

Recommended Books (1)

Years of dedicated observation, contemplation, research, and experimentation has led experts in every discipline all around the world to compile their thoughts in various forms. This section contains valuable resources for advancing one's understanding of biomimicry and related fields. The next time you tap the insight of a brilliant work listed here, give a little thanks to the author who made your learning possible.



AGRICULTURE

- **Fertility Pastures.** Newman Turner. 1974. Polyculture pastures for restoring soil.
- **Gaia's Garden: A Guide to Home-Scale Permaculture.** Toby Hemenway. 2001. Easy to use and understand tour through the permaculture garden.
- **The Future is Abundant.** Korn, Snyder and Musick. 1982. A guide to sustainable agriculture.
- **The Natural Way of Farming.** Masanobu Fukuoka. Fukuoka-san's insights into applying nature's knowledge to agriculture.

ARCHITECTURE

- **Animal Architecture.** Jennifer Owings Dewey. 1991. Explores the kinds of habitats animals build for themselves. Ages 9-12.
- **Animal Architecture.** Karl von Frisch. 1974. Examines how creatures like arthropods, vertebrates, birds, and rodents build their homes.
- **Biophilic Design: The Theory, Science and Practice of Bringing Buildings to Life.** Stephen R. Kellert. 2008. Biophilic design is about humanity's place in nature and the natural world's place in human society, where mutuality, respect, and enriching relationships can and should exist at all levels and should emerge as the norm rather than the exception.
- **Design and Nature II.** Ed M.W. Collins et. al. 2004. (See DESIGN for description)
- **Design For Life.** Sim Van Der Ryn. 2005. Van der Ryn came to see the shifting patterns in nature and how these patterns profoundly affect how people live and work in the structures we build. Explores how architecture has created physical and mental barriers that separate people from the natural world, and how to recover the soul of architecture and reconnect with our natural surroundings.
- **Wonders of Animal Architecture.** Sigmund A. Lavine. 1964. One in a series of Dodd, Mead Wonders series, Lavine adds another interesting and informative book based on his own experiences of studying the ways animals build their homes.

BIOLOGY

- **Animal: The Definitive Visual Guide to the World's Wildlife.** Don E. Wilson. 2001. Over 2,000 species, from the tiny spider mite to the massive blue whale, are profiled in DK's astonishingly wonderful *Animal*, produced in cooperation with the Smithsonian Institution and more than 70 expert zoologists.
- **Color in Nature.** Penelope Farrant. 1999. Explores the role of color in nature, including astronomy, botany, geology, physics and zoology.
- **Design and Nature II.** Ed M. W. Collins et. Al. 2004. (See DESIGN for description)
- **Extreme Nature (Smithsonian Institution).** Mark Carwardine. 2005. Interesting facts and figures about some of the most interesting natural phenomena on earth. From the "most devious plant" to the "strangest nesting material" this book is packed full of interesting information about both common and uncommon organisms.
- **Life Itself: Exploring the Realm of the Living Cell.** Boyce Rensberger. 1998. A digest of everything currently known about the mechanisms by which living cells perform their myriad of tasks.
- **Natural Earth, Living Earth.** Miranda Smith and Steve Parker. 1996. Full-color photography shows how living things interact with the functions and conditions of the earth.
- **The Work of Nature: How the Diversity of Life Sustains Us.** Yvonne Baskin, et al. 1997. Baskin examines the threats posed to humans by the loss of biodiversity. Biodiversity is much more than number of species—it includes the complexity, richness, and abundance of nature at all levels.
- **Dirt: the Ecstatic Skin of the Earth.** William Bryant Logan. 1995. A literary excursion into the life of the soil and of those who work it.
- **Exploring the Way Life Works: The Science of Biology.** Mahlon B. Hoagland., et. Al. 2001. Comprehensive overview of the natural world from patterns in life to energy and evolution. Devoted to the wonder and unity of the natural world.
- **From Gaia to Selfish Genes: Selected Writings in the Life Sciences.** Connie Barlow. 1992. In a well-blended presentation, writings from more





Recommended Books (2)

than 30 scientists and science writers span scales from the biosphere to the cell to DNA, encompass disciplines from global ecology to behavior and genetics, and explore links between biology and philosophy.

- **The Complete Idiot's Guide to Biology.** Glen Moulton. 2004. Following a standard AP biology course curriculum that begins with life, cells, and molecular structure and ends with evolution, ecosystems, and ecology, it covers everything for the biology student in a clear, easy to understand manner.
- **The Future of Life.** Edward O. Wilson. 2002. A great "state of the planet" survey circa 2002 covering species extinctions and the environment.
- **The Hidden Powers of Animals.** Carl P.N. Shuker. 2001. A fascinating look at the astonishing behavior and super-human abilities of animals, from kings of the jungle to household pets. This book reveals incredible truths about animals and their remarkable sensitivities, skills and strengths.
- **The Way Nature Works.** Ed. Jill Bailey. 1992. Drawing on a series of questions that children might ask, a team of scientists proposes answers in this manual for adult readers. They address large issues such as atmospheric phenomena, ecosystemic relationships, and animal communication with brief essays, each well illustrated with charts, diagrams, and photographs.
- **Weird Nature.** John Downer. Firefly Books. 2002. Some of the most fantastic behaviors of real animals are explored in this beautifully illustrated companion volume to a BBC/Discovery Channel series.
- **Why Moths Hate Thomas Edison: And Other Urgent Inquiries into the Odd Nature of Nature.** Hampton Sides. 2001. Do beavers ever get squashed by the trees they're gnawing down? Why are there so many worms writhing on the sidewalk after a storm? What good are goosebumps? Why do llamas spit?

CHEMISTRY - - - - -

- **Green Chemistry: Theory and Practice.** Paul T. Anastas, John Charles Warner. 2000. Overview of the design, development, and evaluation process central to green chemistry. Explores alternative solvents and catalysts, benign syntheses and biomimetic principles, among many other topics.

- **Medicinal Natural Products: A Biosynthetic Approach.** Paul M. Dewick. 2009. A comprehensive and balanced introduction to natural products from a biosynthetic perspective, focusing on the metabolic sequences leading to various classes of natural products.
- **Natural Product Chemistry at a Glance.** Stephen P. Stanforth. 2006. A concise overview of the main principles and reactions of natural product chemistry, for students studying chemistry and related courses at undergraduate level.

CHILDREN'S BOOKS - - - - -

- **Animal Architecture.** Jennifer Owings Dewey. 1991. (See ARCHITECTURE for description)
- **Exploring the Secrets of the Meadow-Thicket.** JoAnne Dennee, Julia Hand. 1994. Observing plants, birds, insects, and animals and how they interact in the meadow thicket. Songs, activities, and stories.
- **Kid's Nature.** Susan Milord. 365 indoor and outdoor nature experiences for kids.
- **Natural Earth, Living Earth.** Miranda Smith and Steve Parker. 1996. (See BIOLOGY for description)
- **Sharing Nature with Children.** Joseph Cornell. 1979. Classic teaching tactics.
- **The Evolution Book.** Sara Stein. 1986. The story of 4,000 million years of life on Earth revealed through observations, experiments, projects, and investigations.
- **The Usborne Complete First Book of Nature.** Michael Chinery et. al. 1990. Beautifully detailed illustrations of plants and animals. A serious nature study for the young and old.
- **Wonders of Animal Architecture.** Sigmund A. Lavine. 1964. (See ARCHITECTURE for description)

COMPUTER SCIENCE - - - - -

- **Computers, Pattern, Chaos, and Beauty.** Clifford Pickover. 1990. Combining fractal theory with computer art, this book introduces a creative use of computers. It describes graphic methods for detecting patterns in complicated data and illustrates simple techniques for visualizing chaotic behavior.
- **Design in Nature: Learning from Trees.** Claus Mattheck. 2004. Describes and verifies external shape laws in nature, not only valid for trees, but also for bones, claws, thorns, etc. Computer



Recommended Books (3)

simulation of these load-adaptive growths is used to find an ecological engineering design, characterized by minimum weight and maximum strength. The optimization procedure is already widely used in industry and many technical examples are given.

DESIGN

- **Biologic: Environmental Protection by Design.** David Wann. 1990. Guide to designing our way out of the environmental conundrum we are in by taking a system's view of technology – asking, “how does it fit in?”
- **Biomimicry: Innovation Inspired by Nature.** Janine Benyus. 1997. Demonstrates how nature's solutions to survival needs have been the creative jumping-off points for individuals seeking solutions to human challenges, developing, or simply revitalizing processes or products.
- **Cat's Paws and Catapults: Mechanical Worlds of Nature and People.** Steven Vogel. 1998. Investigates whether nature or human design is superior and why the two technologies have diverged so much.
- **Cradle to Cradle: Remaking the Way we Make Things.** William McDonough and Michael Braungart. 2002. An engaging description of the problem with today's industrial patterns, and a fascinating description of how a truly sustainable, biomimetic industrial ecology would work.
- **Decoding Design: Understanding and Using Symbols in Visual Communication.** Maggie Macnab. 2008. Symbols are intuitive and immediate. Design that references these symbols creates an immediate relationship with the viewer.
- **Deep Design: Pathways to a Livable Future.** David Wann. 1996. A new way of thinking about design by asking: “What is our ultimate goal?” The idea is to produce designs that are sensitive to living systems.
- **Design and Nature II.** Ed. M. W. Collins et Al. 2004. Contains proceedings of 2nd international conference on design and nature. Brings together researchers around the world on a variety of studies involving nature's significance for modern scientific thought and design.
- **Design for the Real World, Human Ecology and Social Change.** Victor Papanek. 1984. One of the world's most widely read books on design. Author

provides a blueprint for sensible, responsible design.

- **Design in Nature: Learning from Trees.** Claus Mattheck. 2004. Describes and verifies external shape laws in nature. Also explores self healing.
- **Design Lessons from Nature.** Benjamin De Brie Taylor. 1974. This book is concerned with forms in nature, with drawing, with ways of thinking about art and about design and how they are related.
- **Design with Nature.** Ian L. McHarg. 1969. A blend of philosophy and science, author shows how humans can copy nature's examples to design and build better structures.
- **Ecological Design.** Sim Van der Ryn, Stuart Cowan. 1996. The essential concepts of ecological design.
- **Mental Models: Aligning Design Strategy with Human Behavior.** Indi Young. 2008. There is no single methodology for creating the perfect product—but you can increase your odds. One of the best ways is to understand users' reasons for doing things. Mental Models gives you the tools to help you grasp, and design for, those reasons.
- **Secret Design Rules of Nature (Optimum Shapes without computers).** Claus Mattheck. 2007. This gem looks at the rules implicit in nature's solutions to design problems. Aimed at the craftsman as much as the builder or engineer, he demonstrates using simple graphical methods how the rules underlying appropriate shape and form in the natural world can be applied to man-made designs.
- **The Information Design Handbook.** Jenn Visocky O'Grady. 2008. Inspirational gallery of designs that illustrate how to communicate at a glance, logically, effectively, and with maximum benefit. Includes milestones from the history of information design that illustrate and explain breakthroughs and trends.
- **What is Design Today?** George H. Marcus. 2002. The first book to break down the issues of design for a general audience. A much-needed clarification and a tour of the often smart, political, and savvy imagery that characterizes the ever-changing world of products and graphics today.

ECOLOGY

- **A Hierarchical View of Ecosystems.** RV O'Neill. 1986. An advanced look at how ecosystems function.





Recommended Books (4)

- **At Home in the Universe.** Stuart Kauffman. 1996. Kauffman shows how life inevitably will emerge when there is sufficient complexity.
- **Fundamentals of Ecology.** Eugene Odum, WB Saunders. 1971. An early textbook on the basics of ecology, in depth.
- **The Ecology of Urban Habitats.** Philip C. Wheeler. 1999. Though written for a British audience, this book contains a wealth of information about urban ecology: succession, soils, animals, and microclimates.

ECONOMICS/BUSINESS

- **Cradle to Cradle: Remaking the Way we Make Things.** William McDonough and Michael Braungart. 2002. (See DESIGN for description)
- **Ecology of Commerce.** Paul Hawken. 1993. Ecological analysis of business. Practical suggestions.
- **Mid-Course Correction.** Ray C. Anderson. 1998. The story of how the CEO of Interface, Inc. saw the light, and struck out to redesign his petroleum-driven carpet company—and, in the process, a whole industr—by striving towards sustainability. The hope and humility with which Ray tells his story is both refreshing and inspiring.
- **Natural Capitalism.** Paul Hawken, Amory Lovins, and L. Hunter Lovins. 1999. The original comprehensive treatise on business sustainability, using numerable examples and case studies. Excerpts available online at www.natcap.org.
- **Nature of Economies.** Jane Jacobs. 2000. Dissects relationships between economics and ecology through a multilayered discourse around the fundamental premise that “human beings exist wholly within nature as part of a natural order.”
- **Out of Control.** Kevin Kelly. 1994. How our new understanding of biology is transforming both ecology and economics.
- **Small is Beautiful: Economics as if People Mattered.** F. Schumacker. 1989. The author recommends decentralized localized life styles. He outlines a series of proposals intended to save the planet from economic and environmental collapse.
- **The Living Company.** Arie de Geus. 1997. The author writes that “companies die because their managers focus on the economic activity of producing goods and services, and they forget that their organizations’ true nature is that of a community of humans.” He summarizes the

components of the long-lived company as sensitivity to the environment, cohesion and identity, tolerance and decentralization, and conservative financing.

ENGINEERING

- **Biomimetics: Biologically Inspired Technologies.** Ed. Yoseph Bar-Cohen. 2005. Explores biological models useful to engineering and the challenges awaiting future research.
- **Marshall Brain’s How Stuff Works.** Marshall Brain. 2001. Over 1,000 full-color illustrations and photos.
- **Mechanical Design in Organisms.** Stephen A. Wainwright. 1982. Surveys the mechanics of living systems and components of living systems. Interface between mechanical engineering and biology.
- **Nature and Design.** Ed M. W. Collins, et. Al. 2004. Comprehensive introduction to common scientific laws of both the natural world and engineered worlds. Features mathematics, physics, chemistry, thermodynamics, biomimicry, mechanical engineering and history of science.

EVOLUTION

- **On Growth and Form: The Complete Revised Edition.** D’Arcy Wentworth Thompson. 1992. Classic of biology and modern science sets forth seminal “theory of transformation”—that one species evolves into another not by successive minor changes in individual body parts but by large-scale transformations involving the body as a whole.
- **Survival Strategies: Cooperation and Conflict in Animal Societies.** Raghavendra Gadagkar. 1997. Why creatures great and small behave in such fascinating and seemingly perplexing ways is explained in this delightful account of the evolutionary foundations of animal social behavior.
- **The Ghosts of Evolution: Nonsensical Fruit, Missing Partners, and Other Ecological Anachronisms.** Connie Barlow. 2002. How surviving plants are clues to vanished ecological relationships. For designing systems for humans and animals.

GENERAL SCIENCE



Recommended Books (5)

- **Basic Nature.** Andrew Scott. 2002. Fundamental concepts of modern science.
- **A Short History of Nearly Everything.** Bill Bryson. 2004. Covers everything from “primordial nothingness” to “ascendancy of Homo sapiens.”

INNOVATION

- **Alternative Pathways in Science and Industry: Activism, Innovation, and the Environment in an Era of Globalization.** David J. Hess. 2007. Hess identifies alternative pathways by which social movements can influence scientific and technological innovation.
- **Biomimicry: Innovation Inspired by Nature.** Janine Benyus. 1997. (See DESIGN for description)
- **Invention by Design.** Henry Petroski. 1996. Philosophical and cultural study of the process of invention. Full of case studies in easy-to-read writing.
- **Nature: Mother of Invention.** Felix Paturi. 1976. The book provides an overview of bio-inspiration, noting that scientists can learn from natural structures of all sizes and put their knowledge to use in a number of ways, often by studying nature at the nanolevel, where the distinction between nature and human technology is often blurred.
- **Product Design.** B. Martin Pederson. 2004. Features cutting-edge design in a wide range of categories, including electronics, furniture, lighting, transportation, industrial products, home and office products and much more.
- **The Gecko’s Foot: Bio-inspiration, Engineering New Materials and Devices from Nature.** Peter Forbes. 2005. Presents technologists’ pure research into nano-anatomy, followed by their applied and, as many entrepreneurs hope, commercial mimicry of nature’s ingenuity.

MATERIALS SCIENCE

- **Biomimetic Materials Chemistry.** Stephen Mann (Editor). 1995. Provides a unified, up-to-date approach to the applications of biological concepts, products and processes in material research.
- **Biomaterialization.** Stephen Mann. 2002. Describes a new type of chemistry that brings together soft and hard material for the design of functionalized inorganic-organic materials.

- **Biomolecular Materials.** Ed. Christopher Viney et. al. Materials Research Society. Volume 292. 1992. Design of material synthesis, assembly, processing and physical optimization strategies based on examples from nature.
- **Design and Nature II.** Ed M. W. Collins et. Al. 2004. (See DESIGN for description)
- **Structural Biomaterials: (Revised Edition).** Julian F.V. Vincent. 1990. The book presents a biologist’s analysis of the structural materials of organisms, using molecular biology as a starting point. It is an excellent introduction to the field which attempts to stimulate interest in biomaterials.

MATHEMATICS

- **Life’s Other Secret: The New Mathematics of the Living World.** Ian Stewart. 1999. Shows how mathematics can be used to describe the symmetry of the living world. Author argues that “life is a partnership between genes and mathematics.”
- **Mathematics in Nature: Modeling Patterns in the Natural World.** John A. Adam. 2006. An excellent resource for bringing a greater variety of patterns into the mathematical study of nature, as well as for teaching students to think about describing natural phenomena mathematically
- **The Sizesaurus: From Hectares to Decibels to calories, a Witty Compendium of Measurements.** Stephen Strauss. 1995. A fun book about the measurements by which we define the world, tackling such issues as “What would Santa Clause have to do to deliver all his presents in one night,” and in his “Measuring Macropedia” occupying the last half of the book, in which he provides nice graphical and tabular comparisons of the most frequently encountered for units of measurement.

MECHANICS

- **Creatures in their Physical Worlds.** Steven Vogel. 2009. In Press. Biomechanics.
- **Exploring Biomechanics: Animals in Motion.** R. McNeill Alexander. 1992. Explores a multitude of animals’ movement and how they’ve evolved mechanisms for efficiency.
- **Life’s Devices: The Physical World of Animals and Plants.** Steven Vogel, Rosemary Calvert. 1988. This is an entertaining and informative book that describes how living things bump up against non-biological reality.





Recommended Books (6)

- **Life in Moving Fluids.** Steven Vogel. 1996. This book is for biologists who want to come to the beginning of a quantitative understanding of a wide variety of adaptations, and for general readers who want to see how fluid mechanics work in a varied and often surprising context.
- **Mechanical Design in Organisms.** Stephen A. Wainwright. 1982. The designer of a bridge needs to know the strength of his steel or concrete and he needs to know how forces are transmitted through structures. A biologist studying an animal or plant structure cannot understand it fully without the same sort of knowledge.
- **Structural Biomaterials: (Revised Edition).** Julian F.V. Vincent. 1990. (See MATERIALS Science for description)
- **The Biomechanics of Insect Flight.** Robert Dudley. 2002. Explores insect physiology, functional morphology, paleontology, aerodynamics, behavior and ecology. The book excels as a synthesis of all these fields, and as a unique source of information on the subject of insect flight as a whole.

PATTERNS -----

- **A Pattern Language.** Christopher Alexander. 1977. Design for human building and settlements using patterns derived from successful designs.
- **By Nature's Design.** William Neill, Pat Murphy. 1993. Stunning photographs and clear explanations of nature's patterns.
- **Computers, Pattern, Chaos, and Beauty.** Clifford Pickover. 1990. Combining fractal theory with computer art, this book introduces a creative use of computers. It describes graphic methods for detecting patterns in complicated data and illustrates simple techniques for visualizing chaotic behavior.
- **Dynamic Form in Nature.** David Wade. 2003. Collection of families of surface patterns that nature at every scale. The study of these shapes—a subject virtually unknown in the West—was known in ancient China as Li and is the sister science to Feng Shui.
- **Living Energies: An exposition of concepts related to the theories of Viktor Schauberg.** Callum Coates. 2002. Living Energies gives the understandings necessary for revitalizing Planet Earth—for understanding which human actions

either enhance or destroy the vitality of our forests, soils, air and water.

- **Patterns in Nature.** Peter S. Stevens. 1974. A review of the common classes of patterns found in nature.
- **The Curves of Life.** Theodore A. Cook. 1979. A well-thought-out examination of the function of the spiral, or helix, in both nature and art. Demonstrates how the spiral is fundamental to the structure of shells, leaves, horns, human body, drawings of Leonardo, Leaning Tower of Pisa, and more.
- **The Fractal Geometry of Nature.** Benoit Mandelbrot. 1983. Key insights into natural patterns by the developer of the fractal concept.
- **Symmetry: A Journey into the Patterns of Nature.** Marcus Du Sautoy. 2008. Symmetry is all around us. Of fundamental significance to the way we interpret the world, this unique, pervasive phenomenon indicates a dynamic relationship between objects.
- **The Nature of Order: An Essay on the Art of Building and the Nature of the Universe (Four Volumes).** Christopher Alexander. 2004-2006. This is the summation of the life work and thought of Alexander who was trained as a theoretical mathematician and became an architect. He originated the Pattern Language and proposes wholeness as a measure of life within a system (designed or natural) then 15 principles which lead to wholeness.
- **The Order of Things: Hierarchies, Structures, and Pecking Orders.** Barbara Ann Kipfer. 2008. Lists assembled by an experienced lexicographer of ideas: knots, alphabets, architectural elements, leaders of state, anatomy, and more.
- **The Power of Limits: Proportional Harmonies in Nature, Art and Architecture.** Gyorgy Doczi. 1981. *The Power of Limits* was inspired by the continuity of natural patterns. The book explores how certain proportions occur over and over and are also repeated in how things grow and are made.
- **The Self-Made Tapestry: Pattern Formation in Nature.** Philip Ball. 2001. This deep, beautiful exploration of the recurring patterns that we find both in the living and inanimate worlds will change how one thinks about everything from evolution to earthquakes.
- **The Shape of Life.** Nancy Burnett. 2002. Based on the National Geographic/Sea Studios Foundation series seen on PBS. Every animal that ever lived



Recommended Books (7) -----

fits into one of only eight basic body plans. Those basic forms have given rise to billions of species of animals and continue to define the shape of life on Earth.

SYSTEMS SCIENCE -----

- **Buckminster Fuller’s Universe.** Lloyd Steven Sieden. 1989. (See BIOGRAPHY for description)
- **Emergence: The Connected Lives of Ants Brains, Cities, and Software.** Steven Johnson. 2001. Details the development of increasingly complex and familiar behavior among simple components.
- **The Web of Life: A New Scientific Understanding of Living Systems.** Fritjof Capra. 1996. Capra sets forth a new scientific language to describe interrelationships and interdependence of psychological, biological, physical, social, and cultural phenomena—the “web of life.” Capra provides an extraordinary new foundation for ecological policies that will allow us to build and sustain communities without diminishing the opportunities for future generations.
- **Thinking in Systems: A Primer.** Donella Meadows. 2008. Just before her death, scientist, farmer and leading environmentalist Meadows (1941-2001) explains the methodology—systems analysis—she used in her ground-breaking work, and how it can be implemented for large-scale and individual problem solving.
- **Turbulent Mirror.** John Briggs and David Peat. 1989. The authors explore the many faces of chaos and reveal how its laws direct most of the processes of everyday life and how it appears that everything in the universe is interconnected—discovering an “emerging science of wholeness.”



| thanking the experts





Recommended Databases & Websites (1)

Years of dedicated observation, contemplation, research, and experimentation has led experts in every discipline all around the world to compile their thoughts in various forms. This section contains valuable resources for advancing one's understanding of biomimicry and related fields. The next time you tap the insight of a brilliant work listed here, give a little thanks to the author who made your learning possible.

academic search - - - - -

- **DOI Search** (Cross Ref)
<http://www.crossref.org/guestquery/>
- **Citation Styles** (Son of Citation)
<http://citationmachine.net/index.php?page=register>
- **Entrez PubMed**
<http://www.ncbi.nlm.nih.gov/pubmed/>
- **Journal abbreviations**
http://home.ncicrf.gov/research/bja/journams_a.html
http://www.wsulibs.wsu.edu/general/journal_abbreviations.html
- **Scientific Commons**
<http://en.scientificcommons.org/>
- **Scirus**
<http://www.scirus.com/>
- **Scopus**
<http://www.scopus.com/scopus/home.url>
- **Web of Science** (access through university libraries)
http://thomsonreuters.com/products_services/scientific/Web_of_Science
- **Wiley Interscience**
<http://www3.interscience.wiley.com/cgi-bin/home>
- **Journal Seek**
<http://journalseek.net/>

architects, designers, and engineers - - - - -

- **AskNature**
www.asknature.org
- **Buckminster Fuller Institute**
www.bfi.org
- **Centre for Biomimetics: School of Construction Management and Engineering, University of Reading**
<http://www.rdg.ac.uk/Biomim/>
- **Constructural Theory Web Portal**
<http://www.constructal.org/>
- **Engineer and Biologist Mechanical Design**
<https://www.jiscmail.ac.uk/cgi-bin/webadmin?A0=BIOMIMETICS>
- **Engineers Edge**
<http://www.engineersedge.com/>
- **How Products are Made**
<http://www.madehow.com/>
- **How Stuff Works**
<http://science.howstuffworks.com/>

- **How To Do Just About Everything**
<http://www.ehow.com/>
- **MATERIA: exterior and interior building and product materials database**
<http://www.materia.nl/>
- **Motion Mountain: The Free Physics Textbook**
<http://www.motionmountain.net/index.html>
- **Noise Control** (U.S. Department of Labor)
<http://www.nonoise.org/hearing/noisecon/noisecon.htm>
- **Socioeconomic & Earth Sciences Data**
<http://sedac.ciesin.columbia.edu/>
- **Taxonomy of Manufacturing Processes**
http://en.wikipedia.org/wiki/Taxonomy_of_manufacturing_processes
- **Wolfram Demonstrations Project** (interactive visualizations)
<http://demonstrations.wolfram.com/>

biologists - - - - -

biology (general)

- **Ask a Biologist Q&A**
http://www.askabiologist.org.uk/punbb/search.php?action=show_24h
- **Biodiversity Heritage Library**
<http://www.biodiversitylibrary.org/>
- **Catalog of Life**
<http://www.catalogueoflife.org/search.php>
- **EOL: Encyclopedia of Life**
<http://www.eol.org/index/>
- **Engineering Database: Compendex**
<http://www.lib.montana.edu/resources/engineering.php>
- **Entrez Taxonomy**
<http://www.ncbi.nlm.nih.gov/sites/entrez?db=taxonomy>
- **Expert Search** (Authority: Find an expert in any field)
<http://www.authoratory.com/index.htm>
- **Habitat Classification Scheme (IUCN)**
http://www.iucnredlist.org/static/major_habitats
- **ISpecies search engine** (distribution maps, NCBI info, images, and Google scholar articles)
<http://www.ispecies.org>
- **ITIS: Integrated Taxonomic Information System**
<http://www.catalogueoflife.org/annual-checklist/2008/search.php>



Recommended Databases & Websites (2)

- **Library Thing**
<http://www.librarything.com/>
- **Red List Search (IUCN)**
<http://www.iucnredlist.org/search>
- **Species Distribution Grid** (distribution maps)
<http://sedac.ciesin.columbia.edu/species/>
- **Taxonomicon**
<http://www.taxonomy.nl/taxonomicon/>
- **Taxonomy Warehouse**
<http://www.taxonomywarehouse.com/>
- **Tree of Life Web Project**
<http://www.tolweb.org/tree/phylogeny.html>
- **Wikispecies**
http://species.wikimedia.org/wiki/Main_Page/
- **WorldCat**
<http://www.worldcat.org/>

animal (includes coral, worms, & insects)

- **Amphibia Web**
<http://amphibiaweb.org/index.html>
- **Annelid Resources: polychaetes, oligochaetes, leeches and allies**
<http://www.annelida.net/>
- **EOL: Encyclopedia of Life**
<http://www.eol.org/index/>
- **FishBase**
<http://www.fishbase.org/search.php/>
- **Hymenoptera Name Server** (Wasps, bees, ants, and sawflies)
http://atbi.biosci.ohio-state.edu:210/hymenoptera/nomenclator.home_page
- **Parasitology glossary**
<http://parasitology.informatik.uni-wuerzburg.de/login/frame.php?splink=/login/n/h/0870.html>
- **Termite Database**
<http://www.unb.br/ib/zoo/docente/constant/catal/catnew.html>

archaea (single-celled prokaryote; was archaeobacteria)

- **EOL: Encyclopedia of Life**
<http://www.eol.org/index/>
- **DSMZ Bacterial Nomenclature**
http://www.dsmz.de/microorganisms/bacterial_nomenclature.php
- **The Prokaryotes** (Encyclopedic handbook of prokaryotes. Electronic version, 7 volumes)
<http://weblib.lib.umd.edu/external/subject.php?s=Biolog>

bacteria (single-celled prokaryote; includes cyanobacteria)

- **EOL: Encyclopedia of Life**
<http://www.eol.org/index/>
- **DSMZ Bacterial Nomenclature**
http://www.dsmz.de/microorganisms/bacterial_nomenclature.php
- **MicrobeWiki**
<http://microbewiki.kenyon.edu/index.php/MicrobeWiki>
- **Microbe World**
<http://www.microbeworld.org/>
- **micro scope: websites for microbes**
<http://starcentral.mbl.edu/microscope/portal.php?pagetitle=index>
- **The Prokaryotes** (Encyclopedic handbook of prokaryotes. Electronic version, 7 volumes)
<http://weblib.lib.umd.edu/external/subject.php?s=Biolog>

chromista (includes algae with chlorophyll such as brown algae, Chytridiomycetes, Myxomycetes, Zygomycetes, and Oomycetes; note that Protista is no longer recognized)

- **Cyber-Truffle**
<http://www.minter.demon.co.uk/pdms/index.htm/>
- **EOL: Encyclopedia of Life**
<http://www.eol.org/index/>
- **Index Fungorum**
<http://www.speciesfungorum.org/Names/Names.asp>
- **IUCN Red List for Microfungi**
http://www.cybertruffle.org.uk/iucn_red_list/index.htm
- **Mildew, Mould & Myxomycetes**
<http://www.cybertruffle.org.uk/moulds/index.htm>
- **Rare fungi database** (Biodiversity Website for neglected aspects of the natural world, including "distribution maps" of some fungi)
<http://www.biodiversity.ac.psiweb.com/index.htm>

enzyme databases

- **Enzyme Structures Database**
<http://www.biochem.ucl.ac.uk/bsm/enzymes/>
- **Enzyme-Catalyzed Transformations Database - ReBiT**
<http://www.retro-biosynthesis.com/index.html>
- **Enzyme Database - BRENDA**
<http://www.brenda-enzymes.info/>
- **Enzyme Nomenclature Database**
<http://expasy.org/enzyme/>



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Recommended Databases & Websites (3)

- **Enzyme Catalytic Mechanisms Database**
<http://mbs.cbrc.jp/EzCatDB/>
- **Thermodynamics of Enzyme-Catalyzed Reactions Database**
http://xpdn.nist.gov/enzyme_thermodynamics/

fungi and lichens (includes Ascomycetes, Basidiomycetes, VAMs, rusts, smuts)

- **Cyber-Truffle**
<http://www.minter.demon.co.uk/pdms/index.htm/>
- **EOL: Encyclopedia of Life**
<http://www.eol.org/index/>
- **Index Fungorum**
<http://www.speciesfungorum.org/Names/Names.asp>
- **IUCN Red List for Microfungi**
http://www.cybertruffle.org.uk/iucn_red_list/index.htm
- **Mildew, Mould & Myxomycetes**
<http://www.cybertruffle.org.uk/moulds/index.htm>
- **Rare fungi database** (Biodiversity Website for neglected aspects of the natural world, including "distribution maps" of some fungi)
<http://www.biodiversity.ac.psiweb.com/index.htm>
- **Cyberliber: An Electronic Library for Mycology**
<http://www.cybertruffle.org.uk/cyberliber/index.htm>

plants (includes diatoms, green algae, red algae, and bryophytes)

- **BPH Online** (plant science periodicals published between 1665 and the present; other databases too)
<http://huntbot.andrew.cmu.edu/HIBD/Departments/Databases.shtml>
- **EOL: Encyclopedia of Life**
<http://www.eol.org/index/>
- **CITES Medicinal Plants** (Botanic Gardens Conservation International)
http://www.bgci.org/medicinal/CITES_and_Med_Plants/
- **Germplasm Resources Information Network (GRIN)**
<http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?314437>
- **LegumeWeb**
<http://www.ildis.org/LegumeWeb/>
- **MBG:W3TROPICOS (Vascular Plant Names)**
<http://mobot.mobot.org/W3T/Search/vast.html>

protozoa (slime molds, ciliates, dinoflagellates)

- **EOL: Encyclopedia of Life**
<http://www.eol.org/index/>

- **DSMZ Bacterial Nomenclature**
http://www.dsmz.de/microorganisms/bacterial_nomenclature.php
- **Parasitology glossary**
<http://parasitology.informatik.uni-wuerzburg.de/login/frame.php?splink=/login/n/h/O870.html>
- **The Prokaryotes** (Encyclopedic handbook of prokaryotes. Electronic version, 7 volumes)
<http://weblib.lib.umt.edu/external/subject.php?s=Biology>

viruses

- **EOL: Encyclopedia of Life**
<http://www.eol.org/index/>
- **ICTVdb: the Universal Virus Database of the International Committee on Taxonomy of Viruses for virus classification**
<http://www.ncbi.nlm.nih.gov/ICTVdb/index.htm>

biomimicry

- **AskNature**
www.asknature.org
- **Ask The Planet Children's CD**
<http://asktheplanetcd.org>
- **Biomimicry Guild**
www.biomimicryguild.com
- **The Biomimicry Institute**
www.biomimicryinstitute.org
- **Biomimicry Week-Long Workshops**
http://www.biomimicryguild.com/badt_workshop.html
http://www.biomimicryguild.com/costa_ricaworkshop.html
- **Biomimicry Two-Year Certification Program**
<http://www.biomimicryinstitute.org/education/certificate/>
- **BioParadigm ACCESS** (Consolidates information on available biomimetic IP for product designers, engineers and material scientists)
<http://www.biomimeticsregistry.net/>

educators

- **Animal Behavior Society**
<http://www.animalbehavior.org/>
- **Australian Museum: Ichthyology**
<http://www.austmus.gov.au/fishes/>
- **Botany Online: The Internet Hypertextbook**
<http://www.biologie.uni-hamburg.de/b-online/e00/default.htm>



Recommended Databases & Websites (4)

- **Cell Biology: Vaults**
<http://vaults.arc.ucla.edu/>
- **Chemoreception, Olfaction and Aromas**
<http://www.leffingwell.com/>
- **Cricket Communication Research**
<http://cricket.unl.edu/>
- **Crystal lattice structures**
<http://cst-www.nrl.navy.mil/lattice/>
- **Electronics & Electrical Engineering: Hall Effect Measurements**
<http://www.eeel.nist.gov/812/hall.html>
- **Monterey Bay Aquarium**
<http://www.mbayaq.org/efc/>
- **Science Hobbyist**
<http://www.amasci.com/>
- **Slideshare** (share and watch PowerPoint presentations)
<http://www.slideshare.net/search/slideshow?q=biomicrocry&submit=post&x=42&y=8>

green chemists - - - - -

- **About.com: Chemistry Encyclopedia**
<http://chemistry.about.com/od/chemistryatoz/a/encyclopedia.htm>
- **Chemicool**
<http://www.chemicool.com/dictionary.html>
- **Chemspider**
<http://www.chemspider.com/>
- **Critter Chemistry**
<http://pubs.acs.org/cen/critter/critterchemistry.html>
- **Dictionary of Organic Compounds**
<http://doc.chemnetbase.com/dictionary-search.do?method=view&id=2663046&si=>
- **ReBit Enzyme Database**
<http://www.retro-biosynthesis.com/>
- **Green Chemistry Institute**
http://portal.acs.org/portal/acs/corg/content?_nfpb=true&_pageLabel=PP_TRANSITIONMAIN&node_id=830&use_sec=false&sec_url_var=region1
- **NatureWorks**
<http://www.natureworksllc.com/>
- **NIST Chemistry**
<http://www.nist.gov/srd/chemistry.htm>
- **Organic Chemistry Portal**
<http://www.organic-chemistry.org/namedreactions/>
- **Periodic Table**
<http://pubs.acs.org/cen/80th/elements.html>
- **Presidential Green Chemistry Challenge Awards**
<http://www.epa.gov/greenchemistry/pubs/pgcc/presgcc.html>

- **PubChem**
<http://pubchem.ncbi.nlm.nih.gov/>
- **Scorecard - toxicology info**
<http://www.scorecard.org/>
- **Supramolecular Chemistry**
http://en.wikipedia.org/wiki/Supramolecular_chemistry
- **TOXNET - NLM**
<http://toxnet.nlm.nih.gov/>
- **Warner-Babcock Institute**
<http://warnerbabcock.com/>
- **World of Chemistry for All**
<http://worldchemistry.blogspot.com/2009/01/acs-green-chemistry-institute.html>

multi-media - - - - -

- **ARKive: Images of Life on Earth**
<http://www.arkive.org/>
- **Creative Commons Search**
<http://search.creativecommons.org/>
- **Flickr**
<http://www.flickr.com/>
- **Wikimedia Commons**
http://commons.wikimedia.org/wiki/Main_Page
- **Molecular Expressions Photo Gallery**
<http://micro.magnet.fsu.edu/micro/gallery.html>
- **Science Photo Library**
<http://sciencephoto.com/>
- **Morphbank**
<http://www.morphbank.net/About/Introduction/index.php>
- **CalPhotos**
<http://calphotos.berkeley.edu/>
- **3Dscience.com**
http://www.3dscience.com/3D_Science_Clip_Art.php
- **Eye of Science**
<http://www.eyeofscience.de/eos2/index2.html>
- **BIODIDAC**
<http://biodidac.bio.uottawa.ca/>
- **JungleWalk**
<http://www.junglewalk.com>
- **casadaimagem**
<http://www.casadaimagem.com/>
- **SXC**
<http://www.sxc.hu/home>



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Recommended Search Terms & Journals

search terms

adaptation | atom economy | biomimicry | biomimetic | bioinspired | biomineralization | bioremediation | biosphere complexity science | conservation | conducive to life | cradle to cradle | design | ecodesign | ecolabeling | ecological economics | ecopark ecosystem | emulating nature | energy conservation | environmental management | mechanism feedback loops | food web | full cost accounting | green chemistry | green technology | genetic algorithms | industrial ecology | industrial metabolism | natural selection | industrial symbiosis | innovation | input/output analysis | life cycle costing | life cycle design | natural strategy | material flow analysis | natural capitalism | organism | permaculture | photonics | precautionary principle | recycle stewardship | superhydrophilic | superhydrophobic | supramolecular chemistry | sustainability | holistic | sustainable development | sustainable engineering | switchable | SWOT analysis | symbiosis | systems ecology | systems thinking | waste minimization | nature inspired | integrated chain management

used for biomimicry case study ideas

- Biomimetics & Bioinspiration
- Environmental Microbiology
- International Society for Industrial Ecology
- Journal of Experimental Biology
- Journal of Industrial Ecology
- Journal of Materials Science
- Journal of Morphology
- Materials Science and Engineering
- National Geographic & National Geographic News
- Nature
- New Scientist
- Physical Review E
- Proceedings of the National Academy of Sciences
- Progress in Industrial Ecology
- Science (and Science News)
- Scientific American

used often by biologists at the design table

- American Journal of Botany
- Annals of Botany
- Annual Review of Microbiology
- Applied Entomology and Zoology
- Biology Letters
- BioScience
- Chemical and Engineering News
- Copeia
- Flora
- Green Chemistry Journal
- Journal of Bionic Engineering
- Journal of Chemical Ecology
- Journal of Comparative Physiology A: Sensory, Neural, and Behavioral Physiology
- Journal of Comparative Physiology B: Biochemical, Systemic, and Environmental Physiology
- Journal of Comparative Zoology
- Journal of Experimental Zoology
- Journal of Phytoremediation
- Letters in Applied Microbiology
- Microbial Ecology
- Nature Chemical Biology
- Natural History
- Nature Materials
- Oecologia
- Physiology A: Neuroethology, Sensory, Neural, and Behavioral Physiology
- Plant Physiology
- PLoS Biology
- Trends in Ecology and Evolution

