Making for kids

Didattica2.018

XIV-VI-MMXVIII

M. Rivera

Programma

- Strumenti e ambienti per il making
- Il ruolo del making nella didattica
- Esempi e proposte di attività di tinkering
- Strumenti semi-professionali a scuola: idee per arredare un atelier
- Stampanti 3D e altre diavolerie: un semplice percorso di progettazione, modellazione e realizzazione di oggetti da parte dei corsisti.

Strumenti e ambienti per il making

http://www.oils.education/

Focus sugli strumenti o sugli ambienti?

Ambiente = spazio + strumenti + progetto didattico + formatore/coordinatore

La progettazione dell’ambiente deve:

- partire dal progetto didattico della scuola (curricolo)
- valorizzare le competenze e le esperienze esistenti nella scuola
- creare/potenziare quelle assenti o ancora insufficienti
- sfruttare/far ripensare gli spazi scolastici (ambienti dedicati o aule che diventano ambienti polifunzionali)

Il ruolo del making nella didattica

- **Il percorso di apprendimento OILS:**
  - **Ideare → Progettare → Modellare → Creare → Presentare**
- **Fine: Creazione (Prodotto) o Processo?**
- **Anche se il processo è solo strumentale alla realizzazione del prodotto, sviluppa competenze**

Il tinkering, un making per tutti (http://web.media.mit.edu/~mres/download/Art-of-Tinkering.)

TINKERING TENETS

Every day at the Exploratorium, we witness firsthand how empowering tinkering can be—we're there for the head scratching, the trial and error, and the *aha!* moments that result from engaging your world, both physically and mentally. Here we've put together a few of our daily practices and some of the ideas that guide us in our work, and we hope that they will help you in your own tinkering adventures.

MERGE SCIENCE, ART & TECHNOLOGY

On their own, science, art, and technology all ma[illegible] interesting, fun, and rewarding explorations. [illegible] them together, you get a veritable [illegible] principles [illegible] vision. Plus, we find that when you make something that's personally meaningful to you, you get especially mo[illegible] work, leading to [illegible] of great [illegible]

USE FAMILIAR MATERIALS IN UNFAMILIAR WAYS

[illegible] world is full of stuff that was invented to d[illegible] job. But taking a common object a[illegible] g it to [illegible] surprising exploratio[illegible] nuts or crafting tiny cities of tape. A bonus: These materials are often cheap and easy to find, and their universality means you can use them in near-infinite ways.

CREATE RATHER THAN CONSUME

REVISIT [illegible]ERATE ON YOUR IDEAS

EXPRESS IDEAS VIA CONSTRUCTION

PROTOTYPE RAPIDLY

When you have a new idea, it's incredibly helpful to get it out of your brain as soon as possible—to sketch a design or build a working model with stuff you have lying around. That way, you can make it real, work it out, and develop a concrete understanding of your next steps, then move on to Phase 2.

EMBRACE YOUR TOOLS

We love tools. Beyond being just plain useful, they're also an extension of your own critical thinking, letting you physically investigate the way things work—to get in there and pry, screw, hammer, and wire your way to a deeper understanding. And when you learn how to use a felting needle, multimeter, or hand drill, you open up a world of possibilities that allow you to fix things, remix things, and bring something new into the world.

BE COMFORTABLE NOT KNOWING

GO AHEAD, GET STUCK

When you tinker, you're going to mess up. You're going to get [illegible]trated, fail, and maybe even break a thing or two. We call thi[illegible] [illegible]tuck, and believe it or not, it is a very good thing. F[illegible] [illegible]ou don't know, frustrati[illegible] failure [illegible] way of knowing. Treat [illegible] that arise as a problem to play with—rather than a problem to solve—and practice working through times of frustration without judging yourself. You'll find that you develop an astonishing capacity for new understandings.

REINVENT OLD TECHNOLOGIES (AND DISCOVER NEW ONES, TOO)

In this book, you'll encounter dozens of technologies (some old, some new) from all types of art practices and industries. We encourage you to consider all the possible tactics out there that can help you realize your vision—whether your project requires old-school woodworking, photo-making techniques from the 1800s, or relatively newfangled circuitry and programming.

SEEK REAL-WORLD EX[illegible]ERE

TRY A LITTLE "SNARKASM"

We like to joke around while we tinker, and we call our particular brand of well-meaning wit and unprecious playfulness "snarkasm." A little humor helps—it's enjoyable and it alleviates the pressure of trying to make something work.

BALANCE AUTONOMY WITH COLLABORATION

Tinkering with other people can be a blast and is a valuable [illegible] to get things done. It makes you explain your ideas, allow[illegible] [illegible] cross-pollinate and share skills, and lets everyo[illegible] be [illegible] [illegible]ing larger than themselves. On the flip [illegible] we advise [illegible] time to time [illegible] a richer knowledge [illegible] and you'll feel your confidence, your dexter[illegible] even your brain expand.

PUT YOURSELF IN MESSY, NOISY & SOMETIMES DANGEROUS SITUATIONS

[illegible] can get tricky. Prep to use your tools safely, and practice techn[illegible]tting, drilling, soldering, and welding. But the dangerous [illegible]ing is a powerful motivator—it forces you to slow down [illegible] to what you're doing. A little caution goes a long way.

TAKE YOUR WORK SERIOUSLY WITHOUT TAKING YOURSELF SERIOUSLY

Because tinkering should be fun. And when you let go of your ego, you give yourself permission to focus and play. That's when the good stuff happens.

TOOLS FOR TINKERING

One of the most important parts of tinkering is engaging with your tools and materials, and to do that you have to have some on hand! Here are just a few of our favorite tinkering instruments—most of which you can pick up at any hardware or hobbyists' shop, and many of which are tools recommended on the How You Can Tinker pages in this book. Don't let our suggestions limit you, though: Look for other items that can help you complete your projects, and reconsider the possibilities of the everyday stuff all around you.

Sometimes the tools you need are a bit advanced—you should use saws, drills, and soldering irons, for example, according to manufacturers' instructions and with all the proper safety gear and considerations.

Un’esperienza di tinkering per il recupero

Resume&Rescue Lab

Strumenti semi-professionali a scuola per arredare un atelier

Stampante 3D

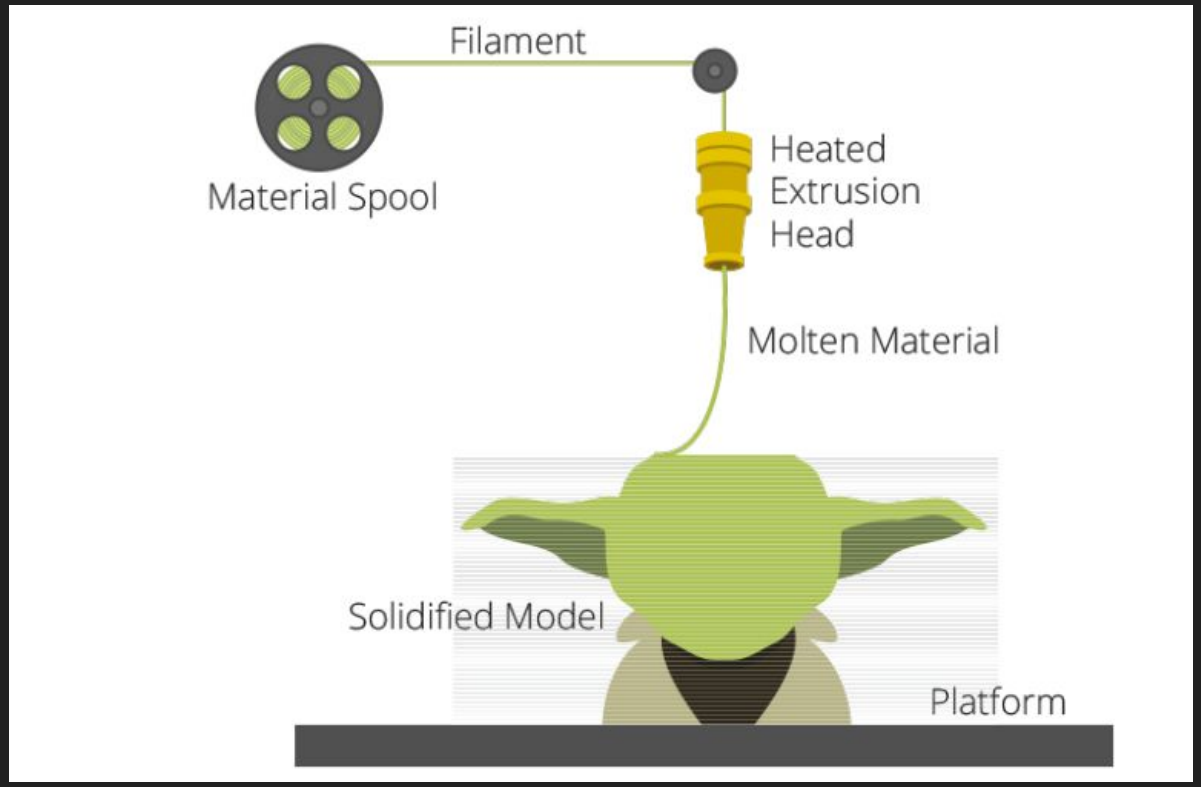
Scanner 3D

Incisore/taglio laser

Plotter da taglio

Termoformatrice

Stampanti 3D



Materiali per la stampa 3D

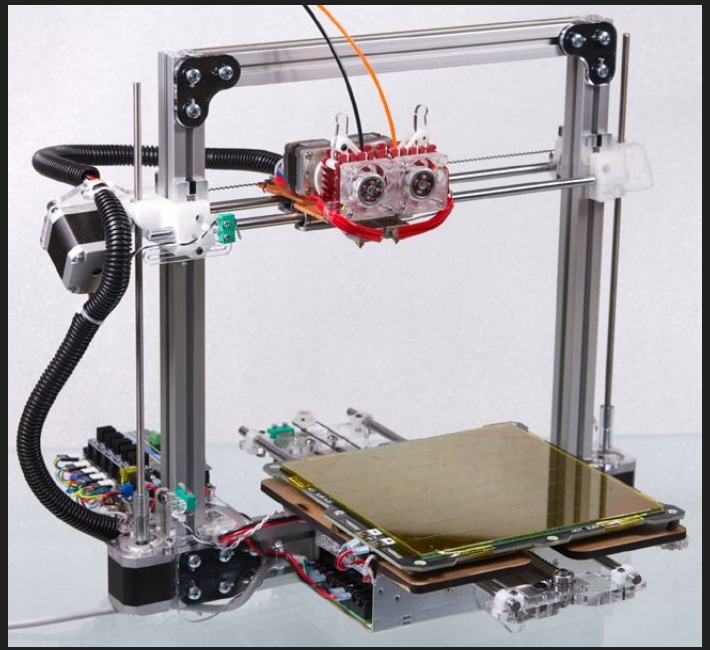
- ABS. Ad elevate temperature (400 °C) l'acronitrile-butadiene-stinere può decomporsi nei suoi costituenti: butadiene (cancerogeno), acrilonitrile (possibile cancerogeno) e stirene. Preoccupazioni circa le concentrazioni di polveri sottili sospese (PTS) nell'aria generate durante la stampa.

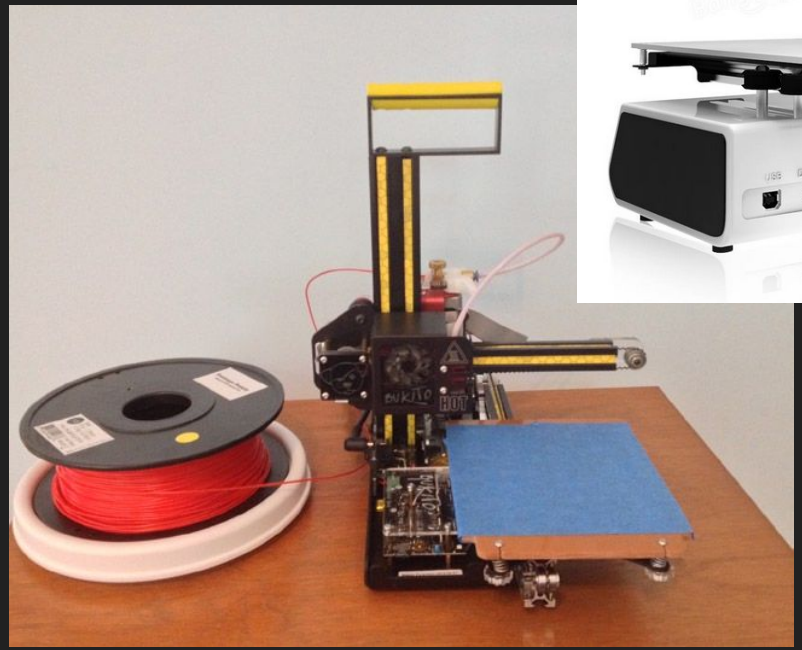
- PLA - Acido Polilattico (biodegradabile, anche in formato di resina)

- Laywood: plastica riciclata, legno e legante.

Esempi di stampanti

Cartesiane





Vantaggi della stampa 3D

- Personalizzazione
- Complessità
- Superfluità di altri strumenti
- Minimizzazione di scarti

Scanner 3D

Da Vinci
3DPRINTER

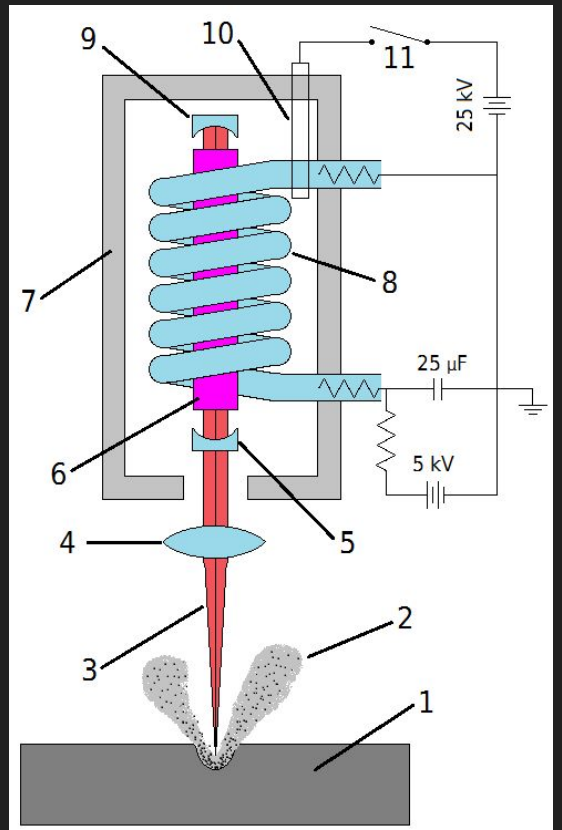
EinScan
SHINING 3D

Artac Eva

Ciclop
Ciclop
bq

Incisione e taglio laser

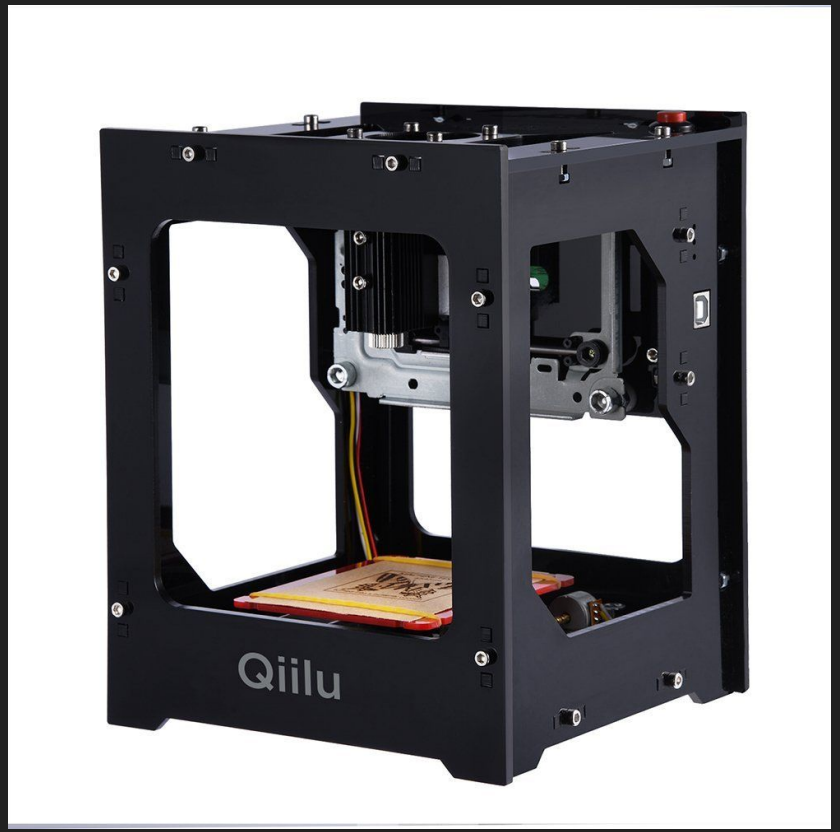
Il principio di funzionamento di una macchina laser

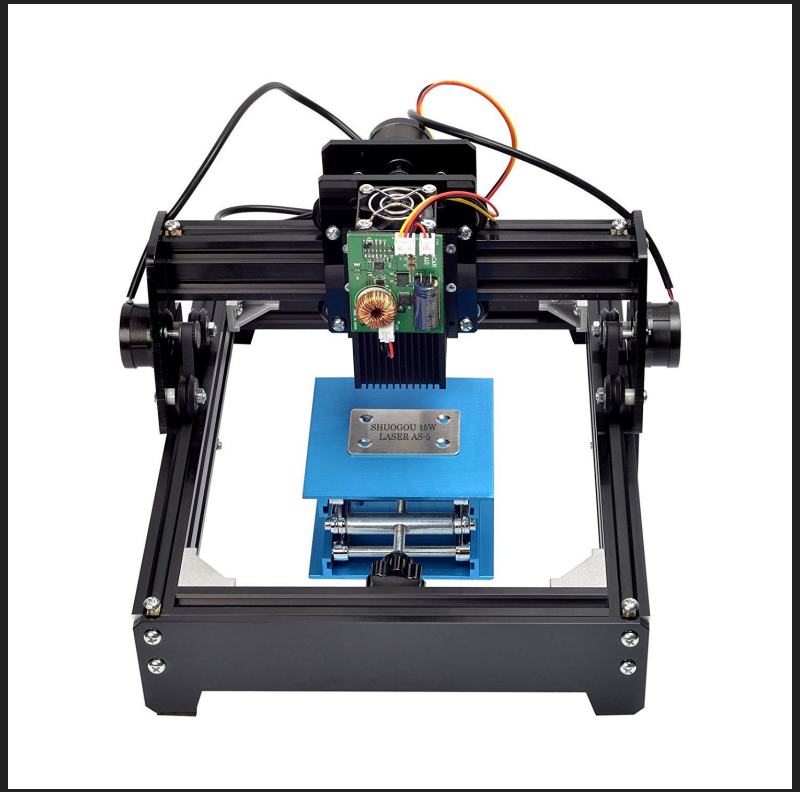


1. Pezzo
2. Materiale vaporizzato e fuso espulso
3. Fascio laser
4. Lente

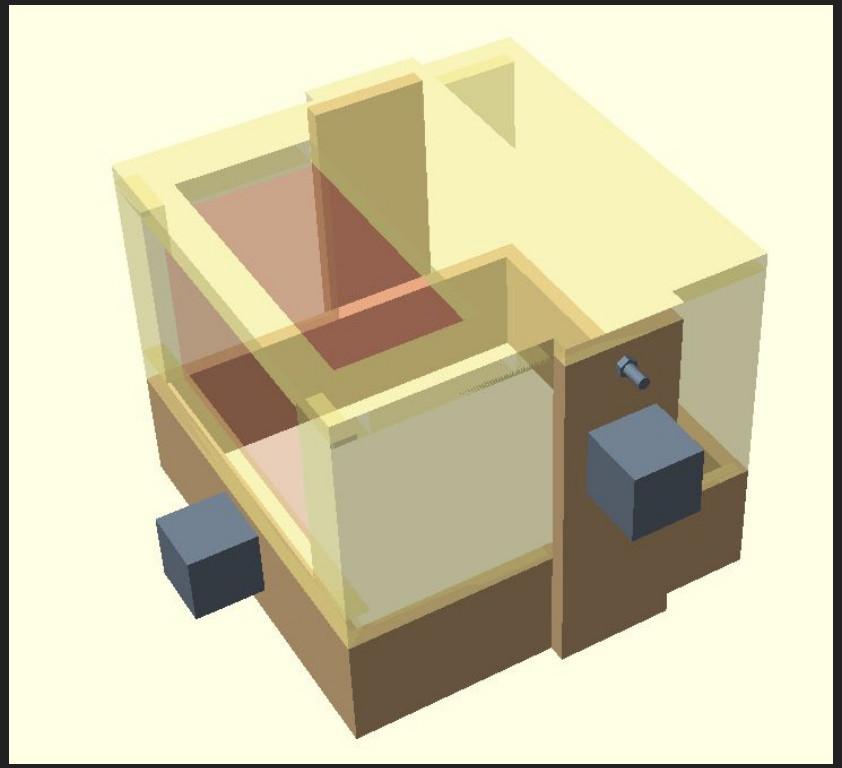
Di Frank50 s - Opera propria, CC BY-SA 4.0, https://commons.wikimedia.org/w/index.php?curid=41663147

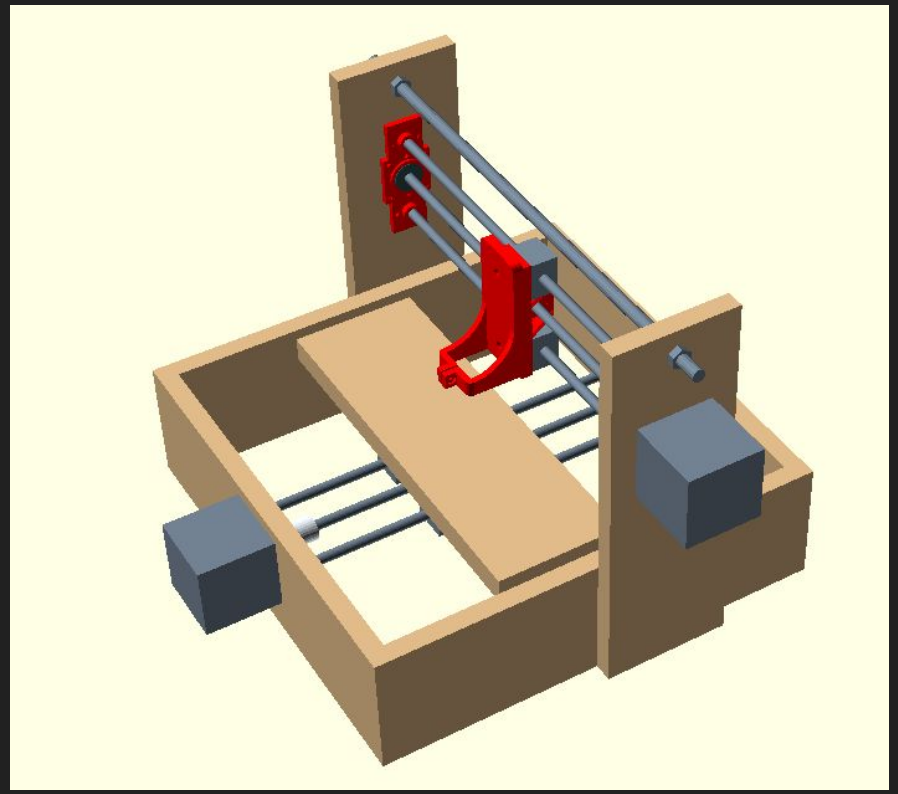
Macchine portatili





Macchine autocostruite





Elementi di pericolo

- elettricità
- laser
- fumi

Plotter da taglio

Termoformatrici

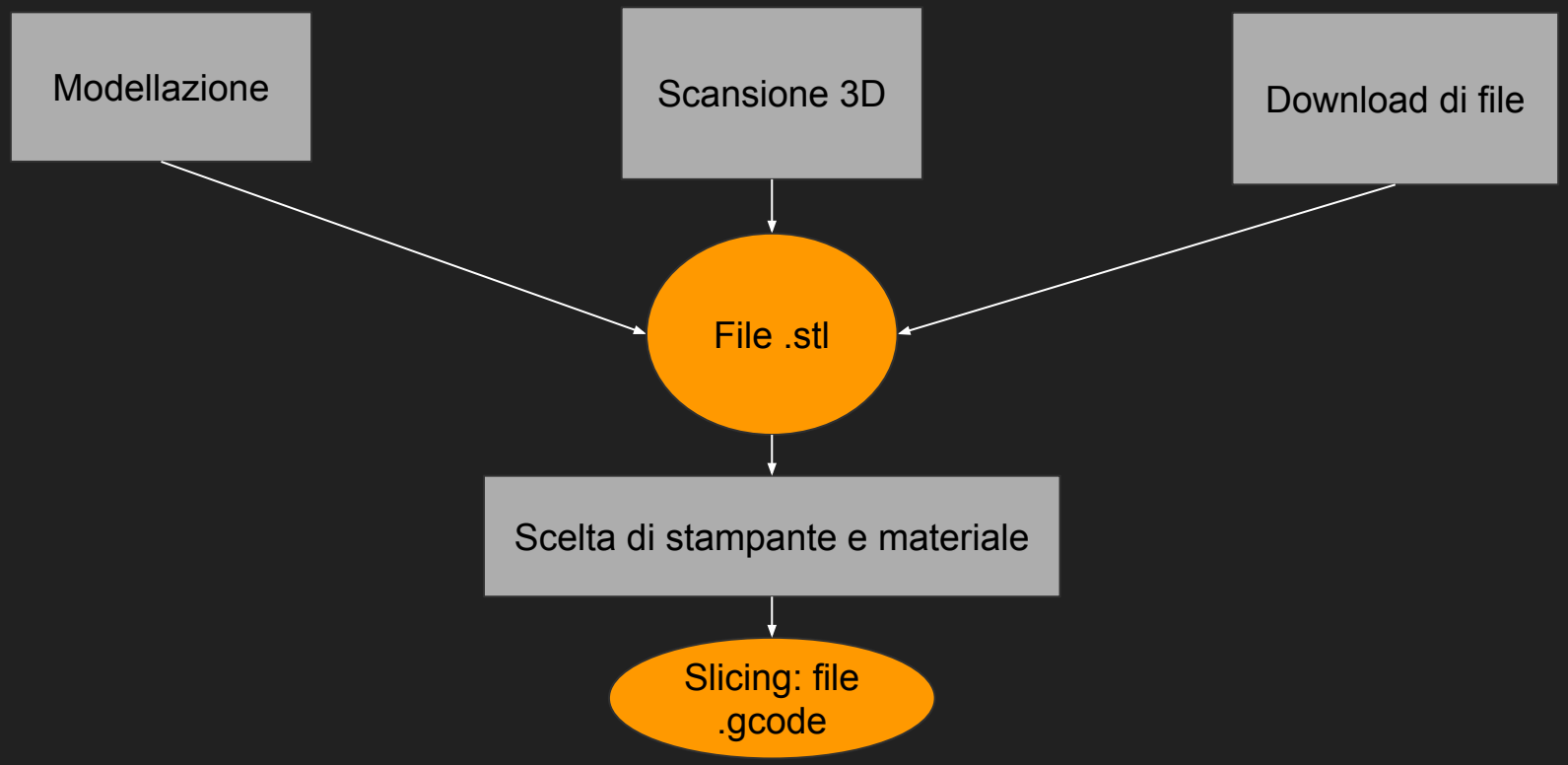
Stampa 3D e altre diavolerie...

Breve laboratorio di stampa 3D e incisione laser

Progettazione e stampa per tutti i gradi e i gusti

Grado	**Attività**	**Tipologia Modellazione**
Infanzia	Stampa (docenti)	File scaricati
Primaria	Modellazione/stampa	File scaricati - modellazione visuale
Secondaria I grado	Modellazione/stampa	File scaricati - modellazione visuale - modellazione testuale
Secondaria II grado	Modellazione/stampa	File scaricati - modellazione testuale

Il processo di stampa 3d



Repository STL

Thingiverse

Instructables

Makezine

Software e servizi di disegno e modellazione

Sketchup (anche come app di Gsuite)

Tinkercad

Openscad

Software di slicing e meshing

Repetier host

Slic3r

Cura

MatterControl (utile anche per stampa virtuale)

Software per taglio/incisione laser

- Software dedicati
- Software per firmware open
  - Firmware: GRBL per Arduino (https://github.com/gnea/grbl/)
  - Software di gestione GRBL per macchine laser: LaserGRBL (http://lasergrbl.com/it/)