



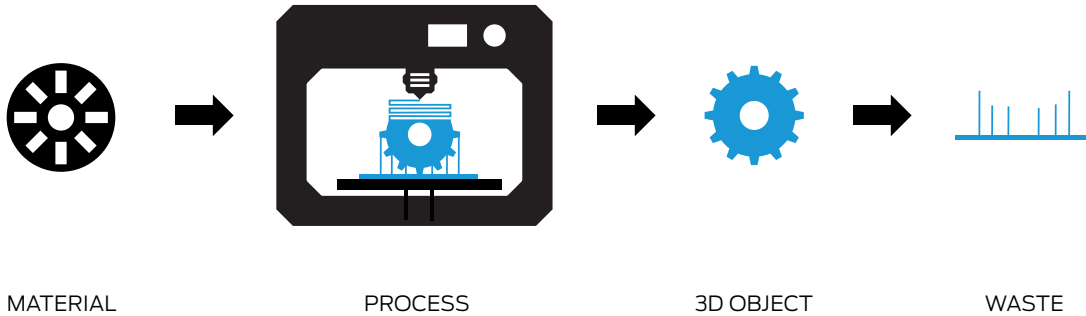
The MakerBot 3D Printing Terminology Guide

An easy way to begin optimizing your 3D printing process is learning how to talk about it. Once you're fluent, you can more easily share your design tips, elaborate on your process, and read through deeper MakerBot resources to learn more. This will lead to a more advanced 3D printing experience.

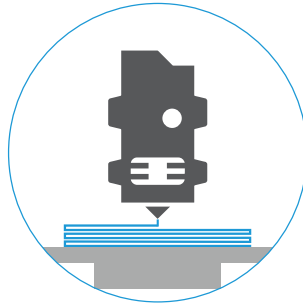
Each term describes a specific part of the process, which gives you a better idea of how it all works as a whole. You'll see how desktop 3D printing works and learn the value of each part in the system, like filament, the printer, Thingiverse, or software, especially at MakerBot.

General 3D Printing Terms

Additive Manufacturing: The process of creating a 3D object by fusing one layer on another, rather than removing or carving out material, such as in traditional machining.



Fused Deposition Modeling (FDM): The additive manufacturing process in which plastic filament is heated and fed through an extruder to build your object layer by layer. MakerBot 3D Printers use FDM technology.



Slicing: The process of taking a 3D model and translating this model into individual layers in MakerBot Desktop or any other 3D printing software. Your 3D printer uses information generated during slicing to build your 3D printed object.

Filament: Thermoplastic material used to build your 3D prints.

Extruder: The “hot glue gun” of your 3D printer; the extruder uses filament to draw out the layers of your 3D prints. It has a cold end to pull and feed the thermoplastic filament from the spool, and then a hot end that melts and extrudes the thermoplastic. This heated thermoplastic forms your print.

Build plate: Surface on which prints are made.

Terms to Know for Preparing Your Files for Printing

STL: Stereolithographic file format, commonly used in 3D printing.

OBJ: Object file format, commonly used for on-screen visualization and 3D printing.

Build volume: Maximum physical size you can print a design on your 3D printer.

Layout: Arrangement of STL and/or OBJ files on the virtual build plate in MakerBot Desktop

.Thing: File type that's saves layouts in MakerBot Desktop. If you prepare and arrange files on your build plate and would like to access them this way at a later time, you must save them as .thing files.

.makerbot/.x3g: File type that MakerBot Replicator 3D Printers use to print; only readable by these printers. An STL file gets converted into a .makerBot or .x3g file when you export your design for printing. .makerbot files are used for MakerBot 3D printers that are 5th generation and newer, while .x3g files are used for older MakerBot printers.

Resolution: The surface quality of a 3D print, typically defined by the layer height.

Layer Height: The thickness of each layer of your 3D print. In MakerBot Desktop, you can choose layer heights ranging from 0.1 mm (high resolution) to 0.3 mm (low resolution).

Raft: A raft is an additional stabilizing surface at the print's base the helps ensure better print quality. Rafts can be removed and discarded after the print is complete.

Overhang: When a layer extends outward, potentially unsupported, over the previous layer.

Supports: Removable scaffolding structure built to help parts of an object that would otherwise be in midair with no material below (see Overhang).

Bridge: When a layer prints in the air between two pillars.

Infill: The support structure built in the interior of a 3D model. It's density can be varied in MakerBot Desktop. Typically, infill is set between 10-15%. To create a fully solid object, the infill density must be at 100%. The lower the infill density, the lighter and more hollow your object will be.

Shells: Outside walls that make up the perimeter of your 3D object.

Print-in-place: A design with parts that can move immediately after printing.

MakerBot Cloud Library: A collection of your saved design files that's accessible over the Cloud on MakerBot Desktop or on MakerBot Mobile.

Terms to Know for Downloading Files from Thingiverse

Thing: Free design file uploaded by a Thingiverse community member.

Likes: A button on Thingiverse that lets you show appreciation for the creator of a design and their work. Liking files creates an uncategorized list that you can access in your profile.

Collection: A curated folder of things you've categorized. Collections can be viewed by other users and are a great way to organize things for students.

Makes/I Made One: After downloading and printing a file from Thingiverse, you can go to the file's main page and click "I Made One." You'll be asked to upload a photo of your 3D print, which is considered a 'Make'. By uploading a photo of your Make, you're demonstrating that the creator's 3D model can be printed successfully. Giving credit is a great way to support the designer and his/her design.

Thing Tags: Metadata tags that are used to classify designs into certain categories. Using tags to search for designs makes it easier to find groups of things that are closely related to each other.

Attribution: Anytime you print and share anything, make sure you remember who made it! Thing Tags can be easily generated at the bottom of each thing's page. Remind makers that when displaying these objects in public, it's vital to give credit to the community members who created them. Tagging is a great way to thank them for their amazing contributions!

Remix: A file that's been downloaded, altered in some way, and re-uploaded. If you decide to remix a file, make sure to attribute the original to its creator.

Customizer: An app built into Thingiverse that gives you the ability to customize 3D models with easy-to-use sliders, text fields, and dropdowns. It's based on the programming language OpenSCAD.

Groups: Community-driven collectives where members share things and talk about specific topics on discussion boards.