Meet a Marine Scientist & Learn How Science Works

An Introduction to the Adopt A Microbe project

First of all, what is the Adopt A Microbe project all about, anyway? Well, as a participant in this project, you will virtually "adopt" one of the awesome microbes featured in our Adoption Center. In case you are wondering, a microbe is a living organism that is so small that you can't see it with your naked eye - you need a high magnification microscope to see it. Other words for microbes that you might be familiar with are bacteria and microorganism. All of the microbes offered in the Adoption Center have an important role to play in the environment at the bottom of the ocean. Over the course of the next few weeks, you will learn all about the cool things your microbe can do while you conduct different science and art projects. You will learn how these microbes live their crazy lives at the bottom of the ocean, and hopefully you will also learn a little bit about what it is like to be a scientist who works on a big ship in the middle of the ocean for weeks at a time.

Maybe you are wondering why we are so interested in microbes living at the bottom of the ocean? What's the big deal?!? Well, did you know that there are more microbes living below the seafloor than there are anywhere else on Earth?!? There is an enormous amount of (microbial) life down there, but we barely have any idea of who the microbes are and what they are doing! Unlike you and me who need to breathe oxygen to get energy to live, microbes can "breathe" all sorts of weird things — such as the iron found in rocks, or methane gas (also known as natural gas, or the stuff in cow farts), or rotten-egg smelling sulfide gas — to get energy to live. The activity of all of those microbes can have a big impact on the cycling of different elements, like carbon, in the ocean, so we need to study them to get a better understanding of what they are doing and how. By participating in this project, you will learn more about the ocean environment, about microbiology, and about cutting edge science at the bottom of the ocean – maybe you'll even be inspired to research some questions of your own! Along the way you will be flexing your learning muscles in pretty much every category of science - biology, chemistry, physics, engineering, and geology – while also getting a healthy dose of math and art.

Let's get started!

Meet a Marine Scientist

When I say the word 'scientist' – what are some of the first ideas, words, and thoughts that come to your mind? Write down your thoughts on the Reflection Page provided.

Maybe you thought of an Einstein look-alike – some strange person with disheveled white hair in a lab coat, pouring bubbling fluids from one flask into another. Or maybe you thought of someone more reserved and proper, with glasses and a pocket protector, carefully taking notes on a clipboard. Did you think of a person wielding a sledgehammer, ready to smash a big rock into small pieces while floating in the middle of the ocean on a giant ship? Or did you think of someone eagerly peaking out of a window in a submarine, looking at a colossal geyser on the seafloor, covered in eyeless shrimp and iridescent worms? Well, as a marine scientist, those are the kinds of things I get to do!

So who am I? My name is Dr. Beth Orcutt, and I am a research scientist at the Bigelow Laboratory for Ocean Sciences in beautiful Maine. I have a borderline obsessive interest in the vast variety of life found way down deep at the bottom of the ocean, and even below the seafloor, and I started this project as a way to get other people excited about life down there too. Once you go deep, you never go back!

As a marine research scientist, I have a pretty interesting job (well, I think so, at least). I spend much of my time trying to figure out how the unseen world at the bottom of the ocean operates, and what impact events happening way down there have on us humans way up here at the surface of the Earth. Luckily, I also get to do more than just think – I get to go visit some of these places! Sometimes I get to visit them in a submarine – like the Alvin. Other times I get to visit them virtually, using remotely operated robots like Jason, or sometimes I use fancy sampling equipment like the giant ocean drilling ship the JOIDES Resolution. For all of these visits, I get to spend a few days to weeks at sea. If I'm lucky, I will get to collect some one-of-a-kind samples from the bottom of the ocean that I can then take back to my lab for investigation.

Before I head out on any expedition, I have to do a lot of planning. A big part of that planning includes developing hypotheses about the questions I am interested in, and then coming up with a plan to evaluate those hypotheses. You will explore how I do that in the activities associated with this.

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STUDENT PAGES

Questions

1. What are some of the first ideas, words, and thoughts that come to your mind when you hear the word "scientist"?

Before going on, watch the "What is it like to be a marine scientist?" video (http://youtu.be/QS_d55k-m5I) *and visit the C-DEBI Community webpage* (http://www.darkenergybiosphere.org/about/community.html)

2. Now that you have watched some videos about "real" marine scientists, what have you learned about being a scientist?

3. How do you think that all of the international scientists involved in studying life at the bottom of the ocean communicate with one another?

4. If you had the chance, what questions would you ask to Dr. Beth Orcutt or her friends about being a marine scientist?

Before going on, complete the Discovering Life Below the Seafloor poster activity

5. What is a hypothesis?

6. What are some different ways to go about testing whether a hypothesis is supported (correct) or not?