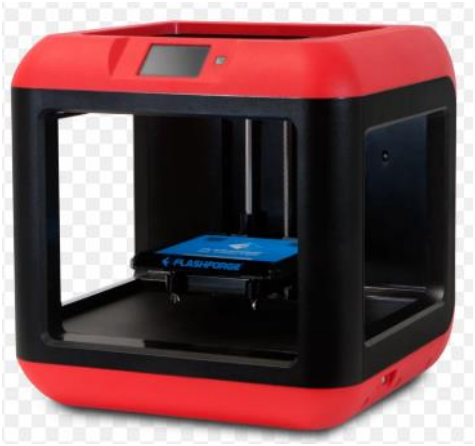
3D Printing Module



3D printing or **additive manufacturing** is a process of making three dimensional solid objects from a digital file using a new type of printer.

In addition to the printer, we require software to design the object. We use **TinkerCAD**.

Let's learn how to design for 3D printing!!

Activity 1: Introduction

Watch the video, "What is 3D Printing".

Assignment: Answer these questions

1. What is 3D printing?
2. What is additive manufacturing?
3. How do you transfer a design to the printer?
4. What is the most common material used in 3D printing?
5. What are they using 3D printing for in the medical world?
6. What did they use 3D printers for in China?
7. What is the first step in 3D printing?
8. What's a modeling software you can use to create designs that was suggested in the video?
9. What happens when the computer receives the data?
10. What other things do they make with 3D printers aside from things made of plastic?

Activity 2: Login

Go to tinkercad.com and login. You may need to join with a code given to you by your teacher.

Activity 3: Starter Lessons

Complete each lesson and use the “Snipping Tool” to **take a photo of your end result from each lesson**. Save it as the lesson name.

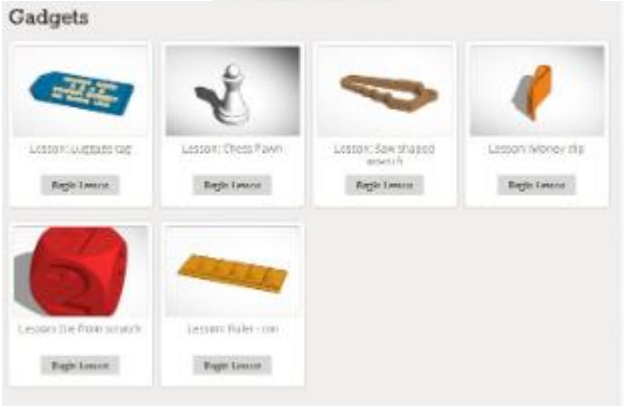
- Place it
- View it
- Move it
- Rotate it
- Size it up
- Group it
- Align it
- Sort it

Activity 4: Basic Skills Lessons

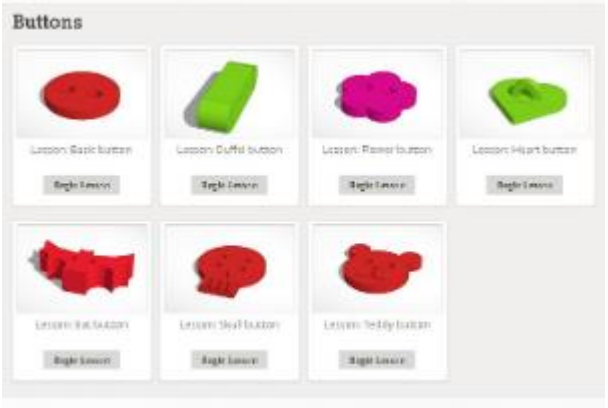
Complete Basic Skills lessons as shown:

Basics: (ALL)

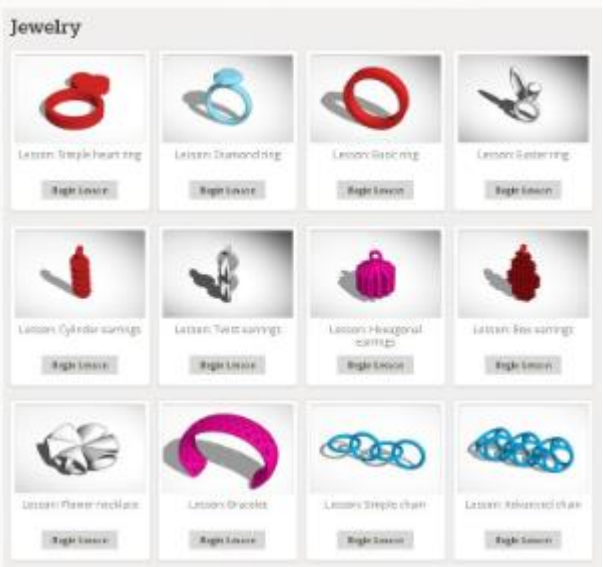
Gadgets: (Any 2)



Buttons: (Any 2)



Jewelry: (Any 2)



Print at least one lesson at the end of the class (so it can print overnight).

Activity 5: Multi-part Project – Choose one **OR** the other

Option #1: The Dispenser

Create a distributor for the kitchen that will serve coffee, loose tea, mint, cereals, dried legumes, sugar, chocolate powder, rice, etc., one handed.

In addition to the 3D printer material, you will also need an elastic band and a plastic jar. **Note:** products that contact food should be made from PLA material.

Looks at the model of a distributor by following the link on our BBT website. Take any measurements that you need.

The distributor must be made of 3 parts:

- a flap that opens to distribute the items
- the body that holds the plastic jar
- a support with 2 holes to fix it to the wall (2 screws: 5 mm hole) that allows the plastic jar to be removed from the wall easily

Bonus: if you can create the threads in the holder that correspond to the threads in the jar.

Option #2: Calendar

Look at the photo of the project. Decide what parts need to me made. Get your plan together and then start designing. Measurements are important.

Activity 6: The 3D Printing Industry

Let's find out a little more about 3D printing in the real world.

Refer to the website provided for this Activity to answer the questions. Scroll though looking at the section heading to help you. Record your answers on your worksheet.

1. We call 3D printing "**Additive Printing**". How is it different than subtractive printing?
2. What is **slicing**?
3. How large is the 3D printing market predicted to be by 2026? Do you think it may play a role in your job someday?
4. What are two advantages of "**rapid prototyping**"?
5. When is 3D printing used for "**rapid manufacturing**"?
6. How is the Automotive Industry using 3D printing?
7. How much did Aircraft manufacturer GE (General Electric) save by 3D printing engine fuel nozzles for their aircraft?
8. What other advantages did GE find with the 3D printed fuel nozzles?
9. What material is GE using to manufacture some of their parts?
10. What do they mean in the construction industry by "**Contour Crafting**"?
11. What are two examples of "Consumer Products" that are 3D printed?
12. What are two examples of "Healthcare Products" that are 3D printed?
13. How might 3D printing be important for future space missions?
14. Near the bottom, in the materials section, they mention 6 materials currently used in additive manufacturing. List them!

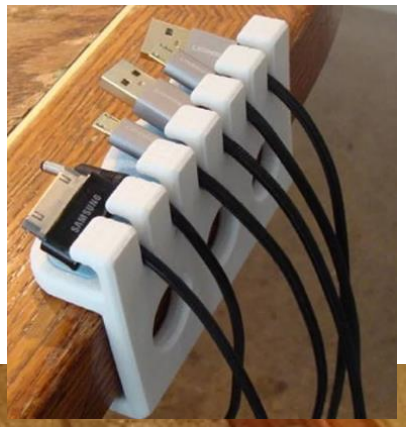
Activity 7: Choose a Project

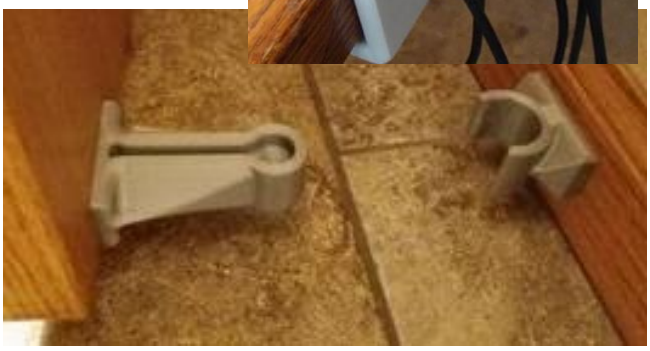
Instructions: Choose a design to complete.

Option #1: Hose Adapter

Create a project that will solve **ONE** of these design problems:

- Hose Adapter – connects two pieces of hose supplied by your teacher
- Cable Holder (that latches onto your desk)
- Door Holder – holds a door open
- Decorative piggy bank
- Media holder – for our 3D printer





Source: http://msashleystechworld.weebly.com/unit-1-tinkercad.html

Cup - https://www.youtube.com/watch?v=HeTqjwfGJgU