Year Two: Formative Assessment

What do the students already know, what do they want to know, and what did they learn this year in science class?

Karen Clayman¹ (kclayperson@mac.com) & Jeff Schinske² (jeffs@sfsu.edu)

¹ A.P. Giannini Middle School, San Francisco Unified School District
² Graduate Student in Ecology and Systematic Biology, Dept. of Biology, SFSU

Abstract: Abstract: Karen Clayman has taught at A.P. Giannini Middle School for 27 years. Jeff Schinske is a graduate student in Ecology and Systematics at San Francisco State University. During the 2006-2007 school year, we worked together in a teaching partnership sponsored by SEPAL and NSF’s GK-12 Program. This paper represents the many examples of “formative” assessment we have performed throughout the school year. Formative assessment is aimed at revealing student thinking, detecting changes in student thinking, and guiding teaching. This contrasts with “summative” assessment, which is primarily aimed at evaluating and grading student performance. As demonstrated below, formative assessment has helped us promote scientific inquiry in the classroom and serve our students by providing data that we use to modify our teaching strategies.

Planning Year 2:

To assist in assessing our first year as teacher/scientist partners in the GK-12 Partnership, the students ranked their top five lessons of the 2005-2006 school year. Substantially in other words, working with students and also other educators, A.P. Giannini Middle School Science Fair (Project), teaching the Presidio Native Plant Nursery and any science lab with edible materials ranked in the student’s top five.

This data guided us in planning our 2006-2007 school year which included obtaining Tobacco Hornworms, working at the Native Plant Nursery, and Chocolate Chip Cookie Mining.

Tobacco Hornworm: Manduca sexta

When introducing Inquiry with qualitative and quantitative observation, we were fortunate to have live specimen to observe provided by the Fuse Lab.

Presidio Native Plant Nursery

Sponsored by the Golden Gate National Park Service, students were able to spend one morning planting. Throughout the week students participating in all science lab and garden work while helping restore the native greenery to the San Francisco Recreation Areas.

Chocolate Chip Cookie Mining

Remove as many chocolate chips as possible using a toothpick without causing extreme damage to the cookie. You are paid for every chip, but also for any damages.

Planet Earth:

Pre and Post Assessment

October 10: We assessed each set of 6th grade students using the document analysis. The student data generated revealed that half of the students had previously been introduced to Earth Science in respect to earth’s layers. Data regarding the student’s initial response:

- Core 84%
- Other 11%
- Other 5%
- Other 9%
- Other 8%
- Core 37%
- Other 12%
- Other 15%
- Other 25%
- Other 25%

Some students used other words to identify earth’s inner layers, rings, or other alterations and make use of one or two occurrence words to identify the earth’s layers. The students were asked to explain how the weather changes and the formation of the weather is due to a change in habit. A student expressed: “I have never earned miniatures, except in my work, a core miniatures and other core miniatures are still a part of the weather. These are the core miniatures that are used in the earth’s layers to describe the earth’s layers.”

October 11: One week later the same document was given to each student. The students were asked to explain how the weather changes and the formation of the earth is due to a change in habit. Two new words had become part of their vocabulary, among which were 34% of the students, and 35% of the students refer to “water.” The earth’s core being identified as an outer core and inner core instead of the core “core” increased by 24%.

Students were then asked to explain their perspectives of earth’s core and earth’s layers. Students increased their perspectives of the earth’s core and earth’s layers. Some students referred to “water,” and 34% of the students, and 35% of the students refer to “water,” and 34% of the students refer to “water,” and 34% of the students refer to “water,” and 34% of the students refer to “water,” and 34% of the students refer to “water,” and 34% of the students refer to “water.”

Earthquakes & Volcanoes: Similar or Different?

Investigating Viscosity in Shells of Volcanic Activity

Research Lesson: Evolution

Baja, CA and Mexico, 15 MYA

Baja, CA and Mexico, 5 MYA

Baja, CA and Mexico, 1.2 MYA

Baja, CA and Mexico, 0 MYA

Student quotes explaining why they changed their answers

Not mostly

Mostly

Because Mr. Schinske says it does

It is not

They can desalt the water.

Because Mr. Schinske says it does

It is not

They can desalt the water.

Chocolate Chip Cookie Mining

Remove as many chocolate chips as possible using a toothpick without causing extreme damage to the cookie. You are paid for every chip, but also for any damages.

APG Science Fair & Scientific Journal Articles

After designing an experiment, collecting data and analyzing conclusions, sixth grade students from A.P. Giannini Middle School were then introduced to a scientific report. Jeff Schinske, a scientist from San Francisco State University and a participant in the Science Education Partnership & Assessment Laboratory (SEPAL), guided the students as they write their papers when including an abstract, introduction, materials and methods, results, discussion, implications, and further studies.

Karen Clayman, the classroom teacher wishes to express her gratitude to Jeff Schinske for his continual guidance and positive influence upon aspiring future scientists, and to SEPAL for the opportunity to participate in the GK-12 Partnership Program.