

## Burbank's 'citizen scientists' participate in world's largest genomics project

Barcoding Life's Matrix is funded by the National Science Foundation



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Students at Luther Burbank High School are participating in the Barcoding Life's Matrix program, a science innovation project hosted by Ventura-based Coastal Marine Biolabs with funding support from the National Science Foundation.

Through the program, students in science teacher Shana Just's International Baccalaureate (IB) Biology Year 1 class are joining a global community of scientists in efforts to build a digital genetic registry of Earth's biodiversity using a DNA barcoding system.

This student-centered campaign is generating reference barcodes for marine species that will provide vital signs of ecosystem health.

Data generated and shared by these "citizen scientists" will someday help researchers to better understand how human activities and natural events impact global marine ecosystems and their inhabitants, Just says.

She explains the project this way:

The DNA barcoding system works on a similar principal to the barcoding system used by retail stores and supermarkets. Items for sale have a UPC (Universal Product Code) barcode that is printed on a product label. The UPC barcode contains a unique combination of bars and spaces that distinguishes each product sold by a company.

For a UPC barcode to be useful for a company and its consumers, it must be linked to specific information about a product, including its manufacturer and retail price. This information is stored within an electronic database that is maintained by a company and its employees. The digital representation of a barcode and the product information linked to it within the database together constitute a product's reference barcode record.

For animals, a DNA barcode represents the sequence of a standardized gene. When the gene sequence is compared between members of the same species, only a few differences are observed. In contrast, a larger number of differences in the barcode gene sequence are observed between members of different species groups. Based on these differences, the sequence of a DNA barcode can be used to uniquely identify animal species.

To be useful as a species identification tool, a DNA barcode must be linked to a species name and other forms of information. This information is stored in BOLD Systems, an electronic database and workbench that resides on the Internet. A global alliance of scientists working under the International Barcode of Life (iBOL) project is currently building the BOLD database by linking DNA barcodes generated from known specimens to a species name and other types of information related to the specimen, including where it was collected.