



3D Printing: Key Terminologies for Beginners

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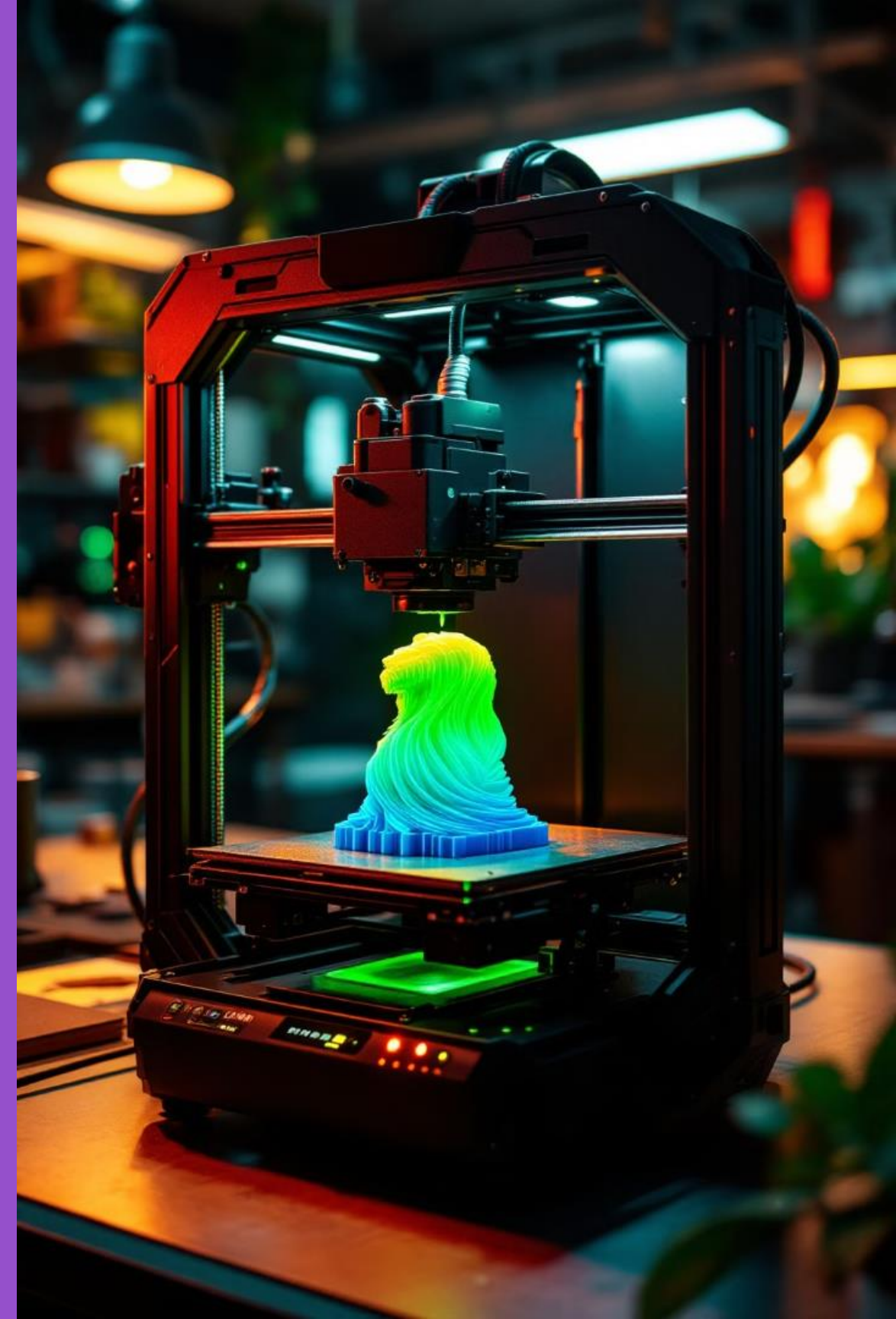
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3D Printing: Key Terminologies for Beginners

Welcome to the world of 3D printing! This revolutionary technology, also known as additive manufacturing, has transformed prototyping and manufacturing processes. Whether you're a curious beginner or looking to delve deeper into this field, understanding the key terminologies is crucial. In this presentation, we'll explore the essential terms, concepts, and techniques that form the foundation of 3D printing.



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Basic 3D Printing Terms

Additive Manufacturing (AM)

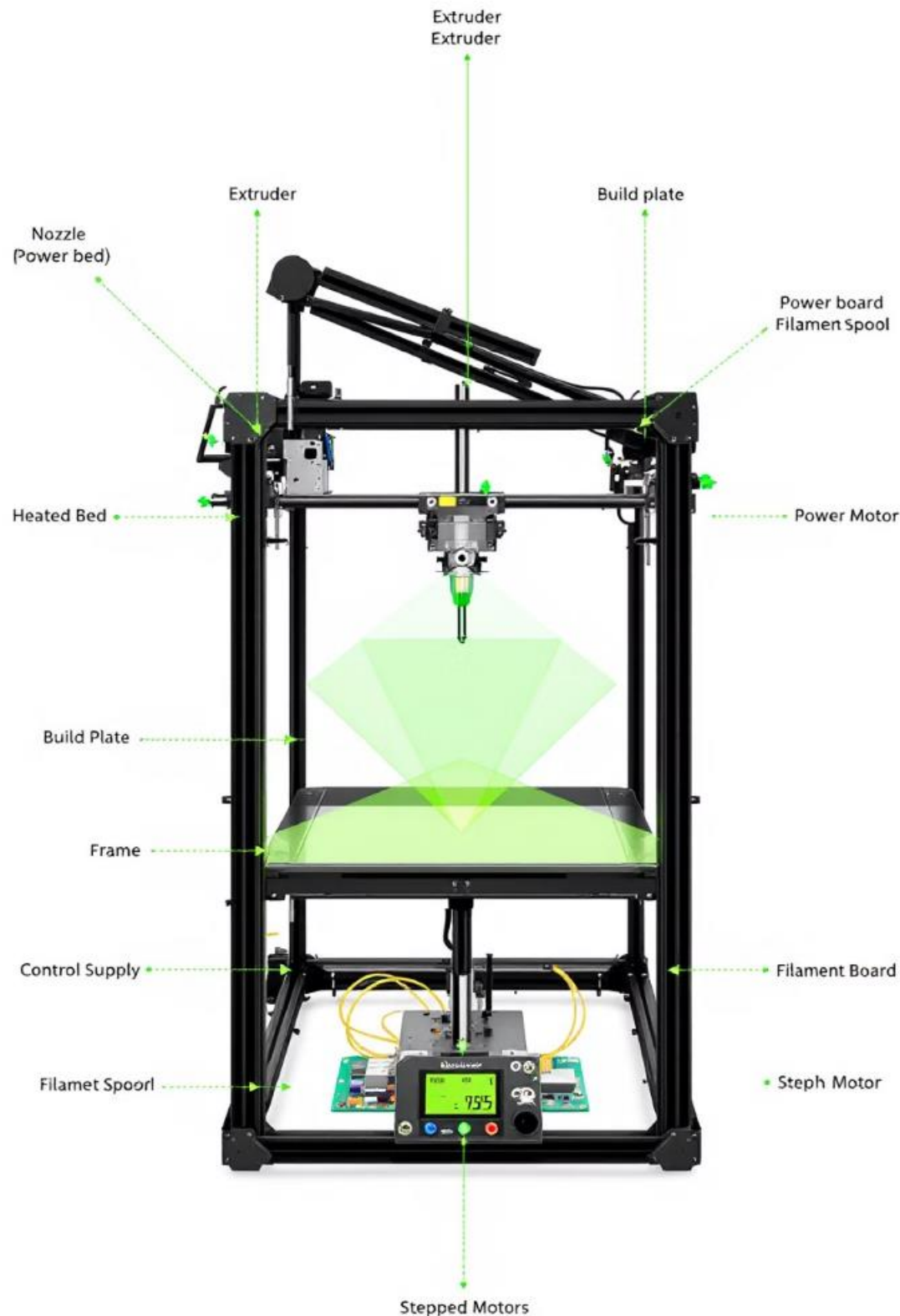
The process of creating objects by depositing material layer by layer, as opposed to subtractive manufacturing methods like milling or cutting.

FDM (Fused Deposition Modeling)

The most common 3D printing technology, where a thermoplastic filament is heated and extruded through a nozzle to create layers of the object.

Build Platform/Print Bed

The flat surface where the 3D printed object is created. It's crucial for proper adhesion of the first layer.



Material-Related Terms

Filament

The raw material used in FDM printing, typically a thermoplastic material that comes in a spool. Common types include:

- PLA (Polylactic Acid)
- ABS (Acrylonitrile Butadiene Styrene)
- PETG (Polyethylene Terephthalate Glycol)

Resin

The liquid material used in SLA (Stereolithography) printing, which hardens when exposed to UV light. Resins offer high-detail prints and are often used for intricate models or jewellery making.

Software-Related Terms



Slicer

Software that converts 3D models into printer instructions (G-code) by "slicing" the model into layers. Popular slicers include Cura and PrusaSlicer.



G-code

The programming language used to control automated machine tools, including 3D printers. It tells the printer how to move and when to extrude material.



STL File

The standard file format for 3D printable models (Standard Triangle Language). It describes the surface geometry of a 3D object.





Print Quality Terms

Layer Height

The thickness of each printed layer, typically measured in microns. Lower layer heights result in finer detail but longer print times. Common heights range from 50 to 300 microns.

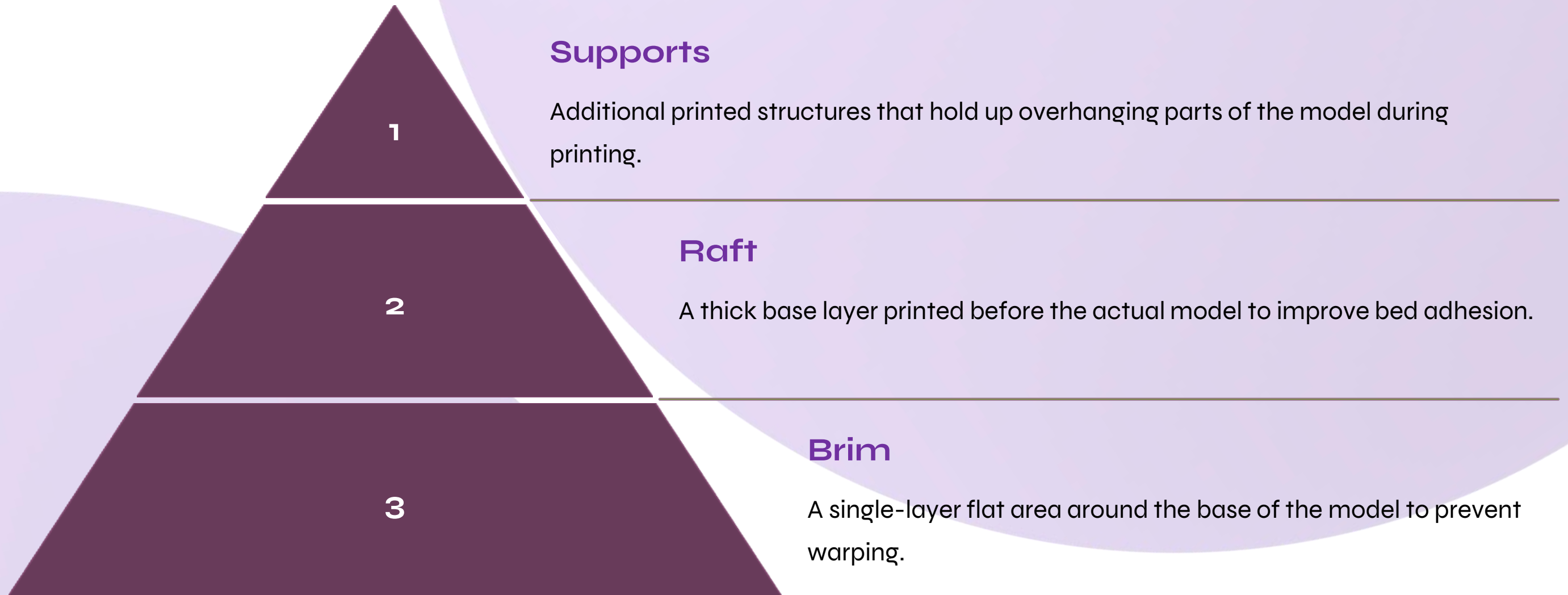
Infill

The internal structure of a 3D printed part, usually expressed as a percentage of solid material. Higher infill percentages increase strength but use more material and time.

Shell/Wall Thickness

The thickness of the outer walls of a printed object. Thicker walls provide more strength but use more material.

Support Structures



Support structures are crucial for successful prints, especially for complex geometries. They prevent sagging and ensure accurate reproduction of overhangs and bridges. After printing, these structures are removed to reveal the final object.



Common Print Problems

1

Warping

When parts of the print curl up due to material cooling and shrinking. Often seen with ABS prints or large flat surfaces.

2

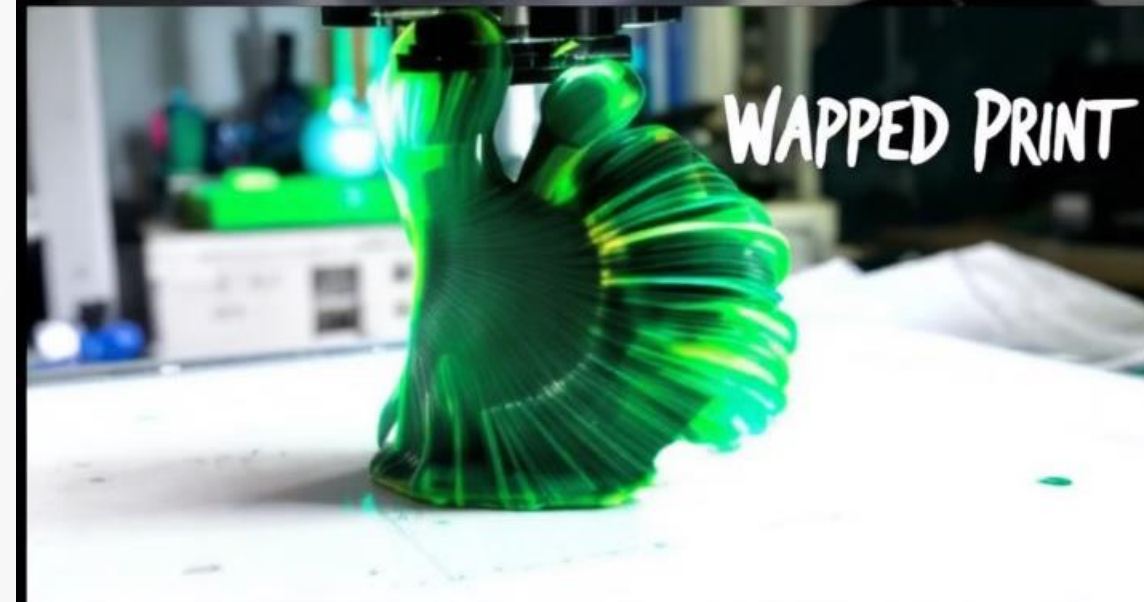
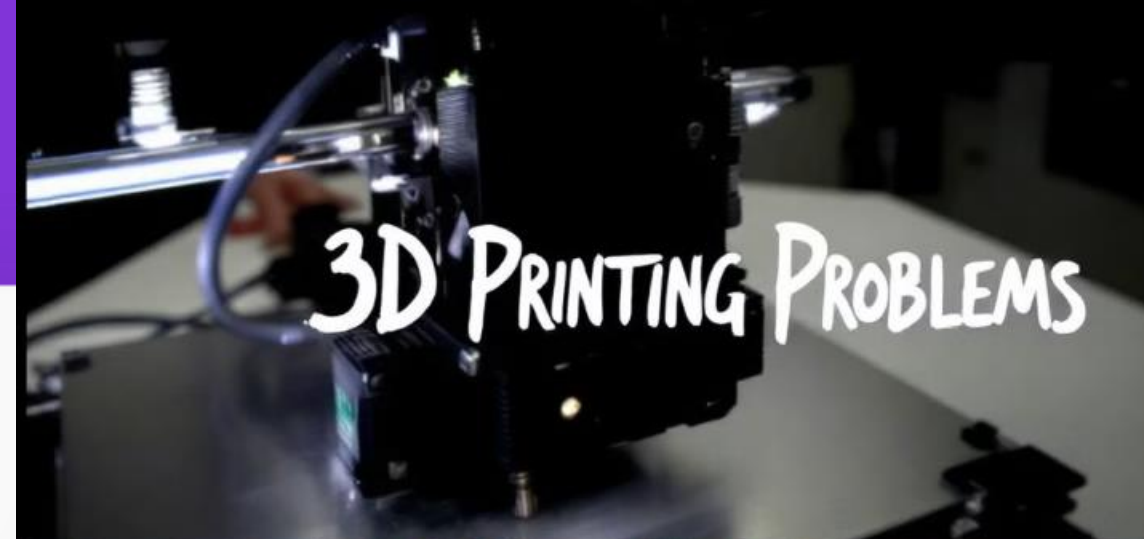
Stringing

Thin strands of plastic between printed parts, also known as "oozing". Usually caused by incorrect retraction settings.

3

Elephant's Foot

A bulging first layer caused by over-squishing or incorrect bed temperature. Results in dimensional inaccuracy at the base.



Solutions to Print Problems

1

Warping Solutions

Use a heated bed, apply adhesives to the print surface, or use a brim. Ensure proper bed levelling and consider using an enclosure to maintain consistent temperature.

2

Stringing Solutions

Adjust retraction settings, lower printing temperature, or enable combing in your slicer. Proper filament storage to prevent moisture absorption can also help.

3

Elephant's Foot Solutions

Adjust first layer settings, use chamfers on the model's base, or slightly increase the distance between the nozzle and the bed for the first layer.

BEFORE



AFTER

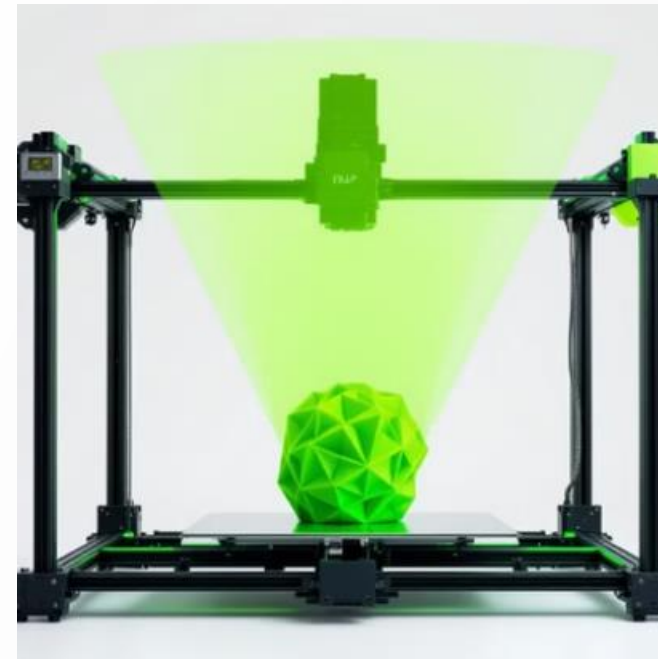


AFTER



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Advanced 3D Printing Technologies



While FDM is the most common, other technologies like SLA, SLS, DLP, and even concrete 3D printing are expanding the possibilities of additive manufacturing. Each technology offers unique advantages in terms of materials, precision, and scale.

Learning Outcomes



1

Identify Technologies

Recognize common 3D printing methods

2

Understand Materials

Know properties and applications

3

Recognize Issues

Identify and solve print problems

4

Communicate Effectively

Use standard terminology

By mastering these key areas, you'll have a solid foundation in 3D printing. This knowledge will enable you to navigate software, troubleshoot issues, and effectively communicate within the 3D printing community.



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Next Steps in Your 3D Printing Journey

1

Practice

Start with simple projects and gradually increase complexity

2

Experiment

Try different materials and printer settings

3

Connect

Join online communities and local makerspaces

4

Innovate

Apply 3D printing to solve real-world problems

Remember, 3D printing is a rapidly evolving field. Stay curious, keep learning, and don't be afraid to push the boundaries of what's possible. With practice and persistence, you'll soon be creating amazing 3D printed objects and maybe even contributing to the next big innovation in additive manufacturing!



Quiz:

Key Terminologies for Beginners in 3D Printing

This quiz is designed to test your knowledge of fundamental terms related to 3D printing. Each question has multiple-choice answers. Choose the best answer for each question.

1) What does FDM stand for in 3D printing?

- A) Fast Design Modeling
- B) Fused Deposition Modeling
- C) Final Design Method
- D) Functional Deposition Method

2) What is the purpose of a build plate?

- A) To heat the filament
- B) To support the 3D model during printing
- C) To control the printer's movements
- D) To store the 3D model files





Quiz:

Key Terminologies for Beginners in 3D Printing

3) Which term describes the maximum size a 3D printer can print?

- A) Build Volume
- B) Print Area
- C) Print Capacity
- D) Model Size

4) What is CAD an acronym for?

- A) Computer-Aided Design
- B) Creative Application Development
- C) Computerized Art Design
- D) Constructive Advanced Design

5) What does the term "overhang" refer to in 3D printing?

- A) The part of a print that extends unsupported by the layer below
- B) The excess material that must be removed after printing
- C) The cooling process of a printed object
- D) The initial layer of a print that adheres to the build plate





Quiz:

Key Terminologies for Beginners in 3D Printing

6) In 3D printing, what is an extruder?

- A) The component that cools down the filament after printing
- B) The part that feeds filament into the nozzle for printing
- C) The platform on which the object is built
- D) The software used to design 3D models

7) What is "layer adhesion"?

- A) The process of adding layers to a print
- B) The strength of the bond between successive layers in a printed object
- C) The time it takes to print each layer
- D) The thickness of each layer printed

8) Which technology uses light to cure liquid resin in 3D printing?

- A) FDM (Fused Deposition Modeling)
- B) SLA (Stereolithography)
- C) SLS (Selective Laser Sintering)
- D) LOM (Laminated Object Manufacturing)





Quiz:

Key Terminologies for Beginners in 3D Printing

9) What is a "brim" in 3D printing?

- A) A type of filament used for printing
- B) A thin layer printed around the base of an object to help with adhesion
- C) A tool used to measure print dimensions
- D) A cooling mechanism for printed objects

10) What does "G-Code" refer to in 3D printing?

- A) A type of filament used in FDM printers
- B) A programming language used to control 3D printers and CNC machines
- C) A software for designing 3D models
- D) A measurement unit for print resolution



Quiz - Answers

How well did you do?

1. B) Fused Deposition Modeling
2. B) To support the 3D model during printing
3. A) Build Volume
4. A) Computer-Aided Design
5. A) The part of a print that extends unsupported by the layer below
6. B) The part that feeds filament into the nozzle for printing
7. B) The strength of the bond between successive layers in a printed object
8. B) SLA (Stereolithography)
9. B) A thin layer printed around the base of an object to help with adhesion
10. B) A programming language used to control 3D printers and CNC machines



Thank you for your attention!



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