This month's newsletter may only take you five to eight minutes – and guess what, if you read it you'll get a lovely gift at the end!

Many of you have prospered by learning about biomimicry by reading Janine's book Biomimicry: Innovation Inspired by Nature. Others among you learned biomimicry from me and still others learned of or about it from various other sources. Regardless of where you learned it (or how much you're currently using it) you'll still be facing two major challenges:

- Incorporating Life's Principles into your work
- Materials!

Frankly, the two of these are intimately connected but for the sake of clarity (especially for a few of you who have missed out on biomimicry to this point) let's just take five minutes to review.

When practicing biomimicry you start with a foundation of Earth's Operating Conditions. These are things none of us can avoid like gravity, water and sunlight. Go ahead, try. Equally as impossible to refute are the elements of dynamic non-equilibrium (Life is not a pendulum. It's an orange in a bowl.), limits and boundaries (We have to have at least some percentage of oxygen to breathe or we die.), and cyclic processes (Birth-death, seasons, day-night . . . you get the picture).

So, if we use these conditions as a base – which really, we have to if we're interested in any measure of long-term success – the next layer upon which we build solution pathways is a group of elements we refer to as "Life's Principles". These handy little adages (based around Janine's teaching and the Biomimicry 3.8 Institute) provide us not just the keys to biomimicry, but to sustainability. If you're into running your business, agency or even your home sustainably; consider these EVERY time you're solving a problem and try to incorporate as many as you can. Yes, I'm suggesting you make Life's Principles a habit – kind of like brushing your teeth. You wouldn't skip that, would you? (Don't tell me if the answer is yes, please.)

Building the Life's Principles Habit

1. Be locally attuned and responsive. Look around you at the cycles and feedback loops happening in the world around you. How can you integrate these into your solutions? Is there a way to access energy or materials close by . . . or closer than an ocean away? Hey, our family has kept over 10,000 pounds of Carbon out of the atmosphere since January by using energy from the sun that beats right down on our farm. Beat that. No really, *beat that, please!* As you're looking locally, you can also incorporate cooperation with those nearby. Monarch butterflies, native bees and other pollinators would love it if you mowed less of your company lawn. In return, they'll pollinate the food crops, flowers and trees you've come to love – and save you gas, depreciation on your mowing equipment and personnel time on said equipment.

2. Adapt to Changing Conditions. As you create your solutions, don't sink all your hopes into one fix. Life changes every day and you have to change with it. Decentralizing, diversifying, using variation to your advantage as well as creating redundancies keep your business, your town, etc. more resilient. Nowhere was this more impactful in my life than when an EF7 tornado destroyed a large portion of my hometown, Joplin, Missouri. Although it eviscerated our largest hospital and medical complex, we

had others spread throughout town(decentralizing and redundancies). In nature, the spread of organisms across a large land/ocean/riverine area protects them by creating variations in the gene pool, decentralizing them in case of disease, natural or human-caused disaster.

3. Evolve to survive. Use what works. Change over time while integrating the unexpected into your solutions. Use what works with variations (See #2.). Learn from other organisms and attempt to use solutions that have kept them or their kin here for 3.8 billion years.

4. Integrate development with growth. A single cell does not a beehive make. As it grows, building from the bottom up, it develops into a more useful structure/home/nursery etc. Importantly, it takes its surrounding conditions into account as it grows. It forms around a tree, instead of cutting it down, ultimately benefitting from that structure. (Now we're kind of back to cooperation, aren't we?) The result is a more robust hive, population of bees and surrounding organisms that benefit. Panelite developed ClearShade insulating glass mimicking the structure of connected bee cells. By integrating individual components into an overall end product structure they've been able to deploy more energy efficient windows and save consumers in ongoing heating costs. How are you building from the bottom up by integrating development and growth? Are you using existing structures to support your growth? Are you nesting components within your companies to move from the simple to complex – whether in your organizational development or on the assembly line?

5. Be resource and energy efficient. The Japanese Shinkansen Bullet Train was modelled after the beak and head shape of a kingfisher, which enters the water with barely a ripple. This structure-based example of biomimicry made for a quieter train when entering tunnels. It also saved 15% on energy while simultaneously becoming enabled to travel 10% faster.

6. Use life-friendly chemistry. Mimicking function, structure and process are each critical entry points into biomimicry. Materials are a big part of these and remain one of the biggest challenges in the field. One can mimic keratin or chitin – but with what other materials? Brent Constantz created a new type of cement at Calera, a product which mimicked calcification like coral reef development. Even with the genius of his product and process, challenges remained. Below is a recent article from Greenbiz.com which creates some new possibilities in materials. Although not biomimetic in nature, they still provide hope. Bill McDonough might simply call it "less bad". Still, Lao-tzu would reply, "A journey of a thousand miles begins with one step."

Biomimicry is a habit we can build. It is not a silver bullet. Solutions are born step by step, gathering elements of sustainability along the way.

Though we may have a thousand steps to go, let's build solutions by combining good habits and walking together to build a more resilient,

sustainable world.

The Right Chemistry
5 steps to reduce the chemical footprint of plastic products
By Ann Blake and Mark Rossi
Published July 01, 2014 Greenbiz.com

By switching the type of plastic used in its IV bags, Dignity Health care system kept 700,000 pounds of high-concern chemicals — the equivalent in weight of a Boeing 747 airplane — out of the environment, according to BizNGO's new analysis of plastics, The Plastics Scorecard v.1.0. Starting from fossil fuels, the steps in plastics manufacturing are littered with chemicals of high concern to human health and the environment. For companies looking to reduce their use of

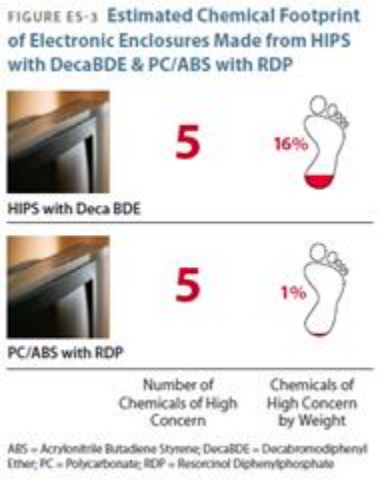
high-concern chemicals, plastics are a huge challenge — and a significant opportunity to reduce their chemical footprint.

In The Plastics Scorecard, we identified over 244 million metric tons of high-concern chemicals used in the manufacture of plastics. For example, plastics consume 96 percent of all Bisphenol A or 3.9 million metrics tons annually. BPA and otherhigh-concern chemicals such as benzene, styrene and phthalates can pose significant risks to the health of workers, communities and the global environment across the life cycle of plastics.

Shifting to safer plastics will improve the health and safety of workers and communities, spur the development of green chemistry and create new markets for companies, workers and communities alike. So how do we get there? The Plastics Scorecard is the first comprehensive method for evaluating the chemical footprint of plastics and a guide for selecting safer alternatives.

How does your plastic rate?

The Plastics Scorecard evaluates plastics based on two criteria, Manufacturing Score and Product Footprint.



The Product Footprint helps companies decide if a product needs to be changed or designed around. (Credit: BizNGO)The "Progress to Safer Chemicals in Manufacturing Score" evaluates plastic polymers on a scale from 0 (most hazardous) to 100 (most benign). In evaluating 10 polymers, the findings were mixed.

Five commonly used polymers score 0 due to the intensive use of high-concern chemicals at every step of manufacturing: polyvinyl chloride (PVC), polycarbonate, polystyrene, styrene butadiene rubber (SBR) and acrylonitrile butadiene styrene (ABS).

Three polymers — polylactic acid (PLA), polyethylene (PE) and polypropylene (PP) — are much further along the path to safer chemicals in manufacturing because their core chemicals inputs are not chemicals of high concern.

Two polymers — polyethylene terephthalate (PET) and ethylene vinyl acetate (EVA) — are in the mid-range.

The Product Footprint measures the number and percent weight of chemicals of high concern in plastic products. It enables purchasers to evaluate products based on their content of highly hazardous chemicals. The report found that by switching to safer plastics or additives, manufacturers of IV bags and electronics can sell products with a significantly lower chemical footprint. For example, by switching from PVC to non-PVC IV bags, health organizations are significantly reducing their use of reproductive/developmental toxicants and endocrine disruptors such as DEHP and BPA.

5 steps to safer plastics

The Plastics Scorecard lays out a five-step program for companies seeking to reduce the chemical footprint of their plastics:

These five steps pave the way to plastics with less risky chemicals. (Credit: BizNGO)

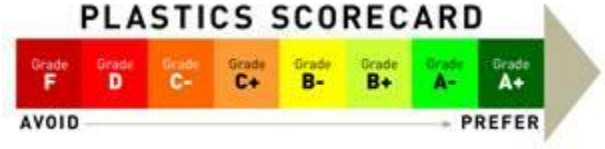
1. Is it necessary? A critical approach to chemicals in general and plastics in particular, especially plastic additives, is to first ask: Is it necessary? For many plastic additives, evaluate if it's necessary for the performance of the product. For example, Kaiser Permanente recently announced it is eliminating unnecessary flame retardants in upholstered furnishings.

2. Find safer additives. In cases where plastic additives are necessary, there are many routes for reducing a product's chemical footprint. First, and often the easiest route, is to substitute high-concern additives with safer alternatives. For example, in the electronics sector, companies are replacing brominated flame retardants with safer alternatives. Figure 2 [ES-3] illustrates how electronic companies dramatically can reduce the chemical footprint of chemicals in products by selecting safer alternatives.

3. Use safer polymers. The most important thing companies can do to reduce their chemical footprint is to shift to safer polymers with better manufacturing scores and fewer additives — thereby reducing both the additives of high concern and the manufacturing footprint. For example, when Dignity Health switched to non-PVC IV bags, it eliminated roughly 1,543,467 pounds of PVC as well as 673,023 pounds of the reproductive toxicant DEHP and 33,651 pounds of the endocrine disruptor BPA over a six-year period.

4. Close the loop and use post-consumer recycled content. PCR content holds the potential of significantly reducing the chemical footprint of a plastic product by bypassing the impacts of polymer manufacturing. In general, using PCR content is a preferred route for reducing the chemical footprint of a polymer and a plastic product. A challenge with PCR content can be the legacy of the past use of chemicals of high concern in plastics manufacturing. For example, the recycling and reuse of polyurethane foam means that companies continue to keep the persistent, bioaccumulative and toxic (PBT) flame retardant pentabromodiphenyl ether (pentaBDE) in the economy. Concerns with legacy toxic chemicals in PCR plastics should be a driver to reduce the chemical footprint of plastics.

Redesign the product. Product redesign holds the potential of both enhancing the value of the product while reducing its chemical footprint. For example, companies can redesign electronic products such that plastic parts do not come into contact or into proximity with parts that heat up, thereby obviating the need for flame retardants. The redesign of chairs to use wire mesh instead of foam reduces the weight and avoids foam that requires flame retardant chemicals.



Ultimately the success of reducing the chemical footprint of plastics will require greater transparency on the chemicals in products. Chemical footprinting holds the potential to create a

metric for measuring progress away from chemicals of high concern and toward safer alternatives. A challenge to managing chemicals in products and supply chains always has been, as the business adage goes, "You can't manage what you can't measure." To date companies have lacked clear metrics for measuring progress to safer chemicals. The Plastics Scorecard, by creating a framework for chemical footprinting, creates a metric by which companies can manage chemicals and measure progress.
If successful, the Plastics Scorecard will advance the development and use of plastics that use inherently safer chemicals in all steps of polymer production as well as in the selection of additives — thereby greatly reducing the costs of hazardous chemicals all along the lifecycle of plastics, from manufacturing to use to disposal.

Yes, I promised you a gift at the end. You now have reinforced knowledge of biomimicry and its components and when you watch this, you'll also have a smile on your face at the half-way point in the week!
http://www.sweetfunnycool.com/vid/these-dogs-are-already-awesome-but-then-this-cat-c.html?utm_source=facebook&utm_medium=fb_sharerphp_desktop&utm_campaign=trafficcheck

Best to you and our planet too,

Margo

Margo Farnsworth
Screendoor Consulting
http://screendoorconsulting.com/
615.478.4889
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