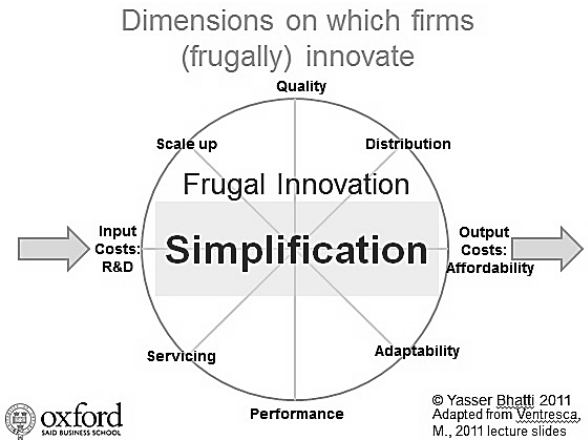
FRUGAL INNOVATION

"That world has multiple challenges that affect people in every country in some way or another. I am talking about water, about health, about climate, about agriculture and food, about living a life that is safe and secure."
http://www.chiefscientist.gov.au/2013/05/australia-india-task-force-report-launch/

"Frugal innovation or **frugal engineering** is the process of reducing the complexity and cost of a good and its production. Usually this refers to removing nonessential features from a durable good (or service)… in order to sell it in developing countries."
https://en.wikipedia.org/wiki/Frugal_innovation



"DO BETTER WITH LESS"

Frugal innovation challenges current technology and manufacturing principles. The aim is **to do better with less.** It does not mean low-tech. It requires re-design, not just deleting features or simplifying design. The innovation needs to be available on a large scale.

The four key needs of innovation are:

- Affordability
- Quality
- Simplicity
- Sustainability

A POSITIVE ALTERNATIVE

Frugal innovation needs to take into consideration limitations in resources (materials, financial, & tools). These constraints form a catalyst for new ideas.

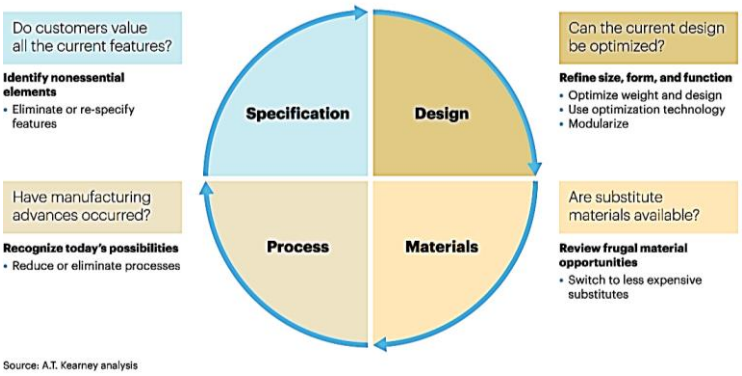
Thinking in a frugal way has positive outcomes.

- Reduces environmental impact - cuts waste, uses less energy & resources. Encourages reuse & repurposing of local materials.
- Strips goods of non-essential features e.g. Lower weight may decrease running costs
- Manufacture using less costly materials
- Aims to improve people's lives by providing affordable medical, transport, lighting, cooking and other essentials
- Assists in the growth of all types of economies
- Provides an opportunity to rethink products / services.

FRUGAL BUSINESS

Businesses working on frugal innovations need to work with the same Design Process and constraints as traditional innovations.

Asking the right questions at each stage of the frugal re-engineering process can uncover unique cost-cutting opportunities. These savings are then forwarded on to the consumer. Ref: https://www.atkearney.com



FRUGAL INNOVATION AT SCHOOL

Students from Secondary schools and Universities have used frugal innovation to help others. The HUT project is a great example.

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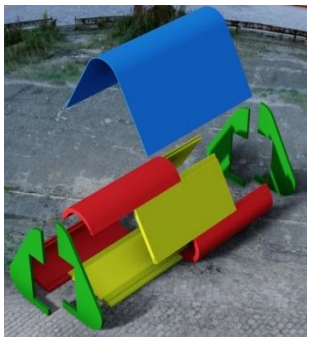
FRUGAL INNOVATION

HUT (HABITABLE URBAN TENT)
Students Norris Palmer and Austin Ortega at Lincoln High in California designed a low-cost, snap-together - shelter designed for the homeless.

Their prototype model was an equilateral triangle box made up of a wooden frame, aluminium sheeting and an insulation layer in between. The HUT includes a bed, carpet and a small window.



The triangular shape was chosen to cut back on the surface area of the structure, which subsequently lowers the amount of material used.

The students hope to market the HUT. The next version will be made out of Polyethylene plastic modules with a unique joining system. An LED light and a compact heating and ventilation system will be added to the original shelter design.

The HUT could be used as a shelter for developing countries or disaster relief.

SINGLE LED TORCH
Scorpio Technology's Single LED torch is a Frugal Innovation.

The torch has been designed to use only a few components. It's simple design also provides the opportunity to reuse (repurpose) a metal mint tin.

The torch required a significant amount of development due to the fact that it uses a 1.5 volts single battery and a single bright LED which requires 3.2 volts to operate.

Level:	Introductory kit
Type:	Electrical
Construction time:	2-4 hours approx.
Scorpio Code:	**LEDTORSING**
Cost: (NB: Check online catalogue for current price)	1+ kits $5.05 ea

Scorpio sent photos of the Single LED torch to Wrigley Australia Pty Ltd (the manufacturers of Eclipse Mints). We received the following response:

This looks great! How innovative.
We do have lots of people that share with us the different ways they use their ECLIPSE tins but this is by far the most impressive!
We have shared this with our Marketing team as well.
Wrigley Australia Pty Ltd

FURTHER INVESTIGATION:

a) Investigate frugal innovations. Do they have any limitations? How do they help the consumer?
b) Try to design in a frugal way reusing found objects. What challenges did you face?
c) Make a Foldscope (template available on the web). Was it hard to make?

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Inspirational projects for teaching Design, Creativity & Technology

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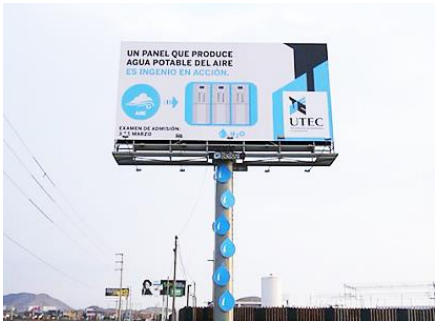
FRUGAL INNOVATION

There are many examples of frugal innovation. The following examples have improved the lives of countless people.

ChotuKool fridge
This portable refrigerator is used by rural Indian families who otherwise could not afford a refrigerator due to cost. The fridge uses a system similar to a computer cooling system. The fridge is able to cool 5 to 6 bottles and 3 to 4kg of vegetables.

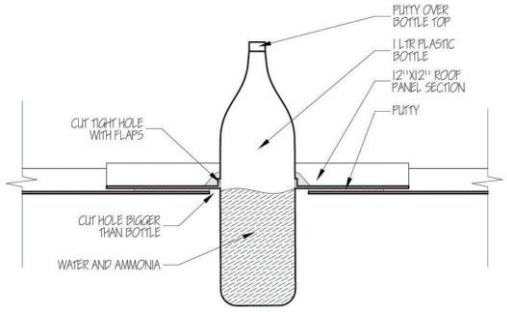
The Swach water purifier
Clean water is a problem in many communities. The Swach –uses natural materials, such as rice husks, to filter water and remove harmful bacterial and viruses. This purifier does not require electricity, running water and doesn't need to boil water. No chemicals like Chlorine, Bromine and Iodine are used.

Advertising billboard
The University of Engineering & Technology of Peru and their ad agency Mayo DraftFCB have developed an advertising billboard that gives access to drinking water.



Lima, Peru is located on the edge of a desert. It is one of the driest places on earth but it has high humidity (approx. 98%). Most people draw water from polluted wells that require high maintenance. The billboard converts the humidity into clean drinking water. The billboard generates around 100 litres of water a day.

The billboard works through a reverse osmosis system, capturing the air humidity, condensing and purifying the water. After purification, the water flows down into a 20-litre storage tank at the base of the billboard. Water is dispensed by tap. The billboard only costs about $1200 to install.



Solar light bulb – "Litre of light Movement"
A simple Solar Bottle Bulb designed by MIT (USA) students from plastic drink bottles, clean water and bleach (chlorine) is lighting thousands of homes in Philippines. The light produced is equivalent to that produced by a 55 watt bulb. The light is environmentally friendly, safe, inexpensive and easy to make.

d.light Kiran S 10 solar light
This portable solar light is a low cost alternative to electricity. It includes a high-efficiency integrated solar panel that provides up to 8 hours of light on a full battery. The efficient LEDs produce light that is 4 times brighter than a kerosene lantern (without its dangers). The lamp provides 360 degree illumination. There are no ongoing running costs and pays for itself within 3-4 months. (Kiran means "ray of light" in Hindi).

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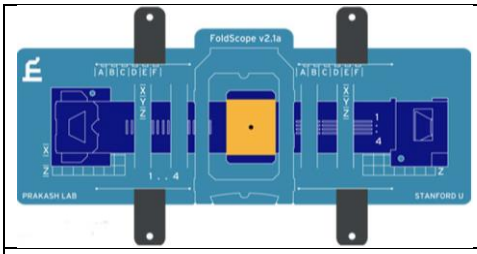
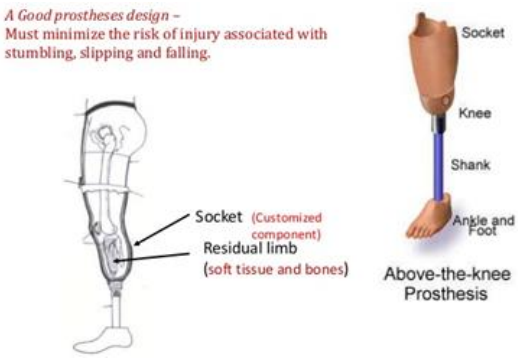


Foldscope
The Foldscope is a tough origami microscope made by folding cardstock and attaching a spherical lens housed in a plastic tray. It can provide more than 2,000X magnification. Costs about $1.00.

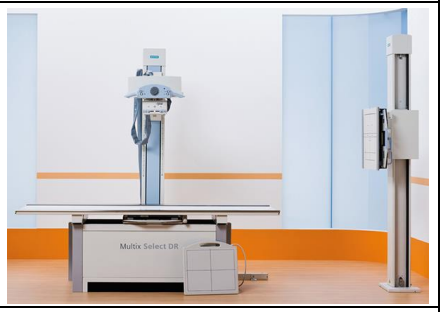


Jaipur leg
Prosthetic legs (artificial) are very expensive. In India the Jaipur Company produces a leg that costs about $150 to develop. Due to its low cost it has improved the lives of thousands of amputees.

The Jaipur foot is made of vulcanized rubber. It is made to resemble a real foot. It was invented by Orthopaedic surgeon Dr P K Sethi and Ram C Sharma in 1969. It costs less than $30 to manufacture.

NeoNurture Car Parts Infant Incubator
This life-saving device uses locally available replacement car parts. This is not only great for the environment but makes an infant incubator for 5% of the cost of conventional devices. It might save as many as 2.4 million infants per year in the developing world.

Multix Select DR Digital X-ray - CT scanner
In China, the Siemens R&D team has designed a high-end computed tomography (CT scanning) device that's simple enough for health professionals who are not doctors to use. It consumes less energy but processes images faster than a conventional scanner. It cuts the cost of treatment by 30% and reduces radiation by as much as 60%.



GE ECG Machine
GE's engineers were given the task of developing a handheld portable ECG machine at minimum cost. The engineers used off the shelf parts. The machine's printer is an adaptation of one used in bus terminal kiosks across India. ECG scans made on this machine only cost of $1.00 making it very affordable.

Square
A small card reader was launched in 2010. It can be attached to a smartphone or tablet into the audio jack. It enables someone to make credit card payments. It has been useful where banks are not available. Suitable for developed & developing markets.

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