MAXXESHOP3D

3D Printing Glossary & Illustrated Guide

FDM/FFF + Resin basics for Schools, Partners, and Students

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Australian-made filament for dependable classroom printing: PLA-Maxx by Maxxeshop3D

About this resource

This glossary explains common 3D printing terms in plain language, with short 'why it matters' notes. It is designed for Australian school environments and suits most printers used in classrooms and makerspaces. The focus is FDM/FFF (filament) printing, with a resin section where terms differ.

Tip: Add a Table of Contents

In Word, go to References → Table of Contents. After edits, use Update Table to refresh.

Key diagrams

Use these diagrams when learning printer parts, axes, and the slicer workflow.

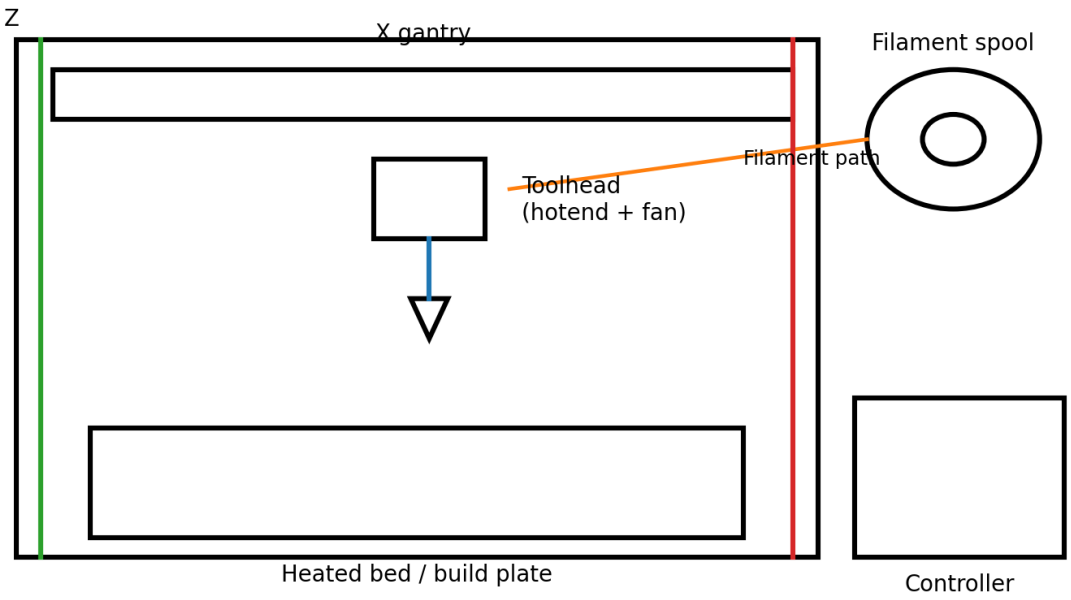

Figure 1. Typical FDM printer anatomy (simplified).

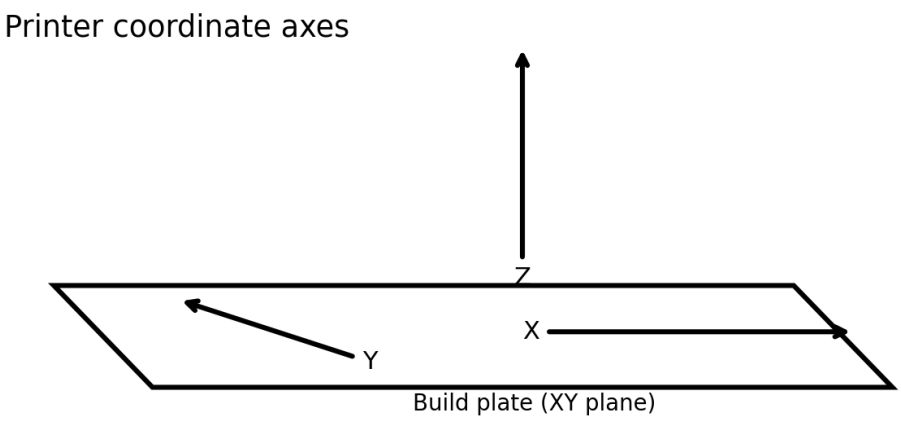

Figure 2. X/Y/Z axes (simplified).

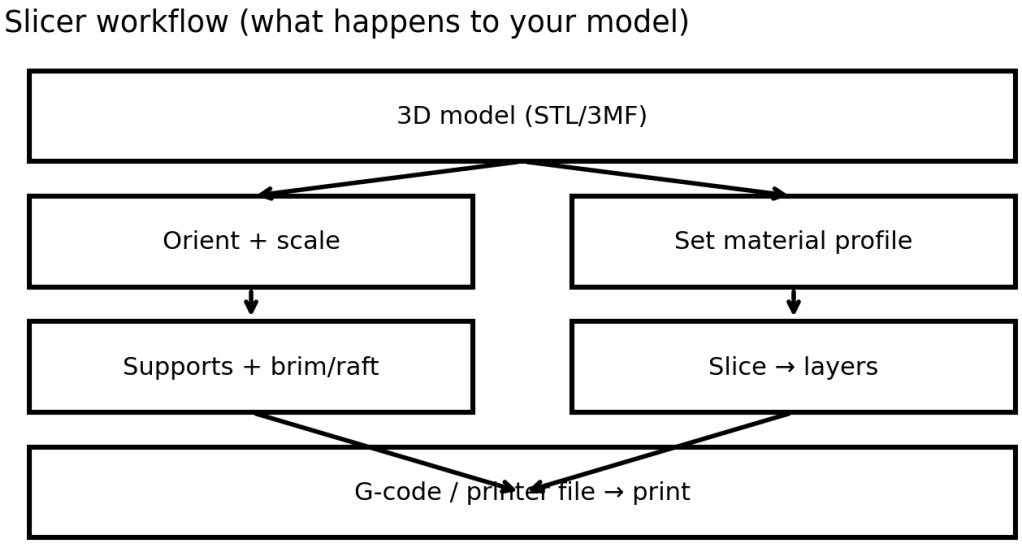

Figure 3. Slicer workflow (model → settings → slice → print).

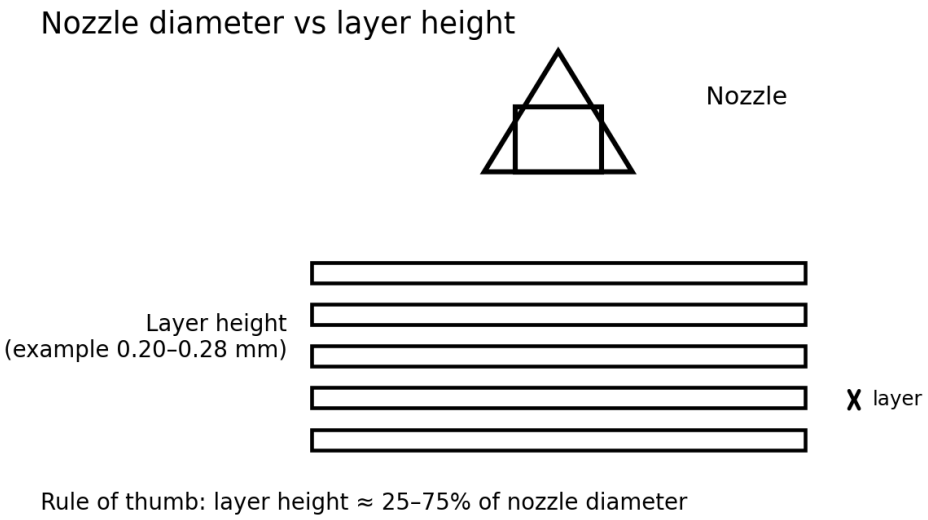

Figure 4. Nozzle diameter and layer height relationship.

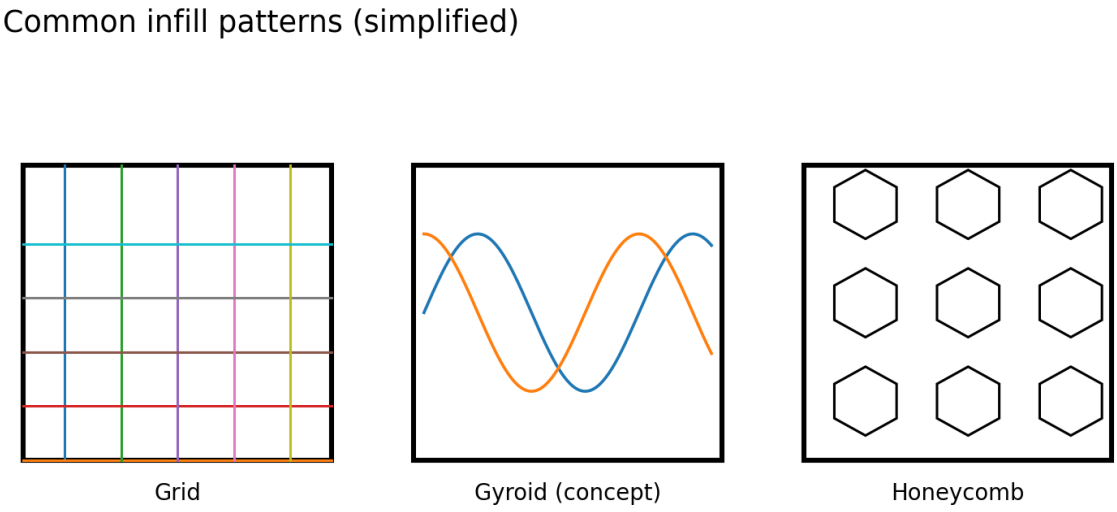

Figure 5. Infill patterns (simplified).

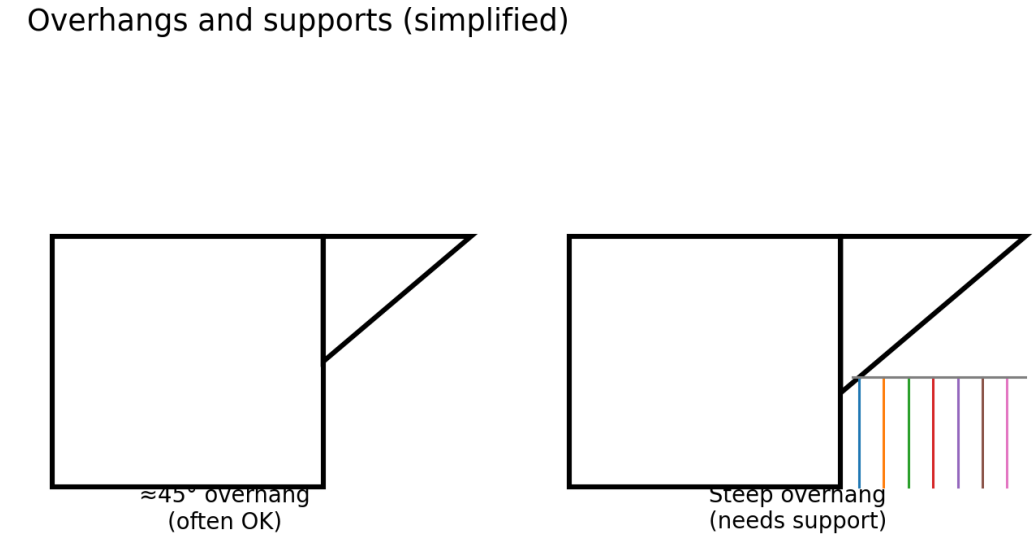

Figure 6. Overhangs and supports (simplified).

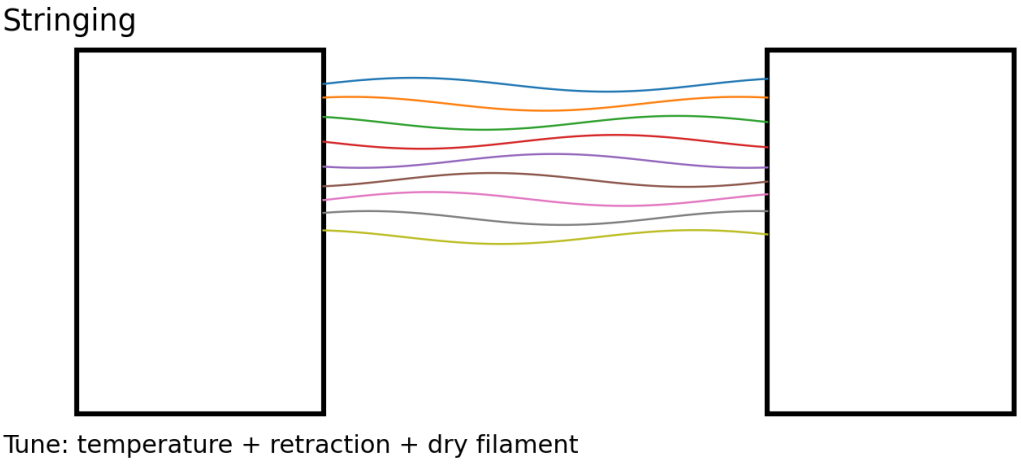

Figure 7. Stringing concept (simplified).

Bed levelling / mesh probing

Measure multiple points to correct first layer

Figure 8. Bed mesh/levelling concept (simplified).

Resin printer anatomy (MSLA/DLP simplified)

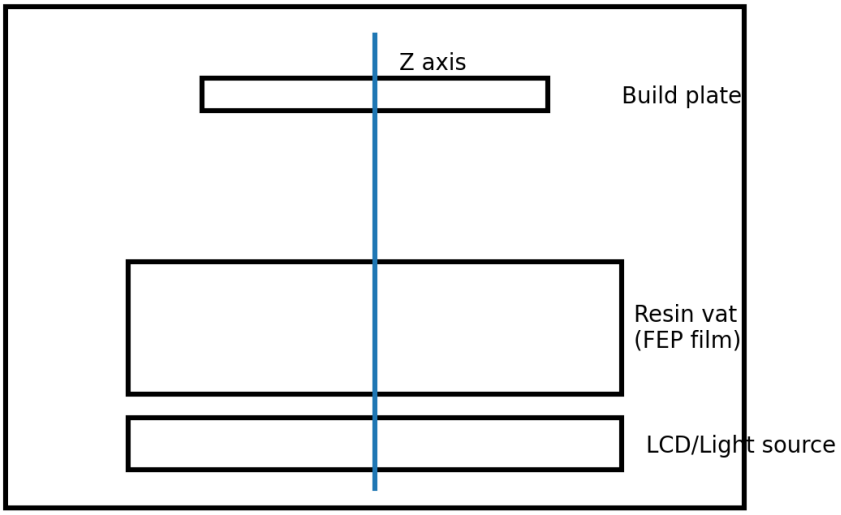

Figure 9. Resin printer anatomy (simplified).

Glossary (A–Z)

Terms are grouped alphabetically. Each entry includes a plain definition, a short explanation, and a few practical notes.

A

Additive manufacturing

Definition: Building objects layer-by-layer from digital data.

Why it matters: The umbrella term for 3D printing. Opposite of subtractive methods like milling.

Notes / tips:

- Also includes metal AM, SLS, SLA.

Adhesion

Definition: How well the first layer sticks to the build surface.

Why it matters: Good adhesion prevents warping and print failures. Clean bed + correct Z offset are key.

Notes / tips:

- Symptoms: corners lift, 'spaghetti' failures.

Anti-aliasing (resin)

Definition: Smoothing of pixel edges in MSLA prints.

Why it matters: Reduces stair-step artefacts on angled surfaces. Too much can soften detail.

Notes / tips:

- Found in resin slicers.

Auto bed levelling (ABL)

Definition: Using a probe to measure bed height at multiple points.

Why it matters: ABL builds a height map (mesh) to compensate for slight bed tilt/warp.

Notes / tips:

- Still requires correct Z offset.

Axis (X/Y/Z)

Definition: The printer's coordinate directions.

Why it matters: X and Y move across the bed; Z moves up/down. Knowing axes helps diagnose shifts.

Notes / tips:

- See the axes diagram.

B

Backlash

Definition: Play or slack in motion components.

Why it matters: Can cause ringing and dimensional error, especially on direction changes.

Notes / tips:

- Check belts, wheels, lead nuts.

Base layers (resin)

Definition: Early layers cured longer to bond to the build plate.

Why it matters: Too few base layers can detach; too many can make removal hard.

Notes / tips:

- Commonly 4–8 layers.

Bed (build plate)

Definition: Surface the print starts on.

Why it matters: Different surfaces (PEI, glass, textured steel) change adhesion behaviour.

Notes / tips:

- Keep it clean and fingerprint-free.

Bed levelling

Definition: Making the nozzle-bed gap consistent across the bed.

Why it matters: Critical for first-layer success. Can be manual, mesh-probed, or both.

Notes / tips:

- Recheck after moving the printer.

Bed temperature

Definition: Heater setting for the build plate.

Why it matters: Warmer beds improve adhesion; too hot can cause elephant foot.

Notes / tips:

- PLA often 55–65°C (start ~60°C).

Benchy

Definition: A small boat model used as a print quality test.

Why it matters: Reveals cooling, bridging, overhang and surface artefacts in one print.

Notes / tips:

- Use consistent settings when comparing changes.

Binder clip marks

Definition: Impressions or collisions caused by bed clips.

Why it matters: If the nozzle hits clips you can get layer shifts or scars.

Notes / tips:

- Move clips away from the print area.

Blob / zits

Definition: Small bumps on the surface.

Why it matters: Often caused by pressure changes, seam placement, or moisture.

Notes / tips:

- Try tuning temperature + retraction.
- Try 'wipe' or adjust seam position.

Bowden extruder

Definition: Extruder motor feeds filament through a tube to the hotend.

Why it matters: Lighter toolhead, but retraction tuning is more sensitive than direct drive.

Notes / tips:

- Common on many school printers.

Bridging

Definition: Printing across a gap without support.

Why it matters: Depends on cooling, speed, and temperature. Good bridges give clean undersides.

Notes / tips:

- Use dedicated bridge settings if available.

Brim

Definition: Extra outline attached to the first layer around the part.

Why it matters: Improves adhesion and reduces warping; trims off after printing.

Notes / tips:

- 5–10 mm typical.

Build volume

Definition: Maximum printable size (X × Y × Z).

Why it matters: Limited by frame and motion system; also affected by origin and margins.

Notes / tips:

- Check before printing large parts.

C

Calibration cube

Definition: A small cube used to check dimensions.

Why it matters: Helps verify steps/mm, flow, and shrink. Measure with calipers.

Notes / tips:

- Often a 20 mm cube.

Cavity / hollowing (resin)

Definition: Making a solid model hollow to save resin.

Why it matters: Requires drainage holes and correct wall thickness to avoid suction and cracking.

Notes / tips:

- Add at least two drain holes.

Chamber temperature

Definition: Air temperature inside an enclosure.

Why it matters: Warm chambers reduce warp for ABS/ASA; can worsen heat creep for PLA.

Notes / tips:

- Vent or open enclosure for PLA.

Clog

Definition: Blocked nozzle that restricts flow.

Why it matters: Caused by debris, burnt plastic, or heat creep. Leads to under-extrusion and clicking.

Notes / tips:

- Fast classroom fix: replace nozzle.

Coasting

Definition: Stopping extrusion slightly before a move ends.

Why it matters: Can reduce end-of-line blobs; too much can create gaps.

Notes / tips:

- Slicer feature (FDM).

Combing

Definition: Travel moves that stay inside the model where possible.

Why it matters: Reduces stringing and surface scars, but can increase travel time.

Notes / tips:

- Slicer travel setting.

Cooling (part cooling fan)

Definition: Fan airflow that solidifies filament quickly.

Why it matters: Improves bridges and overhangs. Too much can reduce layer bonding.

Notes / tips:

- Tune per material and print.

Cura / PrusaSlicer / OrcaSlicer

Definition: Popular slicer software.

Why it matters: Slicers convert models into layers and generate printer instructions.

Notes / tips:

- Profiles matter more than brand.

D

Direct drive

Definition: Extruder mounted close to the hotend on the toolhead.

Why it matters: Better for TPU and fine retraction control, but adds moving mass.

Notes / tips:

- Often preferred for flexible filament.

DLP (resin)

Definition: Cures resin using a projector.

Why it matters: Can be fast for small areas; optics differ from MSLA.

Notes / tips:

- Similar workflow to SLA/MSLA.

Draft shield

Definition: A thin wall printed around the model.

Why it matters: Blocks airflow to reduce warping on materials sensitive to cooling.

Notes / tips:

- Helpful in air-conditioned rooms.

E

E-steps / rotation distance

Definition: Extruder calibration value for commanded filament length.

Why it matters: Ensures the printer feeds the correct amount of filament.

Notes / tips:

- Firmware setting; calibrate carefully.

Elephant foot

Definition: Bottom layers flare out wider than intended.

Why it matters: Caused by excess bed heat or first-layer over-squish.

Notes / tips:

- Reduce bed temp after layer 1.

- Use slicer compensation if available.

Enclosure

Definition: A cover/box around the printer.

Why it matters: Stabilises temperature and blocks drafts. Essential for ABS/ASA; optional for PLA.

Notes / tips:

- Watch for heat creep when printing PLA.

Extruder

Definition: Motor and drive gear that pushes filament.

Why it matters: Needs correct tension and clean gears for reliable feeding.

Notes / tips:

- Listen for clicking; check for filament dust.

Extrusion width

Definition: How wide each printed line is.

Why it matters: Impacts strength, surface quality, and gap filling. Often near nozzle diameter.

Notes / tips:

- Set by slicer (often 'line width').

F

FEP film (resin)

Definition: Clear film at the bottom of a resin vat.

Why it matters: Parts peel from it each layer. Scratches/clouding can cause failures.

Notes / tips:

- Replace when damaged.

FFF / FDM

Definition: Filament printing where plastic is melted and extruded.

Why it matters: Most school printers are FDM/FFF.

Notes / tips:

- PLA is usually the best starter material.

Filament

Definition: Thermoplastic supplied on a spool.

Why it matters: Common types: PLA, PETG, ABS, ASA, TPU. Storage affects print quality.

Notes / tips:

- Keep sealed with desiccant.

Filament diameter

Definition: Standard sizes are 1.75 mm (most common) and 2.85 mm.

Why it matters: Slicer must match the filament size or flow will be wrong.

Notes / tips:

- Measure with calipers if unsure.

Flow rate

Definition: Extrusion multiplier that scales how much plastic is extruded.

Why it matters: Fixes minor over/under extrusion after calibration.

Notes / tips:

- Start at 100% and tune in 2–5% steps.

G

G-code

Definition: Text commands that tell the printer how to move and extrude.

Why it matters: Generated by the slicer; sets temperature, fan, motion, extrusion, etc.

Notes / tips:

- Saved as .gcode/.gco; printer-specific variants exist.

Gyroid

Definition: A wavy, continuous infill pattern.

Why it matters: Strong in multiple directions and prints smoothly.

Notes / tips:

- Popular at 10–20% infill.

H

Heat break

Definition: Thin section separating hot and cold zones in the hotend.

Why it matters: Helps prevent heat creep; relies on a working hotend fan.

Notes / tips:

- If PLA jams mid-print, check hotend fan.

Heat creep

Definition: Heat travelling up the hotend, softening filament too early.

Why it matters: Can cause jams, especially with PLA and long retractions.

Notes / tips:

- Improve cooling or lower temp/retraction.

Hotend

Definition: Heater + nozzle assembly that melts and extrudes filament.

Why it matters: Key variables: nozzle size, temperature, and cooling.

Notes / tips:

- Keep spares and do routine checks.

I

Infill

Definition: Internal structure inside the walls.

Why it matters: Controls strength, weight, and print time.

Notes / tips:

- Often more walls beats more infill for strength.

Infill overlap

Definition: How much infill overlaps with walls.

Why it matters: Too low can cause gaps; too high can cause bulges.

Notes / tips:

- Small changes only.

Infill percentage

Definition: How dense the infill is.

Why it matters: Higher infill increases strength and time.

Notes / tips:

- Try 10–20% for most parts.

IPA (isopropyl alcohol)

Definition: Solvent used to wash uncured resin from prints.

Why it matters: Use gloves and ventilation; keep away from flames.

Notes / tips:

- Replace when cloudy/dirty.

J

Jerk (legacy term)

Definition: Motion setting related to instantaneous speed change.

Why it matters: In Marlin, jerk and acceleration affect ringing and corner quality.

Notes / tips:

- Modern firmwares may expose different controls.

K

Klipper

Definition: Firmware that runs on a host (often a Raspberry Pi).

Why it matters: Enables fast tuning, input shaping, pressure advance, and higher speeds.

Notes / tips:

- Common on high-speed printers.

L

Layer height

Definition: Thickness of each printed layer.

Why it matters: Lower = more detail, longer time. Typical PLA: 0.12–0.28 mm.

Notes / tips:

- Rule: ~25–75% of nozzle diameter.

Layer shift

Definition: A sudden sideways offset in the print.

Why it matters: Usually belt/pulley slip or the nozzle hitting a curled corner.

Notes / tips:

- Check belt tension and warping.

Linear advance / pressure advance

Definition: Firmware feature to manage extrusion pressure during speed changes.

Why it matters: Reduces corner blobs and improves consistency.

Notes / tips:

- Requires tuning; common on Klipper.

M

Mesh (bed)

Definition: A stored map of bed height variations.

Why it matters: Used to compensate for a bed that is not perfectly flat.

Notes / tips:

- Part of ABL.

Microstepping

Definition: Driving steppers in smaller increments.

Why it matters: Can improve smoothness; too high can reduce torque.

Notes / tips:

- Driver/firmware dependent.

MSLA

Definition: Masked stereolithography using an LCD screen to cure resin.

Why it matters: Common resin printer type; detail depends on pixel size and exposure.

Notes / tips:

- Use PPE and safe handling.

N

Nozzle

Definition: Small tip where molten filament exits.

Why it matters: Common sizes: 0.4 mm, 0.6 mm. Smaller = more detail, slower.

Notes / tips:

- Keep spares; swap for clogs.

Nozzle diameter

Definition: Size of the nozzle opening.

Why it matters: Affects line width and maximum flow. Larger nozzles print faster.

Notes / tips:

- Match slicer profile.

O

OctoPrint

Definition: Web-based printer control software.

Why it matters: Uploads jobs, monitors prints, and manages multiple printers.

Notes / tips:

- Great for school labs.

Orientation

Definition: How a model is placed on the bed.

Why it matters: Affects strength, supports, surface finish, and print success.

Notes / tips:

- Rotate to reduce supports.

Overhang

Definition: A surface that extends outward without support beneath.

Why it matters: Overhang quality depends on cooling and angle.

Notes / tips:

- ~45° is often safe; steeper needs supports.

P

PID tuning

Definition: Calibrating heater control for stable temperature.

Why it matters: Reduces temperature swings that cause inconsistent extrusion.

Notes / tips:

- Firmware procedure.

Pixel size (resin)

Definition: XY resolution of an MSLA printer.

Why it matters: Smaller pixels can capture finer detail, but exposure and resin also matter.

Notes / tips:

- Often 35–50 microns.

PLA

Definition: Polylactic acid; an easy, low-warp plastic.

Why it matters: Best for most classrooms: reliable, low odour, straightforward settings.

Notes / tips:

- Store dry.

PLA-Maxx

Definition: Maxxeshop3D's Australian-made PLA filament.

Why it matters: Designed for consistent diameter and stable flow for dependable classroom printing.

Notes / tips:

- Ask us for school-ready profiles.

Print speed

Definition: How fast the printer moves while extruding.

Why it matters: Faster prints take less time but increase ringing/under-extrusion risk.

Notes / tips:

- Balance with cooling and flow.

R

Raft

Definition: A thick base printed under the model.

Why it matters: Improves adhesion but uses material and leaves a rough underside.

Notes / tips:

- Try brim first.

Resin

Definition: Liquid photopolymer cured by UV light.

Why it matters: High detail but needs PPE, washing, and curing. Not ideal unsupervised.

Notes / tips:

- Gloves + ventilation.

Retraction

Definition: Pulling filament back to reduce oozing during travel.

Why it matters: Key for stringing. Too much can cause jams on some setups.

Notes / tips:

- Tune in small steps.

Ringing / ghosting

Definition: Wavy patterns near sharp corners.

Why it matters: Caused by vibration and acceleration.

Notes / tips:

- Reduce accel/speed; tighten belts; use input shaping.

S

Skirt

Definition: A non-attached outline printed before the model.

Why it matters: Primes the nozzle and confirms first-layer settings.

Notes / tips:

- Not for adhesion.

SLA

Definition: Stereolithography; curing resin with a laser.

Why it matters: Common in industrial printers; similar output characteristics to MSLA.

Notes / tips:

- Very high detail potential.

Slicer

Definition: Software that turns a 3D model into printer instructions.

Why it matters: Controls quality, time, and reliability more than almost anything else.

Notes / tips:

- Use proven profiles and iterate slowly.

Spool tangle

Definition: Filament crosses under itself on the spool.

Why it matters: Can snag mid-print and cause sudden under-extrusion or failure.

Notes / tips:

- Always clip the filament end when storing.

Steps/mm

Definition: Motor calibration linking steps to real distance.

Why it matters: Wrong values cause dimensional error and missed steps.

Notes / tips:

- Firmware setting.

Stringing

Definition: Thin threads between parts.

Why it matters: Usually temperature, retraction, moisture, or long travel moves.

Notes / tips:

- See stringing diagram.

Support interface

Definition: Dense layers between support and the model.

Why it matters: Improves underside finish while keeping supports removable.

Notes / tips:

- Tune Z gap and interface density.

Supports

Definition: Temporary structures printed to hold up overhangs.

Why it matters: Needed for steep overhangs. Settings control removal and surface quality.

Notes / tips:

- Tree supports can reduce scarring.

T

Temperature tower

Definition: Test print that changes temperature by height.

Why it matters: Helps find the best temperature for a filament.

Notes / tips:

- Great for new rolls.

Thermal runaway

Definition: Safety shutdown when heating behaves unexpectedly.

Why it matters: If it triggers, check thermistor/heater wiring.

Notes / tips:

- Do not disable.

Thermistor

Definition: Temperature sensor in hotend/bed.

Why it matters: Bad readings cause wrong temperatures and failures.

Notes / tips:

- Fragile; handle carefully.

Top/bottom layers

Definition: Solid layers that close the model.

Why it matters: Too few can leave holes; depends on layer height and nozzle size.

Notes / tips:

- Increase for watertight parts.

TPU

Definition: Flexible filament.

Why it matters: Prints best with direct drive and slower speeds.

Notes / tips:

- Dry it and reduce retraction.

Travel move

Definition: Movement with no extrusion.

Why it matters: Too slow can increase stringing; too fast can increase vibration.

Notes / tips:

- Combing can help.

W

Warping

Definition: Edges lift due to shrink and cooling.

Why it matters: Drafts are a common cause. More severe on ABS/ASA than PLA.

Notes / tips:

- Use enclosure/draft shield; add brim.

Z

Z offset

Definition: Nozzle height relative to the bed at print start.

Why it matters: Most important first-layer setting.

Notes / tips:

- Too high = no stick; too low = scraping.

Z seam

Definition: Where each layer starts/ends on the outer wall.

Why it matters: Can appear as a vertical line on the model.

Notes / tips:

- Control seam position; hide on rear edges.

Resin printing safety (quick notes)

Resin printing can produce excellent detail, but it needs extra safety steps. For school environments, ensure adult supervision, gloves, eye protection, and ventilation. Never pour resin down drains.

- Wear nitrile gloves when handling uncured resin and freshly printed parts.
- Use a sealed wash station or container with IPA; keep away from flames and sparks.
- Cure parts fully under UV before handling without gloves.
- Dispose of resin waste responsibly (cure it solid first, then bin as solid waste per local rules).

Maxxeshop3D note (Australia)

For most school projects, filament printing with PLA is the simplest path to success. PLA-Maxx is manufactured in Australia by Maxxeshop3D for consistent diameter and dependable classroom printing.

Website: maxxeshop3d.com