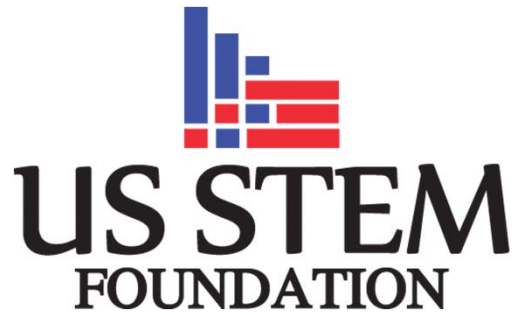


US STEM FOUNDATION





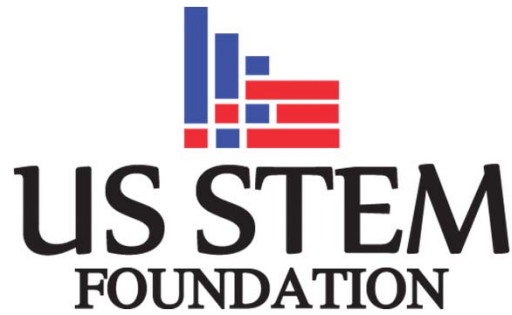
Build Or Buy

Build

- Lower cost
- Hands on experience for students
- Do your own maintenance and upgrades
- Print spare parts
- Bootstrap another printer
- Community support

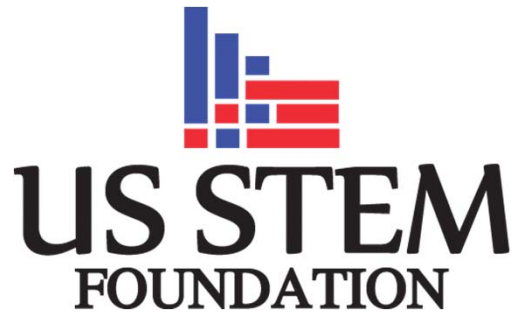
Buy

- Assembled and pre-calibrated
- Warranty and support
- Enclosed build area on some models



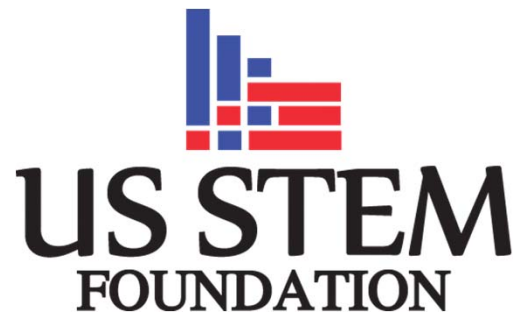
Be a smart shopper

- Lots of online reviews and data
 - <http://3d-printers.toptenreviews.com/index2.html>
 - <http://www.consumerreports.org/cro/2013/08/desktop-3d-printers/index.htm>
 - <http://www.engadget.com/2013/01/29/3d-printer-guide/>
 - <http://www.3ders.org/pricecompare/3dprinters/>
 - <http://www.fastcolabs.com/3016490/9-consumer-3-d-printers-for-every-budget>



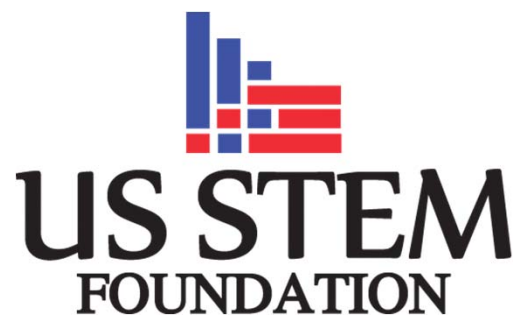
Pay for what you need

- Critical Features
 - Build Area – 200x200x200 is minimal
 - ABS Capable - PLA is generally too brittle
 - Heated Bed – Required for ABS
 - Ridged frame
 - Dual Z motors
 - Speed
- Top usable features
 - SD Card/LCD – Computer less printing
 - All Metal Hot-end – Allows more exotic materials
 - Enclosed build area
 - Light X-axis
 - Autobed leveling
- Cute but maybe not worth it
 - Dual or more extruders



Watch out for

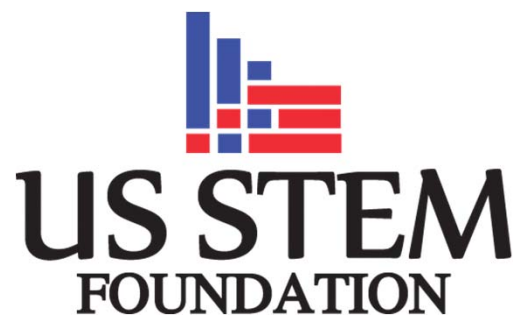
- Proprietary Filament
- Closed software tool sets
- Warranty restrictions
- Cheap imitations from China



FIRST CHOICE OPTIONS

Printer	Cube 2	Replicator 2	MakerGear M2
Volume	5.5x5.5x5.5	11.2x6x6.1	8x10x8
Heated Bed	No	No	Yes
Materials	PLA/ABS	PLA	PLA/ABS
OS	Mac/Win	Mac/Win/Linux	Mac/Win/Linux
Untethered	USB, WiFi	Yes	Yes
Open Source HW/SW	No/No	No/No	No/Yes
Proprietary Filament	Yes	No	No
Price	\$1299	\$2199	\$1775

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Reviewed Printers

Printer	PrintrBot Simple	OpenBeam Mini Kossel	Utilimaker2	Felix 2.0
Volume	3.9x3.9x3.9	7"x5.9"	8.9x8.9x8.1	10x8x9.25
Heated Bed	No	No	Yes	Yes
Materials	PLA	PLA	PLA/ABS	PLA/ABS/Nylon
OS	Mac/Win/Linux	Mac/Win/Linux	Mac/Win/Linux	Mac/Win/Linux
Untethered	No	No	Yes	Yes
Open Source HW/SW	Yes/Yes	Yes/Yes	Yes/Yes	No/Yes
Proprietary Filament	No	No	No	No
Price	\$399	\$899	\$2565	\$1949

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KITS

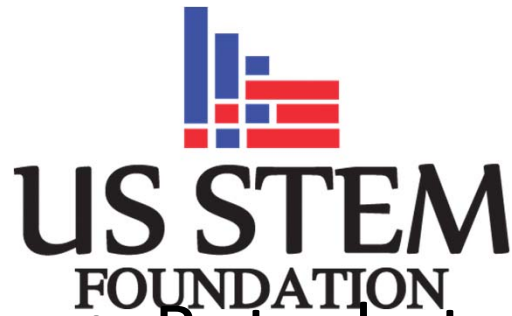
Printer	Prusa I3 (MakerFarm)	MendelMax (Utibots)	Rostock Max (SeeMeCNC)
Volume	8"x8"x7.9	8.3x10.6x6.7	11x14.75
Heated Bed	Yes	Yes	Yes
Materials	ABS/PLA/Nylon*	ABS/PLA	ABS/PLA
OS	Mac/Win/Linux	Mac/Win/Linux	Mac/Win/Linux
Untethered	Yes	Yes	Yes
Open Source HW/SW	Yes/Yes	Yes/Yes	Yes/Yes
Proprietary Filament	No	No	No
Price	\$585	\$1199	\$999

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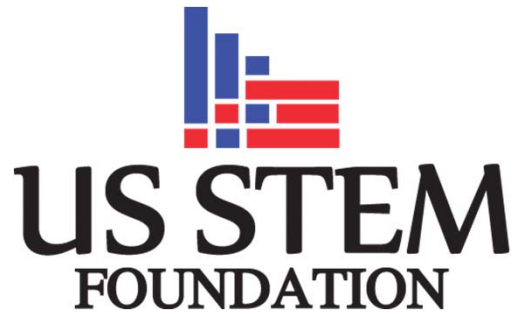
Team Integration

- Consider an off-season project
 - Build a printer
 - Build new parts for last years robot
 - Do some material/strength testing
- Start with CAD
 - Do a design contest
- Design/Print enhancements for your printer
- Print a fundraiser or gift for sponsors



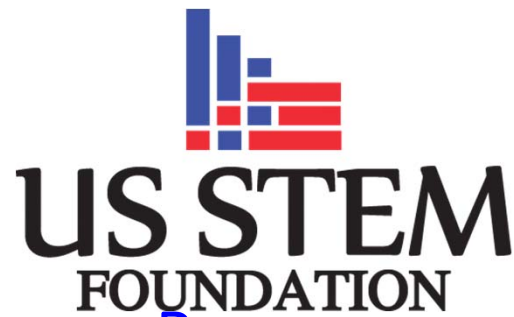
Using the printer

- But what can I print
 - Sprockets, Pulleys, Gears
 - Connectors/Fittings
 - Mounts
 - Wheels/Hubs
- What can I design that is useful?
 - Imagination is the limit



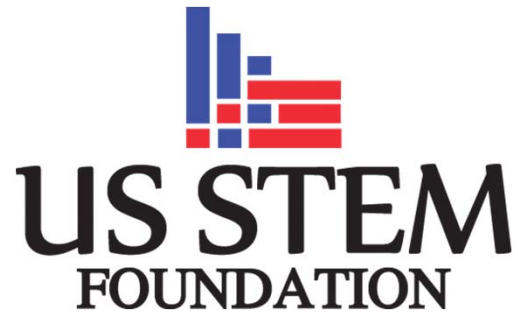
Printer Care

- Keep things clean
 - Dust is an enemy (keep a vacuum handy)
- Keep filament dry
- Calibrate, Calibrate, Calibrate
 - Have a pre-print routine and set of tests
 - Make sure everything stays tight and square



Resources

- Reprap.org – Wiki and Forum
- RepRap Magazine – Articles, reviews, hints
- MakeMagazine – Big Printer Issue
- [Designs and Objects](#)
 - Thingiverse.com
 - <http://www.3dcontentcentral.com/default.aspx>
 - <https://grabcad.com/>
- Good Calculators
 - [Tantillus](#)
 - [Joseph Prusa](#) (old)
 - [Joseph Prusa](#) (new)



Questions?

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