



THE FACULTY CORNER

FROM THE ANACAPA SCHOOL SCIENCE DEPARTMENT. . .

For Megan Nesland's classes, this year is all about the machinery of life---how do living things function in the world around us?

MARINE BIOLOGY

The Upper School Marine Biology class kicked off the year with an investigation of Nanotechnology. This unit was a culmination of my work in a nanotechnology lab at UCSB. The students in my Upper School classes got to be guinea pigs of sorts, testing out a new curriculum that will hopefully help students understand the immense possibilities in the realm of nanotechnology as well as how some of these seemingly miraculous innovations work. Just ask your Upper School student about surface area and flour explosions or the Nano-Supermarket...

We have since moved into the oceans---our main topic for the year. For the first few chapters, we have investigated the physical properties of the oceans, including the sea floor, waves, and tides, which set the stage for the astounding diversity of life found in the ocean's waters and shores. In the coming months, students can look forward to multiple dissections, including that of a Dogfish Shark, interactions with some very live and very slimy invertebrates, and an ongoing examination of our impressive aquatic resources.

LIFE SCIENCE

The Lower School Life Science class serves as an introduction to the fundamentals of biology, including the role of the environment in the functions of living things. So far, the class has examined essential questions like "What does it mean to be living?" "How do we get energy for life?" and "How did I end up like this?" (also known as Genetics). So far, the class has focused on cellular machinery---how do living organisms perform their most basic functions? Students have learned how to operate microscopes and have used them to study the stages of mitosis in onions. They have extracted DNA from strawberries and used the principles of heredity and probability to create a horde of Mendelian monsters. During the upcoming quarters, the class will move outwards and into the visible world. Lower School students can also look forward to dissections, including my personal favorite---fresh squid, as well as a survey of Santa Barbara flora and fauna, from native plants to snakes to humans.

Overall, the study of life is an exciting time for most students and an exceptional opportunity to appreciate the magic in science. We get to study the roots of living things---the reactions, processes, and functions that happen every moment of every day without us even realizing it---and recognize for a moment the true impressiveness of life.

~ MEGAN NESLAND

PHYSICS

Physics is the study of the fundamental patterns of nature. Our class at Anacapa will study the full range of introductory physics topics in a quantitative way; this class is completely equivalent to the algebra-based physics sequence at the University of California, except that we move at a more relaxed pace.

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So far, we have covered motion, forces, and energy. In particular, we have studied motion with constant acceleration, projectile motion, uniform and non-uniform circular motion, six distinct types of forces, Newton's laws of motion, the work-energy theorem, and conservative and nonconservative forces. Along the way, we have developed problem-solving strategies for groups of related problems that give us confidence in tackling new questions. Studying physics is exercise for the brain, and our ability to analyze and think critically has improved already!

Future topics of study include momentum and impulse, rotational motion, systems in equilibrium, gravitation, periodic motion, fluid dynamics, waves and sound, followed by selected topics in thermodynamics, electricity and magnetism, light, and modern physics.

My goal is to engage students and help them train their thought process. I also aim to have a little fun along the way!

~ **ERNEST FREUND**

ROBOTICS

Making connections to math and engineering through robotics has definitely been beneficial for our students! For Anacapa this is the second year we have had the Lego Robotics class. This year the class has three teams competing with one another during class competitions. The curriculum and "missions" the teams use are from the First Lego League (FLL) national and worldwide competition. Each of our teams is made up of two or three students. With such a small team, compared to having five per team last year, the students get a real taste of what goes in to planning, building, programming, and performing the missions as prescribed by FLL.

I have seen returning students realize how difficult and comprehensive it is to have a smaller team and to be responsible for so much more than last year. When competing with one another, the teams take ownership of what they have done and see first-hand how to make adjustments to their programs. We have had two "friendly" in-house competitions thus far with a third coming before Thanksgiving, and I have seen some very good progress. The teams are now working on the more difficult missions, which take more time to program and evaluate the code they have written.

The remainder of the class will include more creative projects and competitions. We may even have some sumo-bot competitions in which the robots will compete with one another to dismantle the attachments and obstacle course creations; in these situations, maneuvering by intense programming will make the difference! These memorable experiences will, I'm sure, stick with these students for years, allowing them to connect to Math, Engineering, and Programming in distinct ways!

~ **BRYAN ANDERSON**