Two years ago, we reported to Current readers about a novel ship-to-shore education and outreach program called the “Adopt-A-Microbe” (AAM) project (Orcutt et al. 2011). AAM focused on raising awareness of microscopic life—“microbes”—living in the deep marine subsurface to middle school audiences while engaging them in the science of the ocean-drilling program, both fundamental components of the Center for Dark Energy Biosphere Investigations (C-DEBI) mission. The AAM project was originally designed as an interactive set of web-based activities to be done in real-time in coordination with a research expedition, involving on-going interactions with scientists at sea.

Currently, our team is making a stand-alone curriculum package based on the AAM project to be used in the classroom, independent of whether an expedition is in progress at sea. Some of the multi-disciplinary topics covered by this curriculum package include an introduction to microbiology and oceanography, pressure and buoyancy, ocean engineering and technology, environmental sciences, geology, and chemistry, with modules containing background information for the educator, instructional pages and worksheets for students, and associated classroom activities that build on the each topic. The curriculum is aligned with National Science Education Standards, and Earth Science and Ocean Literacy Principles. For example, “Microbiology 101: Introduction to Microbes” is a module that includes background information about microbes followed by a series of activities ranging from self-directed reading about a few deep sea microbes and classroom discussions about the students’ “adopted” microbe. Questions include:

• “What is the name of your microbe?”
• “To what domain of life does your microbe belong?”
• “What is the shape of your microbe?”
• “In what environments is your microbe often found?”
• “What is most interesting about your microbe?”

Two examples of student hands-on projects that are part of the Adopt A Microbe project. (1) Using art to conceptualize what environmental microbes look like, and (2) Using straw “coring devices” to collect environmental samples.
Students then make models of their adopted microbes with balloons, clay, or other materials (Figure 1). In another module focused on environmental science and the life of microbes in the environment, an example activity has students make a “Winogradsky column” with some locally collected mud, newspaper and egg yolks to examine microbes in their own “backyard” using techniques that scientists also use to study microbes (Figure 2). Students observe the development of colored bands of different microbes inside the Winogradsky column over time while learning about sources of energy and carbon used to grow life. The complete curriculum package is expected to be available in the beginning of 2014. A preview of the first module is available for download online on the C-DEBI website (darkenergybiosphere.org/adoptamicrobe) and the Consortium for Ocean Leadership’s JOIDES Resolution website (joidesresolution.org/mode/3092).

REFERENCES

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