Chapter 6

CLASSROOM SNAPSHOT 6.2
Promoting Connected Knowledge

Mr. Lieu teaches middle school science and for the last several years has taught units for life science, physical science, and Earth and space science. Although he feels that students learn effectively during each unit, he has noticed that by the end of the year, many students seem to have forgotten what they have learned in the previous units. This year, he is hoping to leverage SPQ to help students build connections across units and to keep their knowledge fresh and relevant throughout the whole year.

Since Mr. Lieu wants to use SPQ to help his students make connections, he has prepared two paper scales on butcher paper that extend across a wall of his classroom. One scale is marked 0–0.1 mm. The other, which is placed below the first, is marked 0–0.001 mm and the equivalent in micrometers, 0–1 μm. The scales are color-coded: The smallest 1% of the 0.1 mm scale, corresponding to 0–0.001 mm, is color-coded red; and the 0–0.001 mm scale is color-coded red, as well. Mr. Lieu will keep the scales posted throughout the year, using them to indicate the size of the objects discussed in the science classroom. This will spur the students to develop an overall model of SPQ. Mr. Lieu points out the scales to his class and asks, “Where would you place the size of a hair? A cheek cell? Discuss with a neighbor for two minutes.” As the students discuss, Mr. Lieu listens in. Most groups are using inches, but Rosa and Kwang are instead using meters and millimeters. Both are recent immigrants from countries that use the International System of Units (SI). Although they are both still developing their English, Rosa and Kwang are advantaged by their cultural background on scale. Mr. Lieu asks Kwang and Rosa to collaborate on locating the size of a hair and a cheek cell on the appropriate scale. They paste images of hair at the right end of the larger scale and label its size in millimeters and micrometers. Then they paste images of the cheek cell in the appropriate place near the middle of the larger scale and label its size, as well. Mr. Lieu informs students that this year they will track objects on these scales, which he calls “sizelines.” He notes that they will ultimately need even smaller scales to locate things such as atoms and viruses. When he later covers macroscopic objects in Earth science, he will add larger scales, too.

In addition to encouraging students to make connections across entities and phenomena included in the DCIs, using SPQ in this way will prompt students to employ practices such as using models, analyzing data, using mathematics, and communicating information. Other crosscutting concepts also play a role. For instance, patterns in the colors of the sizelines will indicate to students how neighboring sizelines relate to one another.