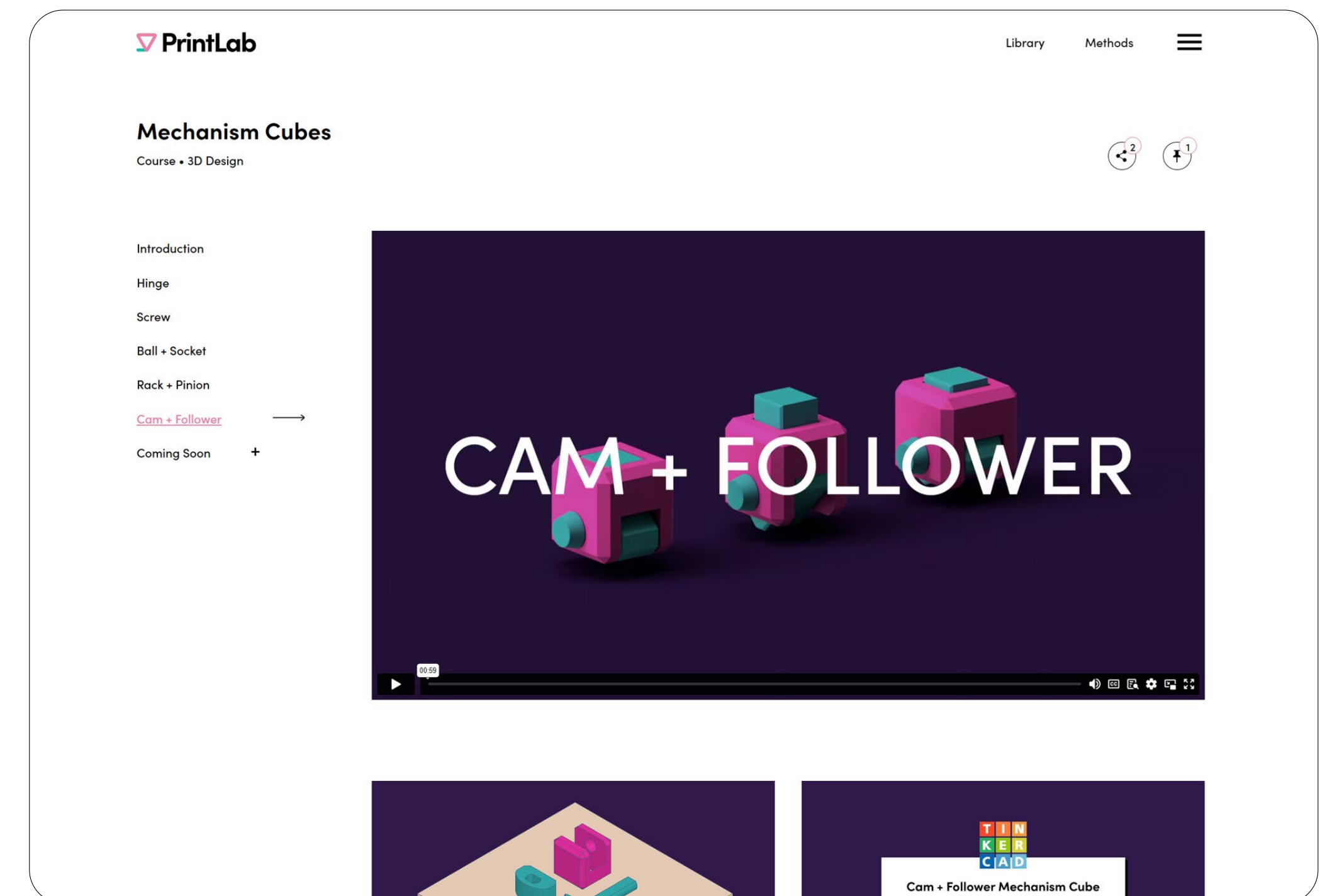
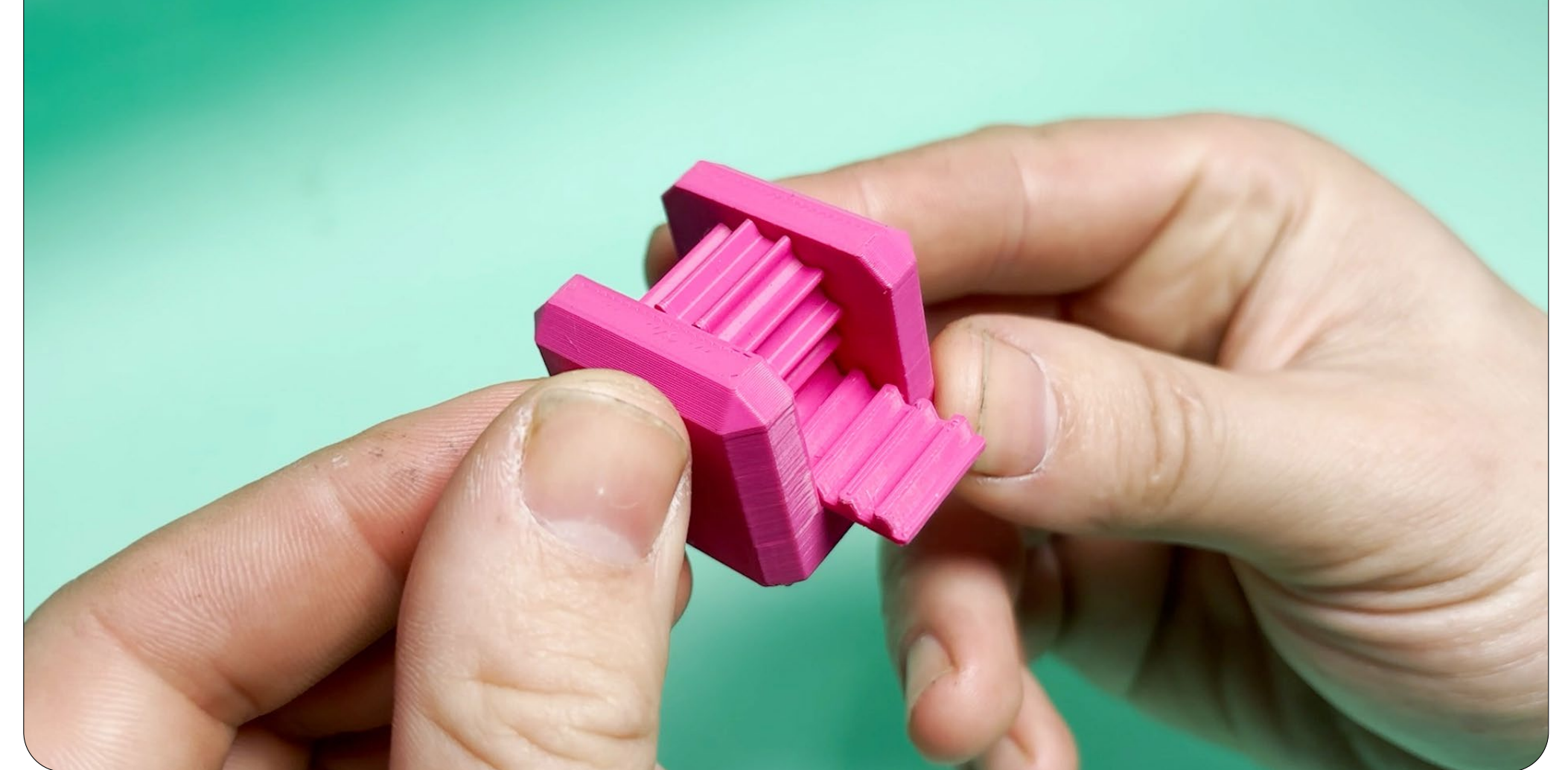
STEP 8 – Engage in additional assistive device CAD Tutorials

If you opted to use Tinkercad from the beginning, you may wish to have a go at the more advanced 3D CAD software, Fusion 360. This can be done by using our [Tinkercad to Fusion 360](#) course, or our [Intro to Fusion 360](#) course. You can also explore additional 3D CAD tutorials in the [Tools Library](#), including a range of assistive device tutorials you may not have completed yet.



STEP 9 – Learn how to add connections and movement to your 3D models.

Our [Mechanism Cubes](#) course is an intermediate-advanced resource, where you'll be introduced to the fascinating world of 3D printed mechanisms. The creative learning resources will teach you how to add connections and movement to your 3D models – unlocking new and innovative design possibilities.



As this learning pathway concludes, you should now be ready to apply your skills to design an assistive device that improves the life of **a real end user**.





STEP 10 – Participate in the Make:able Assistive Technology Challenge

Now that you’ve completed the learning pathway, it’s time to put your skills into practice by developing your assistive device for the Make:able Challenge. [Visit the challenge platform](#) and register if you haven’t already done so, then work through the online toolkit to develop empathy, generate ideas and prototype your concept through an iterative process – bringing a meaningful solution to life for your end user.

[home](#)
[toolkit](#)
[news](#)
[learn 3d printing](#)
[register](#)
[sign out](#)

The challenge toolkit is a complete set of resources to help you to design and make an assistive device.

1 – Introduction
2 – Get Inspired.
3 – Skill Building
4 – Develop Empathy

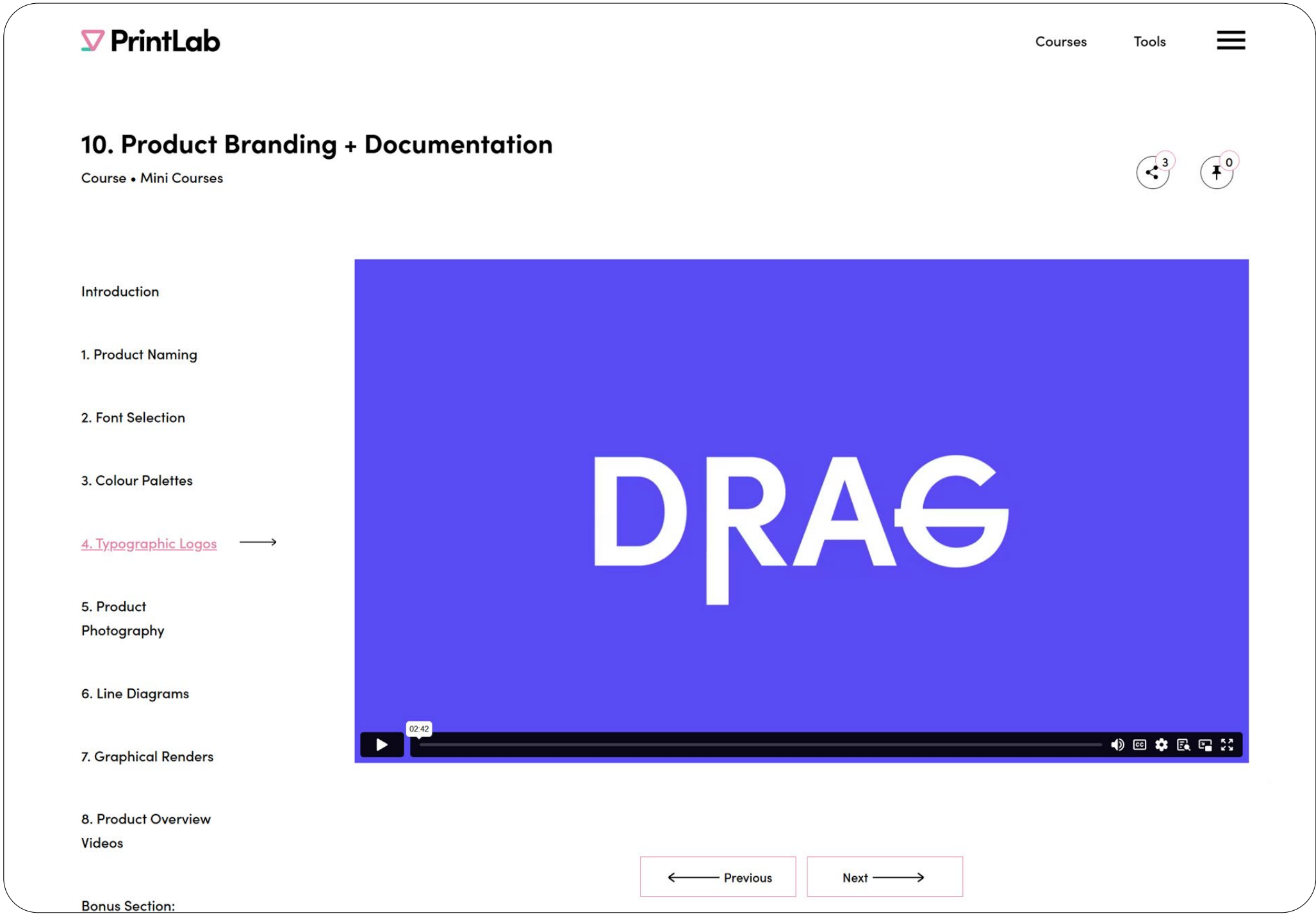
5 – Idea Generation
6 – Design + Make
7 – Test + Iterate
8 – Share your Story

get in touch | hello@weareprintlab.com

[Privacy Policy](#)
[PrintLab Website](#)

STEP 11 – Develop professional branding skills to launch open source devices.

After completing the Make:able Challenge, you may want to take your project even further through our [Product Branding + Documentation course](#). You'll learn how to name your design, build a simple visual identity, capture strong photography, create diagrams and renders, and prepare your project for open-source release — enabling it to be used and adapted by people all around the world.





Did you know that by completing the learning pathway, you can obtain **PrintLab Certifications**?

If you've completed (or partially completed) this learning pathway, you can submit your mini course certificates, project portfolios, and challenge submissions to earn industry-recognised digital badge certifications. These verifiable micro-credentials are ideal for sharing on your email signature, résumé, or digital portfolio — helping you showcase your 3D design and assistive technology skills. Learn more on the [PrintLab 3D Printing Certification page](#).



We hope you found value in this learning pathway. Remember that PrintLab is an ever-growing platform so keep an eye out for **new resources every month!**

www.weareprintlab.com