Gladstone Regional Library MakerTime

What is a MakerSpace?
A MakerSpace is a collaborative workspace used for making, learning, exploring and sharing ideas that uses high-tech (e.g. 3D Printing) to no-tech tools (e.g. Knitting).

What is MakerTime?
MakerTime sessions are creative sessions aimed at teaching or providing a chance to practice new arts, crafts, science and technology.

Some MakerTime sessions previously run include:
- Quilling
- Jam making
- Galaxy Pendants
- Spool Knitting
- Squishy Circuits
- Sewing
- Embroidery
- Paper Pot creation
- Papercraft
- Robotics
- Macramé and
- 3D Printed Christmas Decorations

Information Handouts:
This range of information handouts have been created as a beginner's guide to a variety of self-paced activities. There are a large variety of resources readily available both in library and online for guidance and ideas.

Further Reading and References

The following resources contain more information about the topic:

1. 2022. [online] Available at: <https://all3dp.com/2/d-ampersand-d-miniatures-3d-print-files-dnd-3d-models/> [Accessed 6 June 2022].
2. Instructables.com. 2022. [online] Available at: <https://www.instructables.com/3D-Printing-Basics/> [Accessed 6 June 2022].
3. Sequeira, E., 2020. *3D printing and maker lab for kids*. Beverly: Quarry Books.
4. Rock, S., 2019. *3D printing for beginners : 3D printer manual for exploring, maintaining and troubleshooting your 3D printer*. 2nd ed. U.S.A.
5. Jha, S., 2019. *Autodesk Tinkercad exercises*. CADIN360.

Boyne Island Library hosts a dedicated MakerSpace however MakerTime sessions are available at all branches region wide including:

- Agnes Water Library
- Boyne Island Library
- Calliope Library
- Gladstone City Library
- Miriam Vale Library
- Mount Larcom Library

For more information visit:
www.gladstonelibraries.qld.gov.au

Gladstone Regional Libraries

MakerSpace DIY Collection

Basics of 3D Printing

Image: Felix 3D Printer
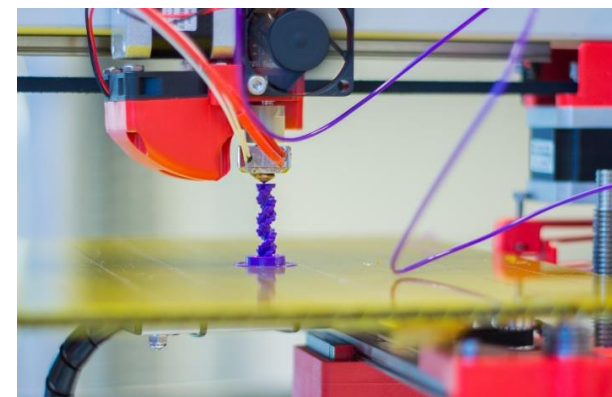**Source:** Wikimedia Commons

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Filament Printing

How it works:
Filament printers use a plastic filament that is wound on a coil and unreeled to supply the material to the printer nozzle. Changing the nozzle allows for a variety of resolution options and material types such as metal and wood filament. These plastics are "Thermoplastics" which means they melt at high temperatures instead of burning, making them ideal for printing.

There are many types of different filaments available all with different properties. Each type requires different temperature settings to obtain the optimal printing result. The library has standard filament only.

Works best for:
Large print jobs are more cost effective using the filament printers. Filament models are also a lot lighter than resin models.

Amount of clean up required:
Finished models can require anywhere from minimal clean up of the raft/brim to a lot of effort depending on the amount of supports that were needed for the print job.

Clean up of filament jobs can be done simply by hand with a craft knife, sandpaper or a rotary tool (e.g. Dremel)

Resin Printing

How it works:
Resin 3D Printing uses a UV reactive resin as a medium instead of filament. Each "slice" of the job is partially set to build the whole before the item is fully cured after being washed. Resin printing is messier than filament printing and therefore consideration of proper PPE is needed.

Because the resin is still photosensitive it is best to keep out of direct light to prevent model becoming brittle or to paint the model to seal it.

Works best for:
The resolution or detail of the finished product is also considerably better with resin print jobs where fine details are desired.

Note: Large/solid items require drainage holes to prevent the trapping of resin in the model.

Amount of clean up required:
Once printing is finished models are removed from the build plate and submerged into a bath of isopropyl alcohol to remove any excess resin before the curing process.

To prevent horizontal shearing (separation of layers) models are best printed on an angle. This means that all items will require some cleaning to remove supports.

Getting Started with 3D Printing

Finding a file
www.thingiverse.com has a large range of ready-made 3D files to download for printing. Files **MUST** be *.STL format for the library printer to use them.

Creating and editing a file
www.tinkercad.com website is a free site that enables you to edit and design 3D objects.

Getting items printed at the library
- Email the file to library@gladstonerc.qld.gov.au giving contact details and which branch you would like to collect the job from
- Please include if you would like your job printed in resin or standard filament. Default is filament if not specified.
- Staff will contact you regarding your file as well as terms and conditions of printing and provide a cost.
- Print jobs are in ABS/PLA single coloured filament (approx. 25c/m with minimum charge of $1)
- Print jobs in resin are charged at 20c/ml with a minimum print cost of $3 (this is to cover the cost of cleaning and curing as well as the resin)
- Jobs must be paid for prior to printing commencing.
- Please allow 10 working days for printing
- Items must be collected within 14 days after printing (unless other arrangements made)
- A copy of the policy can be obtained from staff for your perusal