Fall 2012 Helios New School

Designing With Nature

Designing With Nature will be a four- month, theme-based project that will take students into the world of ecological engineering. Nature provides limitless examples of exquisite design that reflect integrated, sustainable practices. Through the lens of ecological design, students will develop an appreciation for nature's engineering and search for relevant applications for their discoveries.

Immersion:

Stopping Water

Prior to any knowledge of our theme, students will be challenged to dam a river using native materials. This one-day fieldwork trip will lay the foundation for appreciating one of nature's most admired habitat engineers: the beaver.

3-week-old beaver kit swimming in Alhambra Creek in June, 2010

Investigation One:

Beavers / Neighborhood Engineers

If you took a trip back in time to 1650, you would have seen extensive beaver habitats throughout North America. They were engineered and developed by an estimated 60 million or more remarkable little builders. These habitats not only assured homes for beaver families, but also created complex and diverse ecological systems that provided excellent conditions for a wide variety of creatures -- thus creating diverse neighborhoods.

The eventual decimation of the beaver population by European trappers during the 'Great Fur Rush' of the late 1700's and early 1800's caused more environmental damage to the West's ecosystem than any other ecological occurrence. The removal of a 'keystone species' had a cascading effect: other species' support systems were removed; the beneficial results of holding and managing water systems disappeared; and erosion ran rampant. How is it that such relatively small creatures can be such effective builders and engineers? This is but one area we will explore as we study these remarkable manipulators of the environment.

Fieldwork: Amtrak to Martinez

The Martinez Beavers are a family of beavers who, in 2007, caused a sensation when they moved into downtown Martinez, California on the Alhambra Creek. At the end of this investigation, we will take Amtrak to visit these determined and controversial engineers

Investigation Two:
Nature's Engineers

The complexity of our planet Earth is in part due to the creative adaptation to -- and the manipulation of -- the environment by countless organisms. There is an emerging field of knowledge that examines the role that some species play in engineering our environment. Their actions, behaviors, skills and impacts deserve particular investigation to truly understand and celebrate these 'ecosystem engineers.'

An 'ecosystem engineer' is any organism that creates or modifies its habitat. Scientists identify two types of such engineers: allogenic engineers modify their environment by mechanically altering that environment, and autogenic engineers modify their environment by modifying themselves.

It is with a sense of wonder and a detective's methodology that we will examine and explore this rich area of scientific understanding.

Investigation Three:
Biomimicry: Using Nature's Designs

"Biomimicry or biomimetics is the examination of Nature, its models, systems, processes, and elements to emulate or take inspiration from in order to solve human problems."

Leonardo DaVinci is probably one of the most famous early inventors who used skillful observation and application of nature's patterns to devise everything from flying machines to underwater suits. Although humans have historically looked toward nature for design ideas, there is recently a resurgence in the practice of relying on the wisdom of earth's systems for solving contemporary problems. Pursuing a relatively new field of study called biomimicry, engineers and innovators are once again looking deeply at nature's systems for hints to create sustainable, reliant, self maintaining, more efficient solutions to vexing problems. From designing Japan's bullet trains to redesigning a ship's propeller, students will have many opportunities to explore and unpack fascinating applications of the emerging field of biomimicry.

"Doing it nature's way" has the potential to change the way we grow food, make materials, harness energy, heal ourselves, store information, and conduct business.

—Janine M. Benyus

Application Of Learning

Each semester-long project that is undertaken at Helios New School will include a period of earnest application of the skills and knowledge that have developed over the exploration of the theme. WIth *Animals Who Build: Design With Nature*, students will enter the world of biomimicry designers through a process that will encourage fresh and creative application of observable natural systems or designs. Youth, with their fresh eyes, are often in a better position to notice and make useful connections of elements in nature that older, more biased eyes may miss. Students will be provided a framework through which their creative and innovative minds will be challenged to think '*biomimicrily*'.
(try to find that in your dictionary)

Celebration of Learning

The close of a project-based process ends with a Celebration of Learning that highlights the in-depth learning that has taken place and presents the final product to an audience of significance. In this case, students will be presenting to an 'authentic audience' of scientists, innovators, and business people who can provide real world responses to the students' work.

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Project-Based Learning

Project-based learning is at the heart of the curriculum at

Helios New School. We believe that quality learning takes place best within a meaningful context that applies students skills in real world situations.

Calendar

Immersion:
Stopping Water
September 5th

Martinez Beavers Visit
Martinez, California
September 19th

Celebration of Learning:
January 17

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