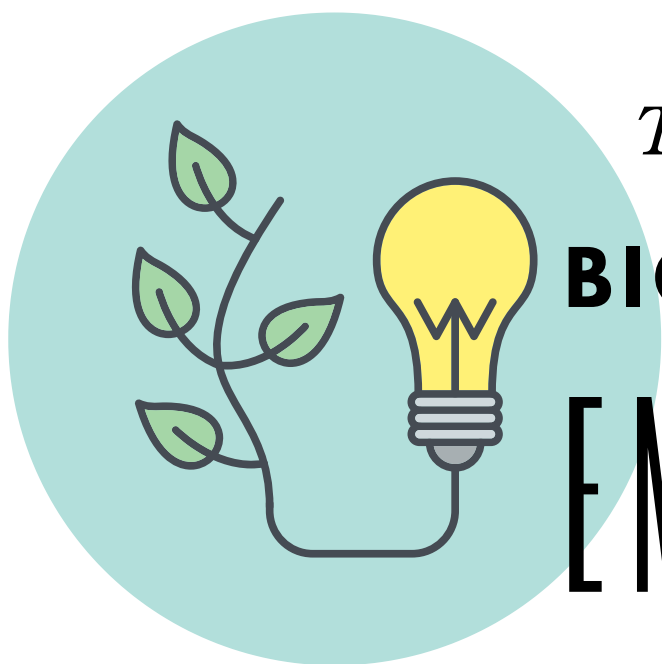


# OCC GATE CLASSROOM PROJECT PROPOSAL

Mrs. Lodge's Scholars - 2022



*Think Like A*

**BIOMIMICRY  
ENGINEER**

School

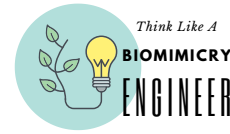
De Portola Elementary

District

Saddleback Valley USD

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*Note: All links in blue will direct you to an online resource or reference.*



# Project Goals

Throughout this project-based learning experience, students will develop hands-on science skills, learn what nature can teach them about sustainable design, and apply it to solving problems in their school, home, or community. This project is an extension of the third grade

Amplify Science Unit: Environments and Survival. Students will be provided with the opportunity to think like a [Biomimicry](#) Engineer as they build observation skills and deepen their understanding of organisms' needs and adaptive traits. [Guiding questions](#) will help students dive deeper into the science content they are investigating: How do humans use [nature's design](#) to solve problems? What are some examples of biomimicry in my own community? How can I use biomimicry to help me think differently about a problem?

After this activity, students should be able to:

- Define biomimicry
- Explain how engineers use biomimicry to design innovative new products
- List examples of engineered products that were inspired by nature
- Use biomimicry to develop an idea for a new product
- Make connections between the disciplines of Engineering and Robotics

# Standards

## California GATE Standards:

**Depth:** Students will explore the core curriculum more deeply, and in greater detail.

**Complexity:** Students move beyond a surface level understanding.

**Novelty:** Students are given the opportunity to create something based on their extended knowledge.

**Acceleration:** The core curriculum is differentiated to provide challenge and learning extension.

## NGSS Standards:

**1-LS1-1:** Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

**NGSS 3-5 ETS1:** Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost.

**3-LS2-1:** Focus on the biological strategy of animal group behavior.

# Project Design

Note: All links in blue will direct you to an online resource or reference.

## ENGAGE

Amplify Science unit will be introduced, and students will learn what a Biomimicry Engineer is, and see [examples](#) of [nature-inspired](#) innovation. Think Like a Biomimicry Engineer Frame is started.

## EXPLORE

Students will explore the field of Biomimicry through [videos](#), books, [articles](#), photographs, [virtual robotics field trip](#), and hands-on activities. Students will go outside and explore and investigate traits of different organisms.

## APPLY

Students are empowered to create a nature-inspired innovation that solves a problem in one of these categories: environment, agriculture, transportation, recycling, or product design.

## EXTEND

Students will extend their knowledge across two disciplines: Engineering and Robotics. They will analyze how their design solution can be applied to robotics and coding. The students will use a [robotics kit](#) that has all of the components they need for their designs and innovation. They will go through the engineering design process to develop their project and prepare for the final presentation in the format of their choice.



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# GATE Instructional Practices

## **TLAD: Think Like A Disciplinarian Frame**

Students will analyze ideas from the point of view of a [Biomimicry Engineer](#). They will learn the language, tools, and methods of this specific discipline. Connections will be made between other disciplines, changes over time, and the science content. Each part of the frame will focus on 1-2 Prompts of Depth & Complexity.

## **Universal Concepts:**

Students will make connections to one of the third grade Universal Concepts: Change. They will explore how an innovation can be changed when it is inspired by traits or qualities found in nature.

## **Prompts of Depth & Complexity:**

Students will be using the Prompts of Depth & Complexity continually throughout this project. These thinking tools will help them make deeper, concrete connections to the content, and understand the concepts on a more advanced level.

## **Differentiation:**

Students have an opportunity to explore their personal interests through individualized projects. They also decide how they will demonstrate their mastery through a variety of choices.

# Collaboration

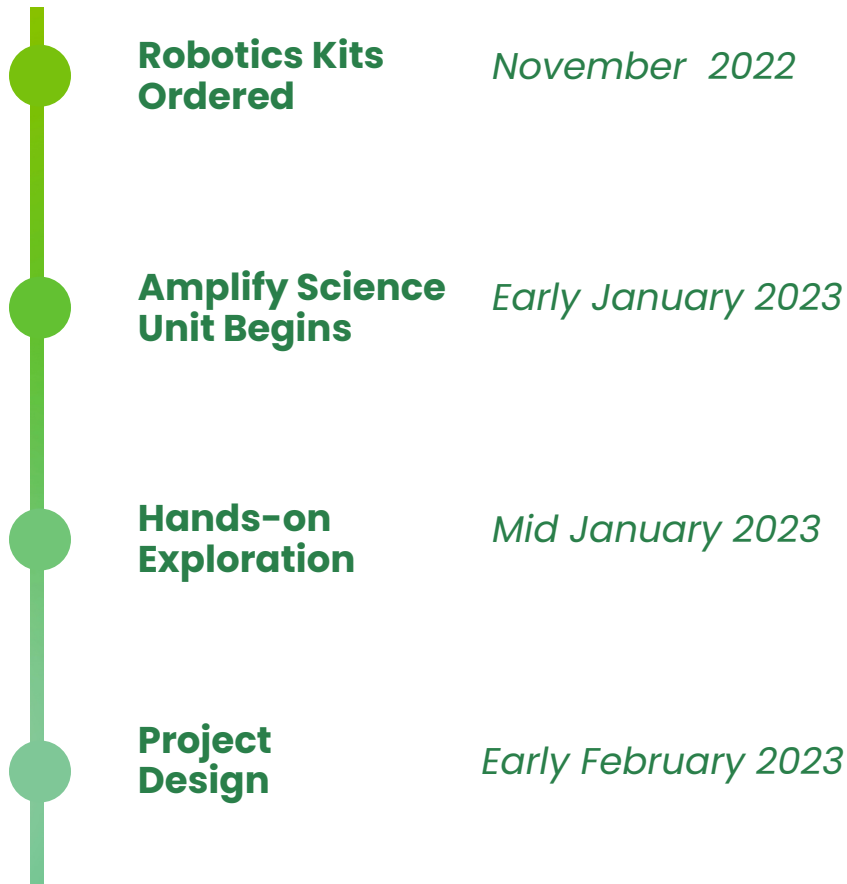
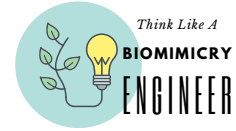
Collaboration is an important part of this project. Students will be working in groups throughout every phase of the unit, and they will continually be sharing ideas, communicating with each other, and analyzing the multiple perspectives within the classroom.

## **Strategies:**

Each group will be assigned a prompt of Depth & Complexity to focus on, and then they will use the **Jigsaw Strategy** to share findings with the whole group.

Groups of students will create a **Concentric Circle** poster with the Big Idea: Nature-Inspired Design in the center and comparison/relationships of different disciplines on the outer circles.

# Timeline



## Budget

No	Material	Qty	Price	Total
1	VEX GO Kit with Storage	4	\$199	\$796 (Excl. Tax)

[VEX Robotics Website](#)