

Iniziare con la stampa 3D

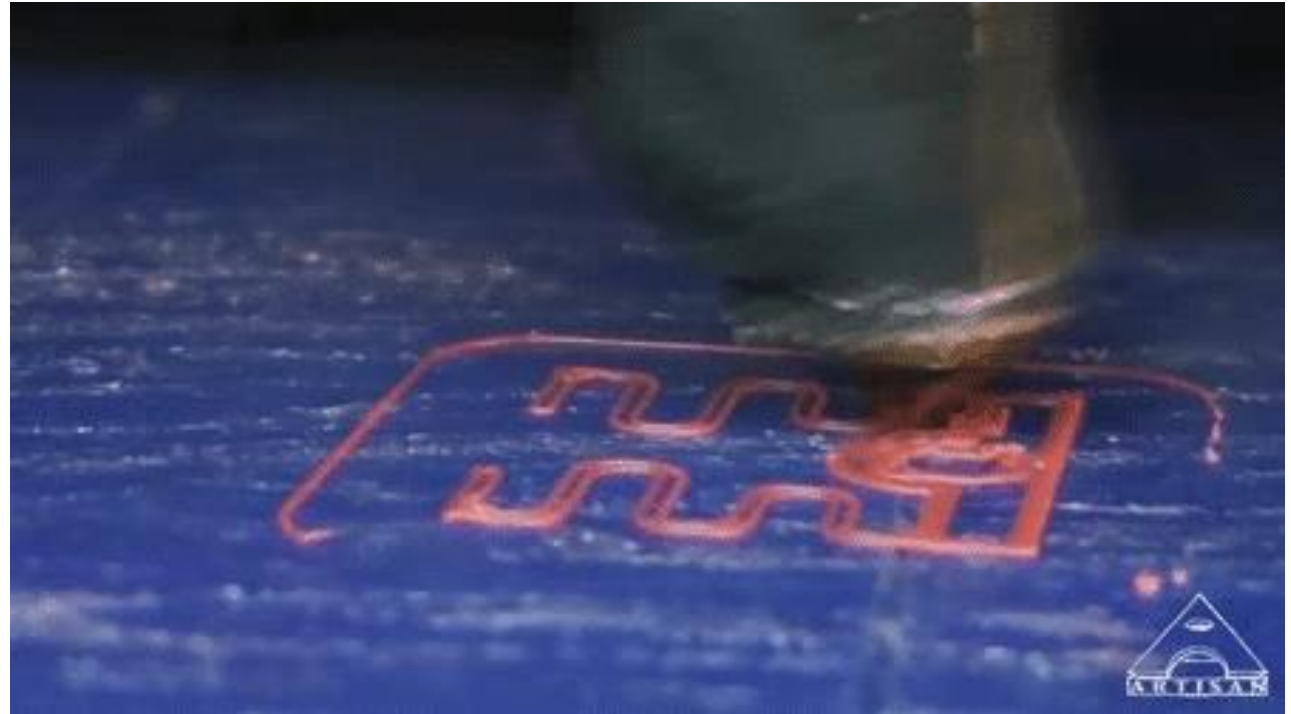
Anders Bod Lund – Create it REAL

Agenda:

- Il processo di stampa 3D
- Terminologia
- Modellazione CAD
- Cosa abbiamo fatto a livello locale
- Visita della scuola
- Software di slicing
- Come fare un grande progetto

Stampa 3D

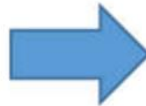
- Fabbricazione digitale
- Produzione additiva
- Stampa 3D FDM/FFF



Create it REAL

- Società di ricerca e sviluppo per la stampa 3D
- Specializzato in velocità e sicurezza
- Partner

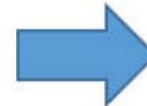
STL File



Computer



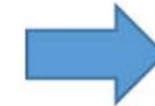
Slicer software to
Prepare the file for
3D printing



3D Printer




Printer controller

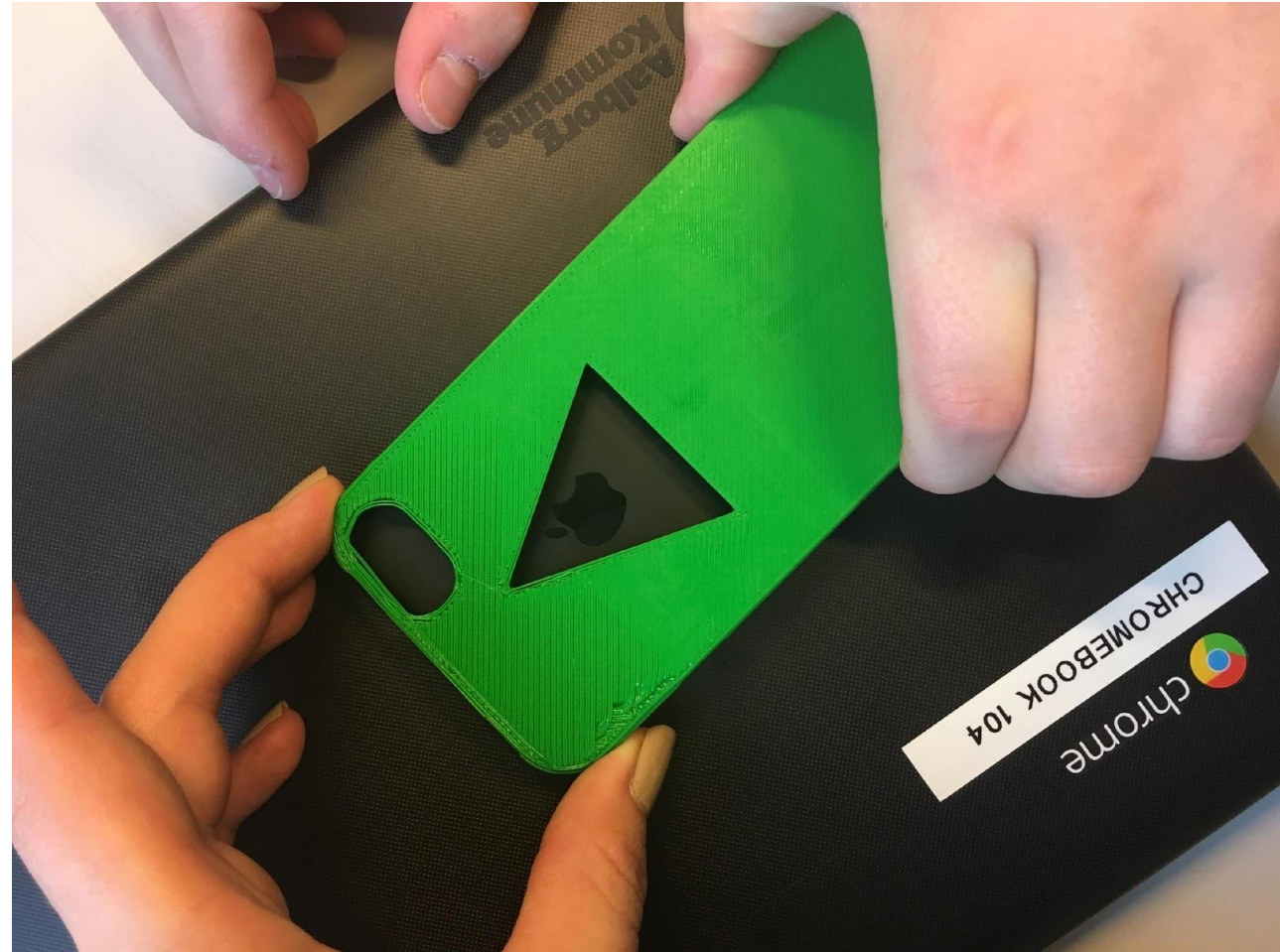


3D printed object



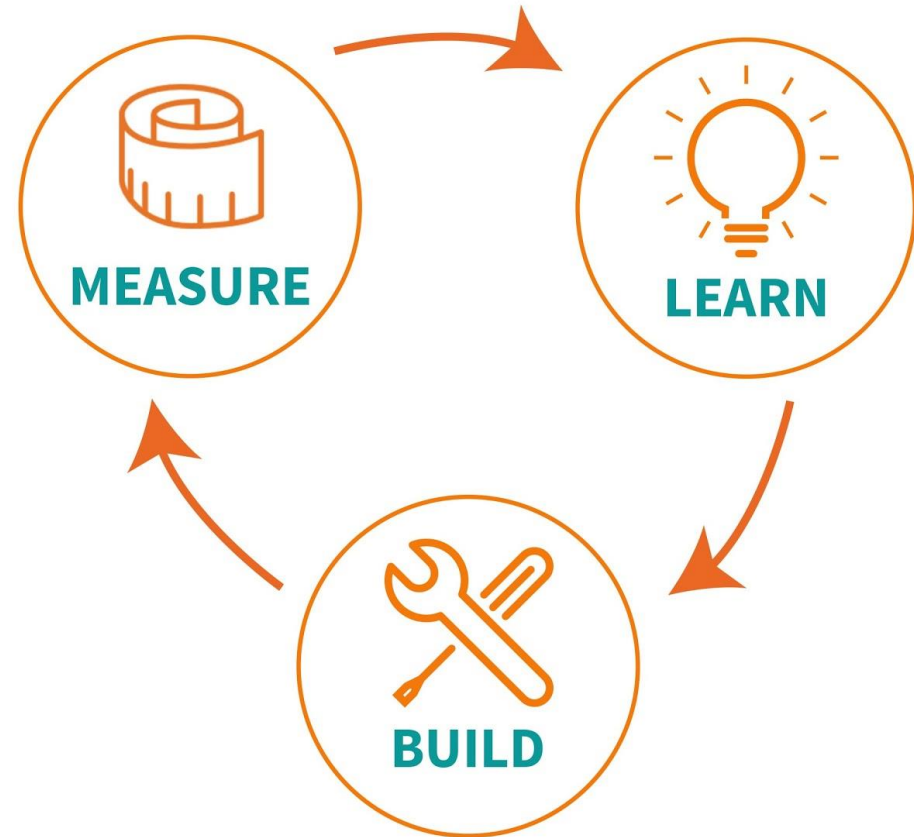
Stampa 3D

- 15 stampanti in 8 scuole
- Insegnanti
- STEM/STEAM
- Il ruolo di Create it REAL
 - Feedback degli insegnanti
 - Caratteristiche sviluppate per i settori educativi

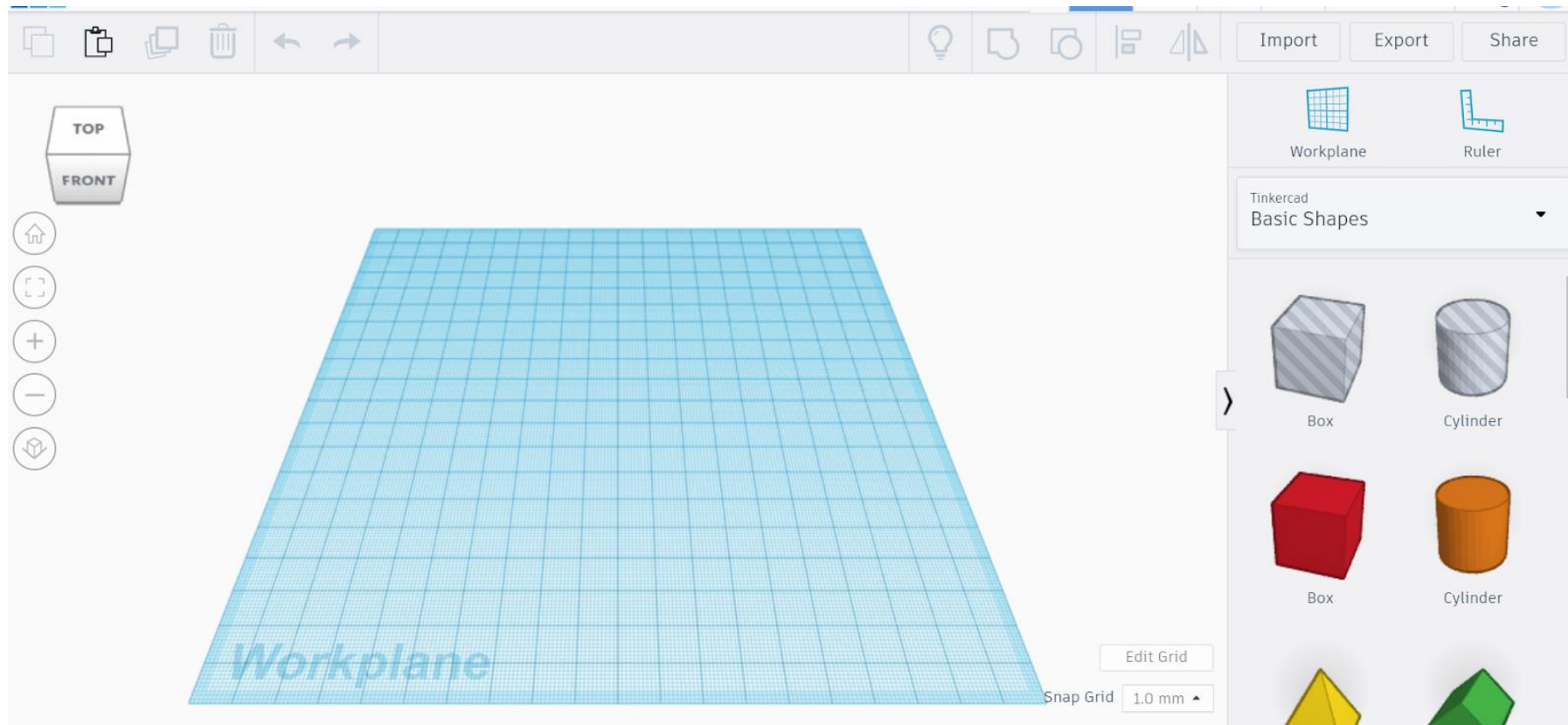


Mentalità di stampa 3D

- Fallire più velocemente
- Startup snella
- Seymour Papert - Costruttivismo
- Innovazione

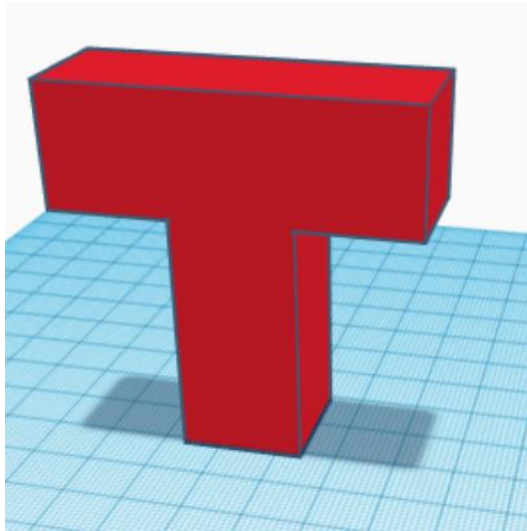


Sfida di progettazione 1 - Creare una targhetta con il nome P. 5



Sporgenze

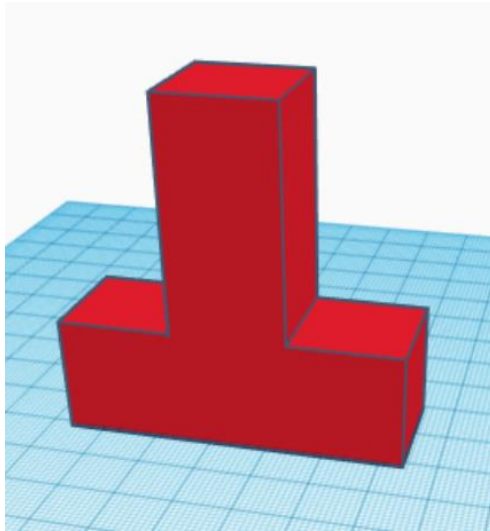
Desired model



Rotation:

Pros: Easy Quick

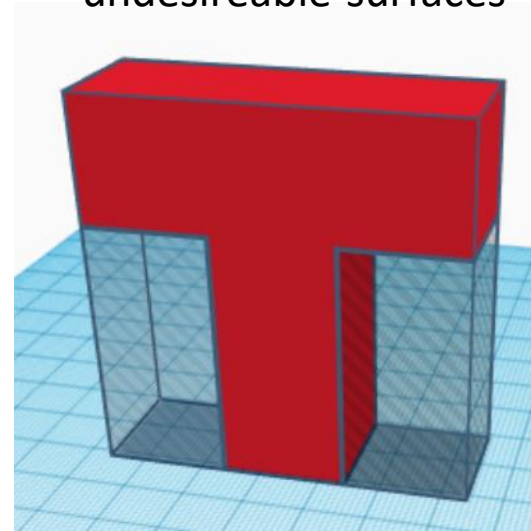
Cons: Not always possible



Support:

Pros: Makes most overhangs
printable

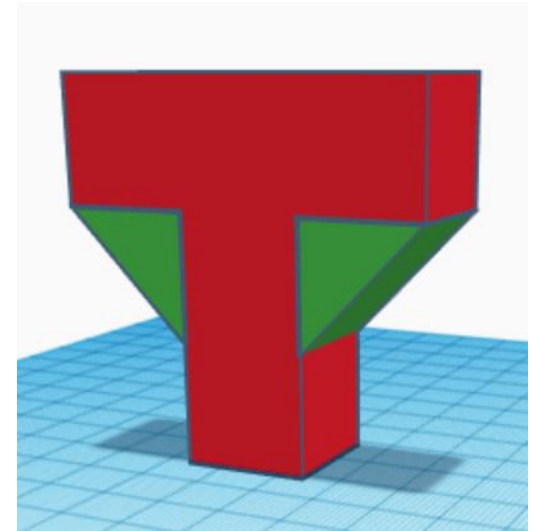
Cons: Wastes materials,
undesireable surfaces



Smart design:

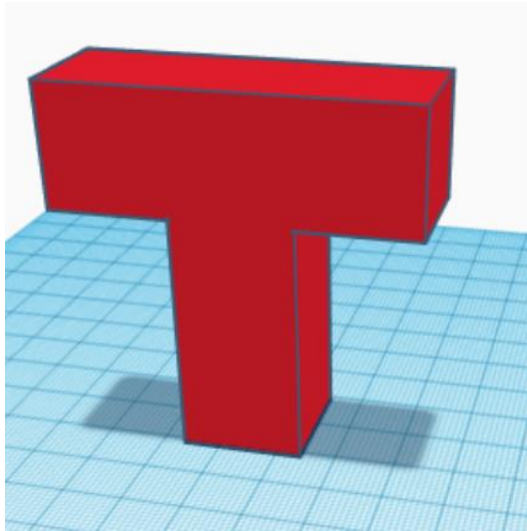
Pros: Learning to design for
production method

Cons: Takes time and skill



Sporgenze

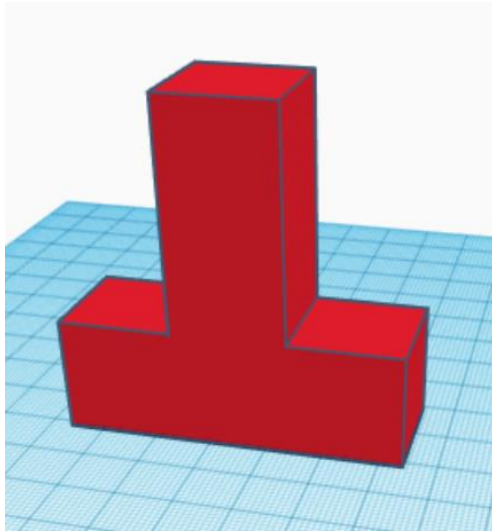
Desired model



Rotation:

Pros: Easy Quick

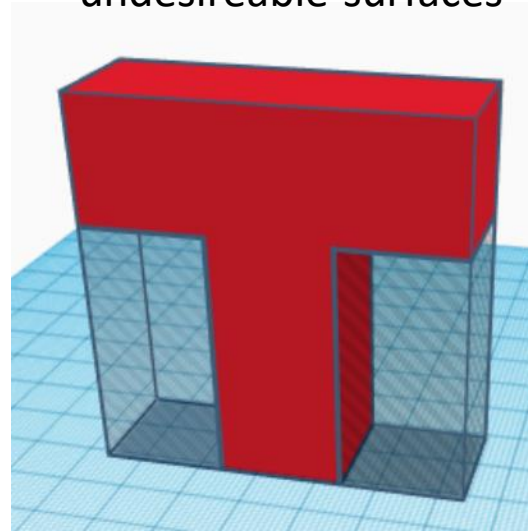
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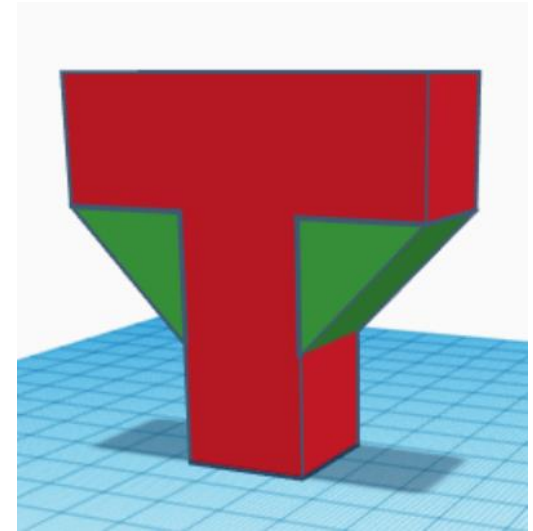
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Smart design:

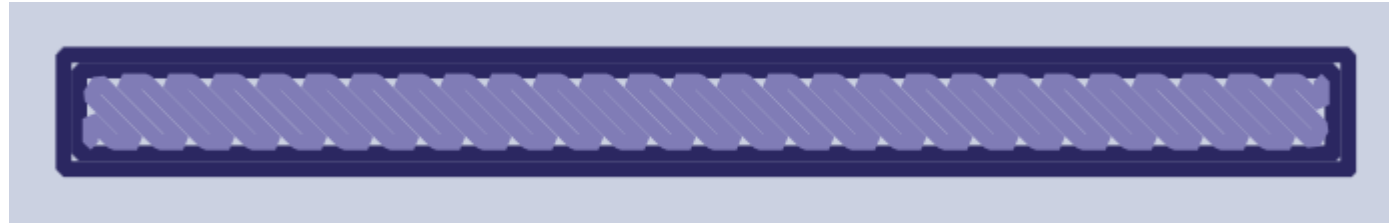
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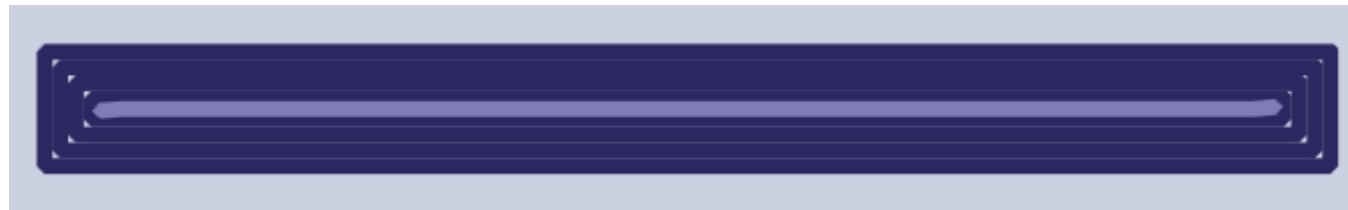


Guscio

1mm shell, or 2 contours

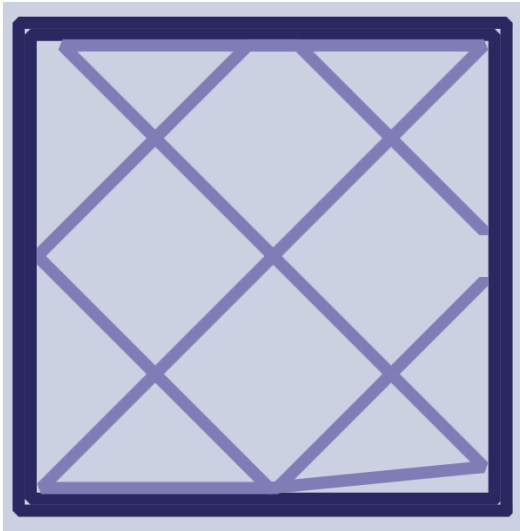


2mm shell, or 4 contours

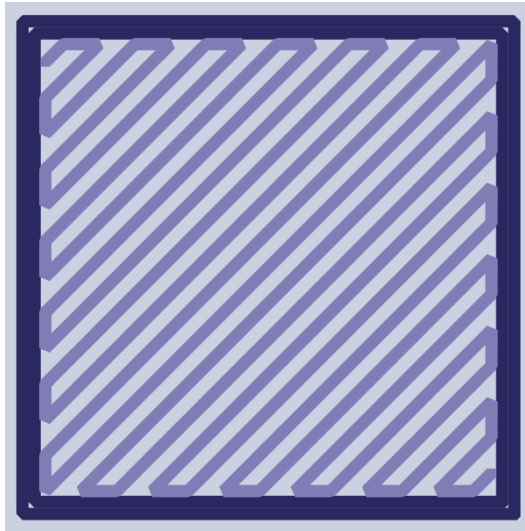


Riempimento

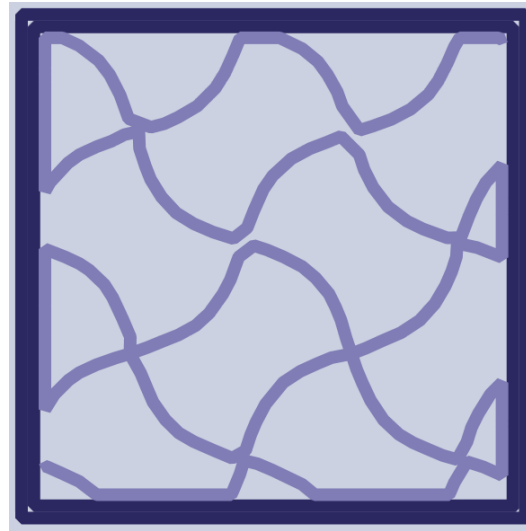
Square infill
15%



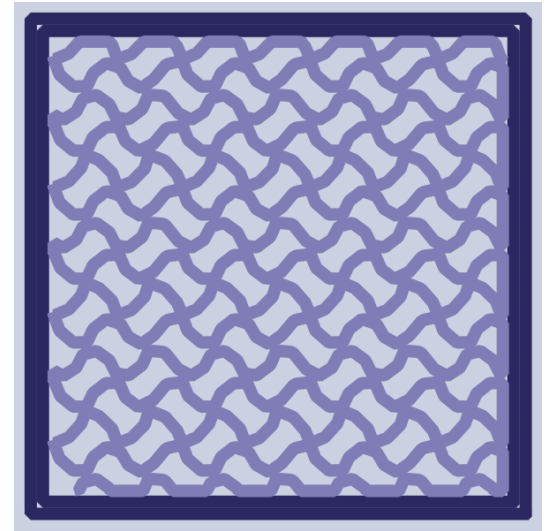
Square infill
50%



3D Gyroid
15%

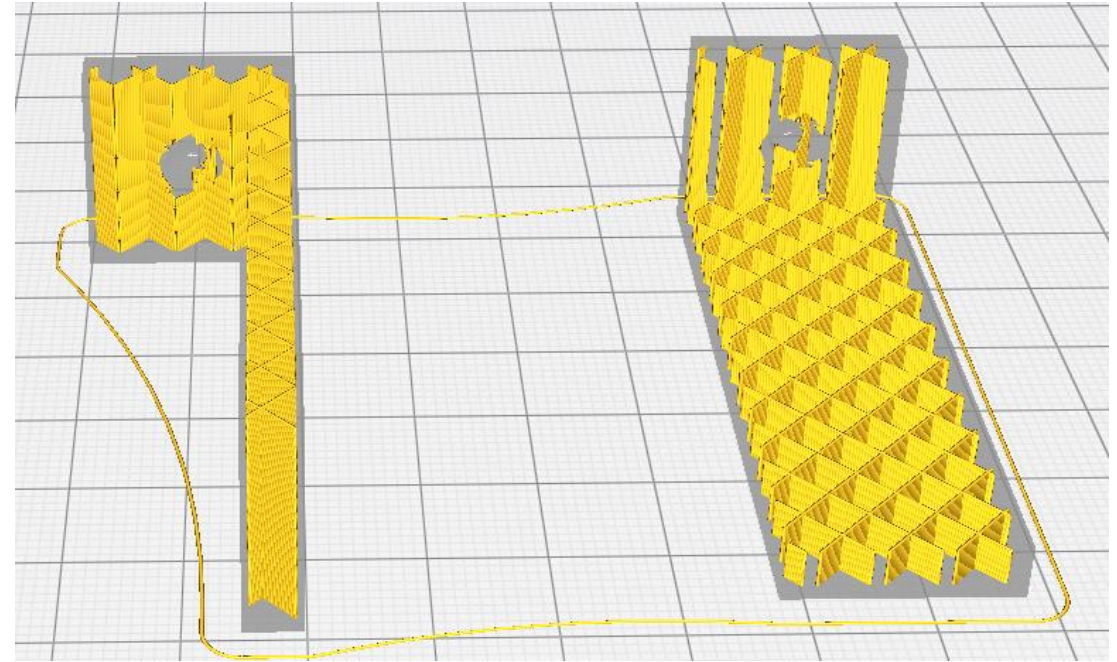
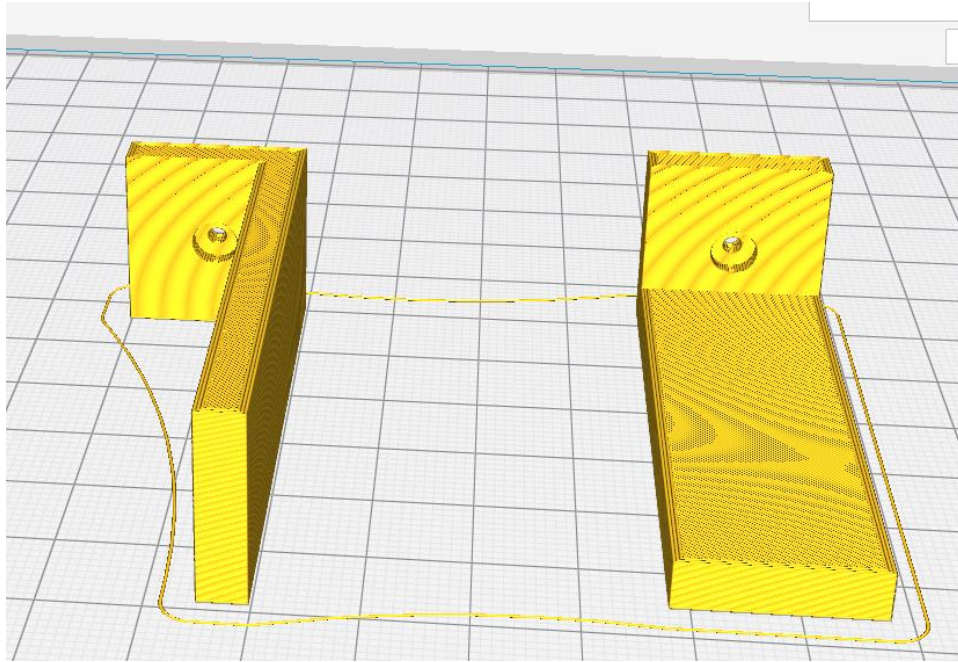


3D Gyroid
50%

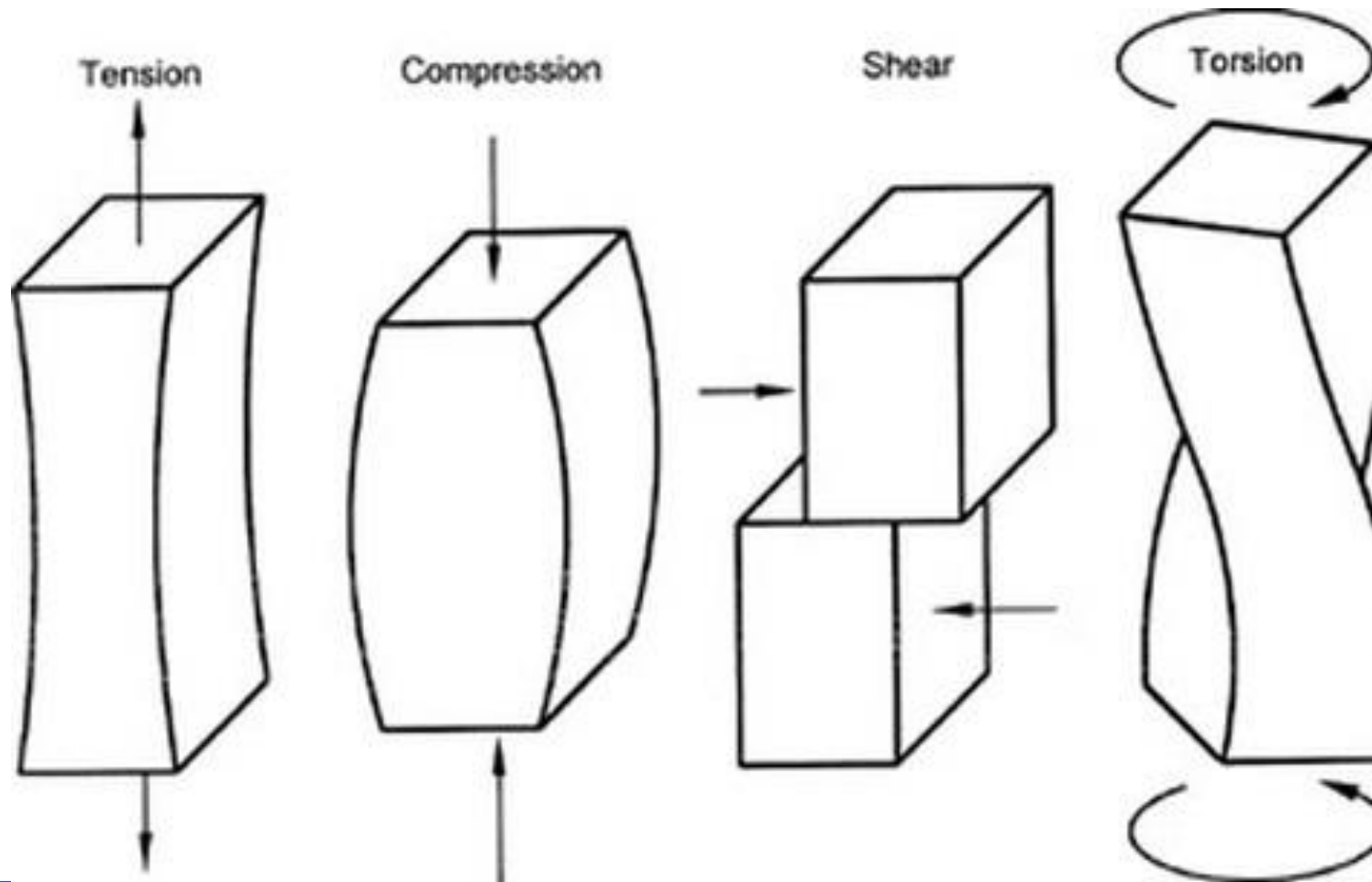


Orientazione

L'unica differenza è l'orientamento. Cosa conta di più per la forza, il riempimento o i contorni?

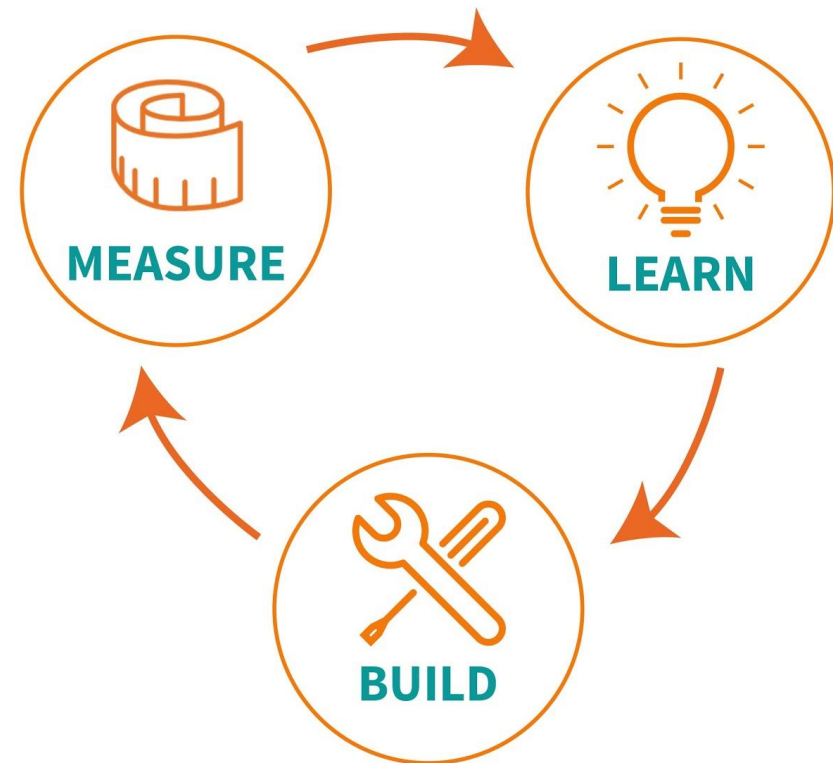


Sfida di disegno - forza anisotropa p. 18



Sfida di progettazione 2 - Fare un ponte p.19

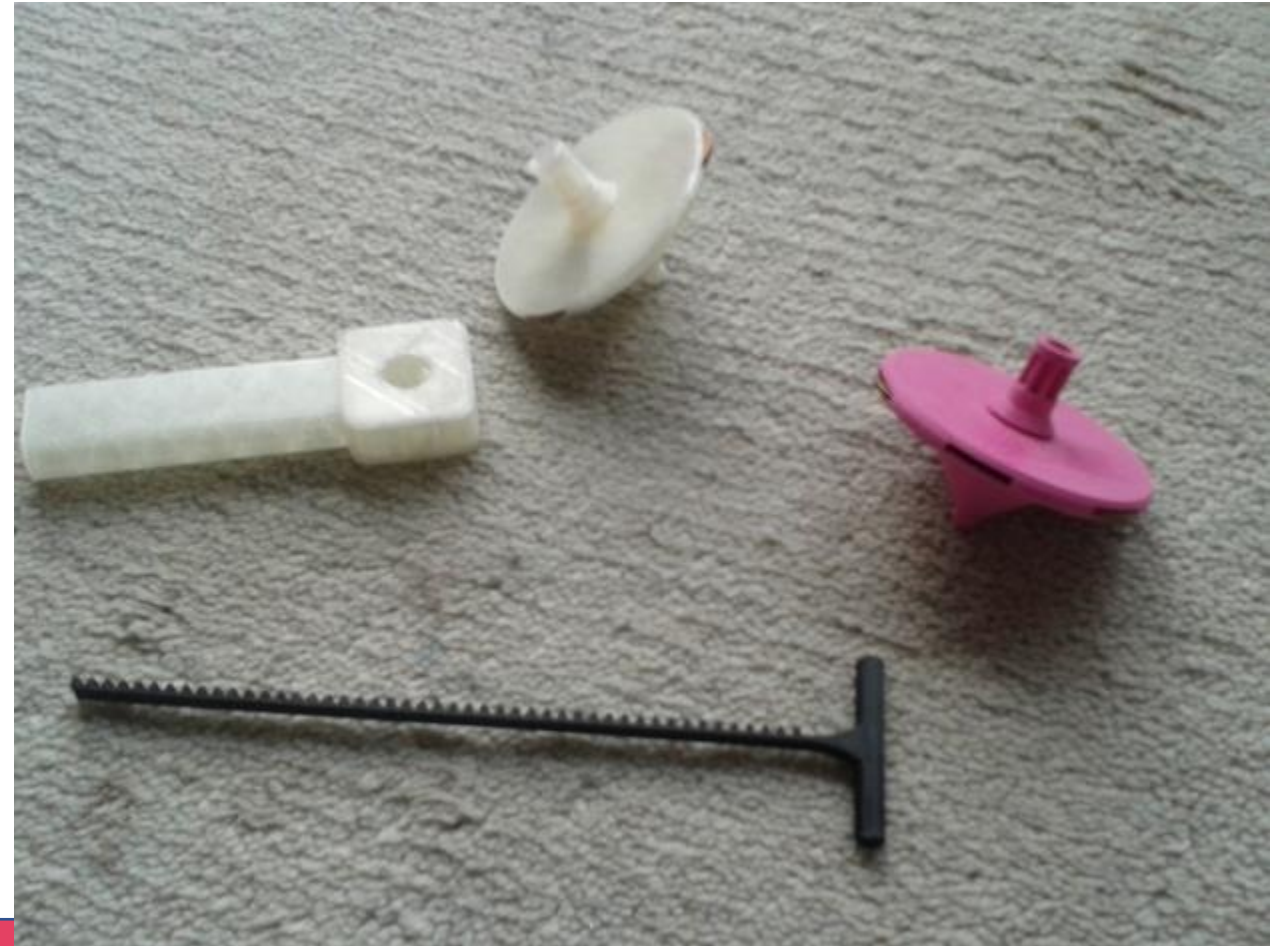
- Il ponte deve essere in scala 1:500
- Il ponte deve ospitare 2 auto in cima e 4 camion sotto
- La forza del ponte sarà testata
- Il costo del materiale del ponte sarà calcolato



Sistema di coordinate Oresmian

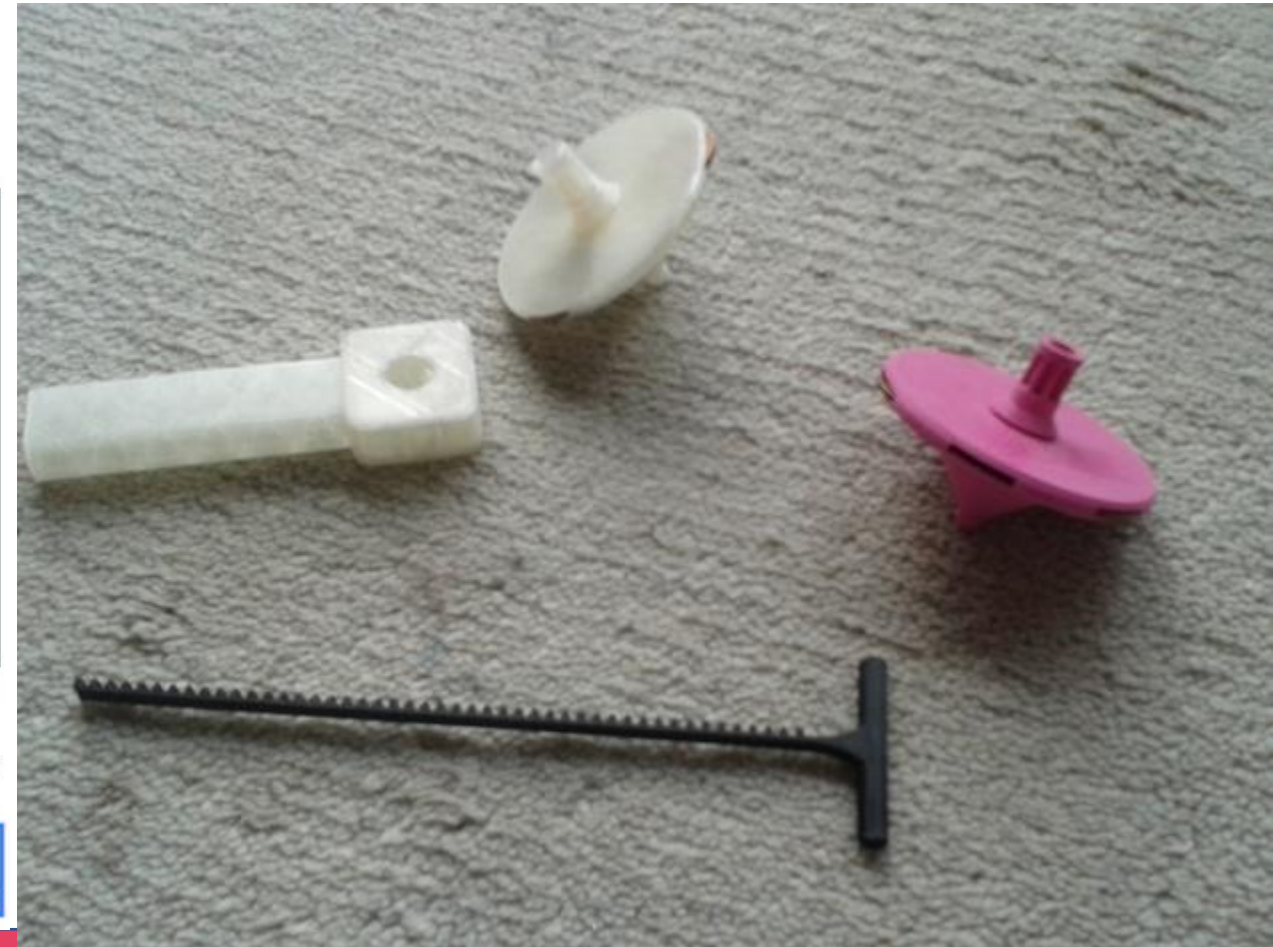
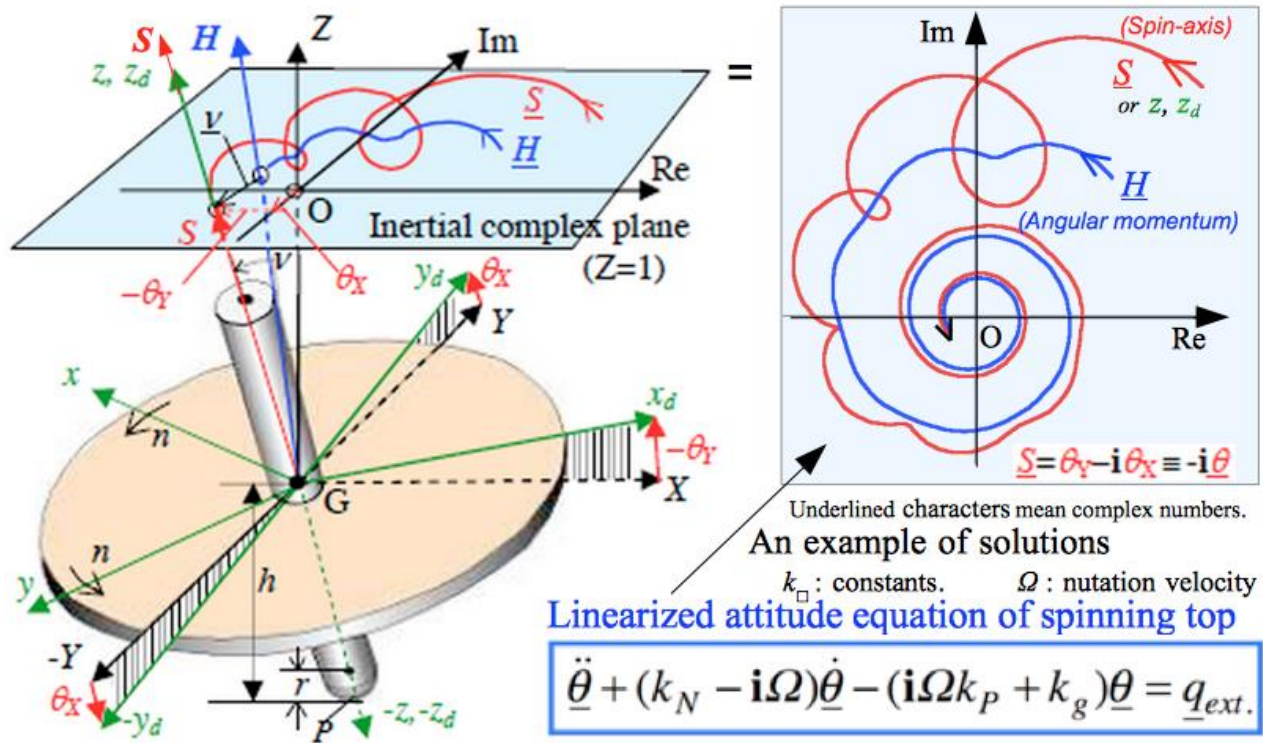
Cosa potrebbe dire un bambino:

- Più peso c'è sul bordo del disco, più stabile gira
- Più bassa è la trottola, più stabile è la trottola
- Se la trottola è più appuntita in basso, gira meglio



Oresmian Sistema di coordinate: Trottole

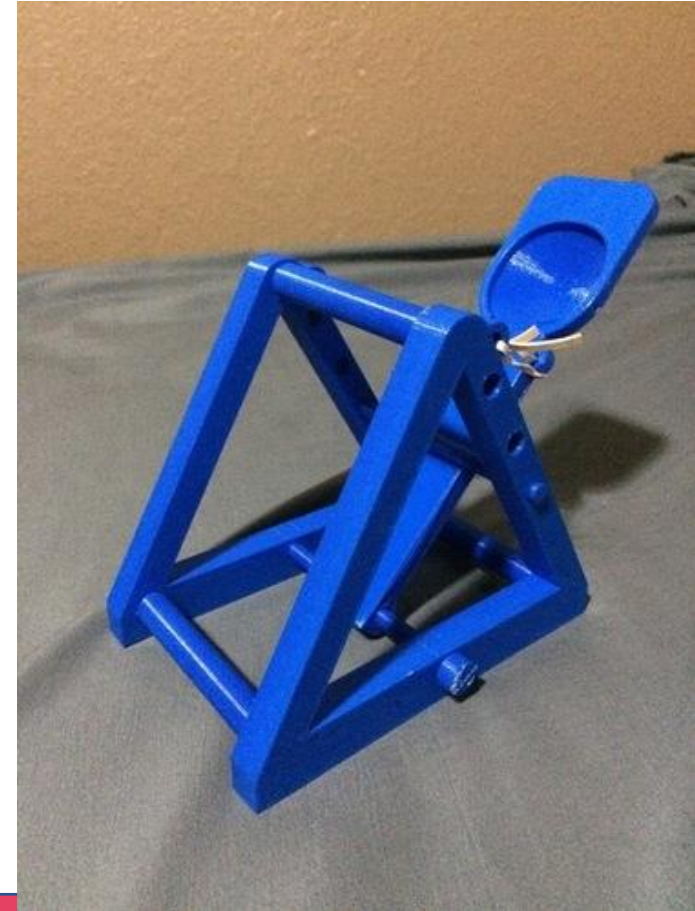
Cosa sta imparando un bambino:



Oresmian Sistema di coordinate


Cosa potrebbe dire un bambino:

- La catapulta lancerà l'oggetto più a lungo, se rilascia il proiettile a 45 gradi
- Più lungo è il braccio, più lungo è il proiettile che spara.



Oresmian Sistema di coordinate: Trottole

Cosa sta imparando un bambino:



Flight Equations with Drag
(no thrust - constant mass)

Glenn
Research
Center

Vertical Ascent

$F_{net} = -W - D$

$a = -g - \frac{Cd A \rho V^2}{2m}$

$V = V_t \frac{V_0 - V_t \tan(t g / V_t)}{V_t + V_0 \tan(t g / V_t)}$

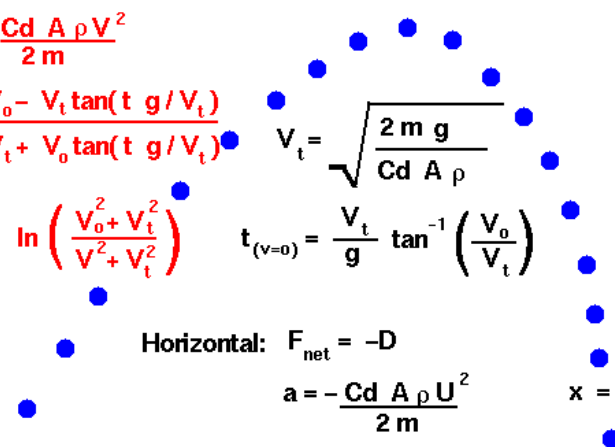
$y = \frac{V_t^2}{2g} \ln \left(\frac{V_0^2 + V_t^2}{V_t^2 + V_t^2} \right)$

Vertical Descent

$F_{net} = -W + D = 0$

$a = 0$

$V = V_t$



Horizontal: $F_{net} = -D$

$a = -\frac{Cd A \rho U^2}{2m}$

Horizontal:

$U = \frac{V_t^2 U_0}{V_t^2 + g U_0 t}$

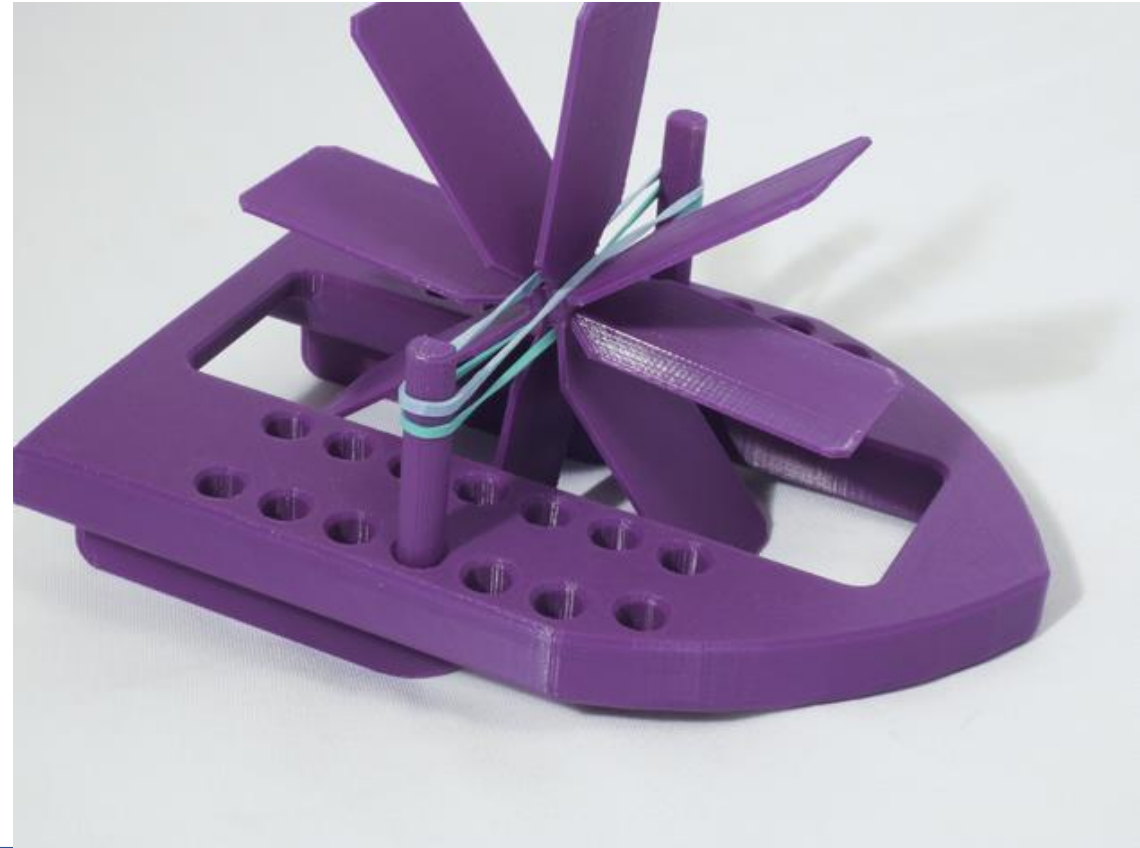
$x = \frac{V_t^2}{g} \ln \left(\frac{V_t^2 + g U_0 t}{V_t^2} \right)$



Oresmian Sistema di coordinate

Cosa potrebbe dire un bambino:

- Più indietro metto la pagaia, più la barca si allontana.
- Tre pagaie fanno andare la barca più lontano.
- Quando il meno possibile dello scafo è in acqua, la barca andrà il più lontano possibile.



Oresmian Sistema di coordinate

Cosa sta imparando un bambino:

