

“What’s our three-word claim?”: Supporting English language learning students’ engagement in scientific argumentation

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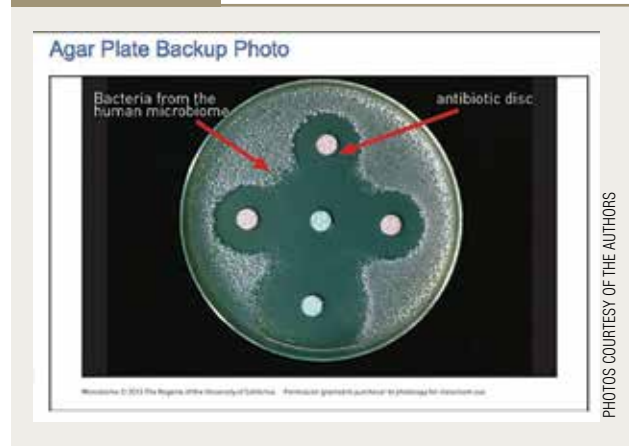
Middle school students in a sheltered English instruction science class are at the beginning of a unit in which they are learning that organisms that are too small to be seen by the naked eye live on and in the human body. (A *sheltered English instruction class* is an instructional setting in which the teacher attends to students’ content learning and English language development.) Specifically, in this lesson students investigate that antibiotics kill bacteria. To start exploring these concepts, their teacher, Ms. Ruttan, asks students to make observations of a photograph of an agar-streak plate test (see Figure 1) to see if they can find evidence of microorganisms living on human bodies. Before students analyze the photograph, Ms. Ruttan informs the class about how the agar-streak

plate test was conducted. (Note: This was not done as a hands-on activity because the culturing of any organism is not recommended at the middle school level.) Ms. Ruttan explains to students that a scientist took a cotton swab, grazed it along the palm of her hand, and then streaked the cotton swab along the inside of a petri dish that had been filled with *agar* (a polymer that contains nutrients to allow microorganisms to grow). Afterward, the scientist placed penicillin disks in the agar plate, sealed the plate to prevent contamination, and let it sit undisturbed for a few days. The teacher further explained that penicillin is a type of antibiotic used to kill bacteria.

After explaining how the test was conducted, Ms. Ruttan directs students to individually write and draw observations of the visible colonies of bacteria in the plate, encouraging them to include different types of descriptors (e.g., color, location in the plate). A few minutes after giving these directions, Ms. Ruttan walks over to a table of students (all student names are pseudonyms):

FIGURE 1

Photograph of agar-streak plate test that students analyzed (Regents of the University of California 2013a)



Ms. Ruttan: Where are most of the bacteria growing?

Beatriz: There are black ones and white ones, and the white ones are *más cerca del* (closer to the) antibiotic.

Ms. Ruttan: Okay. But, where are most of them?

Teresa: *Aquí.* (Here). In the outside.

Ms. Ruttan: Around the outside, right?

Guadalupe: So the black things are the bacteria?

Beatriz: Yeah, and the white.

Ms. Ruttan: All of the things you see are the bacteria.