K’Nex Guns: How 13-year-olds and rubberbands power an open-source hardware community

Eric J. Wilhelm
Instructables.com Founder
Storyline

The Story of Instructables and Big Ideas about Open-Source Hardware

What Actually Happened

K’Nex Guns as a Model Open-Source Hardware Community
Autodesk

Instructables was acquired by Autodesk in August 2011

“K’Nex Gun Site Acquired by Billion-Dollar CAD Maker – What Gives?”

Sunday 2011-09-18 2 PM on the Main Stage at Maker Faire
The Story of Instructables

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Traditional Polynesia Ice Canoe (Ice Proa)

To fret, you need a good imagination and a bit of junk.

"Thomas Uden

Once the ice is clear and the water is frozen, it's time to find a

Ice canoes, or ice sleds, are cool and fun to ride on. The first step is

Initially, I cut some ice shapes out of the ice, sharpened them

Ice canoes are like sleds, but they are made out of ice. The

As I sail, the kite generates force within some quarters square

Kite

Wind

When the wind blows, the kite lifts the sled up and forward.

Wind

Kite

To get going on the ice buggy, you edge against the pull of

ice buggy

Pull

To edge correctly, you need to be aware of the wind and

Wind

Ice buggy

To edge correctly, you need to be aware of the wind and

Ice buggy

After a full day of ice kiting left me with a sore back and

Sore back

Ice buggy


Instructables is a website where you can find tutorials on

Instructables

More pictures

More tutorials

More ice kiting pictures:
The Story of Instructables

Unsatisfied with commercial kitesurfing boards, I decided to make my own.

After drawing the shape and graphic for my board, I cut the rough shape out of half inch plywood. I chose an all-loss because I found that the corners on some of the more rectangular boards caught the waves when I rode in surf and tended to trip me. With my aqua colored wet suit and full surfing helmet, people on the beach always ask me where I left my space ship, so I figured I'd put a picture of Mars on my board so they'd know what kind of creature was asking to be taken to their leader.

I sanded the board, applied a coat of stain, and drilled holes for the foot straps and leash. I then printed out the graphic on non-glossy paper with a plotter, gave the board a coat of epoxy, applied the graphic and gave it another coat of epoxy.
The Story of Instructables

Zeroprestige.org – Open-source approach to kite and kite-powered vehicle design; more than 400 kites built from plans.
Big Ideas about Open-Source Hardware

Movement of Money

Consumers → $ Place an Order → PFab
PFab:
- CAD Package
- Parts Database
- Project Organizer
- Vendor Interface
- User Reviews
- Community Web Portals

$ PFab Revenue → Consumers

$ Place an Order → Product and Parts Vendors

Designers
Engineers
Innovators
Etc. → $ For Design → PFab

$ For Ordered Parts → Manufacturing and Assembly Services

$ For Ordered Services → PFab
Big Ideas about Open-Source Hardware

Movement of Physical Goods

Consumers

Ordered Parts

PFab
- CAD Package
- Parts Database
- Project Organizer
- Vendor Interface
- User Reviews
- Community Web Portals

Optional Direct Delivery to Consumer

Stock Parts

Manufactured Parts

Manufacturing and Assembly Services

Consumers

Product and Parts Vendors

Designers
Engineers
Innovators
Etc.

Stock Parts

Optional Direct Delivery to Consumer
Big Ideas about Open-Source Hardware

Make your own kiteboard

Cut and sand

Operations:
- Table saw
- Belt sander
- Edge rounding

Description:
After marking the shape I wanted, I cut it out on a table saw and cleaned up the edges with a belt sander. Next, I rounded the edges with a belt sander using Tim's method. I sanded the whole surface smooth: 100 grit with a belt followed by 220 on an orbital belt sander.

Related to this how to

Operations:
- Bandsaw
- Router
- Edge rounding
- Belt sanding

Tools:
- Bandsaw
- Router

Comments:
- Showing our friends and experts [phone]
- Some board for 3 years [Soul]
- Love the commercial board [Dan]
- Make sure to leave some pitch [Tim]
Open-Source Hardware Documentation

Traditional Polynesian Ice Canoe (Ice Proa)

Once it's too cold to kayak in the water, it's time to find a frozen lake and ride on top of the water. Build a "traditional" Polynesian ice canoe using aluminum extrusion or whatever material you have on hand. If the water ever froze in Polynesia, I'm sure this is what their ice kayak craft would look like.

ice_proa.zip 14 KB
Open-Source Hardware Documentation

Plywood kiteboard

Step 2 Cut board
Open-Source Hardware Documentation

Trailing 36-Months Number of Instructables and Uniques

- Number of Instructables (x)
- Millions of Monthly Uniques (o)
Bring on the K’Nex
Bring on the K’Nex

Metropolis - a K'nex Ball Machine
Bring on the K’Nex Guns
Why Guns?

The motivation of an air rifle
Changing the RSS feed

http://www.instructables.com/id/K-NEX-GUN/
Bring on the K’Nex Guns

http://www.instructables.com/id/Knex-Machine-Gun_1/
Bring on the K’Nex Guns – K’Nex Heavy Cannon

It shoots large missiles, and shoots them hard. It is powered by 48 rubber bands, tied together into 8 strings of 6. It is 2 feet wide (on the bow) and 5 feet long. A true monster.
X985 Vivisector

http://www.instructables.com/id/X985-VIVISECTOR/
Making 3d knex models using mlcad

by toulvus on Jan 30, 2007

Intro Making 3d knex models using mlcad
Here I will teach you how to make 3d knex models using mlcad.
K’Nex CAD

step 1 construction
make 24 of these!!!! wow!!!
K’Nex CAD

step 2 construction
the 24 barrels go like this

comments (0)
K’Nex CAD

step 3 construction
construct the legs

comments (0)
K’Nex CAD

step 4 construction
add the legs

comments (0)
step 5 firing pins
make 6 of these
K’Nex CAD

step 6 construction
add the firing pins

comments (0)
K’Nex CAD

step 7 rubber bands and extras
the final step, enjoy!!

comments (0)
intro knex tripwire (cannon?)

I seriously don't know what to call this, maybe a tripwire claymore? Anyway, I don't have any kind of string attached now, but you all are really creative, I'm sure you'll think of something!
Community-Sponsored Challenges

The Jamalam, DJ Radio and Lowney Present

The K’Nex Innovations Competition
Round 1: Weapons

Hosted at www.instructables.com

First round begins THURSDAY, SEPT. 1st
AND WILL CLOSE ON SEPTEMBER 30TH

Terms and conditions: entries can either be a slideshow, instructable or a video. Entries must be published between Midnight September 1st and Midnight September 30th. Entries cannot have been published prior to the competition dates, and re-publications are unacceptable. Judges will not take star ratings into account when deciding on winners. No foreign pieces are allowed, apart from rubber bands (or anything similar such as surgical tubing), tape and cut pieces (but try to keep cut pieces to a minimum). Judges will adopt a fair and unbiased approach when judging.
Real Innovation in K’Nex Weaponry

- Block trigger
- Sear trigger
- True trigger with magazine
This is Open Hardware!

Movement of Physical Goods

- Consumers
- Ordered Parts
- Optional Direct Delivery to Consumer
- Stock Parts
- Manufactured Parts
- Product and Parts Vendors
- Designers
- Engineers
- Innovators
- Etc.
- Optional Direct Delivery to Consumer
- Manufacturing and Assembly Services

PFab
- • CAD Package
- • Parts Database
- • Project Organizer
- • Vendor Interface
- • User Reviews
- • Community Web Portals
Self-Sustaining Open Hardware Community

Suitable tools

Motivation

Recognition
This is Open Hardware!

http://www.instructables.com/id/Knex-Heavy-Cannon/
X985 Vivisector
The Story of Instructables

Boston Globe appearance in the same week as dissertation