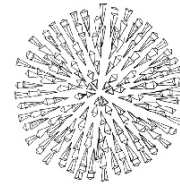


TRIMTAB



Newsletter of the Buckminster Fuller Institute Vol. 18 No. 2 Fall 2005

Keeping a Pulse on the Design Science Revolution

In this education-focused issue of **Trimtab** we are pleased to bring you articles relating to Buckminster Fuller's revolutionary views on education as well as articles by and about members of BFI and those within the Design Science community working to develop new and innovative educational tools and

resources. As we enter another school year, we hope all of our readers will reflect on the state of contemporary education, the challenges we face for the future, and the role Fuller's ideas may play in inspiring us to overcome these challenges.

Sincerely,
Trimtab Editorial Staff

The following article is excerpted from an unpublished essay co-authored by Peter H. Wagschal, Ed.D. and Robert D. Kahn, Ed.D. as they prepared **Buckminster Fuller: On Education** for publication.

Buckminster Fuller: The Five Year Old's Revolutionary Challenge to Contemporary Education

by Robert D. Kahn

R. Buckminster Fuller ("Bucky") was a remarkable teacher. He exuded an enthusiasm, a sense of wonder and discovery that were as contagious



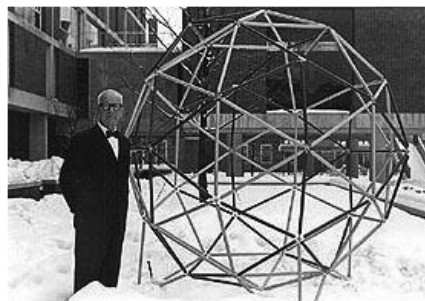
that 99.9% of humanity has no real understanding of technology even though the natural world itself, as he saw it, is nothing more, nor less, than exquisitely designed technology. Why are we all so misinformed and distrustful of the obvious? Because – and this is where education is so central in Bucky's thought – our contemporary science and technology hinge on mathematical models that have no relationship whatsoever to the real world. If we are to improve the quality of human life on Spaceship Earth then we must replace our misguided conception of mathematics – the gateway to understanding science and technology – with a total overhaul of our mathematics and geometry.

as his ideas themselves. After all, he approached "Universe" (Bucky's formulation) as if he were a 5-year old child – with the same excitement, the same awe at life's mystery, and the same openness to discovery.

While Bucky carefully avoided labels, except for his self-chosen "comprehensive anticipatory design scientist," he won international acclaim as a poet, philosopher, mathematician, geometer, engineer, cartographer, and architect. Curiously, he was not generally perceived as a "teacher" or "educator," though those labels are as appropriate as any of the others assigned to him.

The primary objective of Bucky's pedagogy was to reverse the sad fact

As Bucky would have it, our entire educational system – like our building industry – is askew, out of step with



Universe. The changes necessary to make education conform with the principles laid out in Synergetics, are awesome in their magnitude and radical in their implications as



they range from the minute detail of mathematics curriculum to the very structure of education as an institution.

What changes did Bucky envision to re-align education with Universe?

His critique of contemporary education often began with a challenge to educators to relinquish their devotion to specialization. The schools, he asserted, will have to first develop curricula for the youngest children; one that starts with the most general understandings of Universe and builds downward from there. Since nature does not have departments of physics, chemistry, biology, etc., neither should we.

A centerpiece of Bucky's educational thought was his faith in the imaginations, curiosity, and intuitive judgment of children. While adults grew up in a world of "up" and "down," of "sunsets" and "sunrises," children are open to their experiences. If they are provided

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Buckminster Fuller On Education...

None of the world's problems will have a solution until the world's individuals become thoroughly self-educated.

Everything you've learned in school as "obvious" becomes less and less obvious as you begin to study the universe. For example, there are no solids in the universe. There's not even a suggestion of a solid. There are no absolute continuums. There are no surfaces. There are no straight lines.

Education is in the end a self-educating. The experiences stimulate, but then the significance in the experience has to be apprehended then comprehended by the individual.

What usually happens in the educational process is that the faculties are dulled, overloaded, stuffed and paralyzed so that by the time most people are mature they have lost their innate capabilities.

I'm not a genius. I'm just a tremendous bundle of experience.

I find that our whole education system around the world is organized on the basis of the little child being ignorant...assuming the little child as born is going to have to be taught - in a sense as an empty container, waiting for information to be given to it from the grown-ups.

From the Executive Director

by Elizabeth Thompson



As this issue of *Trimtab* goes to press unprecedented suffering and malaise are unfolding in the Gulf Coast region. Our hearts and prayers go out to all of our BFI community members whose lives have been directly affected by this tragedy.

This system-wide disaster brings home – with even greater urgency – the need for comprehensive, anticipatory design tools to not only deal with the complexity of such

disasters when they occur, but to design basic infrastructure systems to help avert them in the first place.

It seems every day we feel here at BFI that the time could not be more right for Bucky's ideas to take hold – to “emerge through emergency”. This issue of *Trimtab* is devoted in large part to an exploration of Fuller's constant focus on the reformation of our educational systems as a key leverage point for bringing about the necessary transformation of the world. The *perceptual* tools required to navigate an increasingly complex world, understand its essential nature, and design new systems more aligned with that perception are the stock and trade of the Design Scientist.

Who We Are

The Buckminster Fuller Institute (BFI), is a 501(c)(3) nonprofit organization committed to a successful and sustainable future for 100% of humanity. Founded in 1983, BFI serves a global network of Design Science innovators and acts as a catalyst, facilitator and resource for networking, learning, and pioneering whole system designs.

Our Mission:

To catalyze awareness and action towards realizing humanity's option for success.

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What is Design Science?

In the words of Buckminster Fuller, Design Science is “the effective application of the principles of science to the conscious design of our total environment in order to help make the Earth's finite resources meet the needs of all humanity without disrupting the ecological processes of the planet.”

Trimtab

The *Trimtab* highlights projects, organizations and individuals who are applying Design Science principles towards humanity's option for success.

Trimtab Production

Managing Editor, Matt Barron
Contributing Writers, Matt Barron, Medard Gabel, Jochen Hartmann, Robert Kahn, Angela Molenaar, Kurt Przybilla, Elizabeth Thompson
Design and Layout, Matt Barron
Printing, Accent Printing, Santa Rosa, CA

Trimtab is printed on 100% post-consumer waste paper with soy based ink.

Contact Info

Buckminster Fuller Institute
181 N. 11th Street, Suite 402, Brooklyn, NY 11211
Phone: (718) 290 9280 • Fax: (718) 290 9281
info@bfi.org • www.bfi.org

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From the Executive Director

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In this issue, we revisit some of Fuller's core ideas about education in an article by BFI Board member Robert Kahn, report on BFI's new educational initiative, the Design Science Lab, and feature a variety of mediums in which Bucky's educational ideas have been integrated by members of the BFI community: books, toys and videos!

We also include an update on the much anticipated (!) completion of BFI's website (coming soon – really!) and a special “back to school” offering from our store.

I would like to thank all of you again for your support. Your contributions, no matter the size – through your annual membership pledge, and

additional donations – go a long way toward building a BFI that can and will make a difference in the world, *now*.

We look forward to hearing from you.

Warm Regards,
Elizabeth Thompson

Buckminster Fuller: The Five Year Old's Revolutionary Challenge to Contemporary Education

continued from page 1

with real understanding of Universe, Bucky never tired of preaching, one that meshes with their personal experiences, they will learn rapidly and eagerly.

The smallest children, Bucky argued, are our best scientists, for they only believe what they learn through experimentation with Universe. If we could help children experience “Sunsights” and “Sunclipses,” “jumping out” and “falling in,” and provide them with the conceptual tools to accurately understand their experience, they could then, as adults, design new technology and move humanity – and not a moment too soon – into an entirely new era. Bucky saw children as the vanguard of a design science revolution that would deploy in-tune-with-Universe technologies to enable us to live equitably and sustainably at a standard of living never before considered possible.

When Bucky directly spoke to educational issues he traversed a wide continuum including: educational psychology, curriculum design, educational technology, early childhood education, the design of learning environments and many other aspects of education. All of Bucky's educational concerns were informed by his commitment to the notion that education must begin with recognition of humanity's “function” in Universe as participants/observers in the purposeful greater order.

Students of intellectual history

may recognize common strands



in Bucky's ideas with those of the transcendentalists (Bucky's great aunt was Margaret Fuller) and the Enlightenment's Jean Jacques Rousseau. Like these intellectual change agents, Bucky perceived a greater universal order although describing it, as did they, in largely secular terms. The child, being closer to nature (and correspondingly less corrupted by human myth and misunderstanding) is a resource who, if truthfully taught, may yet redeem humanity.

Bucky, was the “first citizen of the 21st century,” but he was also a link to 19th century and even the 18th century. “Comprehensivists” after all evoke the Enlightenment's “natural philosophers.”

Bucky's Rousseauian faith in children comes through strongly as do his speculations on educational psychology. Bucky's proposals

included the complete reorientation of educational priorities around the education of the very young first, the linkage of computers and television to curriculum and the prediction of revolutionary change for education. “Don't hesitate to undertake the most logical solutions,” Fuller argued, “take the biggest steps right away and you will be just on time!”

As was the case with his intellectual antecedents, Bucky's educational ideas are often subjected to attack as naively romantic and irrelevant in a cruel, cold world. These criticisms were not new to Bucky, and he would claim that the comprehensive reforms he suggested are practical in a way that piece-meal approaches could never be. In fairness to him, the reader should understand that Bucky, the eternal five year old, freely chose a strategy of “radical naiveté.”

No wonder then that the opening of Synergetics, the magnum opus that will assure his immortality, begins with the challenge: “Dare to be naïve.” For Bucky, naivety is the openness to experience, the operational approach to learning about Universe that is a pre-requisite to humanity's survival.



Phase I Launch of BFI's New Site Nearing Completion

by Jochen Hartmann



Note: the images and content in this screenshot represent a work in progress, the final site may be slightly different.

If you would like to be notified when the new site goes live, please send an email to:

sitelaunch@bfi.org

As some of our readers may be aware, BFI's web effort has experienced some setbacks and detours so it is with some hesitation that I would like to announce our plan to launch a completely overhauled site within the coming weeks (early to mid September 2005). Most of the new site should be updated and ready by the time you will be reading this article.

In order to provide our site visitors a richer, more intuitive experience, we have moved away from the static HTML driven page that has served as our site for the past several years and implemented a fully dynamic site that can be quickly and easily updated.

Phase I of the new site (to be completed within the coming weeks) will include a new site that contains at a minimum most of the current content from our old web site as well as new features such as dynamic discussion forums, an 'intelligent' store area that shows products relevant to pages being viewed as well as RSS feeds in order to link and import news items of interest from other sites. In addition to these features, we have completely revised our 'information architecture' to make

the content easier to navigate.

We are now relying 100% on open source solutions for our infrastructure. I have selected one of the most popular content management system (CMS) available today, Drupal. This CMS provides a very flexible and modular structure allowing new functionality to be implemented very quickly as needed.

In addition, we have been able to negotiate a free hosting agreement with Equivity hosting, allowing the Institute to reduce hosting costs to \$0 annually.

Phase II (due to launch before year end 2005) will include the completion of the new site as well as a full-featured 'members' area providing social networking tools for members of the Institute. The new site will also contain the necessary infrastructure elements to host on-line events such as Q&A sessions with experts in the Fuller community, online polls and shelter and model competitions. All of these initiatives will help the site gather more web traffic and hopefully will result in increased participation and collaboration by the Fuller community.

Expanding Our Membership Community

by Angela Molenaar

Thank you to all of our lapsed members who responded to the June membership mailing. In a great show of support for our work, over 50 former members re-enrolled in June and July! With an average enrollment of \$70 per member, we were able to top our membership goals for the period. Though tremendously gratifying, our work is not done. Our enrolled community currently numbers 450 members. However, our active community (E-bulletin subscribers, store customers, website visitors, callers, and in-person visitors) exceeds 6,000. Our goal is to recruit at least 400 new members from this community. *We need your help!* Do you have a friend, neighbor or co-worker who is a fan of Bucky's work? If so, please pass

on the attached envelope and urge them to enroll in our Membership program. Their dollars will go toward ensuring the continuance of Fuller's legacy by supporting general operations, membership programs (including *Trimtab*, e-bulletin, bfi.org) and educational initiatives. More importantly, their involvement in the BFI community will help to create greater momentum for BFI's larger goal of *advancing the understanding and practice of design science methods to meet mankind's most pressing needs.*

We look forward to hearing from you. Please contact us by email at: **info@bfi.org** or by phone at 718.290.9282.

Want to become a member of the BFI team?

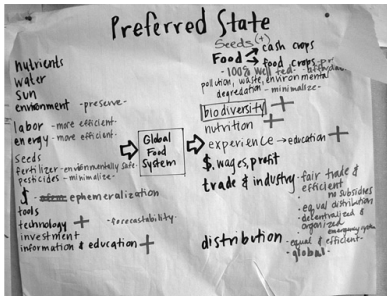
We need resourceful, engaged, and reliable volunteers and interns to help with a number of our projects. For more information contact:

**Angela Molenaar
Tel: 718.290.9282
E-Mail: volunteers@bfi.org**

Bringing Design Science to Bear on the UN's Millennium Development Goals

by Medard Gabel

Medard Gabel is President of *BigPictureSmallWorld*, an educational company that develops and delivers a variety of interactive, multimedia programs on topics critical to making the world work for 100% of humanity, as well as short web movies, and publications. He is the former Executive Director of the World Game Institute, and worked with Buckminster Fuller for twelve years. His most recent books are *Global Inc.: An Atlas of the Multinational Corporation*, which was published in 2003, and *Seven Billion Billionaires*, (to be published next year).



Buckminster Fuller's contributions to humanity include a new way of seeing the world—from a global, whole systems perspective with a well-developed sensibility about social justice and environmental sustainability. In addition to devising a new way of seeing, Fuller introduced a new way of acting in that world as a change agent. Fuller codified this perspective and action as “design science” or in long hand as “comprehensive anticipatory design science.” In the early 1960's, Fuller proposed a “World Design Science Decade” wherein architectural students and professionals would work on developing solutions to the world's most pressing problems.

Fast-forward to the year 2000 and you find the political leaders of the world seemingly catching up to Fuller's proposal. 147 Heads of State

(including the President of the U.S.) met in September of that year at the UN and signed the Millennium Declaration. This extraordinarily bold document included a set of eight goals that the world leaders committed to reaching by 2015. The goals of this document went beyond the usual hot air pontification and promises of most political statements and platforms by not only including a date by when the goals were to be reached, but specific statistical indicators that would measure progress towards reaching these goals. In the five years since the signing of the Millennium Declaration the goals have not only refused to go away, but they have grown in importance and visibility. Today, the entire UN system, from the WHO to UNESCO, UNICEF to UNDP and every agency and program in between, is organized around the Millennium Development Goals (MDGs) and ways of helping every country in the world achieve them. Hundreds of billions of dollars of national budgets, foreign aid, economic assistance, civil society grants, and private sector investment are being invested around the world in programs designed to achieve the goals.

This summer the Buckminster Fuller Institute, in partnership with Medard Gabel of *BigPictureSmallWorld* and Wayne Jocoby of *Global Education Motivators*, conducted the first of ten Design Science Laboratories to be held each summer between now and 2015, when the Millennium Development Goals are to be reached. This first Design Science Lab was held in New York at the United Nations, at the United Nations International School, and at BFI's Brooklyn office.

A small group of 25 students and professionals gathered for an intense week and applied the concepts and tools of design science to developing strategies to achieve the MDGs. The two-day Orientation segment of the program took place at UN headquarters in New York. Lab participants were briefed by UN staff from the World Food Program, FAO, UNDP, The Millennium Development Campaign and others on the MDGs, their context, history, measurement, the progress made so far, and strategies in use for reaching them. An introduction to design science was then held at the BFI offices. Finally, the Lab portion was conducted at the UN International School. Lab participants typically worked for ten to twelve hours a day.



On the last day of the Lab, participants returned to the UN where they concluded the Lab with a presentation of their work to UN staff. The work itself consisted of an eleven-part plan for cutting in half the number of undernourished people in the world by 2015 (one of the MDGs), but also showed how hunger could be totally eliminated in another ten years (by 2025). There will be a publication from this year's Lab coming soon. We will keep you posted about its availability here and on our websites.

This summer's Lab was a prototype for the much-expanded effort we are planning for 2006 and beyond. If you would like to attend, please visit:

<http://bfi.org/summerlab>

A short introductory web movie on the MDGs that the author did for the UNEP can be seen at:

<http://www.bigpicturesmallworld.com/UNEP2/UNEP2Movie.html>

For more details, see the UN's Millennium Development Goals site at:

<http://www.un.org/millenniumgoals/>

Toward Wholeness

Alex Gerber Jr. (PhD, University of Southern California) is an educator, counselor, and musician living in Washington state. His dissertation on Fuller's education philosophy was reviewed on these pages in 1986, which is also the year he began teaching courses and presenting seminars on Bucky's work. Gerber Educational Resources, Alex's consulting and publishing company, is dedicated to sharing holistic awareness and solutions.

In this *Trimtab* dedicated to education it is appropriate to revisit a noteworthy book on the subject, Alex Gerber Jr.'s *Wholeness: On Education, Buckminster Fuller, and Tao*, released in 2001 and now in its second printing. The opening sentence states, "Awakening to wholeness may be the single most important event in anyone's life." Collectively, such awakenings would provide a turning point in the evolution of society and protection of the environment.

"Context: A World Blind to the Whole" is the initial heading of chapter one, a context implied in the following, from Fuller: "Humans are coming swiftly to understand they must now consciously begin to operate their space vehicle Earth with total planetary cooperation, competence, and integrity. Humans are swiftly sensing that the cushioning tolerance for their initial error has become approximately exhausted." (*Earth, Inc.*)

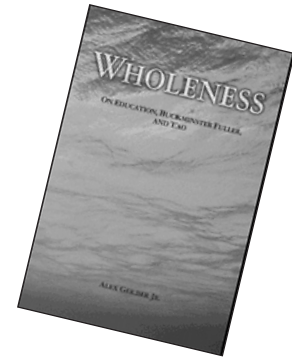
"One of the greatest untold stories of our time is that humanity possesses a multitude of holistic options in every

field of endeavor and for every area of the environment that has been compromised," Gerber writes of his book. "However, the existence of these options does not mean they have been implemented or even valued, because this encouraging news has not yet been transmitted to the populace at large. Doing so is a function and obligation of education in all its forms. The human community becoming conscious of 'the whole' and taking action centered in this awareness will help reduce the fragmentation and disconnection that are causing so much suffering and dysfunction in the world." He emphasizes that one of his main intentions in writing the book is to inspire people to seek out, study, and apply Fuller's work.

"Wholeness is not a subject in the usual sense and cannot be defined, explained, or learned; yet there are things about it that can be learned," Gerber notes. "Just as one can arrive at intuitive understandings of the whole through experience in an area within the whole, such as the environment or health care, the opposite is also true: by learning about 'comprehensivity' itself (Fuller's term), as a subject in its own right, one comes to see how it illuminates every area of life. This fact has enormous implications for education.

Educators will appreciate that among the book's six appendices are two

reference outlines for courses, "Wholeness" and "R. Buckminster Fuller." In a paragraph introducing them Gerber emphasizes that wholeness (infinite oneness) is not something that is "learned" in a formulaic and linear fashion; "it is a state of being, an experience, a perspective, and cannot be reduced to reference outlines or courses." He says these outlines arose out of



courses he taught over many years and are intended only as possible guideposts for educators designing their own courses on Fuller's work and on holism (the theory and practice of wholeness). Other appendices contain suggested readings, resources, activities, and more. For reviews of this highly recommended book, including one by Allegra Fuller Snyder, visit Alex's website, www.wholenessbook.com (a link leads to BFI's online store where the book is available for \$19.95).

It's Time for a Power Shift

by Matt Barron



Kirk Bergstrom, writer and producer of *Power Shift*, is a member and Board member of BFI as well as founder and President of WorldLink Foundation. The *Power Shift* DVD (\$29.95) and the Educator's Version including a 60-page curriculum (\$89.95) are available through Dymaxion Artifacts, BFI's online store www.bfi.org

Most of us would be virtually helpless without a steady supply of electricity. How often do we think about where it comes from, how it reaches us, and what the consequences of its continued use may be? If you answered 'almost never,' the new DVD produced by WorldLink and featured on PBS – *Power Shift* – will astound you.

Incorporating Fuller's concepts of design science, more with less, cosmic accounting, and the promise of a world-wide energy grid, *Power*

Shift charts the effects of our reliance on energy produced using fossil fuels and introduces alternatives like wind and solar power in a contemporary, compelling, and breathtakingly beautiful way.

Hosted by actress Cameron Diaz and featuring interviews with alternative energy experts such as William McDonough, *Power Shift* is a superb introduction to our energy future. You'll stop and think the next time you turn on the lights.

Q & A with Kurt Przybilla, inventor of Tetra Tops™



Kurt Przybilla is an inventor, educator, writer, BFI member and self-described "Positive Futurologist". He invented Tetra Tops™, the world's first spinning top with more than one axis of spin. These award winning toys have been featured in The New York Times, Popular Science,

Baby Einstein, Child and Discover Magazine, as well as at the Smithsonian Institute.

Q. When and how were you first introduced to Bucky and his work?

A. We had a geodesic play gym in our backyard when I was growing up. I grew up in Minnesota, so it would come down every winter and every spring my sisters and I would beg our father to set it up. When I was 6 (1970), we went to the Montreal World Expo Dome and it made a very big impression on me, but it was not until many years later that I really became familiar with who Bucky was.

Q. How is synergetic geometry different from the traditional geometry of angles and planes currently being taught in most schools?

A. Most schools teach planar geometry (usually called Euclidean even though Euclid also developed solid geometry) though this is starting to change. The biggest difference is that Synergetics is actually based in both solid and spherical geometry and then adds energy. The real world structural implications of geometry are where Bucky's work has significance.

Q. Why is it important that students understand the tetrahedron structure? What is its relevance?

A. The tetrahedron is the primary structural system of the universe. Unlike the cube, it holds its shape; it has structural integrity. Understanding this concept is a good foundation for thinking about structure. It is also the first "three dimensional" object. Nothing in three dimensions has less than four sides.

Q. Synergetic geometry is

considerably different from traditional geometry, would someone like myself who was taught traditional geometry need to, in effect, unlearn everything they know to understand Synergetics or does it build off of traditional geometry?

A. Synergetic geometry builds off of traditional geometry, but instead for staying in an imaginary flat plane, it builds the shapes and utilizes their real world structural integrity.

Q. In what ways do Tetra Tops™ represent the geometric principles pioneered by Bucky?

A. All of the Tetra Tops™ are models of the primary structural systems that Bucky spent much of his time explaining. A large portion of Synergetics is all about these shapes. I was reading Synergetics when I built the first set. I wanted some models of the shapes I was reading about because the pictures weren't enough. It was a lucky accident I discovered they spin incredibly well. In fact they are the first spinning tops with more than one axis of spin.

Q. You have developed a curriculum to accompany the Tetra Tops, were Tetra Tops™ and the corresponding curriculum designed with a specific age group in mind? If so, why?

A. The Tetra Tops™ Lesson Plans were written for elementary school students to get them excited about the concepts at an early age when their education has not been too specialized. It aims to show how these ideas of structure are not limited to one branch of science but are important in all of them, from chemistry and physics to earth science and biology.

Q. The Tetra Tops™ curriculum is very hands-on, experience-based learning, do you feel this is more effective than passive learning? Why?

A. Of course. Experience is the

only teacher. The only way to really understand these shapes and their structural integrity is to build them and feel it for yourself.

Q. Why do you think Bucky's work is still marginalized to a degree and not widely taught or referenced in this country? Do you think this will change?

A. Bucky was always in the margins, as revolutionary thinkers usually are. His works and words have inspired many people, but much of his writing is inaccessible. For anyone that has tried to wade through Synergetics knows, it is unlikely to ever be a standard text. Some of the concepts and ideas were integrated into engineering courses long ago, but his most important ideas still are rarely being taught. The most important of which is, how do we utilize what we know to help 100% of humanity.

Q. What do you think is the most pressing challenge facing contemporary education?

A. Attracting, inspiring and keeping good teachers. Our society needs to show teachers more respect. They have the most important job on the planet. Bucky was a great teacher.

Tetra Tops™ Starter (\$8.95) and Deluxe Sets (\$9.95) are available at Dymaxion Artifacts, the online store of the Buckminster Fuller Institute www.bfi.org. The Tetra Tops™ Lesson Plan and Educator Sets are available at www.yo-yo.com.



**Dymaxion Artifacts,
Education Through Innovation**

by Matt Barron

All of the innovative educational products featured in this issue of *Trimtab* are available through Dymaxion Artifacts, the online store of the Buckminster Fuller Institute www.bfi.org

Member Special

In addition to these products, we are offering our members a special deal: buy our **Education Package** including Bucky's book *Education Automation*, a Dymaxion Fold-Up Globe, and a set of 10 Dymaxion Postcards and receive \$5.00 off the normal retail price of \$21.85.

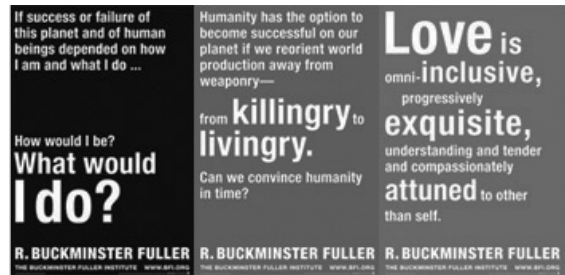
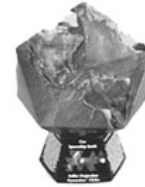
Simply enter the coupon code: **education** in the 'coupon' box at the top of the Check Out screen on the Dymaxion Artifacts site to receive your discount.

Bucky's ideas for "advancing humanity's option for success" are more needed now than ever, and only a more effective educational system can disseminate these ideas to the future generations whose challenge it will be to implement them. Although early childhood education is the ideal time to instill these ideas, it is never too late to unlearn and relearn. In fact, Bucky and many of his contemporaries viewed education as a lifelong, ongoing process with no definitive beginning and ending. Bucky dedicated his life to education - be it through his written works, his speaking tours, or the design of his many innovative artifacts - and I have no doubt that he is eternally pleased that his life's work continues to inspire both young and old to educate themselves and others to help make the world work for 100% of humanity.

**Dymaxion Artifacts "Back-to-School"
Store Specials**

**Education Package
\$16.95 Member Special**

Save \$5.00 with this special deal including Bucky's *Education Automation*, a Dymaxion Fold-Up Globe, and 10 Dymaxion Postcards.



**Bucky Quote Posters
\$19.95/set of 3
\$9.95/each**

Perfect for dorm room walls or for spreading the word about Bucky in your neighborhood. Printed on 100% recycled Mohawk paper produced using wind power.



TRIMTAB

Keeping a Pulse on the Design Science Revolution
Vol. 18 No. 2 Fall 2005

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