#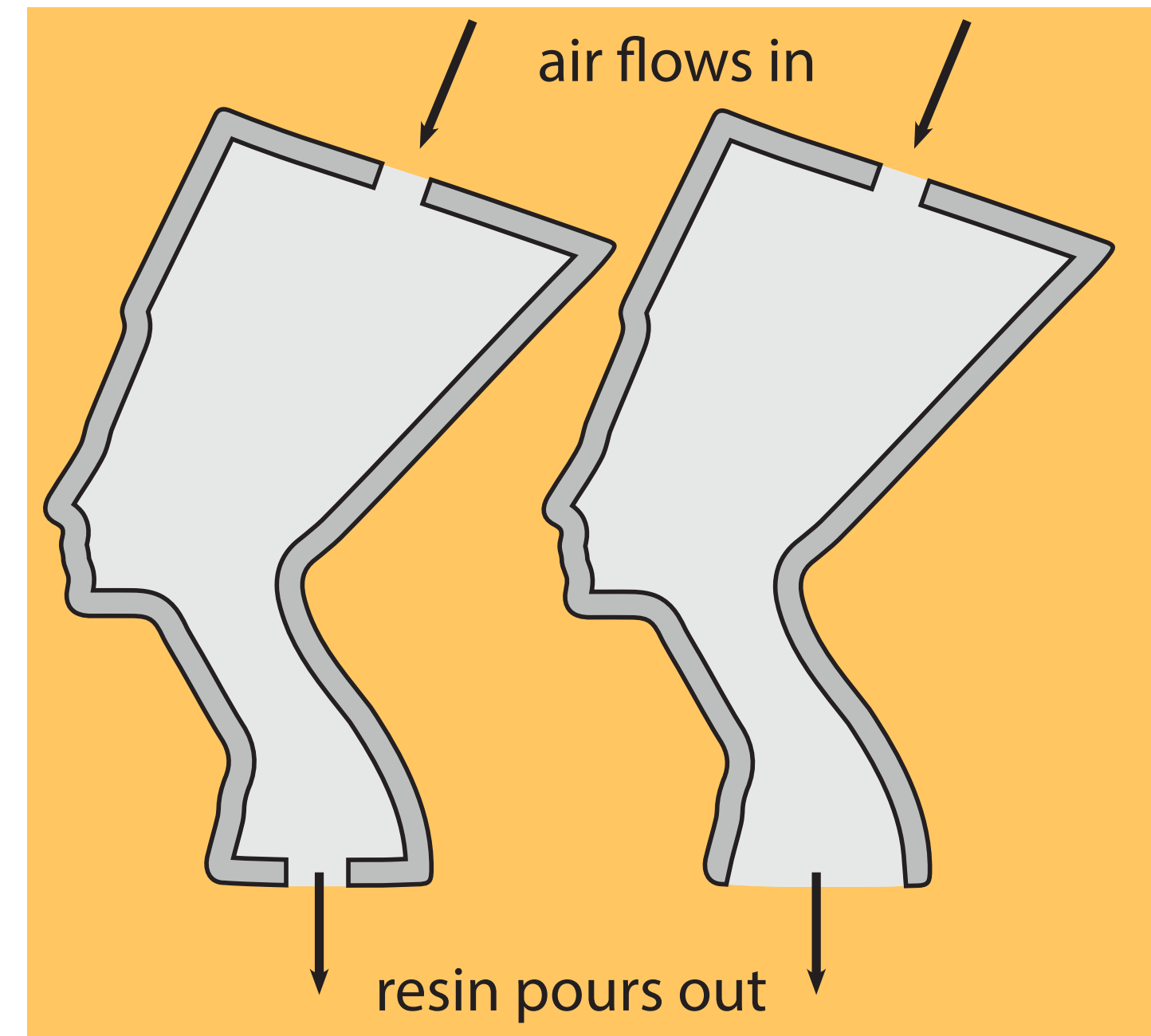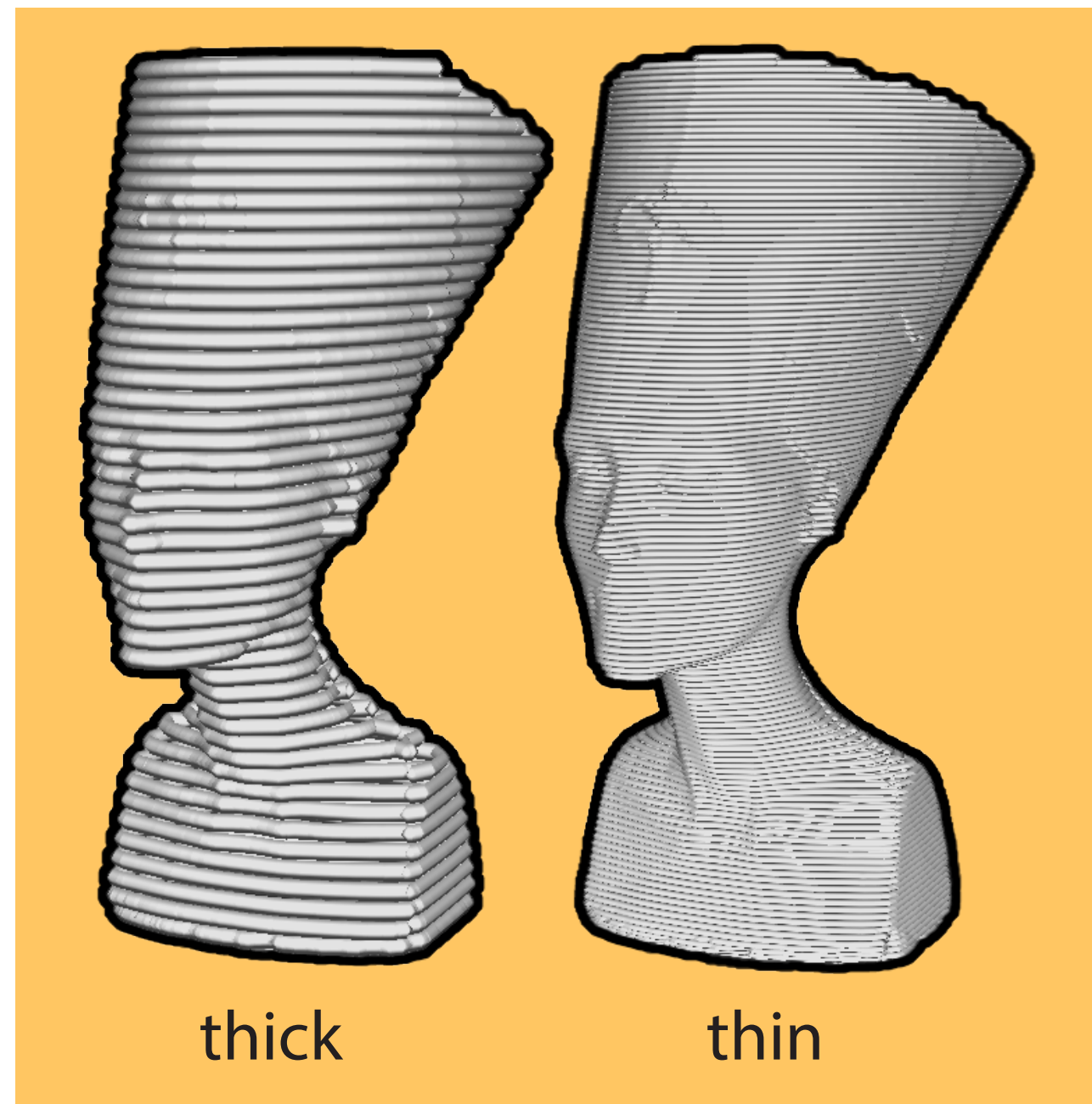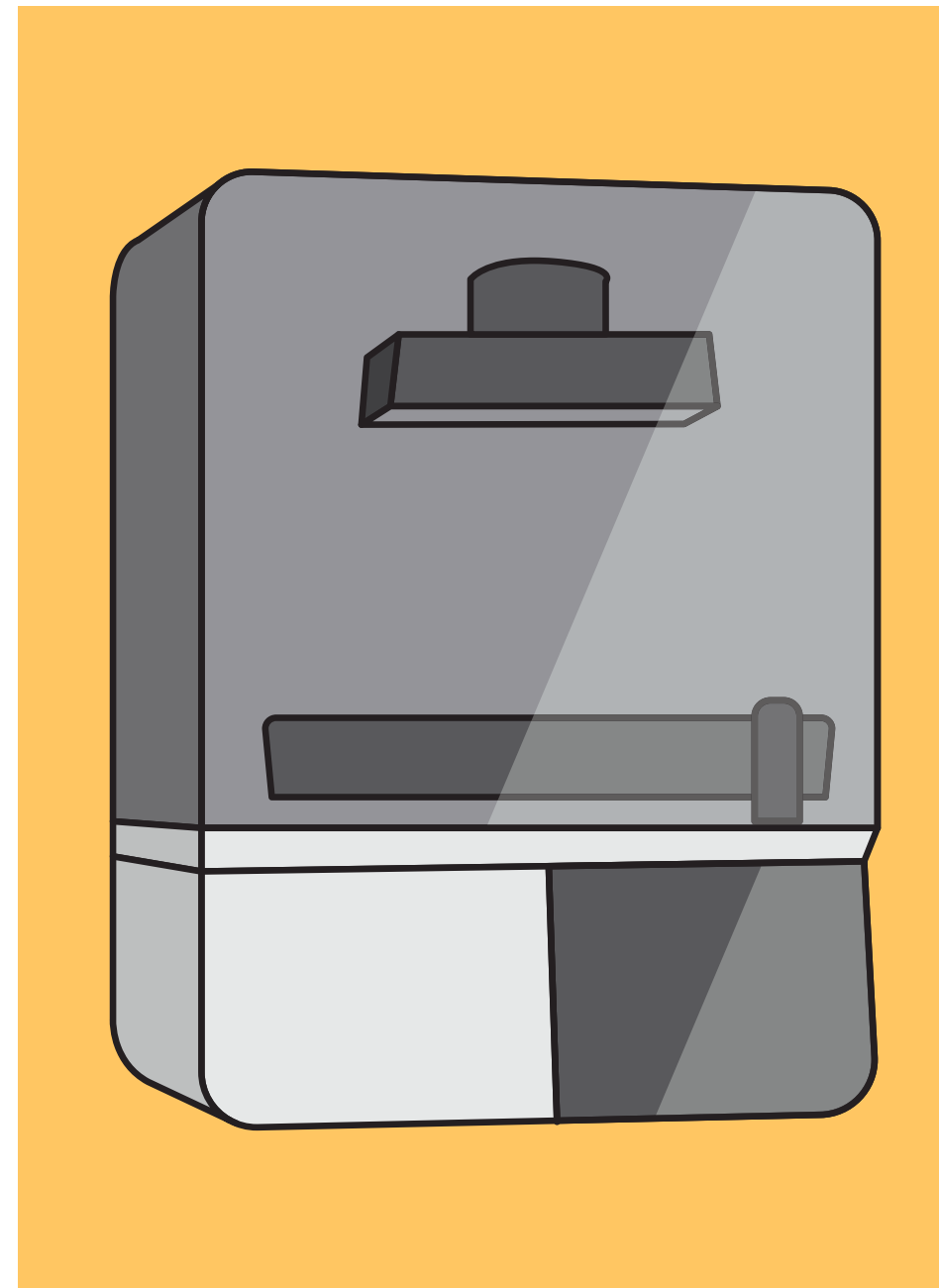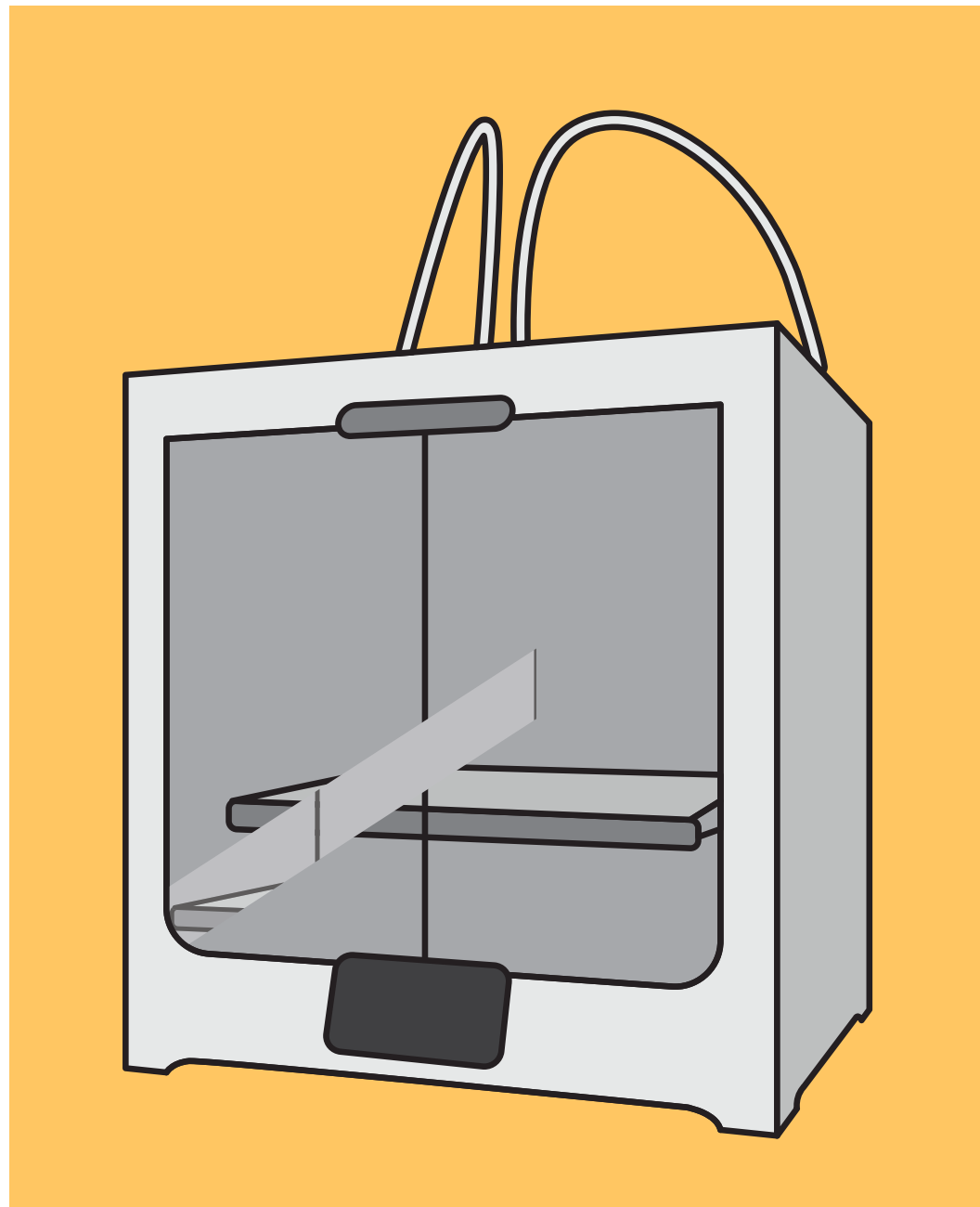 Can an illustrated glossary assist in greater understanding of 3D printing terminology and help more people overcome the initial hurdle of unfamiliar vocabulary?

thick   thin

air flows in

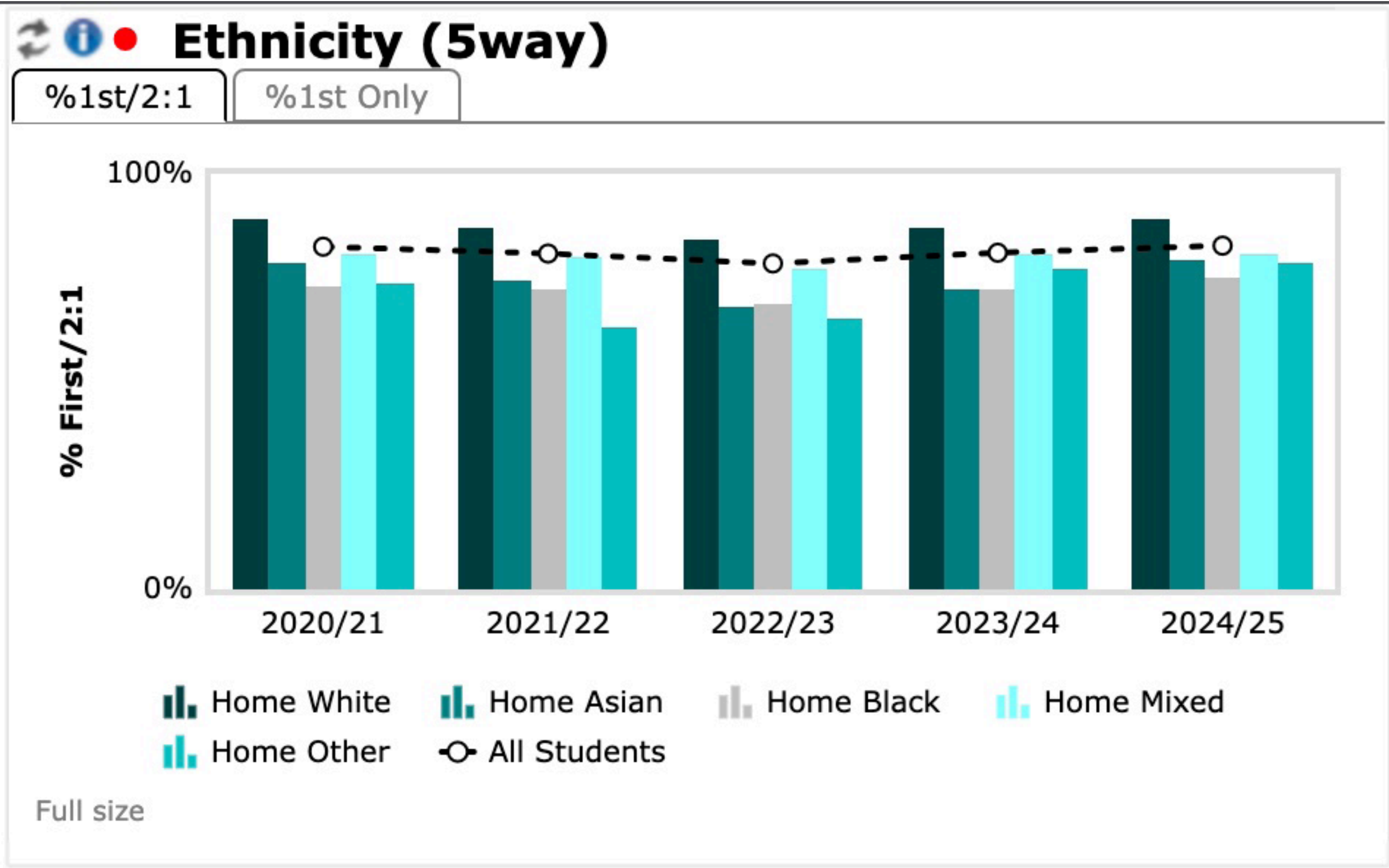resin pours out

Context and Background

The LCC 3D Workshop is an open access space available to all courses and year groups.

Students complete online inductions and book to use the space as needed by their project.
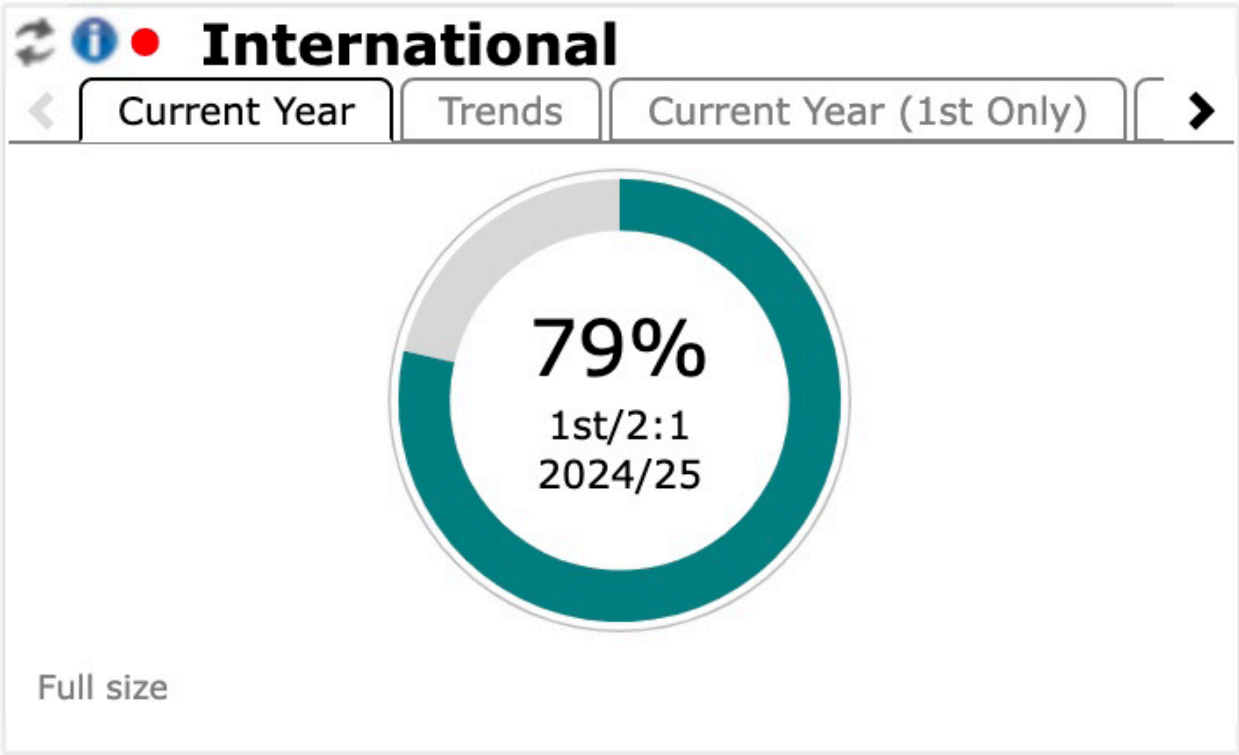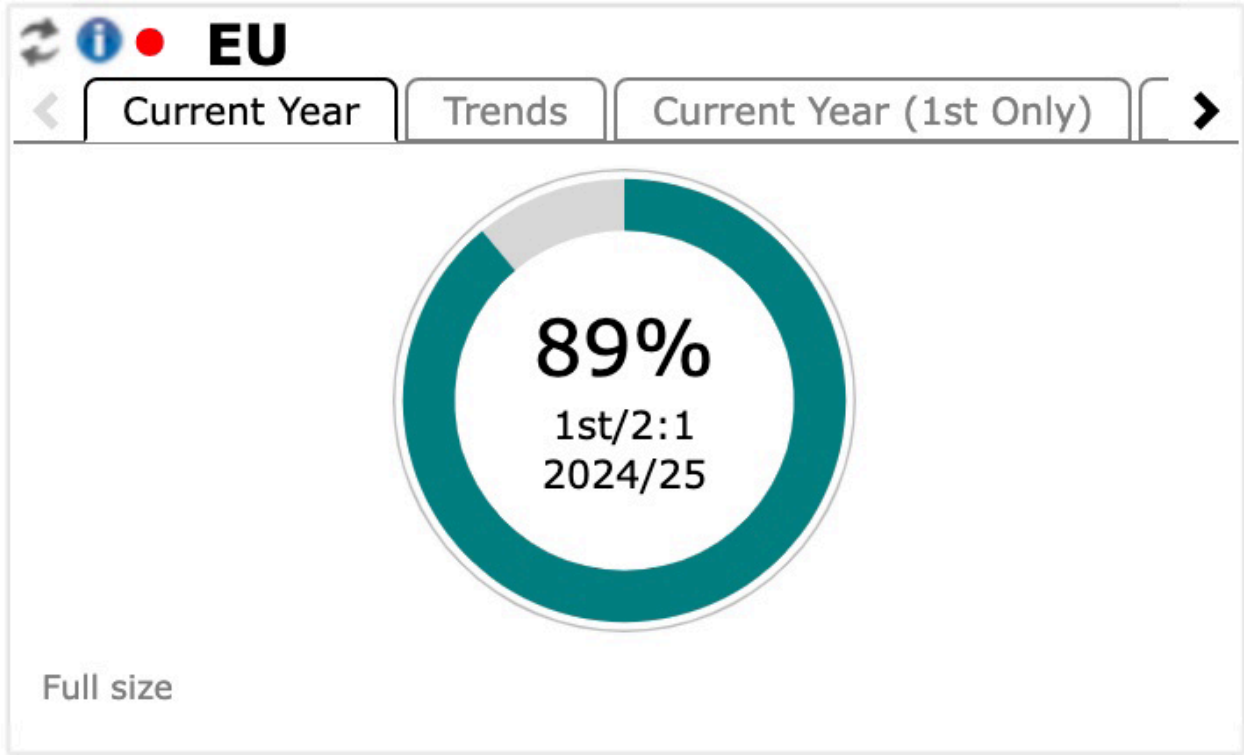
UAL Attainment Rates

Percentage achieving 1sts / 2:1s (2024-25 academic year)

Home White: 90%
EU: 89%
Home Mixed: 81%
Home Asian: 80%
Home Other 79%
International: 79%
Home Black: 76%

ActiveDashboards (n.d.) *ActiveDashboards*. Available at: https://dashboards.arts.ac.uk/dashboard/ActiveDashboards/DashboardPage.aspx?dashboardid=c04b6e35-6d26-4db8-9ea0-5e27d30e3402&dashcontextid=638985459734562108 (Accessed: 6 January 2026)
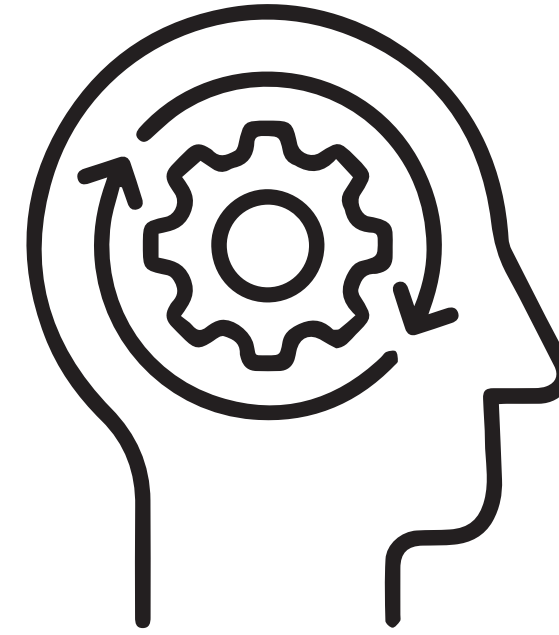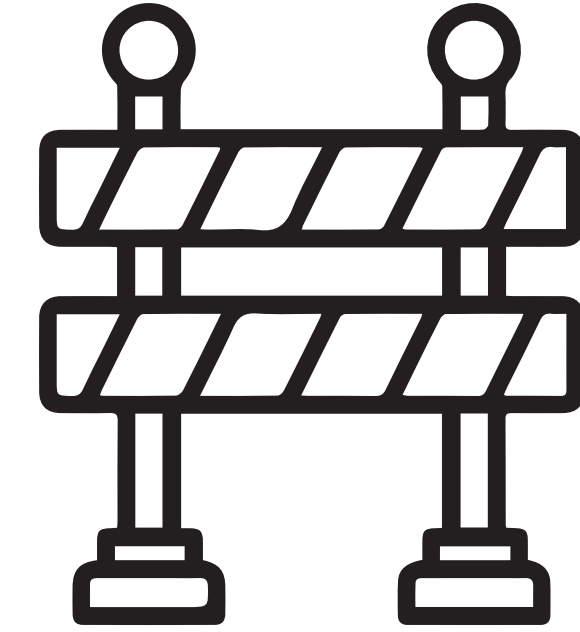
UAL Attainment Rates

attainment → mark scheme → evidence of experimentation, process, skill development → barriers to access?

(possible in workshops)

The use of Illustrations alongside definitions

"...using visual contextual support for teaching vocabulary develops students' vocabulary awareness"

"It is important to provide learners with strategies for inferring the meaning of unknown vocabulary from the context in which it occurs"

Nasrollahi, K. and Daneshfar, S. (2018) 'The effect of visual contextual support and glossary of words on guessing meaning of new vocabulary items in English by pre-university male EFL students', *Journal of Language Teaching and Research*, 9(3), pp. 561–572. doi:10.17507/jltr.0903.16.

Çiftçi, H. and Üster, S. (2009) 'A comparative analysis of teaching vocabulary in context and by definition', *Procedia – Social and Behavioral Sciences*, 1(1), pp. 1568–1572. Available at: https://www.researchgate.net/publication/248606614_A_comparative_analysis_of_teaching_vocabulary_in_context_and_by_definition (Accessed: 12 November

The Resource

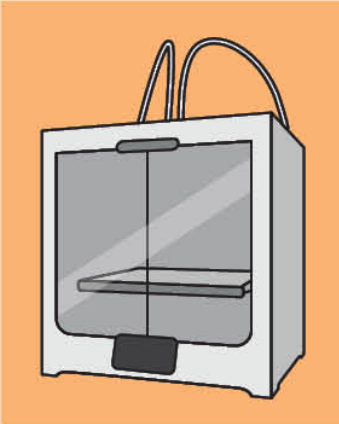A glossary guide to
3D Printing

3D Printing open hours
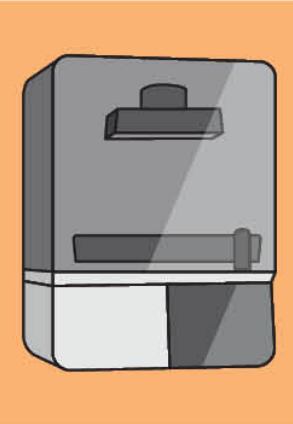
Mon-Fri: 11am-5pm
Wed: 2pm - 5pm

⦿ Located in WG28d

Intro

3D Printing is a way to get your digital 3D models into the real world - wether that's a prototype for a product, piece of a game or a figurine there's a printer for everything. In the 3D workshop we have standard plastic and resin printers, as well as a specialist full colour printer and a clay printer. More information about all these printer types can be found on Moodle, along with the 3D Workshop online inductions. This glossary will take you through some common 3D printing terminology to get you started.

Ultimakers

The Ultimaker printers print using **PLA** (polylactic acid - a type of plastic made from cornstarch). This is the most common type of 3D printing. The printers heat up the PLA, and squeeze it out layer by layer to build up a 3d print in the shape of your model. The material is **cheap** and **strong** - good for prototypes and mechanical parts, but the printers can be slow and the material can feel a bit rough. We have PLA in a variety of colours, but white is strongly recommended as you can then spray-paint later.

Formlabs

The Formlabs resin printers print using **UV reactive liquid resin**, which is exposed to a UV light within the printer which cures the prints layer by layer. Resin prints come out **very smooth** and can pick up a lot of small intricate detail, meaning that they are good for printing models of characters, 3d scans, or a smooth print to use for mould making. The resin printers can print **quickly**, however extra time is needed at the end for the prints to get washed and dried. We have resin in white and clear.
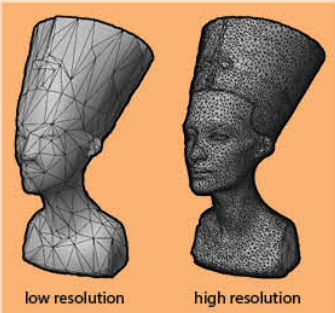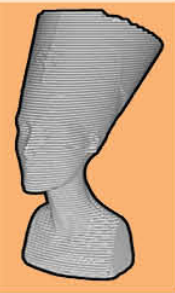
3D Modelling

Model

3D printing starts with a **3D model**, which is a **digital 3d object**. There are many ways of getting a 3d model:
- make it yourself in a software like Blender, C4D, Rhino, Sketchup or Nomad
- download a model online
- ai generate a model
- 3d scan an object

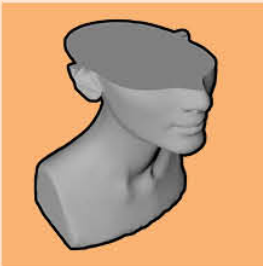low resolution   high resolution

Mesh

If you look closely at the surface of a 3D model it is actually made of **small triangles or squares** (polygons). We always want a **closed mesh** - this means no holes or gaps in the network of polygons. A **high resolution mesh** will have lots of polygons, creating a smooth and detailed model. A **low resolution mesh** will have less polygons, creating a model with less detail that has a rougher surface.
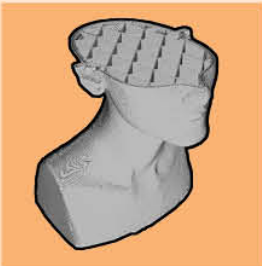
3D Printing

Slice

Once you have a 3D model, you need to **slice** it to be ready to 3D print. Slicing splits the model up into **thin layers**, and the printer will print the model **one layer at a time**. Thin layers will create a very smooth print, but can take longer to print. Thicker layers will create a rougher print, but it will print faster.
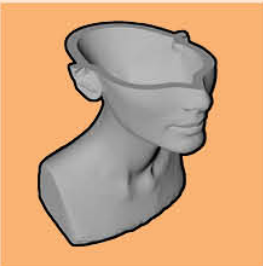
3D Printing

Solid

A model printed completely **solid** is likely to be **strong** but will use a lot of material (which can cost more). The resin printers always print in solid resin.
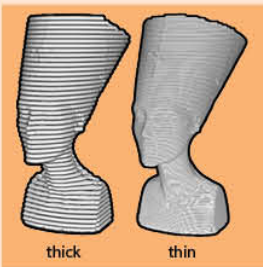
Infill

Infill is generated while slicing, and creates a **structure inside a print**. It helps the prints print **faster**, while still strong, and can come in different shapes and sizes.
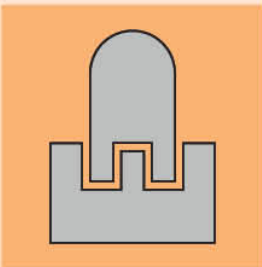
Hollow / Shell

A model does not have to have infil - it can be printed **hollow** which means it has a gap inside. A hollow model is sometimes referred to as a **shell** or a **skin**.
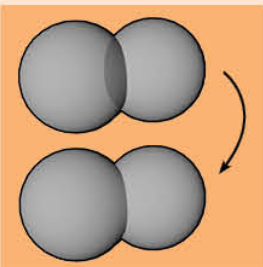
thick   thin

Layer height

The **smaller (thinner)** the layer height of a print, the **smoother** the surface will be. However this will take more time to print, so sometimes a **larger (thicker)** layer height can be beneficial if you want something **fast** and don't mind the surface being **rougher** or the layer lines more visible.

Tolerance

If you 3D print two objects and want them to fit together, **you need to leave a bit of a gap between them** to allow them to slide in - this is called the **tolerance**. Each printer, and also each project, will have a different tolerance so you sometimes have to **test** a few times before finding the perfect fit.

Boolean Union

A 3D model can be made of different shapes, but it is always best to **join** these shapes together. Different softwares have different names for this, but it is usually called a **boolean union**, a **boole** or just **merge / join**. Not joining separate objects together before printing can cause complications.
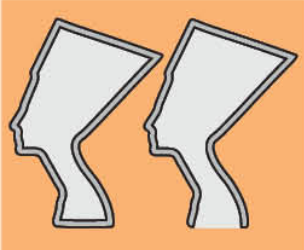
Finishing Touches

Support

3D printers need to generate **support structures** while they print 3d models. This structure looks different for each printer, but it allows the printer to print complex forms. Even a hollow print will need to have some support structures inside the hollow part to allow it to print.
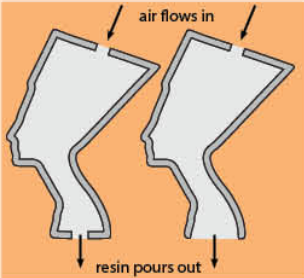
Ultimaker support is made of a different material to the model, and can be ripped off with pliers after the model has printed. This is called **tree support**.

Formlabs support is made of a **scaffolding-like structure**, which reaches up to all the parts of the print. This support has to be cut off using snips, available in the workshop.

Cups

The Formlabs resin printers print using liquid resin, and the models print **upside down** - dipping into the resin. A **cup** (light grey) is formed usually by a **hollow space** or **gap** in a model (dark grey - cross section), and can cause issues by vacuum suctioning to the base of the printer and getting stuck. We try to avoid cups by tilting the model, or by adding **air holes** and **vents**.
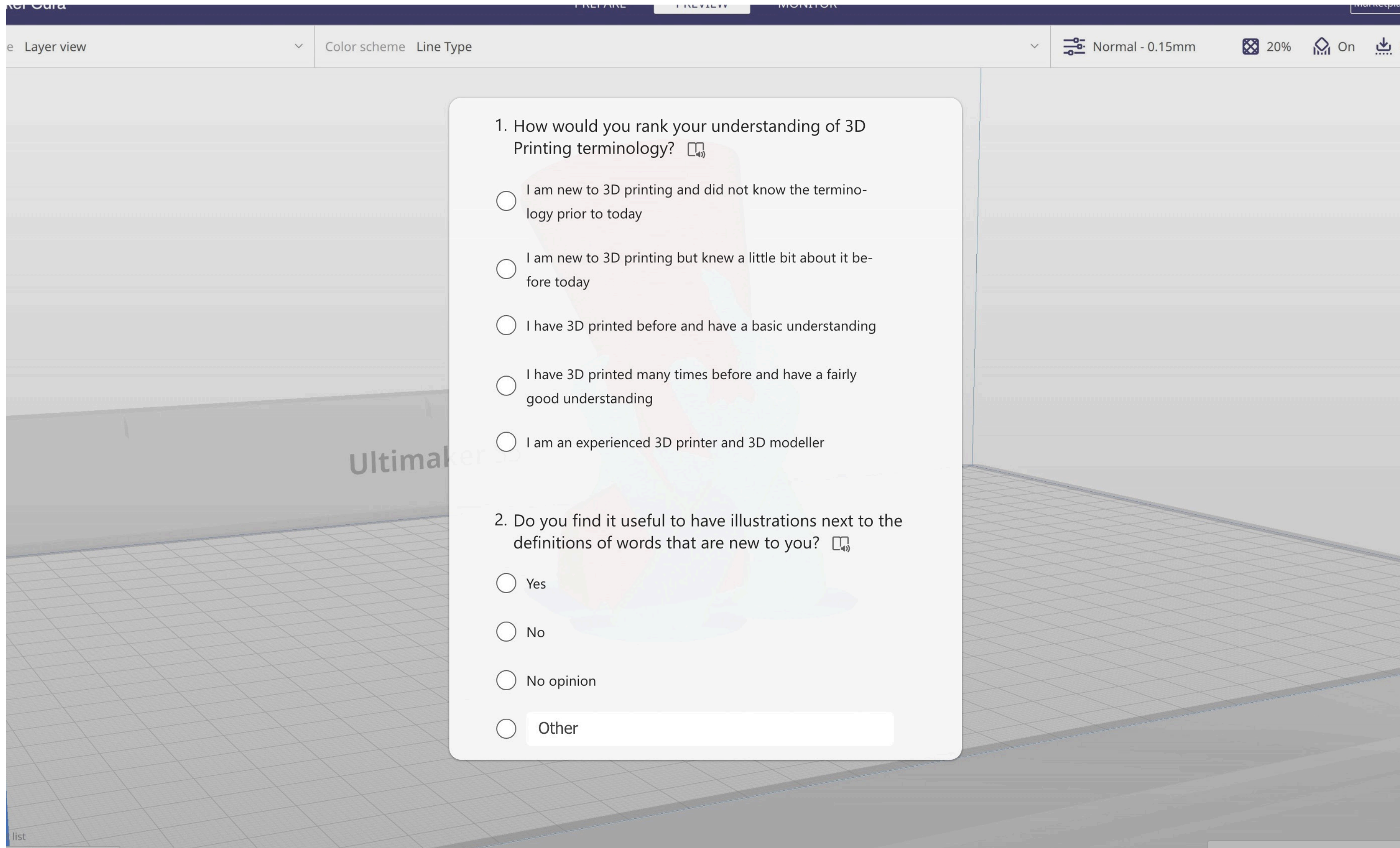
Air holes + vents

air flows in

resin pours out

An **air hole** can be added to a print **at the location of a cup** to break the vacuum suction and allow the print to print normally. If printing a hollow shell on the Formlabs then you actually need **multiple air holes** - at the **top** for air to come in, and at the **bottom** for resin to pour out. Talk to technicians if you need help with this!

Ready to learn about file setup, or book a 3D printer? Complete the 3D Workshop Moodle inductions today!

printed in A1 in two locations in the workshop

large text leaflet with each definition on one A4 sheet available

The Survey

Hosted on Microsoft Forms for anonymity

7 questions designed to situate and establish existing knowledge, see if content like the poster is wanted, and see where the project could head to next

Survey Results

## 1. How would you rank your understanding of 3D Printing terminology?

- I am new to 3D printing and did not know the terminology prior to today — 0
- I am new to 3D printing but knew a little bit about it before today — 3
- I have 3D printed before and have a basic understanding — 2
- I have 3D printed many times before and have a fairly good understanding — 2
- I am an experienced 3D printer and 3D modeller — 0

29%
43%
29%
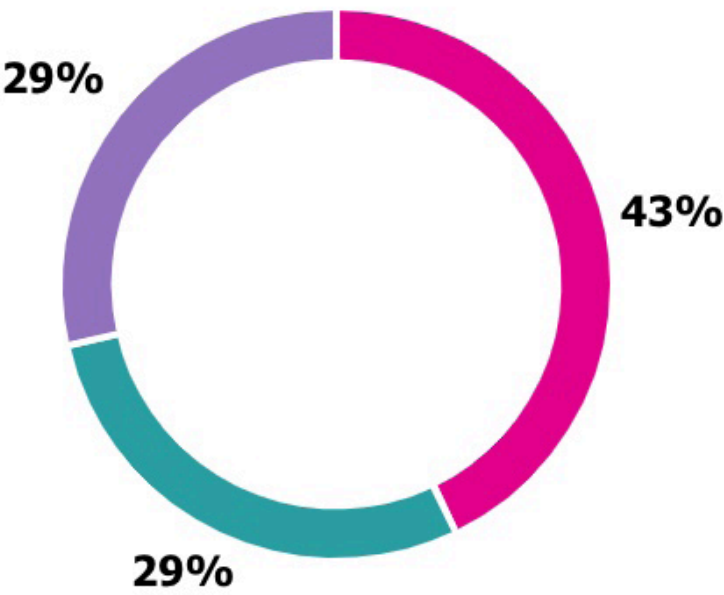
2. Do you find it useful to have illustrations next to the definitions of words that are new to you?

- Yes — 7
- No — 0
- No opinion — 0
- Other — 0

100%

Survey Results

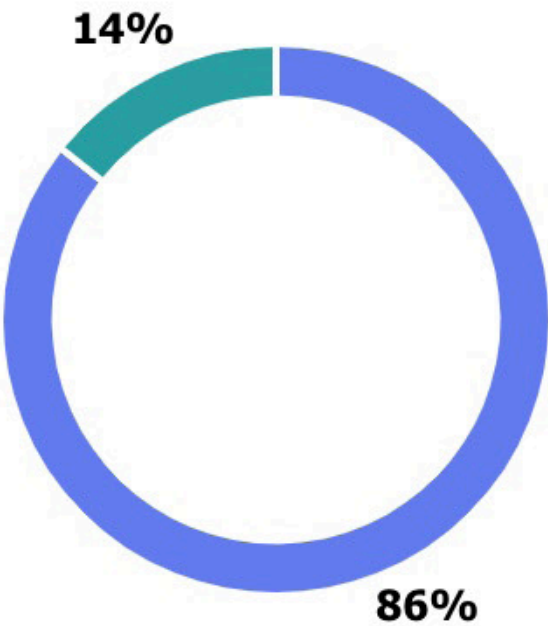3. Did you learn something new from the 3D Printing illustrated glossary guide?

More details
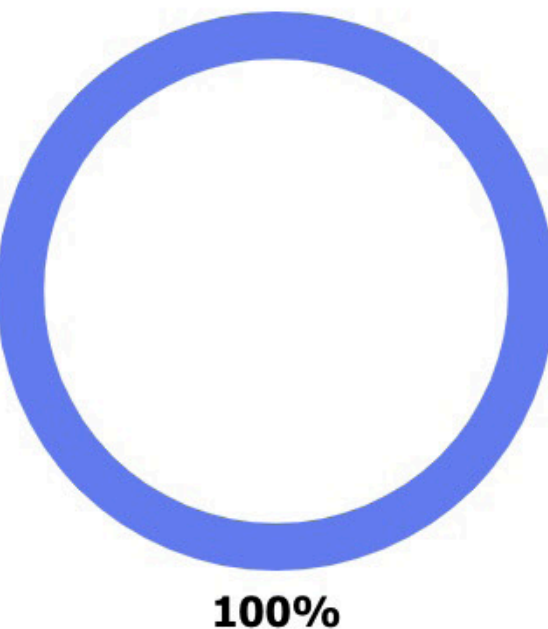
- Yes   6
- No   0
- No opinion   1
- Other   0

14%

86%

4. Do you think posters and resources like this 3D Printing illustrated glossary guide are useful for students?

More details

- Yes   7
- No   0
- No opinion   0
- Other   0

100%

Survey Results

6. How do you prefer to learn or have your questions answered?

● I prefer to ask a technician / tutor in person (eg in the workshops or classrooms)	6
● I prefer to ask a technician / tutor online (eg, via email or Teams chat)	0
● I prefer to use the university resources (eg Moodle, inductions, handouts)	0
● I prefer to research independently myself (eg online tutorials, books)	1
● I prefer to ask my classmates or colleagues for help	0
● Prefer not to say	0
● Other	0
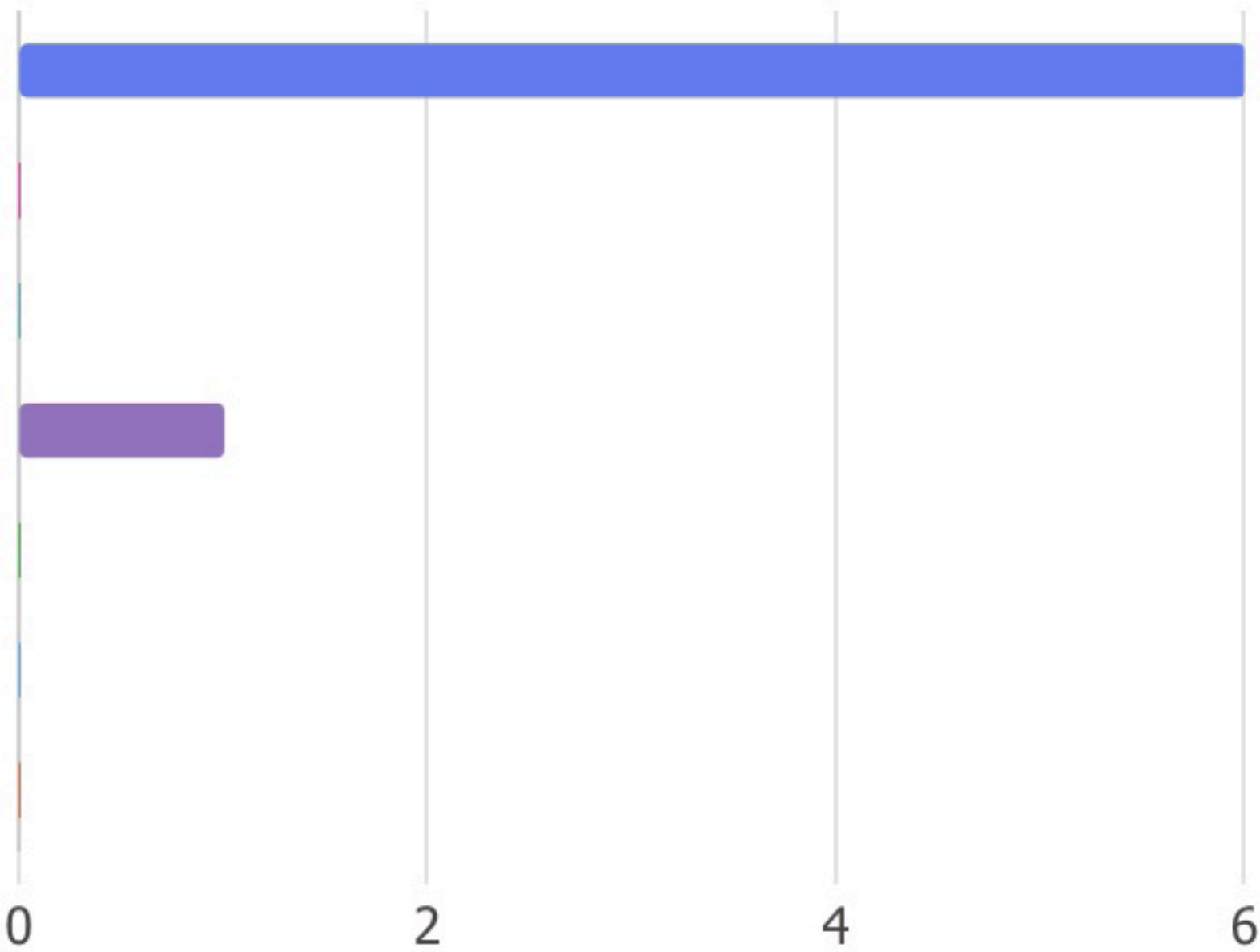
Action Research Spiral
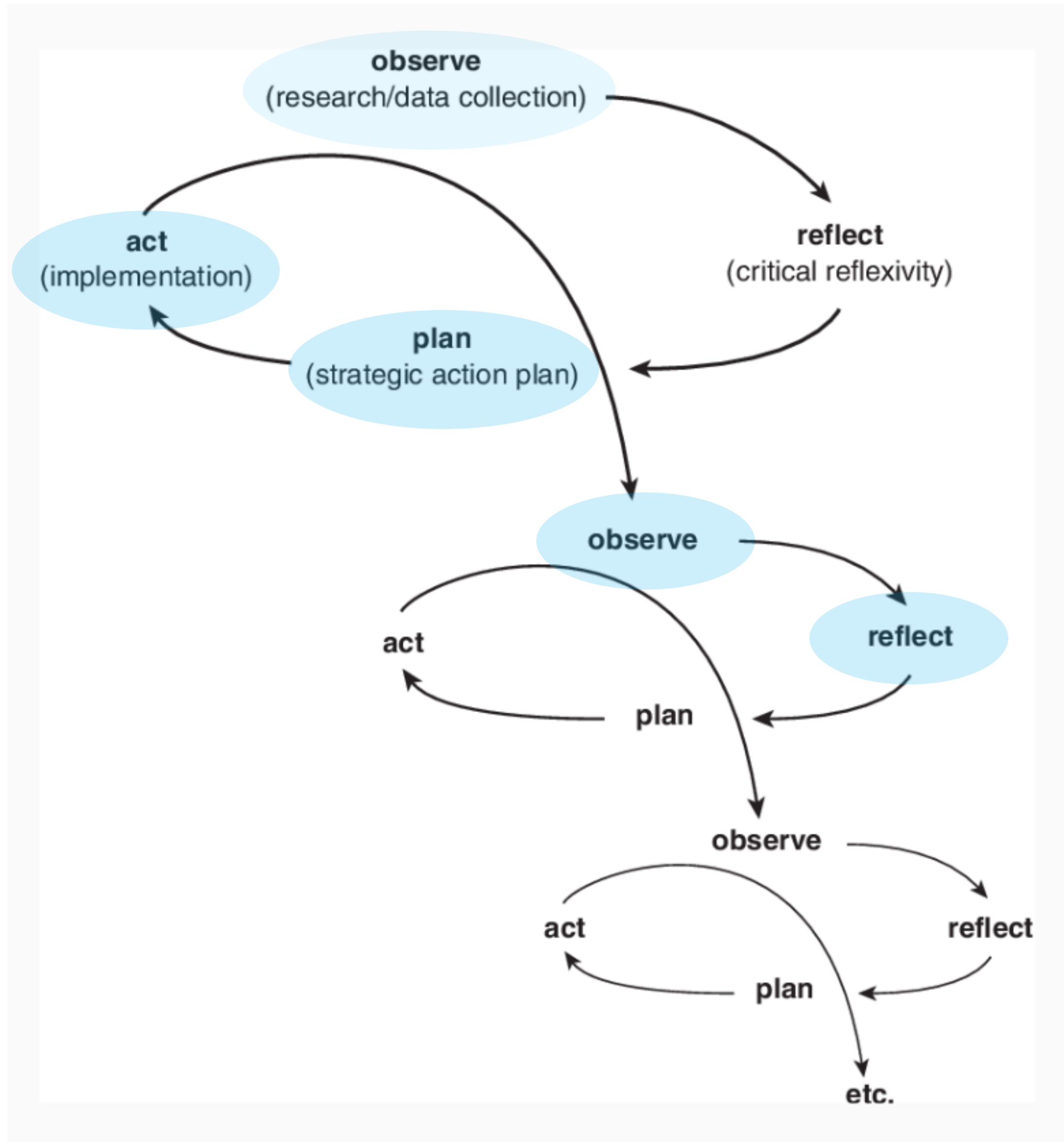
O'Leary's cycles of research
(Koshy et al. 2010: 8)

started with **observe**
plan
act
observe
reflect

↓

plan + **act** + **observe** + **reflect** onwards!

continue the spiral

Reflection

- the poster has proved more useful **in person**, where the illustrations can be pointed to in conversations

- to make the data more informative I should have had a longer collection period

- I want to cretate more posters, for casting, clay, CNC routing etc

- need to focus on offering more opportunities for one-on-one support

References

ActiveDashboards (n.d.) *ActiveDashboards*. Available at: https://dashboards.arts.ac.uk/dashboard/ActiveDashboards/DashboardPage.aspx?dashboardid=c04b6e35-6d26-4db8-9ea0-5e27d30e3402&dashcontextid=638985459734562108 (Accessed: 6 January 2026)

Çiftçi, H. and Üster, S. (2009) 'A comparative analysis of teaching vocabulary in context and by definition', *Procedia – Social and Behavioral Sciences*, 1(1), pp. 1568–1572. Available at: https://www.researchgate.net/publication/248606614_A_comparative_analysis_of_teaching_vocabulary_in_context_and_by_definition (Accessed: 12 November 2025).

Koshy, E., Koshy, V. and Waterman, H. (2010) *What is action research?* London: SAGE Publications.

Nasrollahi, K. and Daneshfar, S. (2018) 'The effect of visual contextual support and glossary of words on guessing meaning of new vocabulary items in English by pre-university male EFL students', *Journal of Language Teaching and Research*, 9(3), pp. 561–572. doi:10.17507/jltr.0903.16.