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Sustainable Design: Green Homes Inspired by Mother Nature

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biomimicry - green house plans



Biomimicry seen in a nasturtium leaf – tiny surface structures allow it to be water resistant naturally.

The Earth has been around for 3.8 billion years (give or take a billion depending on who you ask) and has managed to evolve something like 8.7 million different species (again, give or take a million depending on who you ask) that can survive and thrive in environments of all kinds. That's a pretty solid track record of research and development that can be applied to anything and everything.

The point is that when it comes to solving human problems, our first questions should be these: What can nature teach us? Has nature already solved this problem? Millions of species all over the globe have adapted to meet every conceivable challenge, so we just need to find the applicable natural design and then use our human ingenuity to figure out how to recreate it. The added bonus is that when you solve problems using nature's green design solutions, everything will tend to be more sustainable because it will use less energy, create less waste, and perform better. This new way of thinking about sustainable design is called *biomimicry* or *biomimetics*.

Design inspiration

The Basics of to Biomimicry or Biomimetics

Biomimicry is a new science that studies nature's models and then emulates these forms, process, systems, and strategies to solve human problems – sustainably.

Founder Janine Benyus calls it *innovation inspired by nature*.^[i]

In its simplest form, biomimicry design means first defining the problem in its full context (you'll see many of these concepts in the [Living Building](#) philosophy). The second step is to find an array of organisms that have dealt with a similar problem and context to see what they did to overcome it. The third step is to choose the most successful or relevant strategy and find a way to turn into something you can build.^[ii] The best way to illustrate this is through some real life examples such as the following:

- **Velcro:** If you've ever walked through a meadow and discovered just how good burrs are at clinging to your clothes, then you might not be surprised to find out that Velcro is modeled after those ultra-clingy hook-loop objects.^[iii]
- **Bullet Train:** Japan's bullet trains were fast, but when they went in and out of tunnels they were producing sonic booms that had people cringing in their homes. The engineer in charge of fixing the problem was at a bird-watching event when he noticed how kingfishers have solved this problem by their shape. The redesigned trains mimic the kingfisher shape and also feature additions modeled on owl wings for additional quieting. The trains are now 10% faster, use 15% less energy, and are much quieter.^[iv]
- **Green Building:** A real challenge in sustainable building design is temperature regulation. The Eastgate Centre is the largest office and shopping building in Zimbabwe, located in Harare. It modeled its temperature regulation system on that of termite mounds to great effect. The results include saving \$3.5 million on a conventional air conditioning system, and the whole building uses less than 10% of the energy used in conventional buildings of the same size.^[v]

How to Think Like a Bioneer

So how do you apply the principles of biomimicry in your green house designs? Here are some practical suggestions for using the wisdom of nature to create a sustainable home.

First, **think like nature**. To make the most of biomimicry and sustainable design, you have to learn to think like Mother Nature. What does that mean? Try these principles on for size:

1. Waste=Food;
2. Gather energy and materials efficiently;
3. Optimize the system rather than maximizing components;
4. Use minimal energy and materials;
5. Organize fractally.

As you can see, it's a very different way of thinking! More principles may be found at [Biomimicry for Green Design.\[vi\]](#)

Second, **use the biomimicry design spiral**. The full sustainable design process involves six key steps to *identify* (the human need or problem), *interpret* (biologize the problem by asking how nature deals with it), *discover* (look to see which organisms answer the challenge), *abstract* (catalogue as many of nature's solutions

to the problem as possible for comparison), *emulate* (translate nature's solutions into workable human solutions), and *evaluate* (compare your solution to nature's principles). To see the process graphically illustrated, download [Design for Sustainability through Biomimicry](#).^[vii]

Third, applying **biomimicry at home** means following these seven principles. 1) Design your home to respond to the sun's light, 2) Make connections between your furnishings and décor, 3) Combine form and function, 4) Create life-affirming beauty, 5) Optimize your resources, 6) Reduce and reuse following the cycle of life, and 7) Think locally.^[viii]

More Information: Exploring the How and Why of Biomimicry

- A fuller introduction to biomimicry can be found in [A Biomimicry Primer](#).
- The most thorough resource on biomimicry is the book *Biomimicry: Innovation Inspired by Nature* by Janine Benyus, the founder of the movement. The first chapter may read in its entirety by following the link.
- Many other resources related to biomimicry can be found at the [Biomimicry Institute](#) website.
- See the European take on biomimicry at the [Biomimicry Europa](#) website.
- For more information and examples of biomimicry applied to buildings and engineering, see [Biomimicry: Designing to Model Nature](#).
- For a searchable database of biomimicry strategies and blueprints, bio-inspired products and designs and biomimics or bioneers with whom you can interact, see the [AskNature](#) website.

Image via Flickr: [Kevin Krejci](#)

^[i] What is Biomimicry? The Biomimicry Institute. Retrieved from <http://www.biomimicryinstitute.org/about-us/what-is-biomimicry.html>

^[ii] Biomimicry for Green Design (A How-To) by Jeremy Faludi, 2005, Worldchanging.com. Retrieved from <http://www.worldchanging.com/archives/003680.html>

^[iii] What is Biomimicry? By Hillary Woolley, 2008, CBS News. Retrieved from

http://www.cbsnews.com/8301-505125_162-51236571/what-is-biomimicry/

[iv] Shinkansen Train: High Speed Train Silently Slices Through Air. Retrieved from <http://www.asknature.org/product/6273d963ef015b98f641fc2b67992a5e>

[v] Green Building in Zimbabwe Modeled After Termite Mounds, by Abigail Doan, 2007, Ihabitat.com. Retrieved from <http://inhabitat.com/building-modelled-on-termites-eastgate-centre-in-zimbabwe/>

[vi] (Biomimicry for Green Design – A How-To)

[vii] Design for Sustainability through Biomimicry: An Overview with Examples, by Suparna Vashisht, 2011, Sustainable Silicon Valley. Retrieved from http://api.ning.com/files/UJ2UUT-lhEGXvh85ZVhf-yxXeUIWY9jn*PTdh93jecl3-vlCqFf6xe2KvaaXPCatR1pwWKuuNgeo4xX8cB-q-bHTCjG4IPHZ/BiomimicryHandout.pdf

[viii] Mother Knows Best: Home Design Inspired by Nature, by Deborah Coburn, 2008, Natural Home and Garden. Retrieved from <http://www.naturalhomeandgarden.com/Homes/2008-03-01/Mother-Knows-Best.aspx>



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