

Engineering for a Better Life



STEM DREAMS THE LAB AT NEW RINGGOLD

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Energy Storage - Out Gassing, No Methane Needed!

I would like to touch on another, perhaps more complex energy creation system. This system does not use fossil fuels and can be scaled so that the energy that is produced can meet just about any power requirement. Once again we will need to use solar panels to create the initial energy flow. We will not use this energy directly instead we will use it to do work to create the components that will yield significant energy, energy that can be scaled up to meet our needs.

So let's look at some of the ingredients that are required for our energy system. First we need water, you know H₂O. This can not be just any water it must be pure or distilled water, water that does not have any impurities. To do this we must use some of that free solar energy to create the electricity needed to "distill" the water that we are using. It does this by heating water to steam. The steam is allowed to condense, cool back into water leaving the impurities behind. Next we add some of the solar energy to "split" the Hydrogen and Oxygen apart in the water molecule itself. The oxygen and hydrogen are then stored. The oxygen has many uses apart from energy creation. It is the hydrogen that we are after. The solar energy is used to compress the hydrogen which is then stored in tanks, ready for use. An alternative to this storage method which requires a lot less energy is the use of a material called "metal anhydrous" a metal that readily accepts free hydrogen atoms, loosely holding them until a small amount of pressure is applied which causes them to be released.

It is time to introduce the most important ingredient in our system, the hydrogen fuel cell. This device uses a very thin membrane coated with a catalyst which when exposed to the hydrogen gas, splits the hydrogen into a proton and an electron. The membrane accepts the proton allowing it to pass through while repelling the electron which is then routed by the use of thin wires to the other side of the membrane where it rejoins the proton, creating the hydrogen atom once more. The flow of the electron over the wire creates electricity which then can be tapped to be used for our purposes. Since the hydrogen is reformed this allows us to "stack" these fuel cells one on top or adjoining the next repeating the process increasing the amount of energy produced.

The hydrogen in our system takes the place of batteries, storing the material needed to create our energy on demand. The system that I have described here is complete and only needs the input of water and sun to work. If however it seems a bit complex for you, you can simply order hydrogen in tank form from a supplier and just run this through your system. Oh by the way the only pollutant from this system is, water! Yep that's right, pure water to boot so you could drink the water directly.

There may be some of you who are worried about hydrogen burning or blowing up on you. First hydrogen is the lightest element in the universe if it was to escape it would immediately go straight up through the atmosphere and either combine with oxygen or escape the gravity of our planet altogether. So any burning would be thin and straight up, unlike fossil fuels which spread out and burn large areas. Secondly stored in metal anhydrous it can only be released under light pressure, allowing a specific control of that release which could be stopped easily in an emergency.

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Special points of interest:

- LECTURES AND CLASSES
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- ALTERNATIVE ENERGY SOLUTIONS
- ENGINEERING FOR KIDS
- CAMPS FOR KIDS:
- **MAY 9TH & 16TH**
STRUCTURE: BUILDING TOWERS
10:00 AM — 2:00 PM
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The LARK is an anthology of articles, stories and poems that is published quarterly. Submissions of original written work are welcomed. The writer retains the copyright.

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KG Projections, Inc.

Adult Classes

Classes run on Tuesday and Thursday nights, 6:00 pm—8:00 pm or during the day on Wednesdays 8:00am — 4:00pm. \$280/course/person

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Engineering for a Better Life

A Classroom Report First Plantings 2015

After several weeks of careful work our teams have developed their larger hot air balloons. These worked well because of the volume that the hot air must fill, expanding the balloon's envelop and creating a much higher kinetic motion of the air molecules, so that they push strongly against the envelop forcing it to rise in the air column of the classroom.

These balloons looked very cool and required the teams of two students to work very hard to ensure that all the seams were sealed. They added a bunch of hot air and let their imaginations and balloon take flight!

Our intrepid aerospace engineers have also begun work on two new projects. Using Newton's Law: To every action there is an equal and opposite reaction they are building two devices. The first is an air powered rocket sled the other, brand new to my classes, is a compressed air disk which should spin rapidly and ascend quickly through the air column.

According to the Old Farmer's Almanac for the spring of 2015 in hardiness zone 6 you should be able to plant the following vegetables outside in your garden now:

- Beans
- Broccoli
- Brussel Sprouts
- Cabbage
- Carrots
- Cauliflower
- Kale
- Lettuce
- Onion
- Peas
- Radish
- Spinach
- Swiss chard

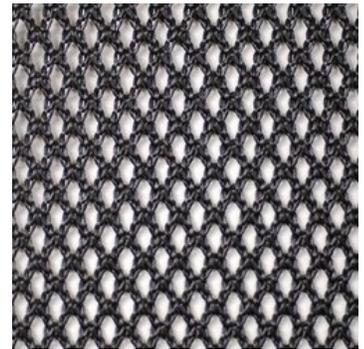
Be sure that your soil has been well turned. Our garden here in New Ringgold, PA has been turned once and we are in the process of removing stones and debris from the garden bed.

We will be planting, beans, peas, carrots, lettuce, radishes, cauliflower and spinach to start our gardening season!

We will post our growing garden here and encourage you to start your own. Buy local!

NASA MSRR Project

The rack gear has been sized and will come along with the pinion gear from Atlantic Gear. The cost will range from 225—275 depending on the length of the rack gear. In the meantime our sample belt is nearing completion. The two bands which will run through the drive gears will measure 108" and be joined by a tough, yet flexible mesh material that is normally used for creating the breathable bands for backpacks.



Beetles, Flies and Wasps

Flower Beetle (Typocerus)

Beetles present the greatest diversity of insects and pollinators. Regular flower visitors include soldier beetles and flower beetles. They feed on pollen and even chew on flowers, but in this mess and soil pollination process they pick up pollen and carry it to other flowers.

Flower or Hover Fly (Syrphid)

Because they're so abundant, flies are important pollinators even though they transport less pollen than bees. Hover flies mimic bees and wasps in coloration and behavior to avoid predators. \

Pollen Wasp (Pseudomasaris)

Don't be frightened if you see this wasp, it doesn't eat insects or bite humans, but seeks out flowers for pollen. A yellow-jacket look-a-like, pollen wasps can be identified from other wasps by their clubbed antennae. They're solitary nesters and you might find their hard mud nests attached to rocks or twigs.

My Life: The Story of a Photon — Fourth Installment

That part of me that reflects back into space usually the infrared portion of my energy can get bounced back to the surface of the earth when I hit water vapor molecules, carbon dioxide, methane, ozone and other gases in the air. This is generally a good thing because it allows the surface of the earth to remain warm enough for humans to live in with some comfort. Over the last 150 years humans have been using fossil fuels to power all types of machinery, which has allowed them to feed, clothe and house an ever increasing number of their population. For example in 1963 there was roughly 2 billion people living on the planet. Now just 52 years later there is roughly 7 billion people. The use of fossil fuels is directly responsible for the ability to support the numbers of people that can now be found and those that will be born in the near future. Unfortunately one of the side effects of all that fossil fuel being burned to create energy is the ever increasing release of green house gases into the atmosphere. As a result more

and more of my infrared energy is being trapped here on the earth and this has caused an increase in the overall temperature of the planet.

What is very hard for people to understand is that the earth represents a semi closed system. Semi closed because some of my energy still escapes into space and it's a good thing that it does because the folks down here would not be able to live in an environment that would resemble Venus where the average temperature is around 728 degrees Fahrenheit, ouch!

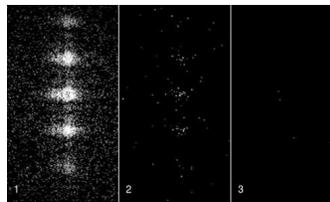
So you know how my energy portion of my personality works, let's talk about how my physical side functions. I am a quasi particle made up of energy and particles as such I have a physical effect on the earth and in space. Let's explore this portion of my being.

How can light be both a particle and a wave? We are now ready to resolve this seeming contradiction. Often in science when something seems

paradoxical, it's because we either don't define our terms carefully, or don't test our ideas against any specific real-world situation. Let's define particles and waves as follows:

Waves exhibit superposition, and specifically interference phenomena.

Particles can only exist in whole numbers, not fractions. As a real-world check on our philosophizing, there is one particular experiment that works perfectly. We set up a double-slit interference experiment that we know will produce a diffraction pattern if light is an honest-to-goodness wave, but we detect the light with a detector that is capable of sensing individual photons, e.g., a digital camera.



http://lightandmatter.com/html_books/lm/ch34/ch34.html

YOUTH IMMERSION CAMPS TAKE YOUNG PEOPLE AGES 9—16 AND PROVIDES THEM WITH TWO SATURDAYS DEVOTED TO A SINGLE TOPIC OF ENGINEERING. THIS REQUIRES KIDS TO WORK IN A TEAM FORMAT WITH SOPHISTICATED MODELS THAT ACTUALLY WORK.

THE CAMPS WILL TAKE PLACE AT STEM DREAMS THE LAB AT NEW RINGGOLD. CALL: TEL. (570)-386-2392

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PREPAYMENT IS REQUIRED!

MORE CAMPS TO BE ANNOUNCED KEEP READING OUR NEWSLETTER!

Seeds of Creativity - Barry Middleton

I often introduce my new engineering students to the art and science that is engineering by doing an imagination exercise.

I tell them that I can teach them all that they need to know about engineering except use of the imagination.

Now I have met a man who does exactly that. Barry Middleton has put together a short series of seminars which talks directly to the following:

Recognizing creativity and talent

Exercising creativity and tal-

ent

Drawing and studio arts

Writing

Building (small scale)

Classes are 6:00—8:00 PM at the Arts Barn 3 Berry Road

Schuylkill Haven, PA 17972

The series dates are Tuesday May 5, Tuesday May 12, and finishes Tuesday May 17.

Contact Barry: 570-366-8736 or kodiakbarr@aol.com



YOUNG MINDS! REAL WORLD PROBLEMS! UNIQUE SOLUTIONS!

THE WEATHERLY INSTITUTE FOR ROBOTICS AND ENGINEERING

3320 Summer Valley Road
New Ringgold, PA 17960

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email: stephen@stemdreams.com

It is the goal of The Weatherly Institute for Robotics and Engineering to create a culture of Science and Technology in which young people and adults may come to learn and be inspired!

Over the years we have watched as technology has increasingly driven our culture, while the number of people who are actually taking engineering and technology courses have decreased. Even more maddening is that this knowledge base has found its way overseas and to other countries making the United States vulnerable to the whims of a global economy.

W.I.R.E. has taken the challenge up in a small way, bringing young children, young adults and adults to the class room and exposing them to a wide range of engineering opportunities.

We are a Christian Based Organization. We Believe!

For twenty two years I have operated my for profit company: KG Projections, Inc. and for the past ten years The Weatherly Institute for Robotics and Engineering or W.I.R.E. a PA recognized non-profit.

My for profit company has generated most of the monies needed for my non profit to survive and complete its mission to teach the children engineering.

Now I have introduced a third arm, STEM Dreams the Lab at New Ringgold. While not a separate company it is the umbrella structure to support my other two enterprises and will allow me to open up a research facility dedicated to creating new technologies to help in our struggle with a changing climate and alternative energy strategies.

I intend to share some of these concepts with you my readers beginning with the Robotic Bee program. So please look for further developments in the pages of this newsletter and those to follow.

Please consider the donation of a **stereoscopic microscope with camera mount or the money (\$300) to purchase the unit.**

Thanks: Stephen Goodale

Changes at STEM Dreams the Lab at New Ringgold

The following is a list of competitions that will made available to our students.

Junior FIRST Lego League	Ages 6—9
FIRST Lego League	Ages 9—14
FIRST Tech Challenge	Grades 7—12
FIRST Robotics Competition	Grades 9—12
The Northeast PA Bridge Building Competition	Grades 7—12
The Real World Design Challenge	Grades 9—12
The NASA Mars Sample Return Robotics Competition	High School Grades 11—12 and College Years 1 & 2

Some of these competitions have the possibility of gaining College Scholarships through the programs that they are attached to and all look great on college applications.

It is time to start planning for the up coming year 2015 — 2016 and the competitions that W.I.R.E. will make available to young people in our region.

Once again all of the competition classes will be held at STEM Dreams the Lab at New Ringgold. In order to do this we will need three things. The first is obviously students who are interested in Science Technology Engineering and Mathematics, better known as STEM. It is important that parents, teachers, and students understand that it will take a commitment of time and energy to be a member of any of these teams.

The second is money. While traditionally, W.I.R.E. has never asked for monies to be part of any classes taught under its umbrella, money has become a necessary element that must be addressed. So to that end we will ask that parents begin to donate what they can to help support the programs that their children are to be part of. W.I.R.E. will not define the amount and will leave that up to the families involved.

The third thing is materials. You may have spare tools, lumber, metals, or old electronics that are available to you. Even help with transportation and chaperoning might become extremely important to aid the team that your child is part of, there is so much more that can help than you might guess.