

Additive Manufacturing

Additive manufacturing, or 3D Printing, is a process in which layers of material are formed under computer control to create an object. The materials can range from wood pulp to metal to cement to frosting, and can be used to build tools, homes, models, or anything else you can dream up!

Try This!

Additive manufacture is regularly practiced by bakers when they decorate cakes and cookies.

1. In a large bowl, use an electric hand mixer to cream butter until smooth, but not airy. Add milk, vanilla and salt and mix to incorporate.
2. Sift powdered sugar over the butter mixture. Mix until incorporated and smooth. Do not overmix, to avoid air pockets in your frosting.
3. Spoon the frosting into the Ziploc, and seal the bag, carefully squeezing out excess air.
4. Use scissors to cut the tip of one corner off the bag. This is where the frosting will “print” from.
5. Print your sculptures by squeezing the frosting from the bag onto the parchment paper.
6. Freeze the prints for at least 20 minutes.
7. Use a knife or spatula to lift the prints from the parchment and onto a snack of choice!

Materials

1 cup unsalted butter
1 tablespoon milk
1 teaspoon vanilla extract
½ teaspoon salt
5 cups powdered sugar, sifted
Wax or Parchment Paper
Electric Mixer
Ziploc Bag
Scissors



Computer Generated
3D Print in Plastic



Hand Generated 3D Print in Sugar

A Little History

3D printing is a form of additive manufacture that has existed since the 1970's, with the invention of the inkjet printer. Much like today's 3D printers, an inkjet will start with an empty surface and add layers of material in order to form a product.

Producing more than just documents, 3D printing is useful for what's called *Rapid Prototyping*. Objects, like a new style of diving helmet, can be quickly printed for engineers to evaluate, redesign, and reprint several times before the final result is manufactured for use.