THE NEW WANDERERINGS ARCHIVE

No 1 to No 9

April to December 2011

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THE NEW WANDERERINGS

No. 1

01 April 2011

Feature:

In light of the recent, **22 February 2011, earthquake in Christchurch New Zealand**, and the **12 March 2011 Japanese earthquake** I thought that it would be fitting to open the New Wanderer with a feature on seismographs and earth quakes.

Earthquake Learning Resources from GNS New Zealand

What are earthquakes, where and why do they happen?

IRIS --- Incorporated Research Institutions for Seismology

IRIS is a consortium of National Science Foundation sponsored universities that is dedicated to the distribution of seismic data.

John C. Lahr: A Tribute to the "Gentleman" Scientist

On 17 March 2009, the world lost a skilled educator and supporter of amateur science.

John Lahr's AS1 Seismograph

This is the start of a series of YouTube presentations about Lahr's AS1 DIY Seismograph.

The Fun with Science

This page, located on **John C. Lahr's** site, contains several unique **Seismometer Designs.** See the student competition … **Design & Build a Seismometer**.

Seismic Sensor based on Diamagnetic Levitation

This is a collection of notes regarding a unique seismic sensor that utilizes the **diamagnetic** properties of graphite.

Useful Links

The Lahr Web Site has a collection of useful seismic links.

DIY Seismograph Construction

Dale H.'s Welcome to my Earth and Space Web site contains a section on building your own instrument...

An Inexpensive Vertical Seismometer

This inexpensive seismometer was developed, in 1998, for Georgia Tech's Mid America Earthquake Center Teachers' Workshop

How to Build an Inexpensive Seismometer.

David Saum's site presents detailed information on how to build a microprocessor based seismometer that can detect earthquakes worldwide. David also provides us with many useful links.

Linear Magnetic Sensors for Seismometers

Chris Chapman reports that he has been experimenting with Neodymium magnets and Hall Effect linear sensors to make a simple linear position sensor, suitable for use with pendulum / feedback type seismometers.

Central Nexus Seismograph Project

George Rhoten shows us his seismometer project that he based on an ADXL345 accelerometer and an Arduino Duemilanove microcontroller.

Seismometer Pivot Studies

Charles R. Patton, Chris Chapman, and Brett Nordgren have conducted studies on various types of seismometer suspensions.

The Redwood City Public Seismic Network

The PSN site is a good place to start if you are looking for information on amateur seismic research.

Welcome to the Quake-Catcher Network

This is a collaborative initiative for developing the world's largest, low-cost strong-motion seismic network by utilizing sensors in and attached to internet-connected computers. **See Dr. Elizabeth Cochran explain the project**.

The Earth Forces Webring

This Webring is a collection of websites presenting information on volcanoes, earthquakes and tsunamis.

Latest Earthquakes in the World - Past 7 days

The USGS provides a display of the World's latest earthquakes.

Really Good Seismometers

Follow the discussion, on the **SAS *Facebook* Page**, between Brett and Jim about the design and construction of a seismometer.

Heat Treating a Seismometer Spring

This item, from **Jim Hannon's Blog,** is a summary of his plans for building an oven that he will use to heat treat springs and bake pizza.

Dave's Landslide Blog

Dave Petley's blog provides a commentary on landslide events occurring worldwide, including the landslides themselves, latest research and conferences and meetings.

An Amazing Seismograph

Here is a look at a seismograph from a different angle.

Earthquakes and Tsunamis

The 28 January 2005 *Wanderings Column* ran a feature on earthquakes and tsunamis.

Wanderings No. 97 --- 03 June 2005

And, lastly, *Wanderings No. 97* contains several other seismic links.

Wanderings:

The Grameen Foundation

The goal of the Foundation is to see poor people, especially the poorest and those living in harder to reach areas, have access to microfinance and technology and as a result of access to these services, move themselves out of poverty.

Newly Discovered Fascinating Marine Specimens

The Canadian Department of Fisheries and Oceans compiled a YouTube presentation showing some of their recent discoveries.

Guerrilla Scholarship

This is a collection, which was compiled by Sheldon Greaves, of tools, ideas, and resources for the amateur scientist, the independent scholar and people, who like to think, learn and create.

Thermoelectric Solar Power

A **Peltier cell** and a **Fresnel lens** are used to produce non-photovoltaic power.

Yahoo Groups

Yahoo Groups enables you to connect with people who share your interests and passions. There are thousands of existing groups so it should be easy to find one that suited to you. No? Then start your own! The following is a brief example of what they have to offer:

The Home for Amateur Scientists @ Yahoo Groups

This forum, while NOT sponsored by or for *The Society for Amateur Scientists,* was created for amateur scientists to discover-design-create-invent-innovate and share science fun, toys & games!

The Mad Scientist @ Yahoo Groups

The Mad Scientist is very similar to the *Amateur Scientist Group*.

Robotics and ROV's @ Yahoo Groups

Here is a fairly active forum that is devoted to DIY Remotely Operated Vehicles (ROV). Here, builders can exchange their ideas and plans.

Arizona Near Space Research @ Yahoo Groups

This is a scientific-educational amateur radio and balloon group that launches high altitude balloons.

Amateur Telescope Making @ Yahoo Groups

Amateur Telescope Makers can use this Group to exchange their ideas, problems and projects.

Amateur Astronomy @ Yahoo Groups

Amateur Astronomy fans can gather here to discuss all aspects of their interests.

Piezoelectric Sensors

A piezoelectric sensor is a device that uses the **piezoelectric effect** to measure **pressure**, **acceleration** or **strain** by converting the forces to an electrical signal.

Piezo Film Sensors Technical Manual

Piezo film is a flexible, lightweight, tough engineering plastic available in a wide variety of sizes.

Piezo Film Pulse Sensor

The Piezo Film Pulse Sensor is a sub-project of the **Phoenix Project Ambulatory Blood Pressure Monitor Project.**

Volunteers Are Needed

If interested, you can take part in the **Phoenix Project Ambulatory Blood Pressure Monitor Project.**

Images Scientific Instruments, Inc

Images SI, Inc is **a source of inexpensive piezo film** for the experimenter.

Piezoelectricity and Rochelle Salt

Wanderings No. 100 15 July 2005 has a few links to piezoelectricity and how to cook up some Rochelle Salt.

World's Simplest CD Player Motor

No, it does not play CD's. This is a simple homopolar motor that is made from a CD, an AA battery, a coat hanger, a bit of copper wire, a quarter and a couple of rare earth magnets..

Spectrum Analyzer with Waterfall Display and Real-Time Audio Processing

SpecLab is a free audio processing program that can use a PC sound card or an ADC as its input.

NurdRage --- Real Experiments Real Science

This site demonstrates chemistry experiments for all levels from simple kitchen chemistry all the way up to advanced organometallic synthesis. **CAUTION!** Do a Web search for the **MSDS Sheets**, and READ them, for the various chemicals that you will be using.

The Golden Book of Chemistry Experiments

It is reported, on the Web, that the US government had this book banned and removed from libraries because they thought that the projects were too dangerous for its intended audience. Is this true? I don't know, but **I downloaded a pdf copy** and didn't find anything that I considered THAT dangerous. You decide.

Producing X-rays from a Cheap Light Bulb

This YouTube clip shows how you can produce X-rays with a small incandescent light bulb. **Caution!** I would not experiment with X-rays without using a personal **dosimeter.**

DIY Cotton Candy Machine

This is sweet! Now you don't have to wait for the circus or county fair to get your fix of cotton candy or candy floss, as it's called "across the pond".

Tree Power

First there was Flower Power and now there's Tree Power? Researchers at the University of Washington found that there is a small but measurable voltage produced by trees. In fact, there's enough power in trees for to run a small electronic circuit.

Make a Joule Thief

The Joule Thief is a tiny, easily built, switching power supply that enables nearly all of a battery's energy to be used even from a so called dead battery. Perhaps it could be used with Tree Power.

Colors of Noise

You heard of White and Pink Noise but what about the other colours?

When Is 24 Not 24?

24 is not 24 when we are talking about bicycle speeds. I have a so called 24 speed bike, but if I calculate the actual gear ratios, using for instance, Sheldon Brown's Gear Ratio Calculator, I can see that some of the ratios are so close that there is not any mechanical advantage from one to the other. The major portion of Sheldon's site is dedicated to bicycles and how they work and how they should be maintained. This link points to a utility that will calculate your **Gear Raito / Gain Ratio**.

The Stirling Engine

Koichi Hirata gives a very good treatment of the Stirling Engine covering what they are, how they work and how to build many types of these engines.

Build a DIY Stirling Engine

Stirlingbuilder.com provides plans and guidance for those who want to build their own Stirling engines.

The Germplasm Resources Information Network

The U.S. Department of Agriculture's *Germplasm Resources Information Network* (**GRIN**) web server provides germplasm information about plants, animals, microbes and invertebrates.

Dr. Duke's Phytochemical and Ethnobotanical Databases

These **phytochemical** and **ethnobotanical** databases show the chemical compounds that are found in various plants and how they are used by civilization.

Flint and Steel: What Causes the Sparks?

I have been making sparks for years both with grinders and with my several flint lock rifles. But I never gave much thought about the science behind these sparks. That is, until I stumbled across this article about **pyrophorics** and starting fires with fire steel.

An Elementary Knowledge of Metalworking

Many projects involve the building of an apparatus using metal or plastic. Koichi Hirata has written an elementary guide to useful shop practises.

Drill Bit Sizes

Drill bits come in many different "flavours" ---- fraction, number, letter and metric.

Drill and Tap Size Chart

The correct drill size that you should use depends upon the material that is being drilled and will you want a clearance hole or will you be tapping threads?

AWG Wire Size Converter

Here is a calculator that will convert between AWG, inches and mm diameter, and square mm area measures of wire size.

Jack Horkheimer: Star Gazer

I remember Jack Horkheimer from the "old days" when he was the Star Hustler on PBS. Even though I wasn't into astronomy, I always liked his presentation and I could never forget his theme song ---- **Isao Tomita's Arabesque No1.**

Climate Change

Here are the views on Climate Change from the Met Office, the UK's National Weather Service.

Climate Truth

Climate Truth is one person's attempt to understand what is happening to the Earth and why.

Climate Truth Initiative

Ian L. McQueen's group, *The Climate Truth Initiative,* does not appear to have a Web site. They should NOT be confused with

Climate Truth as they each take a different view of the climate change / global warming debate.

Climate Debate Daily

"Let the best argument win." --- A look at both sides of the argument.

YouTube Account of Stolen E-mails

Climate deniers have been making a lot of noise about the set of stolen e-mails from the Universtiy of East Anglia.

The Argo Float Network

Much has been written about **the scarcity of proper land temperature monitoring stations** are giving false indications for Global Warming. On the other hand, we have the Argo Float network which **is a collection of over 3200 ocean based** sea temperature and salinity monitoring stations that is spread around the globe. The Argo network, coupled with **Satellite Altimetry** data, may give us a better insite to the whole question. You can access the **Argo Data** @ **Argo.net**.

The Kids Room:

Imhotep's Legacy Academy (ILA)

Imhotep's Legacy is a university outreach program that mobilizes the community to help improve student success and bridge the achievement gap for Grades 7-12 students of African heritage in Nova Scotia.

High School Experiments

Here is a collection of fairly simple classroom physics experiments.

Welcome to the Astronomy & Physics Demonstration Website!

The Departments of Astronomy & Physics at Saint Mary's University, Halifax, NS has a nice selection of online demonstrations.

Bigshot: A Camera for Education

What an excellent concept! The Bigshot Camera Project is still in the prototype stage and the units are not currently available for purchase. When released, the cameras will be able to give the child hands-on experiences in both technology and art.

Oh, Go Fly a Kite!

Anthony's Kite Workshop shows us how to make many different types of kites, including Alexander Graham Bell's **The Tetrahedral Kite**.

The Scott Sled

This has to be my all time favourite kite. It's easy and very quick to build and it's an excellent flyer. One addition --- I always use two tails, attached to the bottom of each outer spar, made out of 3 or 4 metre lengths of **flagging tape**.

Arvind Gupta's Toys from Trash

What an educator! Arvind Gupta brings science to the people and shows them how to build science and fun toys from common junk.

Arvind Gupta's YouTube Videos

Arvind Gupta has a number of clips on YouTube

Drawing Slate for the Blind

Arvind Gupta demonstrates his DIY aid for the blind. Yes, this video is in Hindi, but you can still get an idea of what it's all about.

The Science Toy Maker

This is a teacher-created site for people who like to roll up their sleeves and make fun, mysterious science toys and projects that entice scientific investigation.

Science Toys You Can Make With Your Kids

Simon Quellen Field shows us how to make Science Toys with common household materials, often in only a few minutes that demonstrate fascinating scientific principles.

Stuff from Junk!

David Williamson shows us how a variety of toys and scientific demonstrations can be made with stuff that can be found around the house.

How to Make a DIY Force Meter

This DIY Force Meter (a.k.a. **Spring Balance**) can be built from PVC plumbing scraps and will let you measure pushes and pulls around you. The meter can be calibrated in Newtons or what ever units you wish.

Compressed Air Rocket

Rick Schertle demonstrates how to make a reasonably safe rocket system. Compressed air, not pyrotechnics, is the only fuel.

The Bio-Battery

Can a lemon battery light a LED?

How Many Cosmic Rays Go Through Our Bodies Every Minute?

Cosmic Chris, created by Tara Newman, shows that the number is around 500.

Build a Toy

The V&A Museum of Childhood, London, offers many online and at home activities, on **Their Kids' Pages,** to keep the little ones busy.

Women in Science:

Teen Scientist Fights Lentil Fungus

Rui Song, 14, recently took a $5,000 prize at the **Sanofi-Aventis BioTalent Challenge** in Ottawa, for her research on a fungus that attacks lentils, a major agricultural export.

Frances Oldham Kelsey Ph.D, M.D.

Dr. Kelsey is a pharmacologist, who, while working for the U.S. Food and Drug Administration, blocked the approval to market **thalidomide** in the US because she had concerns about the drug's safety.

Celebrating mathematical women

Coinciding with the 100th International Women's Day two new competitions to find the best young female mathematical minds in the UK and Europe have been launched.

Random Samples:

The Uncultured Project

The Uncultured Project is Shawn Ahmed's one man journey to try and make the world a better place by connecting online communities to communities on-the-ground in a way that creates meaningful & tangible differences.

Re-Surface Your Scratched CD / DVD's

If you have any children in your house, you are bound to end up with a bunch of scratched CD/DVD's that will no longer play. My local DVD rental store charges $2.50/CD to remove the scratches which can get a bit expensive. Therefore, I thought that there had to be a better way so I did an Internet search and found dozens of remedies. I read a few and come up with the following procedure that gave me excellent results:

- First, wash the CD/DVD with warm water and dish washing liquid.
- Dry by patting with tissues.

- See if the CD/DVD plays
- If it won't, wet the CD with water
- Place the CD, track side up, on several layers of news paper
- Put a glob of tooth paste, cream not gel, on your finger
- Using a fairly firm pressure, rub the paste across the CD, from the centre to the outer edge of the CD
- Continue all around the CD for about 5 or 10 minutes.
- Wash the CD as above.
- Try to play the CD/DVD. You might have to repeat the process to get all the scratches out.

Note: I found that I did not have to remove the actual scratch in order to fix the CD/DVD. Perhaps just rounding off the sharp edges of the scratch will fix the problem. Anyway, why not try to repair some non-important disks to see if it works for you. Good Luck!

Suppliers and Stuff:

Being listed here does not constitute an endorsement of any information, product or service.

Dr. Who's Sonic Screwdriver

This collector's item is an exact replica of the **Gallifreyan** multipurpose tool used by **The Doctor** himself.

Metallium --- Pure Element Samples

Metallium specializes in supplying high-purity metal and non-metal Element Samples to individuals and organizations around the world.

Gyroscopic Bicycle Training Wheel

Also available from **Think Geek** is this high tech training wheel. I think that we may buy one as soon as the 16 inch version is released.

Interesting Science Toys

Bill Beaty has compiled this list of science toys.

The EZ-Expander

This **Arduino** shield is an inexpensive way to add 16 new digital output pins to your Arduino.

The UV Monkey

This small key ring gadget quickly indicates UV intensity.

Liquidware --- Open Source Electronics

Liquidware is a supplier of open source **Arduino** compatible modules.

The Amateur Scientist 3.0 CD-ROM

Bright Science is offering the complete collection of *Scientific American's* **"The Amateur Scientist"** column from 1928 to its final cancellation in 2001.

On The Lighter Side:

Rock-Paper-Scissors: You vs. the Computer

Test your strategy, against the NY Times Robot, in this rock-paper-scissors game which illustrates basic artificial intelligence.

A Look at the Elements

Tom Lehrer takes us on a trip through the elements.

Giant Swiss Army Knife

For $1000 you can purchase this **Genuine Swiss Army Knife** and let your **MacGyver** shine forth.

The Buzzword Generator

Are you writing a paper? Well, instead of "using plain text" you can blow your readers away with "de-engineered solution-oriented moderator" and other buzzwords.

What Is A Shig?

How about a Lincolnshire Curly Coat Pig or sheep-pig.

Keep Your Mind On The Job!

These posters, featuring characters from the **Simpsons**, are a great way of using humour to reinforce basic safety practises.

The 2009 Ig Nobel Prize Winners

Improbable Research has awarded the 2009 Ig Nobel Prizes at the **19th First Annual Ig Nobel Prize Ceremony**.

From The Far Side:

Aqua Teen Hunger Force Boston Bomb Scare

31 january 2007 --- The News Media whipped up a state of panic, in the streets of Boston, with their reporting of the Bomb Squad finding electronic cartoon figures attached to the bases of bridges.

Updated: Boston Mooninite Installers Arrested

Turner Broadcasting System had to pay Boston-area authorities $2 million to settle claims as a result of their guerrilla marketing campaign for “Aqua Teen” being mistaken for terrorist bombs.

Star Simpson

The Aqua Teen affair reminded me of Star’s problems in Boston. See **Wanderings No. 155 from 06 February 2009**

Retired Chemist Runs Afoul of State and Federal Authorities

Here is another “one” from Massachusetts!

Teen with Home Chemistry Lab Mistakenly Arrested for Meth Production

A Canadian college student majoring in chemistry built himself a home lab and discovered that trying to do science in your own home quickly leads to accusations of drug-making and terrorism.

Methamphetamine Laboratory Recognition

Watch out! If you happen to purchase the wrong combination of items, you, too, may be turned in by some vigilant Wal-Mart clerk. Also, did you know that, in **Texas**, you are not allowed to purchase an **Erlenmeyer flask** without a permit?

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THE NEW WANDERINGS

No. 2

01 May 2011

Feature:

Sub Atomic Particles

You may have seen a few of the various methods of detecting sub atomic particles, especially those that are extraterrestrial in origin, scattered through some of the past issues of *Wanderings.* This month I'm offering a consolidated list with a few new ones thrown in.

Wanderings No. 126 and **Wanderings No. 170**

These two columns contain links to DIY Charged Particle Detectors, some of which are repeated here.

Cosmicopia

NASA's Cosmicopia contains an collection of information about cosmic rays, the Earth's magnetosphere, the Sun, space weather, and other exciting topics in space science.

Build a DIY Cloud Chamber

A cloud chamber is a simple device that will show the tracks that are produced by cosmic rays as they pace through the chamber.

Amateur Cosmic Ray (Muon) Detection

The aim of this project is to develop a DIY Cosmic Ray Detector which is easy to build, low cost and has some kind of usable output. Robert Hart's **Hardware Hacking** Site shows his work with different types of detectors together with some of his other interests.

Cosmic Ray Detection With Fluorescent Tubes

Here is a link to Robert Hart's fluorescent tube cosmic ray detector that is patterned after **CERN** researcher Sascha Schmeling's design.

An Interesting DIY Cosmic Tube

The **fusor.net** has a discussion thread concerning the use of fluorescent tubes as cosmic ray detectors.

Cosmic Ray Triggered Music

Sebastian Tomczak uses Robert Hart's cosmic ray detector and an **Arduino** to trigger music.

Counting Particles from Space

Check out ***The Amateur Scientist*** for Feb 2001.

Note: The above 2 items use a 0.01 inch or 250 µm bare copper sense wire. This wire is actually AWG 30 and is fairly easy to find but it will probably be enamel covered magnet wire. This covering makes it VERY difficult to solder the sense wires to the frame. But don't panic! Common lamp or zip cord is made up of two conductors of stranded wire --- and guess what? There is a very good chance that the individual strands are bare AWG 30 wire.

The Cosmic Connection

The Berkeley Lab Cosmic Ray Telescope is a simple but pricey, DIY cosmic ray detector.

The Muon Lifetime On-Line Experiment

This project is a real particle physics experiment, prepared for the student and/or general public that can be remotely operated with only a simple web browser.

Techlib Geiger Counter and Ion Chamber Site

Charles Wenzel's Techlib.com has always been an excellent source of information on DIY radiation detectors. Also, have a look at his **Blog**.

Building A DIY Geiger Counter

This is a fairly simple circuit using the SSBM-20 Russian GM tube. The article is continued in **Part 2**.

ATtiny26 Geiger Counter Schematic and Code

An **ATtiny26** microcontroller is used to display the counts from a LND7313 Geiger tube.

Sparkfun's Geiger Counter

Sparkfun has a small USB Geiger Counter for $150.00 US. They also have a tutorial showing how to use a Geiger counter as **a true random number generator.**

GS Tube.com

This Russian vacuum tube distributor is a source of exotic items such as photomultiplier, Geiger and electrometer tubes.

A Do It Yourself Neutron Detector

A Geiger counter, silver paint and paraffin wax are used to make a DIY neutron detector.

A Geiger Tube Mood Lamp

Even though this link is for a novelty mood lamp, Michal Zalewski gives us useful information on GM tubes and high voltage supplies.

The Sudbury Neutrino Observatory

The Sudbury Neutrino Observatory (**SNO**) is situated 6800 feet under ground, in INCO's **Creighton mine** near Sudbury, Ontario, Canada. The detector consists of 1000 tonnes of **heavy water.** The **neutrinos** react with the heavy water to produce flashes of light called **Cherenkov radiation.** This light is then detected by an array of 9600 photomultiplier tubes.

Magnetometers - Measuring the Magnetic Field of Earth

The Earth's magnetic field is another interesting phenomenon to observe.

CARISMA (Canadian Array for Realtime Investigations of Magnetic Activity)

The CARISMA Network is an array of **magnetometers** that are used to measure disturbances in the Earth's magnetic field, caused by activity occurring in a region of space near the Earth, known as the magnetosphere.

Wanderings No. 60

The Feature from the **02 April 2004 Wanderings** contains a number of DIY magnetometer links.

Wanderings:

Potassium Chlorate

Yes --- amateur science endeavours may contain elements of danger but use your head! Recently, I observed a science fair entry that investigated the efficiency of various amateur rocket propellant mixtures. I was very disturbed that one of the propellants was based on a mixture of potassium chlorate and a metal powder. Apparently, this student's mentor had no idea what potassium chlorate is!

Rocket Boys/October Sky

In the book / movie *Rocket Boys / October Sky* Homer Hickam and his buddies also used a potassium chlorate fuel for their rockets. See Section II Question #23.

Potassium Chlorate MSDS

The Material Safety Data Sheet (MSDS) for potassium chlorate states it reacts vigorously, and in some cases **spontaneously ignites or explodes**, when mixed with many combustible materials.

The Dangers of Using Potassium Chlorate

Jimmy Yawn warns about potassium chlorate as a rocket fuel component.

Introduction to Amplitude Modulation (AM)

This explanation of AM, by the *York County Amateur Radio Society,* departs from the simplified classic definition of detection by rectification.

DIY Scanning Electron Microscope

You may have seen Ben Krasnow's piece on his **DIY Scanning Electron Microscope** on the CSL Blog. Check out Ben's personal blog for further details and an insight to some of his other work.

Science Made Alive

Wilco Oelen wants to show, at the level of the amateur, that science can be fun and very rewarding.

Could You Build A Toaster From Scratch?

Thomas Thwaites talks about his **Toaster Project** on the **TED Site**.

A Wood-Gas Stove for Developing Countries

Simple DIY stoves that are based on the gasification of wood or other biomass provides a cleaner, better controlled and more efficient cooking media for developing countries. See, also, the **Biomass Energy Foundation's website.**

Cook Up Some Biodiesel In Your Kitchen

Here is a simple recipe that will allow you to demonstrate the conversion of vegetable oils into biodiesel, using common household chemicals

One Straw

This site contains information on one family's 'journey" towards self sustainability.

A Guide to Placing Wind Turbines

This "How To" guide recommends standards that will help to reduce the possible health risks occurring from the noise produced by wind turbines.

Red Rock Energy

Red Rock links to alternative energy systems for the home or small property owner who is interested in natural energy or solar power.

List Of Distributed Computing Projects

There are many distributed computing projects, on the Internet that could give you a chance to do real science. If interested, check the list and you might find a project that you like.

Have You Ever Seen a 300 mph Sock?

Visit **Joseph A. DiVerdi's High Speed Photography Page** and see how he was able to catch this fleeing sock.

Microscopy UK

"Microscopy & Astronomy are two areas of scientific study where a non-professional can make important discoveries!"

The Tesla Turbine

This group of *Instructables* covers the plans for building several different types of boundary layer effect Tesla Turbines. These devices are high RPM low torque motors that can be run from compressed air or even the water flow from your kitchen sink.

Sugar Donuts + Starbuck's Passion Tea = Solar Power

Yes, it's true. You can make a solar cell from a donut. Actually, it's the powder sugar from the donut that is used. You can't use regular icing sugar as it probably does not contain the required Titanium Dioxide (TiO_2) that commercial icing sugar has. But you may be able to find TiO_2 in the form of icing whitener at the local cake shop or from **Natures Flavors**.
Read the **Comments & Response** on the American Chemical Society's site.

Webcam Based DIY Laser Rangefinder

Todd Danko describes how a mini laser pointer can be configured along with a single webcam to provide mono-machine vision with range information.

Details of the Laser Range Finder

Here are some details of the University of Buffalo's laser range finder.

Möbius Strip

We have, all, heard about the Möbius Strip, a figure with only one side and one edge, but, what about a bottle with only an inside?

The Klein Bottle

Konrad Polthier will show us this amazing bottle that has an inside but no outside. Or you could look at it, the other way, and say that it has an outside but no inside.:-)

Make Your Own Klein Bottle

This Instructable will show you how to make your own simulation of a Klein Bottle.

Make a DIY Manual Vacuum Pump

This Instructable shows you how to convert a manual bicycle pump into a vacuum pump.

Convert A Tire Inflator-Into A Vacuum Pump

Are you a bit lazy and don't want to pump by hand? Then why not let a motor do your pumping and convert a tire inflator-type air compressor into a vacuum pump?

Guerrilla Guide To CNC Machining

Michal Zalewski has compiled his experiences in bench top manufacturing for robot builders, model makers, and other hobbyists

Hobby Servo XY Table at TeleToyland

You can remotely control this XY table at **TeleToyland**.

Low Cost Hobby Servo XY Table

Build your own XY Table

How To Make Springs

Do you need a hard to find special spring? Why not make one?

The Arduino @ Instructables

I found this listing of all of the Arduino Instructables too late to be included the Arduino Feature that was presented in **Wanderings #171**.

TEA Laser --- Only Three Inches Long

This YouTube video shows Nyle Steiner's small TEA Laser (Transverse Electrical Excitation at Atmospheric Pressure).

Simple Homemade T.E.A. Laser

If you liked Nyle's laser why not try building your own? This site is an excellent step by step hand holding guide through the construction and firing of a T.E.A. laser. In case you missed it, this laser operates at atmospheric pressure so no vacuum pump is required and the only exotic component is a simple high voltage power supply.

Cool Homemade Stuff

Take a look at Nyle's Web site to see what else he's been working on.

The TEA Nitrogen Gas Laser

More information on T.E.A. lasers can be found on Mark Csele's Homebuilt Lasers Page.

The Canadian Association of Rocketry

The Canadian Association of Rocketry (CARWeb) is the online voice and information repository for rocketry in Canada.

How to Design, Build and Test Small Liquid-Fuel Rocket Engines

This e-book provides the serious amateur builder with design information, fabrication procedures, test equipment requirements, and safe operating procedures for small liquid-fuel rocket engines.

A Beginner's Guide to Accelerometers

"An accelerometer is an electromechanical device that will measure acceleration forces. These forces may be static, like the constant force of gravity pulling at your feet, or they could be dynamic - caused by moving or vibrating the accelerometer"

The Accelerometer: Theory

Here is a tutorial on accelerometers from **Pyroelectro**.

Pyroelectro Tutorials

Pyroelectro has other tutorials and projects besides their accelerometer tutorial.

How to Make an Inexpensive DIY Analog Pressure Sensor

This Instructable shows you how to construct an analog pressure sensor from black anti-static dissipative foam.

The Lego RCX Input Multiplexer

This Color Sensor circuit shows how three resistive sensors can share a single **Lego Mindstorm's RCX** micro controller input.

Low Cost Water Flow Sensor

This YouTube video shows how to build Carnegie Mellon University's water flow or vibration sensor.

The Gauss Rifle: A Magnetic Linear Accelerator

This simple project is both educational and amusing. You can buy a version from **Think Geek**.

DIYbio

DIYbio is an organization dedicated to making biology an accessible pursuit for citizen scientists, amateur biologists, and DIY biological engineers who value openness and safety.

DIY Centrifuge Using Dremel Tool

If you need a small centrifuge and already have a Dremel tool this may be what you are looking for. The adapters are available from **Shapeways**.

Build A Net Gun

This Instructable shows you how to build a Net Gun capable of firing a 90 square foot net 15 to 25 feet.

Dry Ice Info and Applications

Here is a site that has everything you always wanted to know about dry ice.

The Dry Ice Directory

This site may help you in locating a local source of dry ice.

Start Seeing Magnetic Fields

The Evil Mad Scientist Laboratories introduces to some basic and inexpensive tools that will enable us to see magnetic fields.

Infrared Detectors

Boston Electronics offers a wide range of photodetectors spanning the spectrum from the ultraviolet to the infrared and their web page describes the characteristics of each type.

Amateur Science - Getting Started in Photometry

This Power Point Presentation details how the amateur astronomer can get started in **Photometry.**

The Make Club

"Inspired by such websites as **MAKE magazine**, **Instructables**, **hack-a-day**, and **ReadyMade**, MAKE Club is all about creativity. It's for the DIY'ers, the dreamers, and those who like to get their hands dirty."

Getting Started in Electronics

The ECE Lab wed site has a good selection of topics that cover the basics of electronics.

Micro Forge

Kip Kay, of Make Magazine, shows us how to make a *DIY Micro Forge* in his **Weekend Projects Series**.

KP4M4-001 Stepper Motor

A while ago, I came across a bunch of "OLD" floppy disk drives. Instead of throwing them into the dumper I decided to have a look inside and --- lo and behold! --- I found KP4M4-001's which are heavy duty unipolar stepper motors.

Stepper Motor Control

This page shows various ways that may be used to control a stepper motor.

Controlling Stepper Motor with a Parallel Port

This stepper motor driver allows you to control a unipolar stepper motor through your computer's parallel port.

About Rare-Earth Magnets

This is a short article on rare earth magnets from **Lee Valley Tools**.

Online Unit Converter

Here is a collection of utilities that will enable you to convert between different units of measurements.

My Daughter's Scythe

We are storing a lot of my daughter's belongings, while she is off working in New Zealand. Among her stuff is a scythe. It seems to me that a lawn mower would be a lot easier :-) Learn all about this ancient tool at **The Scythe Connection**.

Rough Science

Rough Science is a 10-part TV series produced by the BBC and can be seen, sometimes on the Discovery Channel and/or PBS. The plot involves five scientists who are placed on a remote island and are challenged to solve a series of scientific challenges using only their knowledge, ingenuity, and whatever is at hand. BTW --- this is my daughter's favourite TV show. See **Rough Science on YouTube.**

The Penobscot Bow

Scroll down to the posting by David W. and you will see a picture of the strange looking compound bow that I saw on the TV show, Pawn Stars. Several years ago, during my Internet wanderings, I came across a primitive version of this bow that is called the **Penobscot** or **MicMac** Bow. It would be interesting to build one to scientifically test its effectiveness.

Boston Dynamics' 4 Legged "Mule"

Boston Dynamics designed a robot "pack mule" for the Army.

Los Alamos National Laboratory Technical Reports Collection

Gregory Walker and **Science Madness** are making available a large on line collection of technical publications that are no longer available from the **Los Alamos National Laboratory**.

The Ivory Bangle Lady

Did Africans live in ancient York during the Roman occupation?

The Federation of American Scientists

The Federation of American Scientists was founded by scientists who had worked on the Manhattan Project. They believed that they had a unique responsibility to both warn the public and policy leaders of potential dangers from scientific and technical advances and to show how good policy could increase the benefits of new scientific knowledge.

Operational Sea Surface Temperature and Sea Ice Analysis

The OSTIA system produces a high resolution analysis of the current sea surface temperature (SST) for the global ocean

Met Office Hadley Centre Observations Datasets

Researchers at the Met Office Hadley Centre produce and maintain a range of gridded datasets of meteorological variables for use in climate monitoring and climate modelling. This site provides access to these datasets for *bona fide* scientific research and personal usage only.

The Art of Grantsmanship

Jacob Kraicer's guidelines will assist both new and veteran investigators to optimize their chances of successfully competing in a peer-reviewed grant application competition.

Farmers Are Trying To Cope With Roundup-Resistant Weeds

Repeated and intensive use of the herbicide **Roundup** has resulted in strains of Superweeds.

The Kids Room:

Bang Goes The Theory

BBC's *Bang Goes The Theory* site has a nice **Hands On Science** section. Note --- The videos may not work in North America.

The ASPIRE Project

The ASPIRE Lab claims to be one of the most innovative and interactive science education websites available on the Internet.

The Science House

The Science House's mission is to work in partnership with K-12 teachers and students to promote the use and impact of hands-on **inquiry based learning** in science and math.

Hands-on Student Inquiry Activities

Here is a collection of student activities from The Science House.

Let's Talk Science

Let's Talk Science's approach to science education engages children and youth with fun, exciting hands-on / minds-on activities that improve their understanding of physical and life science, mathematics and technology.

Science Answers

Actual answers from US science students.

Teachers' Resources: A Guide to Kitchen Chemistry

This **Instructables Guide** was compiled by **Matt.Nupen.**

Homemade Spectroscope

Dr. Shawn shows you how to build a DIY Spectroscope from common house hold "junk".

LEGO and LDraw

LDraw™ is an open standard for LEGO CAD programs that allow the user to create virtual LEGO models and scenes.

Women in Science:

Jeri Builds a Homebrew NMOS Transistor

This YouTube video features **Jeri Ellsworth** showing us the step by step process in constructing a DIY NMOS transistor.

Science Demonstrations, Experiments, and Projects

This collection was compiled by **Dr. Anne Marie Helmenstine.**

Random Samples:

Kiva --- Empowering People Around The World With A $25 Loan.

Kiva is a non-profit organization with a mission to connect people through lending to alleviate poverty.

Interactive Health Tutorials

The **U.S. National Library of Medicine** and **MedlinePlus** present a series of health tutorials that cover the symptoms, diagnosis and treatment for a variety of diseases and conditions.

Desert Camels at Sunset

If you look closely, at this picture, you will see little white lines. These ARE the camels and the black images are just their shadows!

Eric Whitacre's Virtual Choir

Britlin Losee inspires Eric Whitacre to form a Virtual Choir. The choir was composed of 185 singers from 12 countries who never sang together until, with the magic of the Internet, their voices were edited together.

Suppliers and Stuff:

Being listed here does not constitute an endorsement by SAS or me of any information, product or service.

Egg-Bot

The Egg Bot is **The Evil Mad Scientist's** open-source art robot that can draw on spherical or egg-shaped objects

Emovendo

Emovendo can supply rare earth magnets in a wide variety of shapes and sizes.

Manual Vacuum Pump

This $25 Brake Bleeder and Vacuum Pump Kit are designed for the automotive industry but are capable of providing a moderate vacuum for the amateur scientist or hobbyist.

GridChoice

GridChoice is a supplier of a wide selection of new, used, and obsolete items such as **stepper motors**.

Spectacular Chemical Experiments

"This book demonstrates over 80 enjoyable, impressive and sometimes almost unbelievable chemical experiments for the classroom, lecture hall or home."

HMS Beagle Online

HMS Beagle Online is dedicated to providing you with a wide array of products which help to engage young and old minds alike in the amazing world of science.

Benchmark Legacy Chemicals From H.M.S. Beagle

H.M.S. Beagle recreates their version of A.C. Gilbert's 1936 chemistry set.

The Amateur Scientist 3.0 CD-ROM

Bright Science is offering the complete collection of *Scientific American's* **"The Amateur Scientist"** column from 1928 to its final cancellation in 2001.

On The Lighter Side:

Try The Impossible Paper Trick

Instead of cutting nice neat lines, try using jagged cuts for a more puzzling effect.

The Impossible Puzzle

Here is another interesting paper puzzle.

Howjsay?

Do you need a free online talking dictionary of English pronunciation?

The Bubble Machine

Got some free time? Why not fill your life with bubbles from this DIY bubble machine?

From The Far Side:

The End of the World!

If Judgment Day will be held on 21 May 2011 with the End of the World to follow on 21October 2011 then I guess that all **the predictions for 2012** were a waste of time.

Time Travel

Explore John Bajak's Flux Capacitor and other devices that cause temporal distortions.

The Tesla Shield

The Tesla Shield was inspired by the work of Nikola Tesla, and was designed by **Life Technology** to heal, strengthen and protect the mind body and soul. Myself --- I like the aluminum foil cap :-)

Copper Magnetic Therapy Jesus Bracelet

If you don't believe in the Tesla Shield, perhaps you'd like a Jesus Bracelet. Magnetic Copper? It has to be a miracle!

James Randi and the Jesus Bracelet

Read Randi's views on the bracelet.

QRay

And then there was the QRay bracelet.

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THE NEW WANDERINGS

No. 3

01 June 2011

Feature:

In this month's Feature we will be looking at some of the sites dealing with Amateur **Radio Astronomy**, a branch of science that was started, largely, by the work of **Grote Reber**, an amateur astronomer. Then to round things off, I'm including a few links to general / optical astronomy.

The Society of Amateur Radio Astronomers

SARA is an international society of dedicated enthusiasts involved in amateur radio astronomy.

Amateur Radio Astronomy

Amateur Radio Astronomy from the Hardware Hacker

Project Bambi

Project Bambi is made up of a group of people who are interested in amateur **SETI**.

Radio-Sky Publishing

Radio Sky makes the fascinating world of radio astronomy accessible to a wide audience of students, teachers and amateur scientists

Stanford Space Weather Monitor Program

Take part in the Stanford Space Weather Monitor program and monitor real-time effects of space weather on Earth's ionosphere using inexpensive equipment developed by the **Stanford Solar Center**.

The Radio JOVE Project

Here is a hands-on inquiry-based educational project that allows the general public to learn about radio astronomy by building their own inexpensive radio telescope.

The INSPIRE Project

This program uses DIY receivers to measure and record **VLF** emissions such as tweeks, whistlers, sferics, and chorus along with man-made emissions.

Strange Extraterrestrial Radio Noises

Listen to some examples of extraterrestrial radio sounds.

SID-GRB@home

David Saum shows us how to build an simple VLF radio receiver that can detect *Sudden Ionospheric Disturbances* (SID) caused by x-rays from solar flares or *Gamma Ray Bursts* (GRB).

How to Build a Parabolic Reflector

Using the supplied template you can turn a flat sheet of anything flexible into a parabolic reflector.

Constructing a Cardboard S-band Antenna

Anthony Monteiro shows us how to build a 2.4 GHz horn antenna using two cardboard cartons, aluminum foil, and packing tape.

The W1GHZ Online Microwave Antenna Book

Paul Wade's e-book is a source for designs of DIY antennas that are useful for radio astronomy.

Horn Antenna Designer

This utility will assist the user in designing horn antennas.

SkyView --- The Internet's Virtual Telescope

SkyView is a Virtual Observatory generating images of any part of the sky at wavelengths in all regimes from Radio to Gamma-Ray.

Microsoft's WorldWide Telescope

"WorldWide Telescope enables your computer to function as a virtual telescope, bringing together imagery from the best ground and space-based telescopes in the world."

Modeling the Heavens

With David Colarusso's free online program you can create your own solar system simulation plus see how to solve **Kepler's Equation** and calculate the planets' positions.

Center for Backyard Astrophysics

CBA is a global network of small telescopes dedicated to photometry of cataclysmic variables.

Amateur-Professional Collaborations

Jeff Robertson shows how you can get involved in astronomical research.

Astronomy: Amateurs Making Discoveries

"Amateurs still make significant contributions to the fields of astronomy and space science. Comets, for example, are often discovered first by non-professional astronomers."

Mike Boschat's Astronomy Page

Michael has compiled a huge collection of links to astronomical groups and associated web sites.

Heavens-Above

Chris Peat's site is dedicated to satellites and astronomy.

Royal Astronomical Society of Canada

The Royal Astronomical Society of Canada is Canada's leading astronomy organization bringing together over 4,200 enthusiastic amateurs, educators and professionals.

Paint Net

Justin Quinnell points us to a freeware program, Paint Net, in his article ***How to Make Your Own Six-Month Duration Images of the Sun's Path Across the Sky*** in TCS's 07 May 2010 issue. Paint.NET is a MS Windows image and photo editing software package that has been compared to other digital photo editing software packages such as Photoshop or Paint Shop Pro etc.

The Atmosphere and Green Lasers

What are the dangers of using a Green laser Pointer by "stupid" people?

Abbey Ridge Observatory

The Abbey Ridge Observatory is the backyard astronomical observatory of Dave and Michelle Lane of Stillwater Lake, Nova Scotia.

The Sun Gun

Safely view the sun with Bruce Hegerberg's DIY Solar Telescope, the Sun Gun.

Amateur Magnetometer

Tom Field has upgraded Scientific American's DIY torsion magnetometer my including a webcam and a MSWindows logging program.

Real-time Spectroscopy

Tom Field has also developed a program that allows the astronomer to easily analyse the spectrum from stars or planets.

Deep Astronomy

This website is Tony Darnell's labour of love**.** He created it for no other reason than he wanted to write and bring his experiences to others.

ICSTARS

Vic and Jen Winter have compiled a gigantic list of Astronomy resources that can be found on the Web.

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Wanderings:

Mosquito Repellent Myths

Mosquito season is once again upon us. We have all heard of the many myths and home remedies that are supposed to prevent mosquito bites but what really works?

Can a Mosquito Death Ray Solve the Malaria Problem?

This TED presentation that shows what happens when people "Think Outside of the Box" and let their creativity run wild.

Can We Eat To Starve Cancer?

Here is another TED presentation where William Li presents a new way to think about treating cancer and other diseases.

Dynamic Patterns Research

Dynamic Patterns Research Citizen Science is a guide for the citizen scientist to learn about science by doing real science.

The Citizen Science Quarterly

The CSQ is a Blog and "print" magazine that covers topics of interest to the amateur / citizen scientist.

Another "Citizen Scientist"

Raymund John Ang's *Citizen Scientist* blog is a place to read about citizen science and contributions of amateur scientists in the advancement of science and society.

Scientific American and Citizen Science

Has ***Scientific American*** finally decided to get back into **Amateur / Citizen Science**?

How to Build an Inexpensive Microbarograph

This microprocessor based microbarograph design can detect infrasound (sound less than 20 Hz).

Science Projects

Leslie Wright has many scientific interests similar to those shown on his **Lasers Page**.

Webcam Based DIY Laser Rangefinder

This site contains a collection of Todd Danko's recent projects.

DOFMaster

You can customize and construct a copy of Don Fleming's Depth of Field Calculator to assist you in your photography.

A DIY Mechanical Iris

This **Instructable** will show you how to build an adjustable mechanical iris.

Mechanical Iris Images

Here is a collection of irises from Google Images.

The Fun Science Gallery

Giorgio Carboni's Fun Science Gallery contains fun, simple, and low cost science equipment and experiments for amateur scientists. Be sure to check out his **Other Sites** collection.

Green Power Science

Green Power Science is dedicated to the backyard scientist. They believe that some of the smartest people in the world discover the best things through trial and error in their own backyards.

Neodymium Magnet Levitation

On the *Green Power Science* **YouTube Channel** we will see how a couple of neodymium magnets can be used a bearings.that can supporet a heavy weight.

e-Zee DIY Steam Engines

This is a curriculum support site, developed by Nial McCabe that provides free lab-project plans for technical students, their teachers and others interested in applied mechanical engineering

The Little Engine Pages

The Little Engine Pages and **StirlingSouth.com** are now companion sites. Both sites will be concerned primarily with Stirling Engines, but all types of model engines are fair game!

Soldering-Is-Easy --- The Comic Book

Here is a "How to Solder" tutorial presented in a comic book format.

A Simple DIY Spectrophotometer

This ***Instructable*** shows how to build a simple DIY spectrophotometer.

Educypedia – Science

This educational encyclopaedia has sections for:

- **Chemistry Experiments**
- **Energy Experiments**
- **Physics Experiments**

WebElements

WebElements is an excellent example of an interactive on-line periodic table.

Periodic Table

Here is another useful periodic table which together with WebElements should give you almost everything that you wish to know about the various elements.

The Birth of the Computer Mouse

The mouse was invented in 1964 by Doug Engelbart and his team at the **Stanford Research Institute.**

Biology Letters

Biology Letters publishes short, highly-innovative, cutting-edge research articles and opinion pieces accessible to scientists from across the biological sciences.

Water Propelled Rocket

This page looks into the derivation of the basic rocket equations.

Magic-1: a Custom Computer

Do you want something different from the normal run of the mill PC's and Apples? Then try "rolling your own" like Bill Buzbee, Aidil Jazmi and other adventurous soles.

Unidata

Unidata is a diverse community of over 160 institutions vested in the common goal of sharing data, and the tools to access and visualize that data.

The Lemelson-MIT Program

The Lemelson-MIT Program is dedicated to honouring the acclaimed and unsung heroes who have helped improve our lives through invention.

ScienceForums.Net!

ScienceForums.Net! welcomes discussion at all levels of science — from beginners to researchers, covering topics from "A" to "Z"

Flour and Semolina

"The Visual Dictionary is more than a reliable resource of meticulously labelled images—it innovates by combining dictionary-scale definitions with exceptional illustrations, making it the most complete dictionary."

Sustainable Innovations

Sustainable Innovations' goal is to promote sustainable harvests and innovations in science, engineering, technology and business. Their immediate focus is in building enterprises for delivering clean water and health care in developing countries.

Be an Archaeologist for a Day

Team up with professional archaeologists excavating a buried 13th century Dominican Friary in Trim located in the Boyne Valley, Republic of Ireland.

Solvers Wanted

InnoCentive has thousands of Challenges that need your brainpower and companies that are willing to pay you to think.

Scilab

Scilab is a free open source scientific software package, similar to **Matlab**, for numerical computations providing a powerful open computing environment for engineering and scientific applications.

GNU Octave

This is another , free downloadable high-level numerical processing language that is mostly compatible with Matlab.

Albert Einstein's Scientific Publications

This Wikipedia article lists Albert Einstein's publications.

There's Plenty of Room at the Bottom

This is a talk given by, Nobel-winning physicist, Richard Feynman in 1959. In it, he hypothesizes about microscopic machines or nano-technology.

Nano-medicine

Robert A. Freitas Jr. expands nano-technology into the field of medicine.

GridRepublic

GridRepublic members run a special screensaver that allows their computers to become part of a global super computer work on public-interest research projects in science and medicine when the machines are not otherwise in use.

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The Kids Room:

The Google Science Fair

Google has announced an on line Science fair for junior and senior high school students. The 2011 semi-fianalists have been announced. Why not get ready and enter the 2012 competition?

The Wizard's Laboratory

Chris Young will take you through some exciting chemistry experiments and introduce you to the art & science of crystal growing.

The Science Toy Maker

This site shows us how to build mysterious, kinetic, noisy, DIY science projects that entice scientific investigation.

The Science Explorer

Here is a collection of activities from San Francisco's **Exploratorium**.

Motion Mountain: *The Adventure of Physics*

Motion Mountain is a free down loadable physics that among the most widely read physics texts in the world.

The Khan Academy

The Khan Academy is an organization on a mission. We're a not-for-profit with the goal of changing education for the better by providing a free world-class education to anyone anywhere.

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Women In Science:

Scientific Inquiry in a "Web" Laboratory

"Hanny van Arkel had been using the **Galaxy Zoo** Web site less than a week when she noticed something odd about the photograph of IC 2497, a minor galaxy in the Leo Minor constellation"

Hanny and the Mystery of the Voorwerp

Read about Hanny's discovery in "comic book format".

The Woman Astronomer

The Woman Astronomer on line.

Women in Astronomy

This is a listing of some of the famous Women in Astronomy, down through the ages.

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Suppliers And Stuff:

Being listed here does not constitute an endorsement by SAS or me of any information, product or service.

Biopunk: DIY Hacks Into the Software of Life

In this book, Marcus Wohlsen defines Biopunks as a loosely knit, multifaceted movement to find ways to permit people to engage in DNA research without the restrictions and costs imposed by the scientific and medical establishment.

The Visible Body

Emily Smithson gave me a "heads up" on this site which describes their revolutionary 3D human anatomy visualization and learning tool.

Radio Astronomy Supplies

Jeffrey M. Lichtman's Radio Astronomy Supplies is a source of all things related to radio astronomy

The NeoCube

What do you get when you lump together 216 individual high-energy rare-earth magnetic spheres? It's a NeoCube!

Mini Camcorder

Are you looking for a Mini Camcorder for a rocket or balloon project?

The GPS Travelogue

This device uses GPS to track and record everywhere you travel, allowing you to later upload your journey to online mapping applications such as Google Earth.

The Trackstick

The Trackstick is a small USB GPS tracking device.

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Random Samples:

From time to time, I will be listing some links here that may not be directly related to science but are still interesting (IMO).

The Ancient Musical Instruments of Ireland

I think that the instrument that is playing at the opening of this clip sounds very similar to Australia's **Didgeridoo.**
Here is some **further information** on the prehistoric Celtic music and instruments from Ireland.

The Chapman Stick

I recently stumbled across this unusual musical instrument that evolved from the guitar.

Bach's Toccata and Fugue

Bob Culbertson plays Bach on the Chapman Stick.

Bach's Fur Elise

Here is another example of Bob playing his "stick".

Knock on Wood!

This Japanese **Rube Goldberg machine** plays Bach's "Jesu, Joy of Man's Desiring" the hard way! This was reportedly used in a cell phone commercial.

Bach's "Jesu, Joy of Man's Desiring"

This YouTube shows humans, The Celtic Woman, singing "Jesu Joy of Man's Desiring".

The Third Wave

A number of years ago I saw a movie, on TV, about an experiment, *The Third Wave*, which was conducted by high school teacher Ron Jones. The goal of the experiment was to demonstrate that even democratic societies are not immune to the appeal of fascism.

The Euro Simulator

The Euro Simulator is a fairly good target shooting simulator.

Poor Folks Bows

This is Sam Harper's site "Bow building for poor people and apartment dwellers".

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From The Far Side:

The EVGRAY Electric Motor

If you like conspiracy theories then you might be interested in Ed Gray and his mysterious motor.

The Galactic Compass

This is **J. Emerson Webb's** device that he claims can prove that the **luminiferous aether** exists. I wonder if this device is similar to the **Velador.** Also see the **Velador Blog Site.**

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THE NEW WANDERINGS

No. 4

01 July 2011

This edition was originally slated for *Wanderings #171* in the **Citizen Scientist.** But since TCS ceased publication in May 2010 #171 was never used. I've decided to up date it and present it as ***New Wanderings #4 for July 2011***. Enjoy!

Note: its vacation time. Therefore August's New Wanderings may be late.

Feature:

For this month's Feature we will be looking at the **Arduino microcontroller.**

Microcontrollers are small computers, often housed on a single chip, that are capable of performing many types of programmed tasks. One common function, of the device, is to replace a circuit made up of a complex array of discrete logic gates by a computer program. An advantage of this is that the application can easily be modified by changing some program code instead of doing actual hardware modifications.

Before we go too far, I'd like to mention that the Arduino is not the only show in town. There are many excellent systems, on the market, with vastly different features so you should be able to find one that fits your needs.

You have probably come across several of the most popular:

- **BASIC Stamp and Propeller** from **Parallax**
- **Picaxe** based on **Microchip Technology Inc's** PIC family of micro controllers.
- **MakeController Kit v2.0** from **the Maker Shed**.

Recently, I came across NGX Technologies' **BlueBoard-LPC1768-H** which looks quite impressive.

A few of the reasons that I like the Arduino are:

- There is a large user presence on the Web

- It has a small foot print
- Its architecture is "**open source**"
- There are a large number of "daughter boards" or "shields" available
- There is a **SD shield** available that gives several gigs of data storage.

Is there anything that I do not like about it? Yes, I wish that there was a mounting hole at each corner. Other than that, I haven't found anything more. Granted, I have not had too much time to "play" around with my board.

The Arduino Home Web Site

The current basic Arduino, the **Duemilanove**, is built on the **Atmel ATmega328 chip.** **Duemilanove** means 2009, in Italian, the year that it was released.

AVRFreaks

The AVRFreaks host discussions on the ATmega386 and other Atmel products.

Getting Started with Arduino

This book was written by Massimo Banzi**,** one of the Arduino developers, and is a good place to start.

The Arduino Tutorial Bundle

This is a collection of 11 tutorial experiments.

Here are a few of the many sites that host Arduino project collections:

- **The World Famous Index of Arduino Knowledge**
- **10 DIY Arduino Projects and HOW - TO - Tutorials**
- **The Arduino @ Instructables**
- **The Arduino @ YouTube**
- **Electronics Lab --- Arduino Projects**
- **Hack a Day --- 301+ Arduino Projects**
- **uCHobby --- Arduino Projects**
- **Introduction to Microcontrollers with Arduino**
- **The Arduino as I2C bus scanner and other projects**

The Arduino @ Goggle Code

This project is a home for the development of the Arduino platform.

An Arduino based Liquid ID Spectrometer

Eric Rosenthal designed and built that can be adapted for either transmissive or reflective modes. See ***Wanderings* #160, 03 July 2009** for further information.

The pHduino

CarlOS NEVES BUILT A PH METER THAT IS CONTROLLED BY AN ARDUINO.

Arduino Controlled Magnetic Stirrer

An Arduino is used to control a magnetic stirrer.

An Arduino RC Lawnmower

Summer is here**.** Why not be lazy and let an Arduino mow your lawn?

Secrets of Arduino PWM

In a **PWM** or Pulse Width Modulation signal the frequency is constant, but Time On/Time Off or duty cycle can be varied between 0 and 100%.

Arduino Based Serial RC Servo Controller

Here is an Instructable that shows how to control **RC type servos** with an Arduino.

Arduino "RADAR"

Use an Arduino and a SRF-05 ultrasound range finder to make a radar.

The Reverse Geocache Puzzle

This Arduino / GPS based puzzle box will not open until its owner figures out where on earth to move it. Follow the Puzzle Box saga on **Arduiniana.**

Ferret

Ferret was a high altitude balloon tracker that was constructed, in an afternoon, for a balloon launch (Project Orion) from Churchill College, Cambridge.

Arduino RFID Door Lock

An Arduino is used to control a keyless lock.

Arduino Sound

Part 2 --- **Hello World**
Part 3 --- **Playing a Melody**

LCD's and the Arduino

This link shows how to connect a LCD display to an Arduino.

4 Digit 7 Segment Display

The Maker Shed has a 4 digit display circuit board available for $50.

Ferret

Ferret was a high altitude balloon tracker that was constructed, in an afternoon, for a balloon launch (Project Orion) from Churchill College, Cambridge.

Digital Camera Control Using Arduino

In many modern digital cameras, the USB port can be used not only for transferring images to a PC, but also for sending control commands to the camera.

Arduino-Based GPS Camera

This camera was designed by **Flickr arms22** and includes a **LS20031 GPS** receiver, a **C328** 640x480 camera module and a SD card to store images. Unfortunately, it's mostly in Japanese. But you might be able to glean some information from it. Give it a try. Here is some of **Flickr arms22's other work.**

Hack a Keychain Digital Camera

This Instructable shows how to control a small digital camera with a microprocessor.

Arduino I/O Pin Performance

Here is the sketch that was used to measure how often a pin I/O command can be issued.

Solarbotics Ardweeny

This is a stripped down tiny version of the Arduino.

How to build the Ardweeny

The Ardweeny is a microcontroller that has the foot print of a single chip.

The Arduino Proto Shield

Here is an open-source prototyping shield for the Arduino.

An Arduino Board Layout Library

This collection of board layouts, in **Eagle** format, is available for download at **Adafruit.com**.

The EyeWriter

Q-Breach has developed a low-cost eye-tracking apparatus that allows a person with paralysis resulting from Amyotrophic Lateral Sclerosis to write or draw using only their eyes.

The Eye Shield

The Eye Shield is a circuit board that allows the Arduino to have the power of sight. It interprets analogue video (**PAL or NTSC)** from a camera or other source.

Core2duino

See how to build an Arduino shield that adds another Atmega 168/328 on top of your Arduino,

Core3duino

As if the Core2 wasn't enough ----

I²C (Inter-Integrated Circuit)

I²C bus is a multi-master serial single-ended computer bus that is used to attach low-speed peripherals to a motherboard.

The Philips I²C Bus Manual

In this manual, Phillips gives a detailed explanation of the I²C bus.

Expand the Arduino I/O with the I²C bus

Try the I²C bus with your Arduino application.

The Arduino

So, where can you buy an Arduino?

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Wanderings:

Make Your Own Organic Light Emitting Diode (OLED)

A DIY LED is only one many excellent projects that can be found at the University of Wisconsin's **Video Lab Manual.** Take some time wander around the rest of their site as there is a lot of good stuff there such as --- **Exploring the Nanoworld with LEGO® Bricks.**

The Bradford Robotic Telescope

The Bradford Robotic Telescope is a collection of telescopes and other instruments that is located on Mount Teide, **Tenerife**.

Tho X. Bui's Solar Catenary Reflector

Tho X. Bui briefly describes his Solar Catenary Reflector, in Issue #21 of **Make: Magazine** but his Web Site covers his reflector in much greater detail.

Intro to RFID

This Instructable gives you step-by-step instructions for 15 different fun RFID projects.

The Icarus Project

Here are the **amazing pictures** of Earth captured by Robert Harrison, a balloon and his compact camera. Have a look at **Robert's pictures on Flicker**.

The Balloon Project: San Francisco

Robert's work is a bit more advanced than **the Balloon Project**.

99 Luftballons

All these balloons reminded me of Nena's song ☺ And NO --- it's not "99 RED Balloons"!

A DIY Cloud Chamber

The main part of this DIY cloud chamber is a **Peltier Cooler** semiconductor device.

Build a CD Spectrograph

A cardboard box + an old CD = a DIY Spectrograph.

The Baghdad Battery

Did the ancient Assyrians use electricity?

Build a DIY Hydrophone.

The **Panasonic WM-61A** microphone capsules that are used in this project were found on **eBay.**

Conductive Glue, Paint and Thread

These DIY conductive items should prove useful to the experimenter. How about making a, **papier-mâché,** high voltage terminal for a Vann de Graaff generator?

A Passive Infrared (PIR) Motion Sensor

A tutorial from **Adafruit**

How to Build a Small Fume Hood for Stinky Projects

Many activities, related to amateur science, “stink” so it might be advisable to make use of a **fume hood**.

But, before you roll up your sleeves and start construction of your hood you should look at the **Fume Hood Standards** from the University of Waterloo and take special note about using spark free electrics (fans / switches / etc) if you ever intend on using substances that give off flammable vapours.

You could also expand the fume hood into a combination with **a glove box**. I wanted to give you a link to a better DIY glove box but unfortunately, the best one that I found was on a DIY Designer Drug site and for obvious reasons I did not want to link to it.

TeleToyland

You will be able to use these web connected applications to reach out on the Internet’s virtual world and affect the real world. See how TeleToyland’s **Marble Maze** was built.

Inkscape

This is a free open source vector graphics editor, with capabilities similar to Illustrator or CorelDraw.

VirtualBreadboard

Download your ***free*** copy. Virtual Breadboard is an easy to use virtual simulation tool that can be used in place of a real breadboard to quickly model electronic and microcontroller applications. Now it is equipped with a virtual **Arduino**!

Raven Lite

This is another ***free*** software program. Raven Lite, from the Cornell Lab of Ornithology, that lets users record, save, and visualize sounds as spectrograms and waveforms. Raven Lite is intended for students, educators, and hobbyists, and can be used for learning about sounds, as an aid in birdsong recognition, and in musical instruction. **Download your copy of raven Lite**.

Controlling Small Variable Speed Motors

Use your PC’s serial out put to control a small variable speed motor.

The H-Bridge

Chuck McManis shows a simple way to control a bi-directional DC motor.

A Better H- bridge

Eugene Blanchard shows his design for a more robust H-Bridge.

Basic Testing of Semiconductor Devices

Samuel M. Goldwasser shows us how to test many semiconductor devices.

GO/NO GO Test of MOSFET Transistors

With a suitable digital multi-meter, you should be able to do a fairly accurate GO/NO GO Test on MOSFET transistors.

DIY 3D Milling Machine

See this homemade mill at **Max's Little Robot Shop**.

Communicate With a Roomba Via a Serial Link

Do you know that your Roomba vacuum cleaner can form an excellent robot platform?

Hydraulic Ram Pump

This pump requires no energy input except gravity. One down side, it requires a **head** of at least 1 metre in order to work.

Is Our Response to Music Hard-Wired or Culturally Determined?

Investigate the question with Bobby McFerrin in *Notes & Neurons* at the **The World Science Festival.**

Digital Signal Processing

Digital Signal Processing (DSP) is a tool that is used to process signals (or data) by digital means.

Digital Signal Processing Tutorial

This is one of the tutorials from the extensive collection at **101 Science**.

Signal Analysis/Processing Software

This is only for those of you who are running a Linux system.

Acoustics and Vibration Animations

Dr. Dan Russell's site contains animations which demonstrate various concepts concerning acoustics and vibration. I especially like this visualization of **Longitudinal and Transverse Wave Motion**.

A Modified Didgeridoo

Kyle Evans extends the versatility a **didgeridoo** with signal processing software.

The Turing Machine

Mike Davey built this excellent example of a Turing Machine. The concept was originally the result of a "thought experiment" by **Alan Turing**, one of the fathers of the computer age.

A Turning Machine Simulation

Try your hand at programming with this Java applet.

Educypedia

Educypedia is an information resource about Scientific and Educational material such as Electronics, Science, Engineering, Encyclopedia and Information Technology.

Integrated Publishing

The Integrated Publishing site contains a wealth of assorted information such as a section on **Radiation Detection Technology**. Some of the items are free while others are available as user pay subscription service.

Intute

Here is a free online service that can help you to find the best web resources for your studies and research

GRID-Arendal

GRID-Arendal is an official United Nations Environment Programme (UNEP) collaborating centre, supporting informed decision making and awareness-raising

Dr. David R. Brooks, whose site I included in **Wanderings #169**, has alerted me to a couple of interesting links that are located on his site:

- This application, a **Simple Model of Solar Irradiance or Insolation**, is an approximation that provides some insight into the basic physical processes that control the amount of sunlight reaching Earth's surface under "clear sky" conditions.

- **The Bird and Hulstrom's Solar Irradiance Model** is widely used for estimating broadband clear sky irradiance at Earth's surface.

The Vostok Ice Core

In January 1998, an ice-drilling project at the Russian Vostok station, in East Antarctica, produced the deepest ice core ever recovered, reaching a depth of 3,623 m and has yielded a 400000 year profile of **Temperature and Atmospheric CO2 Concentrations** .

AccuWeather.com Global Warming Center

This site offers links to some of the latest research and commentary by experts from both sides of the global warming / climate change debate. For example **Evidence Suggests Man-Made Warming Greatly Exaggerated**.

Patent Medicines

These are medical compounds of questionable effectiveness that are sold under a variety of names and labels

Join the Conversation on the Future of Science in the US

The white house wants to hear from you!

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The Kids Room:

SURFING the NET with KIDS

This site offers a vast collection of resources for kids. Have a look at their **Science Section**. They even have a selection of **Science Games** such as **Assembler**.

Physics 2000

Physics 2000 is a collection of interactive physics demos that make extensive use of Java applets. Try running the **Double Slit Experiment** for yourself.

Infamous Double Slit Experiment

This is a detailed explanation of the Double Slit Experiment in the form of a YouTube video.

It's Alive!

Collin shows that you can have fun with corn starch and water.

NCH Tone/Waveform Generator

You could use this free waveform generator, with a suitable amplifier and speaker, to create your own "corn starch monster".

Experiments in Psycho-Acoustics

Does the ear and brain mix signals?

How to make an Awesometastical PVC Flute

You can turn a short length of PVC pipe into a working music instrument.

Funology

Have fun with science!

The Science Explorer

Here is an on-line book of home science experiments from San Francisco's **Exploratorium.**

What is the Game of Life?

Explore the wonders of math with *The Game of Life*, *Spirograph, Mazes* and much more.

The Little Shop of Physics

This group of science educators and students travel their region with a van full of hands-on experiments teaching people that science is something that anyone can do.

The Rubik's Cube

How fast could you solve it?

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Women in Science:

Sarah Flannery

In 1999, a 16-year-old Irish girl, won the **Esat Young Scientist Exhibition** and the **EU Young Scientist of the Year Award** for her project entitled *"Cryptography - A new algorithm versus the **RSA**".* Her paper described her discovery of the **Cayley–Purser Algorithm.** Even though she later reported that the algorithm was flawed the whole thing attracted considerable media attention.

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Random Samples:

The Bhut Jolokia Is The World's Hottest Chili Pepper

In 2007, **Guinness World Records** certified the Bhut Jolokia as the World's hottest chilli with a **Scoville rating** of between 855,000 and 1,050,000.

When a Phillips is not a Phillips!

This is an excellent example of the myriad of different screws that are available. There seems to be as many screw types as there are stars in the sky.

When a Phillips is not a Phillips Plus So Much More!

If the previous wasn't enough, there are even more types of screws!

Personally, I strongly dislike Phillips, Posidrive, Reed and Prince or any other "cross" head screws. In fact, I refuse to use them unless forced to under pain of death – Well not quite ☺ --- My preference is the **Robertson**.

Alt Codes

The Alt Codes is a collection of 256 decimal numbers that give the user access to characters that are not normally available on the standard PC keyboard.

Anyone who is running a web site or contemplating doing so may be interested in the following sites:

- **Web Building Tutorials**
- **HTML Primer**
- **The HTML Code Tutorial**
- **Ted's Comprehensive HTML Tutorial**

A Stroll Through Pakistan's DIY Machine Gun Market

The other side of DIY

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From The Far Side:

Locations of Some "Official" US Weather Observation Stations!

It is utterly unbelievable that these are actually official sites.

The ADE651 Bomb Detection "Divining Rod" System

The ADE651 is supposed to be able to detect IED's and other explosive devices. Here is a REAL **ADE651 promotional video.**

BBC Newsnight: UK Bans Exports of "Bomb Detecting" Dowsing Rods

It seems that the ADE651's do not work.

The ADE651 aka Quadro Tracker

James Randi's view of the ADE651.

Eric Krieg

Eric follows the 'work" of Free Energy Gurus **Dennis Lee** and **Joe Newman**.

EarthTech International (ETI)

ETI is a privately funded research organization dedicated to the exploration of new frontiers in physics.

The Beaty-tchison Effect

Bill Beaty demonstrates antigravity ☺

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THE NEW WANDERINGS

No. 5

01 August 2011

Feature:

My wife, Gail, and I recently bought a small cabin in the woods. Before we had a power connection there was no way to keep things cool. I could have, easily, thrown a few ice packs in the cooler and had my cold drinks. But that was not too scientific. Instead, remembering the work of Rolex Award winner **Mohammed Bah Abba and his pot-in-pot cooling system** I hacked together a quick version of his cooler using peat moss instead of sand. It worked! **Then to service my other needs ☺**

The Rolex Awards

Making a Difference: Rolex supports outstanding projects in the fields of science, technology, exploration, environmental conservation and cultural heritage

Here are a few of the many **Rolex Award winners**:

Rolex Award Winner Hans Hendrikse

Hans and his brother, Pieter, designed the Q-Drum a low-cost rolling water container for developing countries.

Rolex Award Winner Makoto Murase

Murase is the first to develop practical ways to use rain on a large scale for urban environments.

Rolex Award Winner Steven Lurie Garrett

Steven develop a CFC-free refrigerator to help the ozone layer

Rolex Award Winner Forrest M. Mims III

Forrest designed an instrument, the Total Ozone Portable Spectrometer (TOPS), to monitor ozone, and other instruments to measure haze and water vapour.

Will Bill Gates Build Toilet 2.0?

The Bill & Melinda Gates Foundation has entered into a joint venture with the German government to improve sanitation in poor urban areas.

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Wanderings:

Citizen Science Alliance

"The Citizen Science Alliance is a collaboration of scientists, software developers and educators, who collectively develop, manage and utilise internet-based citizen science projects in order to further science itself, and the public understanding of both science and of the scientific process. These projects use the time, abilities and energies of a distributed community of citizen scientists who are our collaborators".

From Dust to Edge

Tim Dolan sent us this link that chronicles Jesus Hernandez's journey through the various steps that he took to make a knife blade out of homemade steel.

Rust Removal using Electrolysis

Do you have a severally rusted tool or other object? Why not use science to clean it up?

Electrolytic Rust Removal

Geoff Gariepy's YouTube Video demonstrates this rust removal process.

The Open ECG Project

The goal of the Open ECG Project is to develop an open source, low cost, and clinically functional electrocardiography solution.

A Toothpaste Diode?

This article shows how to build a diode with toothpaste. What other common materials could be used? Experiment!

Ben Krasnow's Blog

Ben's blog contains some of his favourite projects, which include everything from woodworking to electronics.

An Examination of the Amateur Scientist Circuit Board Nitrogen Laser

Jon Joss gives his views on the theory of the operation of this laser.

DIY Photo Bio Reactor

Here is Jared Bouck's appratus for producing algae.

What Can We Do With Algae?

Algae + CO2 = Biofuel

How To Make Springs

This 126-page tutorial will guide you through the design and fabrication of various types of springs.

Laser Microscope

Teravolt shows us how to build a quick and easy laser microscope.

Laser Projection Microscope

Here is another version of Teravolt's microscope.

Rob's Laser Microscope Build

And --- another one

Michael Gasperi's LEGO Mindstorms NXT/RCX Sensor Input Page

Michael has compiled a large resource of Mindstorm Sensors.

Webcam Based DIY Laser Rangefinder

Todd Danko has several interesting projects such as a laser range finder and **an Internet controlled stepper motor.**

Build a low cost DIY 3D scanner

Two Cornell University students design a low cost 3D Scanner.

David --- A 3D laser Scanner

Try DAVID, a free and easy-to-use software for low-cost 3D laser scanning! Try eBay for the Line Laser.
See DAVID on YouTube.

Fluid Scanning

Use milk or ink for 3D scanning.

How to Build a Machine to Produce Low-Energy Protons and Deuterons

Larry Cress built a Particle Accelerator that was featured in C. L. Stong's August 1971 ***Amateur Scientist* column**.
These YouTube videos show **Part #1** and **Part #2** of an updated version of Larry's accelerator.

The Theremin

The Theremin is a musical instrument, named for inventor Leon Theremin that uses electronic circuits to produce audible tones.

World Lunar Eclipse Calculator

This calculator will give critical information about recent and future lunar eclipses for any spot on the Earth. Scroll down the page and check out their other calculators.

Living Tongues Institute for Endangered Languages

The Living Tongues Institute for Endangered Languages is a non-profit organization dedicated to the documentation, revitalization, and maintenance of endangered languages.

The Enduring Voices Project

The goal of the Enduring Voices Project is to document endangered languages and prevent language extinction by identifying the most crucial areas where languages are endangered.

25 Amazing Ancient Beasts

Marlene Donnelly compiled this showcase illustrating the artistic representations of what some of the recently discovered fossils may have looked like in real life.

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The Kids Room:

Scientists Need Your Help!

Mars Scientists are asking students from around the world to help them understand the red planet.

The Canada Wide Virtual Science Fair

This is an annual online science and technology contest open to all Canadian students in grades K-12.

Newton --- Ask a Scientist

Newton is an electronic community for Science, Math, and Computer Science K-12 Educators that have been answering questions, since 1991,that help to enhance the knowledge of students and teachers alike.

The Magic Ring

“This physics illusion trick is relatively easy to perform, yet it's deceptive and eye-catching.”

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Suppliers And Stuff:

Wow! Can We Do That Again?

This e-book is a super quick & easy "hands on" guidebook, full of exciting, educational science demonstrations & experiments for students of all ages.

Solar Cell Kits

Here are several educational solar cell kits that can teach the basic principles of science and solar energy.

How Fast Was That?

Hammacher Schlemmer carries a Shirt Pocket Radar Gun.

The Amateur Scientist CD-ROM

There are several sources for this CD containing the complete collection of *Scientific American's* **"The Amateur Scientist"** column from 1928 to its final cancellation in 2001.

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Random Samples:

The Models of Dr. Young Park

A retired dentist turns his skills to making aluminum aircraft models

DIY Is Not a New Phenomenon

Pre-WWII children were expected to entertain themselves. With no TV, Xbox or Internet what were they to do? They used their hands, imagination and the many books and magazines that showed them how to build things. For example check out **Boys Books** at **Lindsay Publications**, **The American Boy's Handy Book** and **The Boy Mechanic**.

WorldCat

WorldCat is an on line service that lets you search the of library collections in your community and thousands more around the world.

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On The Lighter Side:

Home Made Roller Coaster

Some people have too much time on their hands ☺ This is a good example of physics in action.

Rube Goldberg Machine

Someone else has too much time on their hands.

Honda - The Cog

Turn your Honda into a Rube Goldberg Machine.

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From The Far Side:

Out Of Their Minds

Canada's CBC Radio is running a series, Out of Their Minds that examines exciting ideas and inventions, and the heretical thinkers behind them. It will feature in-depth documentaries on inventors and innovators with novel approaches to seemingly intractable problems.

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THE NEW WANDERINGS

No. 6

01 September 2011

Wanderings:

Arduino, Gyroscope and Processing

This Instructable shows how to use an Arduino to read and plot the output from a XV81-000 gyro sensor.

Accelerometer & Gyro Tutorial

This Instructable is a tutorial on the use of accelerometers and gyros.

Guide to Gyro and Accelerometer with Arduino Including Kalman Filtering

This Guide was found on the **Arduino Forum**.

The Curious Inventor Guides

Here is a collection of Guides, on various topics, from *The Curious Inventor.*

Science for Citizens

Science for Citizens allows the average person to discover, to take part in, and to contribute to science through recreational activities and research projects.

Brian Wesley Rich's Science Web Site

Over the years, Brian has built up a collection of experiments that he has conducted with kids.

Professor Mark Csele's Homebuilt Laser Page

Mark discusses the various designs of DIY lasers.

How to Build a Simple T.E.A. Laser

Here is an Instructable showing a simple T.E.A. laser design.

Qualitative Analysis of a Jade-Like Rock from North-Western Washington

This is a detailed step by step account of the analysis of an unknown mineral sample.

Make Your Own Plankton Sieves

The New England Coastal Wildlife Alliance shows us how to make simple sieves.

Build a Large DIY Sundial

This **Instructable** shows you how to draw a large sundial in your driveway.

Nestor's Micrometer

In this **Instructable**, Trevor Nestor shows us how to build a *Quantum Laser Micrometer*

Test for the Dominant Side of Your Brain/

This is weird! It seems that I can change the rotation of the dancer at will! Give it a try and see if you can, also.

Determining Your Dominant Eye

Here is a simple test that will determine your dominant eye.

The Museum of Retro Technology

This site should give you many hours of interesting reading. Than, if you enjoyed the museum have a look at this collection of **Unusual Steam Locomotives**.

The Roswell Incident

No, it's not about "that incident"! It's about Robert Goddard, who was one of the fathers of modern rocketry.

STEREO

This NASA system consists of two space-based observatories - one ahead of Earth in its orbit, the other trailing behind. With this new pair of viewpoints, scientists will be able to see the structure and evolution of solar storms as they blast from the Sun and move out through space.

Ninety-Five Percent Of Objects In Earth Orbit Are Human-Made.

This NASA simulation gives us an idea of the amount of objects that are orbiting the Earth.

Footprints in the Sand

Foot prints, that are thought to be around 6000 years old, have been discovered on the beach at Formby Point, UK.

Fish with Transparent Head Filmed

Many strange creatures roam the deeps.

Wireless Data from Every Light Bulb

Harald Haas asks "What if every light bulb in the world could also transmit data?" View this and other interesting presentations at **TED**.

TED Conversations

TED's new feature enables us to share our ideas, ask questions or join in a debate with other people across the globe.

Rock Snot

Rock Snot or didymosphenia geminata, a type of slimy, yellow-brown, freshwater algae is now considered a global invasive species,

Science 2.0

Science 2.0 encompasses collaboration, communication, participation and publication among an audience that is interested in the sciences.

What's Wrong With The Second Law?

Johannes Koelman, the Hammock Physicist, discusses The Second Law of Thermodynamics.

I am in the process of modifying a rifle sight and need to drill and tap a hole for a 7/32 - 40 machine screw. Since this is a non-standard size I had to revert to e-bay to find a tap. But what size drill should I use? Again I searched the Internet but could not find this screw size in any of the common Screw – Drill – Tap tables.

Further searching turned up this **Tap Drill Calculator for Inch Sizes** which gave me a drill size of 0.1944 inches. I than used the **Decimal Equivalents for Drill Sizes Table** and found that the closest drill size was a No. 10 (0.1935).

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The Kids Room:

Are you thinking of going on to university next year? To help you in your selection of a school, the following two sources may be of interest:

Quacquarelli Symonds World University Rankings

Times Higher Education's list

The Eratosthenes Experiment

This is a Worldwide Science and Math Experiment that enables the student to measure the circumference of the Earth on 23 September 2011.

Who Was Eratosthenes?

Eratosthenes was the first person to calculate the circumference of the earth

The Goal of the Noon Day Project

This is another version of the Eratosthenes Project.

What is Local Noon?

Information about gnomons, sundials and related matters

The Center for Innovation in Engineering and Science Education

The Center sponsors and designs interdisciplinary projects that teachers can use to enhance their curriculum.

Science Buddies

Science Buddies offers free science fair project ideas, answers and tools for the serious student.

Use a Laser Pointer to Measure the Data Track Spacing on CDs and DVDs

This is an example of the quality of the Science Buddies projects.

ScienceForums.Net!

ScienceForums.Net! welcomes science discussion at all levels — from beginners to researchers, covering topics from biology to computer science.

Sciencetoys

Simon Quellen Field shows you how to make toys at home with common household materials, often in only a few minutes, that demonstrate fascinating scientific principles.

Toying With Science

Toying with Science is Simon Quellen Field's Blog containing a series of short essays on scientific topics.

Science Teacher Resources

CR Scientific has a collection of simple experiments in chemistry, mineralogy, biochemistry, and microbiology

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Random Samples:

Rao and His Hand Shadows

I remember seeing this guy on the Ed Sullivan Show, years ago.

Shadows in Science & Art

The CoolStuff Newsletter #23 from Arbor Scientific features the art of **Eric Grohe** and **Julian Beever**.

Cycle Karting

CycleKarts are small, lightweight, nimble machines made by their drivers for the pursuit of motoring sport.

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Suppliers and Stuff:

LaserGlow

LaserGlow carries an extensive selection of various types of laser modules.

LaserDIY

LaserDIY is a small but growing company dedicated to innovations in laser technology.

Edmund Optics Inc

Here is a great source of components for your optical project.

Edmund Scientific

Edmund Scientific has always carried a diverse array of interesting items.

Genetic Genealogy

Through DNA analysis, Genetic Genealogy may be able to trace the path of your ancestors and find out who they were, where they lived and how they have migrated throughout the world.

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On The Lighter Side:

The Elements

Here is an amusing look at the Periodic Table by Tom Lehrer.

A Shadow in Flat Land

A teacher uses a projector to create the illusion that his shadow isn't following him!

Another Rube Goldberg Contraption

See what happens when geeks use science and enter the realm of Rube Goldberg.

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THE NEW WANDERINGS

No. 7

01 October 2011

Starting, in this month's column, I will be including a section covering interesting items that were found on the ***Instructables***, ***YouTube*** & ***Make*** sites.

Feature:

It is amazing how simple "low tech" technologies can vastly improve the day to day life of the peoples in the so called developing countries.

For example:

Mohammed Bah Abba and His Pot-in-Pot Cooling System

This device allows, people in tropical countries, to preserve their produce for several days as opposed to several hours.\

The Malian Peanut Sheller

A simple, locally produced, machine has come to make a big difference in the lives of many villagers around the world. It is capable of shelling 50 kilograms of raw, sun-dried nuts per hour.

Build a DIY Universal Nut Sheller

This Instructable takes you through the steps in building your own sheller.

The Rocket Stove

This is a simple highly efficient stove that can be constructed from many different materials. The top of the line stoves are constructed, in a shop, from steel while at the other end of the spectrum, a villager can build his/her rocket stove from mud.

Solar Cookers International

Solar Cookers International (SCI) spreads solar cooking technology worldwide, particularly in areas with plentiful sunshine and diminishing sources of cooking fuel. This is a technology that can largely eliminate the time women spend in collecting fire wood for their cooking fires.

Solar Pasteurisation

The lowly discarded 2L plastic soda-pop bottles can be turned into a remarkably simple method of producing drinkable water. The bottles are filled with bacterially contaminated water and placed in the sun. A combination of ultra-violet radiation and temperature rise makes the water suitable for human consumption. See the UNESCO report on **Solar Disinfection.**

Isang Litrong Liwanag

This is another example of "pop bottle technology" that was recently brought to my attention. "Isang Litrong Liwanag (A Litre of Light) is a sustainable lighting project which aims to bring the eco-friendly Solar Bottle Bulb to under privileged communities in the Philippians. Designed and developed by students from the Massachusetts Institute of Technology (MIT), the Solar Bottle Bulb is based on the principles of Appropriate Technologies – a concept that provides simple and easily replicable technologies that address basic needs in developing communities."

The Solar Bottle Light

This is a step-by-step illustration of how the bulbs are built and installed.

Ten Examples of Appropriate Technology

This list is an example of appropriate technologies that have enhansed the daily life of many people.

MyShelter Foundation

The Litre of Light Project is sponsored by *MyShelter Foundation* which was established by Illac Diaz to create a system of sustainability and reliability through its capability-building and employment-generating projects.

The Full Belly Project

The Full Belly Project is a non-profit organization dedicated to empowering people, in rural communities, by training local people to manufacture our appropriate technologies.

Welcome to Village Earth!

Village Earth is a growing network of organizations and people all working together to support marginalized communities to have greater control over the decisions and resources that shape their lives.

These are but a few examples of sustainable, grass roots or DIY technology. This field is wide open for the Citizen Scientist to, perhaps, make a contribution.

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Wanderings:

Scrap to Power

This is the home of re-purposed trash! The author likes to find new uses for the old-broken-useless stuff we all seem to throw away too often.

Brian's Pop Can Solar Heater

Here's what you can do with all of those empty pop cans that you have collected.

Build It Solar

On this site, Do-It-Yourselfers will find the plans for a wide variety of solar space heating projects that they can build. Search on "beer" for a version of the Pop Can Heater.

The Solar Power Forum

Besides the exchange on the pop can heaters, the forum contains many discussions relating to other DIY solar projects.

The Physicist's Fireplace

The Texas Fireframe® grate was invented by PhD physicist Dr. Lawrence Cranberg for greater fireplace efficiency.

Views from Science

In his Web Site, Eli Silk, describes some of his work in Amateur Science.

Low Temperature Differential Stirling Engine Designs

For several years, Hubert Stierhof has been developing Stirling engines with hopes of finding a design that is applicable for the needs of Third World countries, to serve as solar water pumps or small scale power stations (< 50 Watts).

Nightmares of the Art of Measuring

G. Hathaway compiled and edited this list that contains some of the problems and pitfalls that experimental scientist may encounter during the course of an investigation.

Amateur Scientist's Guide to Water Quality Monitoring Observations

NASA presents these guide lines in order to assist the amateur scientist in measuring and understanding the factors that influence water quality in their area

Time in Motion: the Story of the Sea Clock or Harrison's Chronometers

In October 2010, my wife and I were fortunate to be able to spend a week in London, UK. Among our many activities we were able to visit and **The Royal Observatory** and **The National Maritime Museum** where we saw John Harrison's Sea Clocks.

Museo Leonardiano da Vinci

The week before London we went to Vinci, Italy, hoping to see the Leonardo Museum. But, unfortunately, it had closed, for renovations, the previous day.

Math, Science & Technology @ h2g2

"h2g2 stands for *'The Hitchhiker's Guide to the Galaxy'* - an unconventional guide to ***Life***, ***The Universe*** and ***Everything*****.** This site - the Earth Edition of the Guide - is an encyclopaedic project contributed to by people from all over the world."

MadLabs!

Mad Labs is dedicated to fun science. This site contains experiments and projects that you can do in the classroom.

Can I, or Can't I, See the Aurora?

NOAA's Space Weather Center says that "Being able to see the Aurora depends mainly on two factors, geomagnetic activity (the degree of disturbance of the earth's magnetic field at the time) and your geographic location."

What Was the First Personal Computer?

You might be surprised with the answer.

The Ten Most Beautiful Experiments

George Johnson reads from his book – *The Ten Most Beautiful Experiments*.

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From Instructables, YouTube & Make:

Arduino Project Board

This little project board will allow you to free up your Arduino for other projects.

Bootload an Arduino with a ZIF Socket

Bootloading an Arduino with a ZIF socket allows you to easily program the **ATMEGA328** chips for use in other circuits.

DIY EEG

Connect a **Star Wars Force Trainer** to an Arduino for your own home brewed **EEG**.

How to Build a T.E.A. Laser

Here is another simple DIY T.E.A. Laser

Faraday Rotation

In this experiment, a high school student recreates Faraday's 1845 experiment in which he used a powerful electromagnet to rotate the polarization of a beam of light.

How to Smell Pollutants

Use an Arduino and a **Figaro** TGS2620 gas sensor to detect the relative gas levels that are given out by volatile organic compounds.

DIY Microtome

A microtome is a device that is used to cut biological specimens into very thin slices. This link shows how you can build a microtome from LEGO components.

DIY Micro-Photography

Here are two easy ways to take pictures through a microscope, one with a point and shoot camera and one with a cheap webcam.

Catch a Falling Star

With a little more equipment than a magnet and a microscope you can collect and view micro meteorites.

Make Your Own Slide Rule

Before the advent of hand held calculators, in the early 70's, we used slide rules to perform complex calculations. Try building your own and see how we did it.

How to Use a Slide Rule

Now that you made a slide rule, here's how to use it.

The Circular Slide Rule

The circular slide rule was a compact version of the more common linear rule.

The Curta Calculator

And than there was the **Curta Calculator**

Beginning Soft Circuits/

Use these Instructables to get started with projects to light up your clothes and perhaps, you too, can be arrested as a terrorist and than banned from Logan airport like **MIT student Star Simpson**.

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The Kids Room:

Ask the Van

Volunteers with the **Physics Van** outreach program at the Department of Physics at the University of Illinois have been answering questions online since 1998.

SciGirls

This PBS site is for girls who are interested in the sciences.

Make a Battery and Discover the Reactions Involved

This site shows you how to build a battery from common kitchen items and explains what is going on. Be sure to check out their other experiments in the "Kid's Stuff" section.

Build the SprutBot

This simple little robot will follow a line. The author provides an explanation on how it works. This would make a great start to a school project.

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On The Lighter Side:

The of the 2011 Ig Nobel Prize

Here Are the Winners of the 2011, and earlier, Ig Nobel Prizes that are presented annually by **The Annals of Improbable Research**.

MSDS: Dihydrogen Monoxide

Dihydrogen monoxide, also known as hydric acid, is responsible for injury, death, and property damage all over the world. Visit the **Dihydrogen Monoxide Research Division** online at **www.dhmo.org**.

Humour in the Work Place

WorkJoke is a jokes orientated web site dedicated to profession related jokes.

Physicists Jokes

Chemists Jokes

Biologists Jokes

Mathematicians Jokes

Engineers Jokes

Technicians Jokes

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From The Far Side:

The End of the World October 21, 2011

Harold Camping and Family Radio try again!

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THE NEW WANDERINGS

No. 8

01 November 2011

Feature:

I think that we can all agree that since its introduction, the Arduino micro controller has made quite a stir in the fields of Arts, Science and Technology. Therefore, this month I am presenting another *Feature* on the popular Arduino Microcontroller system.

An Introduction to the Arduino

The Arduino and clones are great, inexpensive microcontroller systems!

An Arduino Course

This collection of Arduino tutorials concentrates on the software side of Arduino work, inevitably, substantial information is also provided on hardware issues.

Arduino "How To's", Goodies, and Projects

This site is for those of you who are looking for write-ups of how to do specific things with an Arduino or for information on things you want to connect to your Arduino.

Proto-DAC Shield for Arduino

With 16 resistors you can build a simple digital-to-analog converter (DAC) that allows you to experiment and learn DACs do and how they do it.

How-To: Shrinkify Your Arduino Projects

Shrink your Arduino application to a single 8-pin package.

Programming an ATtiny45 with an Arduino

This tutorial shows you how to program an ATtiny45 or ATtiny85 microcontroller using the Arduino software and hardware.

The Arduino Analog to Digital Converter

This article demonstrates how to use the Arduino's onboard AtoD converter.

Great 18-Bit ADC for GPS and Proto Shield Sensor Logging

The Arduino's ADC is not suitable for many sensors like thermocouples or bridge sensing for pressure, strain, and force. Also it has fairly low dynamic impedance since it has no buffer amplifier.

The Arduino Analog Input Pins

Here is a description of the analog input pins on an Arduino chips (Atmega8, Atmega168, Atmega328, or Atmega1280).

The World Famous Index of Arduino & Freeduino Knowledge

This is an evolving index of practical subjects for the Arduino and Freeduino microcontrollers.

Instructable: Arduino

The Instructables editors have chosen some of their best DIY Arduino projects to educate and inspire you to make great things with easily available tools.

Make: Arduino

Arduino resources on the Make: web site.

Arduino Rocket Launcher

The author, feeling the need to create something needlessly complicated to short a battery across the ignitor of a rocket motor, turned to his Arduino Mega.

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Wanderings:

The Aurora Detector

This site shows how to build several devices that will detect the presence of the **Northern Lights or Aurora Borealis** by monitoring the earth's magnetic field

More Aurora Detectors

A simple DIY magnetometer may be used to detect the Aurora Borealis.

The OpenEEG Project

The OpenEEG project is a source of plans and software for DIY EEG devices.

Star Wars Science - Force Trainer

This "toy" uses **EEG technology to read your alpha and beta brain waves** to control the levitation of a ball. It's a simple task to hack into the game and possibly control other tasks. See --- **Brain Control for the Arduino**.

The Flat Earth Academy

The Flat Earth Academy is a website where any enterprising person can learn useful "stuff". The author's background is in the sciences, so that is where the first and most extensive Good Stuff will be.

PAControl

This website is a source of free information relating to process control and automation. For example have a look at the free workbook --- "***Process Control Systems for Control of Temperature, Flow and Filling Level***."

Anodizing Aluminum

On Frank J. Hoose's "machine shop" site, he includes information and links for those who may be interested in anodizing aluminum.

An Open Source Pendulum Sensor Kit

An Arduino is used to calculate the pendulum's period and the results are displayed on a graphic LCD or on a computer. The pendulum can be used to investigate the relation between the pendulum's length or mass and period. The device can also be used as a gravity meter to determine acceleration due to gravity "g".

The Magnet Man: Cool Experiments with Magnets

This web site is devoted to magnetism and the cool experiments you can do with permanent magnets and electro-magnets. He, also, includes the plans for a simple **DIY Gauss Meter**.

The Fundamentals of Electrostatic Discharge

This tutorial should be useful to anyone working with electrostatic discharge devices (**Van de Graaff Generator**) or working with static sensitive electronic components or devices.

An Earthquake Demonstration and Exploration Tool

Kelsey Linton and Ross S. Stein at the **U.S. Geological Survey** demonstrate QuakeCaster, an earthquake teaching tool.

The History of Malaria

Malaria, a widespread and potentially lethal infectious disease, has afflicted people for much of human history.

World's Smallest Motor: 1 Nanometre in Diameter

Chemists at Tufts University have invented the world's smallest electric motor. I bet that **Richard Feynman** would have been very excited at this development in **nano-technology**.

Icecube Searches for Neutrinos

The Icecube Telescope is a sub-atomic particle detector that is located at the South Pole. IceCube searches for neutrinos from the most violent astrophysical sources: events like exploding stars and gamma ray bursts.

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From Instructables, YouTube & Make:

Instructable: A DIY 10 HP Hovercraft

When you get tired of mowing your lawn, why not pull the motor from the mower and build a hovercraft?

Instructable: Perpetual Motion Machine

Who says that perpetual motion is impossible? Build this real-life version of M. C. Escher's Waterfall and prove them wrong ☺

Instructables: LED Infinity Mirror

I saw something like this in a hotel room in Italy. It was quite awesome.

Instructables: How to Prepare an Electrophoresis Argarose Gel

This Instructable illustrates the process of casting, loading, and processing an electrophoresis argarose gel, which is capable of separating biological molecules, based on size and weight by utilizing electricity.

YouTube: The Rope Pump

This is a design of a simple water pump.

YouTube: 2000-Year-Old Computer Recreated

This is a demonstration of the recreation of an ancient Greek analogue computer.

YouTube: The Greek Antikythera Mechanism

Michael Wright explains his reconstruction is greater detail.

YouTube: Virtual Reconstruction of the Antikythera Mechanism

To see just how much effort Michael Wright put into building his reconstruction have a look at this virtual model.

YouTube: A Solar Powered, Magnetically Levitated Motor

This would make a nice desktop conversation piece.

Levitation Device

These levitation toys have been available, commercially, for some time, but why not make your own?

Make: Gyrocar

Most of us have played with a toy gyroscope at one time or another. This clip will show you how to convert one into an ingenious gyrocar.

Make: DIY Transistor from a CdS Photocell

Nyle Steiner does it again!

Make: DIY T.E.A. Ultraviolet Laser Made from Scrap Aluminum

Here is another simple T.E.A. laser design.

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The Kids Room:

Motion Mountain: The Free Physics Textbook

This free Physics eBook consists of 6 pdf volumes (170 MB).

"These pdf's tell, using hundreds of colour pictures and embedded films, about animals and sport (mechanics, gravity and heat), about the sky at night (relativity and the structure of the universe), about lightning, lasers and nerves (electricity, optics, the brain, language and truth), and about colours, pleasure and the stars (basic and advanced quantum physics, including nuclear physics and radioactivity)."

Prepare for the Science Fair

This animation, by Kevin Temmer, shows you how to prepare for a Science Fair.

Donald-Duck-In-Mathmagic-Land Part 1/3

Disney and Donald-Duck team up and explore the world of mathametics.

Part 2/3

Part 3/3

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Women in Science:

Scientist in a Strange Land

The September, 2011, issue of *Popular Science* had an article, *Scientist in a Strange Land,* about Felisa Wolfe-Simon and the backlash that surrounded her announcement that her research team had isolated bacteria that could subsist on arsenic in place of phosphorus. What was the reason for this controversy? Bad science? The media? Or what?

Felisa Wolfe-Simon's Original Paper

Here is Felisa's original paper as appeared in *Science.*

Felisa Wolfe-Simon's Response

This is Felisa Wolfe-Simon's response to concerns regarding her discovery.

Felisa Wolfe-Simon's CV

You can view Felisa Wolfe-Simon's CV and Publications on line.

Further Reading

You can view other articles, about this subject, at *Science*.

Random Samples:

The Barefoot College

The Barefoot College was founded in 1972 by Bunker Roy. The College is a place where "Rural men and women irrespective of age, who are barely literate or not at all, and have no hope of getting even the lowest government job, are being trained to work as day and night school teachers, doctors, midwives, dentists, health workers, *balsevikas*, solar engineers, solar cooker engineers, water drillers, hand pump mechanics, architects, artisans, designers, masons, communicators, water testers, phone operators, blacksmiths, carpenters, computer instructors, accountants and *kabaad-se-jugaad* professionals".

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Suppliers and Stuff:

Scientific American's "The Amateur Scientist" [CD-ROM]

This CD contains the complete The Amateur Scientist columns from Ingalls to Carlson.

Newton

The Newton software package provides a completely new way of learning and teaching physics. Build, manipulate or investigate real-life 3D physics experiments interactively and solve problems.

Ford Model "T" Spark Coil

Induction coils, of one form or another, were once standard equipment in any well equipment science laboratory. Do you have one? I do!

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On The Lighter Side:

How to Rise Baby Praying Mantis

This item brought back memories. Long, long ago when I was about 9 +/- years old I found a bunch of **strange things** attached to some branches. I did not know what they were but being inquisitive; I collected a bunch to bring home. I then put them on the back porch and quickly forgot about them. Some time later I went out to the porch and to my surprise there were thousands of tiny baby Praying Mantis all over the place! I can't remember what happened next but I can still picture that horde of little critters ☺

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From The Far Side:

Space Energy Test? (2-23-1994)

This is an excellent example of how a person, who has no understanding of "first year" DC theory, can come up with an outrageous explanation of how things work.

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THE NEW WANDERINGS

No. 9

01 December 2011

Feature:

This year the **Winter Solstice** will occure on 22 December @ 05:30 **UTC** and is generally regarded as the first day of winter. But, actually, the ancient peoples, such as those who inhabited Ireland and the British Isles, celebrated the Winter Solstice as Mid Winter and they rejoiced in the fact that the days were becaming longer. The **Solstices** and **Equinoxes** were regarded as mid seasons and not the start of the **seasons**, as we do today.

It is thought that many of these peoples built structures in order to display the Sun's path thus indicate the changing seasons.

Newgrange Ireland

Newgrange was built during the Neolithic or New Stone Age and is older than Stonehenge in England and the Great Pyramid of Giza

The Winter Solstice at Newgrange

During the Winter Solstice sunrise, the sun light reaches back into the main chamber.

YouTube: Stonehenge at Mid-Summer and Mid-Winter

This video is a simulation or the sun rise at the Summer and Winter Solstices at a re-constructed monument.

Megaliths and Sheep

It seems that sheep like to hang around of megalithic sites

YouTube: Loughcrew - Spring Equinox 2005

In this video clip we can see the rising sun, on the spring equinox, can be seen illuminating the passage and chamber at the 5000 year old Loughcrew megalithic cairn T in Ireland,

The Gungywamp Chambers,

The Gungywamp Complex, located in Groton, Connecticut appears to have, also, been constructed to indicate the equinox. But who built it?

The Forgotten Technology?

W.T. Wallington presents a theory depicting how the ancient engineers may have moved heavy stone.

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Wanderings:

The Society for Amateur Scientists

Have you wondered what happened to *The Society for Amateur Scientists'* Web Site --- **www.sas.org**? For some reason it was changed to **www.soamsci.org** .Unfortunately, many of the site's links are broken because they refer back to the old sas.org domain.

An Automated System for Detecting Meteors

Rick Boozer takes us through the trial and errors that he encountered in developing this project. You should check out the other items on his **Astronomy Blog**.

Amateur Magnetometer

Tom Field built this torsion magnetometer following the directions that may be found on **Scientific American's "The Amateur Scientist". [CD-ROM]** **---** (January 1999 & March 2000)**.**

Tom also developed a Windows program, **LaserTrack.exe** that will capture and plot a webcam's video of the laser spot's movement. This program may find use in other applications.

Build High Resolution Spectrograph

Science Toys shows you how to build a fairly simple high resolution recording spectrograph. Be sure to browse through the rest of the Web site.

Techlib

Charles Wenzel's Techlib site is an excellent source of DIY projects for the advanced amateur.

Amateur Experimental Rocketry

Aerospace Engineer (aka Rocket Scientist) by day --- dedicated amateur rocketeer by night, Richard Nakka may be thought of as one of the gurus in the exciting and challenging field of Amateur Experimental Rocketry which, unlike, Model Rocketry or High Power Rocketry is an activity whereby the rockets are designed and constructed entirely from "scratch".

QU8K

On 30 September 2011, Derek Deville's *Qu8k* soared to an altitude of 121,000 ft from the launchpad at Black Rock Desert, Nevada.

Air Command: Water Rockets

The *Air Command* has a pretty good site covering the construction of water rockets and their components.

Water Rocket Simulation

This program performs a numerical simulation of your rocket's entire flight.

Yahoo Groups: Water Rockets

This group provides a one-stop forum on homemade rockets that are powered by compressed air and water.

A LEGO Based ROV

Amos G. Winter built a LEGO Remote Operated vehicle (ROV) using the LEGO MindStorms Robotics Kit

The Sea Perch Program

The Sea Perch, designed by the MIT Sea Grant College Program, is a simple, remotely operated underwater vehicle, or ROV, made from PVC pipe and other inexpensive, easily available materials.

Sea Perch Construction Manual

Interested? Then, here is *The Sea Perch Construction Manual*.

Homebuilt Remote Operated Vehicles

This is an excellent resource for anyone who is thinking of building a ROV.

Build Your Own Underwater Robot and Other Wet Projects

This book, by Harry Bohm and Vickie Jensen, is a good starting place.

Yahoo Groups: Robotrov --- Robotics and ROV's

This Group is a place for builders of remotely operated vehicles or ROV's. It is a great resource for those who may be interested in underwater vehicles.

How to Stain PVC

You can use this procedure to stain the PVC components of your ROV a nice yellow so that the ROV will have a greater visibility.

Citizen of Science

The author hopes that with the use of recycled and second-hand items, individuals and teachers will use this blog to bring back the joys of doing science.

PopSci 5-Minute Project: Disc Doctor

Megan, at Popsci 5 Minute Projects shows us how to repair a scratched CD or DVD. I have used tooth paste, myself, and it works. Also, did you notice the rainbow of colours reflecting off of the CD? Mike Haney makes use of this feature in the next item.

PopSci.com 5-Minute Project Video: Cereal Box Spectrometer

Mike, a Popsci 5 Minute Projects editor, uses an old cereal box and a CD to build a simple spectrometer.

PopSci 5-Minute Project: Archive

Check out their other clips. You might find some interesting items.

Notes on Workshop Techniques

The Model Engineers Support Page has a series of articles describing machining techniques and tricks to get the best out of your workshop machinery.

Cochlear Implant

My sister-in-law is deaf and several years ago she opted for a 16-channel cochlear implant.

Cochlear Implant Samples

I have always wondered what my sister-in-law's implant sounds like. Alan Alda and PBS' *Scientific American Frontiers* provide us with some cochlear implant sound samples. You will notice that the quality improves with the number of channels

Mystery of the Super Flood

On Sunday, 6 Nov. 2011, I watched *The Passonate Eye* on CBC TV. The program was about how an enormous catastrophic flood created the Scablands, in eastern Washington State. **Harlen Bretz**, the geologist who originated this flood hypothesis was black listed by his peers.

USGS: The Channelled Scablands of Eastern Washington

This e-book, by the USGS, tells the geologic story of the Spokane Flood.

Discover the Ice Age Floods

The catastrophic floods from Glacial Lake Missoula and Lake Bonneville are among the largest known floods in geologic history.

The theory of the formation of the Scablands is used as fodder in the ongoing Creationist / Evolutionist Debates.

The CPU Shack Museum

"In my daily hunt for new processors, and other chips for the museum, as well as information about new chips, I constantly come across interesting chips, in strange locations. Here you will get a chance to learn where many of the chips in the museum come from and what they are."

The Royal Society

Brittan's Royal Society is a fellowship of the world's most eminent scientists and is the oldest scientific academy in continuous existence.

Royal Society's Journal Archive

The Royal Society's Journal Archive has been opened up for free online search and access. Here are a few examples of the items that can be found on the site:

- **A Letter from Benjamin Franklin Regarding His Electrical Kite**
- **A Letter of Isaac Newton Containing His Theory of Light**
- **A Geological Paper by Charles Darwin**

Dyslexie: A New Font That May Help Dyslexics Read More Easily

The Dyslexie font was created by Christian Boer, a dyslexic Dutch graphic designer.

Synthetic Lint Ends Up In Oceans

Science News reports that researchers are finding that lint, from washing polyester garments, is contributing to ocean pollution.

Laundry Lint Pollutes the World's Oceans

Here is *Science Magazine's* version of the "lint" story.

Columbus' Arrival in the New World may Have Caused a Mini-Ice Age

Did Columbus and the subsequent explorers set off a chain of events that cooled Europe's climate by causing a carbon dioxide drop?
Be sure to read the "comments".

A Skeptic's Own Study Finds Climate Change Real

Seth Borenstein, of The Associated Press, reports that **Richard Muller**, a prominent skeptic of global warming has determined that temperatures are actually rising.

Climate Experts: More Weather Disasters Ahead

Here is another item from Seth Borenstein, of The Associated Press --- "The final draft of the report from a panel of the world's top climate scientists paints a wild future for a world already weary of weather catastrophes costing billions of dollars."

Solar Light for Africa

Solar Light for Africa is a non-government organization (NGO) whose mission is to transform the lives of the people of Africa by providing them with light and energy using solar power.

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From Instructables, YouTube and Make:

YouTube: How to make a PVC Membrane Pipe

A Membrane Pipe is an easily made musical instrument.

YouTube: Claricano

The Claricano or membrane pipe can be tuned and used to play music.

YouTube: Claricano Drone

Kick up the Claricano a notch by adding a **drone** or two or three ☺

YouTube: How to make a Straw Kazoo

A number of years ago, a co-worker asked me if I knew of a simple musical instrument that his child could make for a school science project. I suggested a simple reed instrument similar to the one that is shown in this clip.

YouTube: US Govt. Clears Scientists of Charges That They Manipulated Data

"U.S. officials have cleared scientists of charges that they manipulated data about climate change in e-mails that were stolen from a British university in 2009, triggering a climate scandal. The US government has now officially concluded that the so-called controversy was anything but."

YouTube: Continental Drift --- The Evolution of the Earth

This YouTube simulation shows how the Earth may have evolved into tour present day continental distribution.

YouTube: Silver Soldering For Beginners

Silver Soldering produces a much stronger joint than ordinary tin/lead solder. Here is a short video that shows how to get started with silver solder.

YouTube: Water Rocket Variable Nozzle

This is a simple way to vary the thrust from a water rocket.

Exploring Radioactivity with a Homemade Cloud Chamber

Samuel Fonteneau documents his observations resulting from his experiments with a Cloud Chamber.

YouTube: A Simple DIY Cloud Chamber

A Cloud Chamber allows you to view decay of radioactive materials. This is a fairly simple chamber to build, as long as you have a source of dry ice.

YouTube: Expansion Cloud Chamber

Expansion type Cloud Chambers do not need dry ice for their operation.

YouTube: Turn Almost Anything into a Theremin

Make music with a **Drawdio**.

Instructable: Projects for Science Classes

Author, Kiteman, has a number of projects that may be useful as science lessons, either as activities for students, or as demonstrations by teachers or parents.

Instructable: Cloud Chamber Using Peltier Coolers

Rich Olson, of **Nothing Labs**, shows how he built his **Peltier** cooled Cloud Chamber. **See Peltier Coolers on eBay**.

Instructable: Mad Science Fair

"Bring out all of your devious scientific experiments for your chance to win a complete pet jellyfish kit from Jellyfish Art or a Celestron USB microscope. We are looking for all home-made, fringe, or just plain weird science projects, regardless of scientific field." Note --- The contest closes 26 December 2011.

Instructable: EMG Biofeedback

This **Electromyography (EMG)** will give you an indication of muscle activity.

Instructable: Pocket Lathe

The author built this lathe to make a miniature chess set.

Instructable: Mini Metal Lathe

Here is another small DIY lathe from the same author. It needs a bit more work before it can become a useful metal lathe.

Instructable: A DIY ROV Thruster

A ROV thruster can be constructed from a modified Rule bilge pump.

Instructable: Make a DIY Piezoelectric Crystal

This Instructable shows you how to grow Rochelle Salt crystals.

Instructable: How to Build a Rubber Band Heat Engine

I recall seeing a similar heat engine in *Scientific American's - Amateur Scientist* a number of years ago.

Instructable: Grow Your Own Bioluminescent Algae

These algae will only flash when disturbed during their night cycle. If you're looking for something which will constantly glow, you should check out bioluminescent bacteria instead.

Grow Your Own Bioluminescent Bacteria

This article will help get you started in cultivating bioluminescent bacteria such as **vibrio fischeri**.

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The Kids Room:

Science Toys

Make toys with common household materials that demonstrate fascinating scientific principles.

The Science Toy Maker

This is a teacher-created site for people who like to roll up their sleeves and make science toys and projects.

Science Buddies

Are you looking for inspiration for a science fair project or are you in need of fun, at-home science experiments? Then Science Buddies is for you! They have over 1,000 project ideas in all areas of science."

Guidebook to Constructing Inexpensive Science Teaching Equipment

This guidebook provides instructions for building a wide selection of science teaching equipment. Note this is a large, 54 MB, pdf file that will take a while to download and open.

Astronomy 161: The Solar System

Astronomy 161 is an on-line semester covering, primarily, the Solar System.

Astronomy 162 Stars, Galaxies, and Cosmology

In this on-line semester, our perspective widens to look at the entire Universe.

The Gateway

The Gateway hopes to be the world's leading digital library and metadata cooperative, helping educators serve students by providing access to educational knowledge through cutting edge innovation and collaboration.

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Random Samples:

Playing for Change

Music has the universal power to transcend and unite us as one human race. With this firmly fixed in their minds, the crew, with their audio/video squipment, set out to share it with the world.

"Sittin on the Dock of the Bay"

Here is an example of *Playing for Change's* achievement of compiling the works of musicians from around the world into one performance.

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Suppliers and Stuff:

Scientific American's "The Amateur Scientist" [CD-ROM]

This CD contains the complete The Amateur Scientist columns from Ingalls to Carlson.

Starry Night

Simulation Curriculum Corp offers a full range of Astronomy simulation programs.

Create a Customized Map

Map Sherpa guides you through the steps to create and download your custom map.

Makershed: A $99 Geiger Counter Kit

This Geiger Counter kit is able to detect beta and gamma radiation.

Makershed: A DIY Hologram Kit

This $99 Hologram Kit contains everything that you will need to produce holograms.

Makershed: Microcontroller Kits

The Makershed has two Arduino based microcontroller kits.

- **Ultimate Microcontroller Pack**
- **Getting Started with Arduino Kit v3.0**

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On The Lighter Side:

Need a Paper?

SCIgen, from MIT, is an automatic CS paper generator.

Need to Complain?

Scott Pakin's automatic complaint-letter generator will fill your needs.

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From The Far Side:

Brown's Gas

Is Brown's Gas simply *oxyhydroge*n, a mixture of hydrogen and oxygen ($2H_2 + O_2$)? Or is it some **wonderful discovery** (HHO) that could allow us to run our cars on water or neutralize the radiation from radioactive waste among other things? Read more about Brown's gas at **The Planetary Association for Clean Energy, Inc.**

Brown's Gas: Plasma Orbital Expansion of the Electrons in Water

This is a paper by Chris Eckman, an undergraduate student at Idaho State University. "*Brown's Gas boasts a plethora of unusual characteristics that defy current chemistry. It has a cool flame of about 130 degrees, yet melts steel, brick and many other materials*." !?

Brown's Gas - The Reality

"Jon's" opinion of Brown's gas.

The Keely Motor Company

In 1872 John Keely, a carpenter and mechanic, announced that he had discovered a new principle for power production --- etheric energy.

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