

3D Printing Professional Learning

HALF-DAY RUN SHEET

Unlock the potential of 3D
printing in the classroom.

08:30 - 12:30

2 MODULES

Build.
Fix.
Teach.

Fundamentals, materials and slicing,
then hands-on printing on real
machines.

MODULES

- 01 Introduction to 3D Printing
- 02 Get printing!

PROGRAM OVERVIEW

Day at a glance

A half-day program covering the fundamentals of 3D printing, then putting them straight into practice on real machines.

08:30 - 09:00	Arrival Snacks, coffee and networking	BREAK
09:00 - 10:30	Module 1 Introduction to 3D Printing	PRESENTATION
10:30 - 11:00	Morning tea Morning tea and coffee	BREAK
11:00 - 12:30	Module 2 Get printing!	PRACTICAL
12:30 - 13:30	Lunch Lunch, and the end of the half day	BREAK

Program flow

Establish how the machines and the software work, then spend the second module on real printers putting that knowledge into practice.

MODULE 1

Introduction to 3D Printing

Establish the technology fundamentals before moving on to hands-on printing.

09:00 - 10:30

PRESENTATION

3D Printing Fundamentals

- 3D printing refers to additive manufacturing (AM), a broad class of manufacturing methods involving the sequential addition of materials, as opposed to subtractive manufacturing.
- Introduction to the family of 3D-printing technologies:
 - FDM
 - Stereolithography
 - Laser sintering
 - Multi Jet Fusion
 - Niche AM, including layered paper printers and house printers

Deep dive into FDM - the printer of the classroom and hobbyist

- FDM printer configurations
- Three axes and their control systems
- Hot ends and extruders - how they function and their limitations
- Which materials can be printed and why
- Run-through of commonly used materials

Practical lens

The focus is not only on how the machine works, but on the operating limits and material choices that shape reliable classroom use.

From digital model to reliable print

09:00 - 10:30

PRESENTATION

Slicing - converting the file into the language of the printer

- Slicing converts a model into tool paths in 2D slices.
- Slicing considerations - precision and mechanical properties
- Overhangs
- Advanced slicing settings

Models and data types

- Meshes and why they are used
- File types and model repositories
- CAD-created files
- 3D scanners and their place in the classroom

10:30 - 11:00 · Morning tea

Morning tea and coffee before the practical printing module.

MODULE 2

Get printing!

Move from theory to the machines: profiles, levelling, filament, nozzles and calibration, worked through by hand.

11:00 - 12:30

PRACTICAL

Printing practically

- Create slicing profiles for a range of models, considering print times, material properties, and expected forces.
- Estimate bed adhesion and support needs.
- Set up and level a range of printers.
- Load and unload filaments of varying materials.
- Change nozzles and see the differing results.
- Calibrate printers and check for errors and inconsistencies.
- Experiment with varying print beds and adhesive treatments.

Hands on the machines

Every step in this module happens on a real printer. Prints will fail during the session, and working out why is the point of it.

Keeping your printer primed

11:00 - 12:30

PRACTICAL

Common printer errors

- The failures seen most often in classroom machines, and what causes each one
- Reading a failed print to work out what went wrong

Troubleshooting 101

- A repeatable order of checks when a print fails
- First-layer, adhesion and levelling faults
- Extrusion, nozzle and filament faults

Servicing schedule

- What to check weekly, each term, and once a year
- Consumables worth keeping on hand
- Storing filament so it prints reliably

Practical principle

A printer that is maintained on a schedule fails far less often, and almost never during a lesson.

End of the half day · 12:30

Lunch runs from 12:30 to 13:30. Half-day participants are welcome to stay for it; full-day participants carry on into the afternoon sessions.