

# 3D Printing

**What is 3D printing?** Technology that prints physical models from digital files.

**What can you make with 3D printing?** Models, prototypes, playing pieces, ornaments, pendants, tokens, key chain decals, cookie cutters – and much more!

## Uses of 3D printing:

- **Replace things:** Print missing pieces or replacement parts. Have a die or piece missing from a game? Design and print!
- **Invent things:** Have a great idea for an invention? Design and print!
- **Model things:** Designing a house or sculpture? Design a smaller scale model and print!
- **Wear things:** Design and print rings, bracelets and necklaces.

## How are 3D prints designed?

- Computer Assisted Drawing (CAD) software is used to create 3D drawings which are called models (see *Tinkercad Guidelines* for more information)
- Ready-made and free to download models are also available online in Tinkercad or thingiverse.com

## 3D Printing at the Margaret River Library

- The printer: **Flash Forge Dreamer**
- The filament: **PLA** (PolyLactic Acid). Biodegradable and made from renewable sources.

## Getting started:

1. **Design** a model using Tinkercad (see *Tinkercad Guidelines* for more information)
2. **Save** the file (as **.stl**) then make an appointment with the designated library staff member who will sit with you, and use Flash Print software to **convert** the file into a printable format (see *Flash Print Guidelines*). Flash Print will convert the files to a **.g** format, which makes them printable on the Flash Forge Dreamer.

## Technical information – for those who like to know!



- A 3D printer prints models in **3 dimensions**, using the x, y and z axis.
- The process is also known as **additive manufacturing**.
- **3D** design data is converted by software into **2D layers**.
- The **extruder** head melts and deposits filament in successive layers on the build plate.
- The **build plate** drops down as the extruders print the layers.
- **Filaments** can be made of PLA (which is a bioplastic made from corn) or ABS (the plastic used to create LEGO), gold, titanium, food, cement or other substances.
- The Margaret River Library uses **PLA plastic** which is completely biodegradable.
- **Infill** of designs is normally printed using a honeycomb design
- **Rafts** make the print stick to the bed better by giving it more surface area.
- The printer builds **scaffolds** for overhangs or bridges.
- High level 3D printers are currently used to print prosthetics, clothing, house parts, plane parts, and even living body organs.

## **Shire of Augusta Margaret River Libraries – 3D Printing Guidelines**

The Margaret River Public Library's 3D printer is available to the community to print three-dimensional objects in plastic (PLA) from a digital computer file under supervision and guidance from Library staff. Access to the printer is to inspire use of emerging technologies and to help create an interest in Computer Aided Design (CAD) and additive manufacturing. The Margaret River Library's printer is a **Flash Forge Dreamer**.

The following guidelines establish the circumstances in which the public may utilise the library's 3D printer.

- 1. The Library's printer may only be used for lawful purposes.** The public will not be permitted to use the 3D printer to create material that is:
  - a. Prohibited by local, state or federal law
  - b. Unsafe, harmful, dangerous or poses an immediate threat to the well-being of others.
  - c. Obscene or otherwise inappropriate for the Library environment.
  - d. In violation of another's intellectual property rights. For example, the printer will not be used to reproduce material subject to copyright, patent or trademark protection. (See link below for more information).  
[http://www.copyright.org.au/acc\\_prod/ACC/Information\\_Sheets/3D\\_Printing\\_Copyright.aspx](http://www.copyright.org.au/acc_prod/ACC/Information_Sheets/3D_Printing_Copyright.aspx)
- 2. The library reserves the right to refuse any 3D print request.** Additionally, all print submissions are subject to approval based on scheduling and availability.
- 3. Cost - \$4.00 per hour or part thereof**
- 4. There is a 4-hour limit on all prints.**
- 5. Only designated Library staff will have hands-on access to the 3D printer**
- 6. Design creation:**
  - a. Any 3D drafting software may be used to create a design as long as the file can be in saved in **.STL** format. The library recommends Tinkercad to create designs (see Tinkercad handout)
- 7. Submitting a design for printing**
  - a. Persons wanting to use the 3D printer service should contact the Library during opening hours on 9780 5600 and make an appointment with the designated Library staff member. Please bring your design as a **.STL** file saved on a USB to the appointment.
  - b. Relevant staff member will help you to prepare file in FlashPrint (printing software that prepares a file for our Flash Forge dreamer).
  - c. Wait times for your file to be printed will be estimated after the print has been checked in FlashPrint.
  - d. Prints will be placed in a queue. If there is high demand, the library will limit the number of prints per person.
- 8. Please note the guidelines governing the use of the Library's 3D printer are subject to change.**