

**SUMMARY REPORT OF THE
BAY AREA EARTH SCIENCE INSTITUTE (BAESI)
FIVE-YEAR SATURDAY WORKSHOPS AND
FIELD TRIPS (2003 – 2008)**

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Summary Report of the Bay Area Earth Science Institute (BAESI) Five-Year Saturday Workshops and Field Trips (2003-2008)

Introduction

The Bay Area Earth Science Institute (BAESI) is a professional development program for teachers of students in grades 4-12 that supplies standards-based earth science concepts and effective strategies for teaching them. This summary report covers a span of five and a half years of Saturday workshops and field trips conducted by BAESI (2003-2008).

BAESI participants are drawn not only from the South Bay close to San José, but also come from the greater San Francisco Bay Area, with some teachers traveling distances of about 100 miles to attend. About 80% teach in schools with >25% enrollment of underrepresented groups, and about 60% teach in schools with >50% enrollment of underrepresented groups.

From 2003 to 2008, the BAESI conducted 44 Saturday workshops and field trips; this report summarizes surveys from 39 of these events which included a total of 619 responses. Some participants have attended more than one workshop or field trip.

All BAESI workshops are keyed to the *Science Content Standards for California Public Schools, Kindergarten through Grade Twelve* and connections to the Standards are explicitly discussed in the workshops. BAESI workshops aim for an approximately 50-50 blend of fundamental earth science concepts and ready-to-use classroom activities. Participant may earn 1 unit of inexpensive (~\$40/unit) university credit for participating in any two full-day Saturday sessions.

The majority of workshops and field trips were led by BAESI Co-Directors Ellen Metzger and Richard Sedlock, both Professors in the Department of Geology at San José State University. Other instructors included Phil Stoffer (United States Geological Survey), Joan Carter (a teacher at Branham High School in San José who also teaches an introductory geology course at SJSU), Eugene Cordero (SJSU Meteorology), Michael Kaufman (SJSU Physics), and Angela Hessler (Chevron).

Workshops were designed for teachers; however a mixture of students, teachers, and volunteers were able to attend certain field trips (see Appendix A). Appendix A lists the dates and topics of the workshops/field trips, the instructor(s), the number of participants and the number of teachers who completed evaluations. The comprehensive five-year report (available at <http://www.baesi.org/Eval09.htm>) contains a detailed summary of each evaluation, covering workshops and field trips from 2003 through the fall of 2008.

Evaluation Questions

Teachers were asked four evaluation questions about the effectiveness, usefulness, content, and quality of the presentation. Teachers were able to provide comments or suggestions at the end of the evaluation. The four evaluation questions were: 1) How effective was this workshop in teaching you earth science concepts?; 2) How useful was this workshop in giving you ideas and strategies you can use in your science classes?; 3) How difficult was the academic content of this presentation; and 4) How would you rate the workshop leader(s) in terms of being prepared, presenting information clearly and effectively, and responding to questions? Teachers rated each question from a range of 1, being the lowest, to 4, being the highest, with the difficulty level question (Question 3) rated in reverse (1, easy, to 4, very difficult).

Evaluation Results

A total of 619 teacher participants completed evaluations during the span of 2003 to 2008. Teacher participants were asked to evaluate the effectiveness, usefulness, difficulty level, and quality of the presentation of each BAESI Saturday workshop/field trip. Teachers' ratings of all aspects of the workshops and field trips were positive; average ratings and frequencies for each question were calculated. Frequency of responses for each question can be found in the comprehensive five-year report.

Overall, the BAESI has provided quality activities to teachers who found the workshops and field trips to benefit their professional development and teaching of earth science. Average ratings for the presentation quality was 3.8 ("outstanding"), ratings ranged from 3.3 to 4.0; effectiveness of the workshop/field trip in teaching earth science concepts was 3.7 ("very effective"), ranging from 2.9 to 4.0; difficulty of the academic content of the presentation was 2.1 ("about right"), ranging from 1.7 to 2.6; and usefulness in providing ideas and strategies for use with science classes was 3.6 ("very useful"), ranging from 2.5 to 4.0. Comparisons of the average ratings of all workshops and field trips are presented in the next section of this report.

Comparison of Evaluation Ratings Across Five and a Half Years

The table below compares evaluations by teacher participants in the 2003-2008 Saturday workshops and field trips. A total of 619 responses are included in the table below.

Highest average ratings were given for the quality of the preparedness and presentation of field trip and workshop leaders (3.8 out of 4.0), which was followed by the effectiveness of the field trip/activity in teaching earth science concepts (3.7), and usefulness in providing ideas and strategies for use with science classes (3.6). Participants also gave an average rating of about right (2.1) for difficulty level.

Question	Year 1 (2003) N = 52	Year 2 (2004) N = 123	Year 3 (2005) N = 99	Year 4 (2006) N = 136	Year 5 (2007) N = 112	Year 5.5 (2008) N = 97	Average Rating
1. How effective was this field trip/activity in teaching you earth science concepts? (1=Not at all effective, 4=Very effective)	3.6	3.6	3.7	3.7	3.8	3.7	3.7
2. How useful was this field trip/activity in giving you ideas and strategies you can use in your science class? (1=Not at all useful, 4=Very useful)	3.7	3.5	3.7	3.7	3.6	3.5	3.6
3. How difficult was the academic content of this presentation? (1=Easy, 4=Very Difficult)	2.1	2.2	2.0	2.1	2.2	2.1	2.1
4. How would you rate the trip/workshop leader(s) in terms of being prepared, presenting information clearly and effectively, and responding to questions? (1 = Poor, 4=Outstanding)	3.9	3.8	3.8	3.9	3.9	3.7	3.8
Total N = 619							

In the past five and a half years, the BAESI conducted a total of 44 Saturday workshop activities. The next table presents the average evaluation ratings of each question by activity and year for 39 of the 44 workshop activities.

Summary of Average Evaluation Ratings by Activity and Year

	How effective was this field trip/activity in teaching you earth science concepts? (1=Not at all effective, 4=Very effective)	How useful was this field trip/activity in giving you ideas and strategies you can use in your science class? (1=Not at all useful, 4=Very useful)	How difficult was the academic content of this presentation? (1=Easy, 4=Very Difficult)	How would you rate the trip/workshop leader(s) in terms of being prepared, presenting information clearly and effectively, and responding to questions? (1=Poor, 4=Outstanding)
Year 1 (2003)				
#1 Castle Rock State Park and Sanborn County Park (N=35)	3.6	3.6	2.1	3.9
#2 Mars (N=17)	3.7	3.9	2.1	3.9
Average Rating (N=52)	3.6	3.7	2.1	3.9
Year 2 (2004)				
#1 Weather (N=22)	3.7	3.8	2.1	3.7
#2 Field Trip to Pinnacles (N=10)	3.0	2.5	2.1	3.6
#3 Plate Tectonics (N=17)	3.8	3.8	2.4	3.9
#4 Field Trip: Moss Beach to Mussel Rock (N=20)	3.7	3.3	2.4	4.0
#5 Field Trip to the Coast (N=9)	3.0	3.0	2.2	3.6
#6 Volcanoes and the Earth System (N=25)	3.7	3.8	2.0	3.8
#7 Effects of Earthquakes on People and the Landscape (N=20)	4.0	3.9	2.1	4.0
Average Rating (N=123)	3.6	3.5	2.2	3.8
Year 3 (2005)				
#1 California's Water (N=19)	3.8	3.8	1.9	3.8
#2 Field Trip to Hayward Fault (N=6)	4.0	3.8	1.7	4.0
#3 Field Trip to Santa Teresa Hills (N=17)	3.8	3.8	1.9	4.0
#4 Geologic Hazards (N=18)	3.9	3.8	2.1	3.8
#5 Field Trip to Hayward Fault/Coyote Hills (N=10)	3.5	3.4	1.7	3.8
#6 Using Authentic Data to Teach Meteorology (N=12)	3.0	3.3	2.3	3.3
#7 Shaping Earth's Surface (N=17)	3.8	3.8	2.3	3.8
Average Rating (N=99)	3.7	3.7	2.0	3.8

	How effective was this field trip/activity in teaching you earth science concepts? (1=Not at all effective, 4=Very effective)	How useful was this field trip/activity in giving you ideas and strategies you can use in your science class? (1=Not at all useful, 4=Very useful)	How difficult was the academic content of this presentation? (1=Easy, 4=Very Difficult)	How would you rate the trip/workshop leader(s) in terms of being prepared, presenting information clearly and effectively, and responding to questions? (1=Poor, 4=Outstanding)
Year 4 (2006)				
#1 Earthquakes: Faults and Hazards (N=11)	4.0	3.8	2.6	4.0
#2 Rocks and Minerals (N=23)	3.8	3.4	2.1	3.9
#3 Field Trip to Santa Teresa Hills (N=4)	4.0	3.8	2.0	4.0
#4 Sun-Earth Connections (N=21)	3.8	3.9	2.3	3.9
#5 Understanding Earth Science Through Problem-Based Learning (N=18)	2.9	3.3	1.8	3.4
#6 Field Trip to Alum Rock Park (N=2)	4.0	4.0	2.0	4.0
#7 Climate Change (N=19)	3.8	3.9	2.0	3.9
#8 Field Trip: Coastal Geology (N=17)	3.5	3.3	1.9	3.8
#9 California's Water (N=21)	3.7	3.8	2.1	3.9
Average Rating (N=136)	3.7	3.7	2.1	3.9
Year 5 (2007)				
#1 Dynamic Earth: Plate Tectonics (N=10)	3.8	3.7	2.3	3.9
#2 Earthquakes and Volcanoes (N=9)	3.7	3.9	2.0	4.0
#3 Global Warming (N=20)	3.8	3.7	2.1	4.0
#4 and #5 Field Trips to Coyote Lake-Harvey Bear County Park (N=14)	3.6	3.5	2.1	3.8
#6 Field Trip to Pinnacles (N=12)	4.0	3.9	2.0	4.0
#7 Santa Cruz (N=15)	3.5	3.3	2.2	3.7
#8 Mt. Diablo (N=16)	3.8	3.4	2.4	3.8
#9 Astronomy (N=16)	3.9	3.6	2.4	4.0
Average Rating (N=112)	3.8	3.6	2.2	3.9

Year 5 1/2 (2008)				
#1 Models for Teaching Earth Science (N=15)	3.9	3.9	2.0	3.9
#2 Exploring For Oil and Gas (N=14)	3.8	3.3	2.2	3.9
#3 Global Warming Food Connections (N = 23)	3.7	3.7	2.3	3.9
#4 Earth and Life Through Time (N = 26)	3.6	3.5	1.9	3.4
#5 Energy, Minerals, and the Future (N = 19)	3.5	3.3	2.1	3.5
Average Rating (N=97)	3.7	3.5	2.1	3.7
Average Rating of ALL BAESI 39 Workshop/Field Trip Activities	3.7	3.6	2.1	3.8

A total of 39 workshops and field trips are summarized in this report (those for which complete evaluations were compiled and collected). Teachers indicated that the workshops/field trips were effective in teaching earth science concepts (with a rating of 3.7 out of 4.0). Ratings ranged from 2.9 to 4.0, which showed that teachers found the workshops to be effective or very effective. Workshops were found on average to be very useful, providing ideas and strategies that teachers can implement in their science classes. Some workshops may have been more useful than others; there was a large variance in ratings for workshop usefulness, ratings ranged from 2.5 to 4.0. The academic content of the workshops were rated to be about right, ranging from 1.7 to 2.6; teachers found workshops to be between easy and somewhat difficult, but not very difficult. Workshop and field trip leaders were found to be on average good or outstanding in their preparedness and presentation. Ratings, for workshop/field trip leaders, across the different activities ranged from 3.3 to 4.0. Overall, the BAESI has provided quality activities to teachers who found the workshops and field trips to benefit their professional development and teaching of earth science.

Conclusion

The Bay Area Earth Science Institute (BAESI) plans to continue professional development programs for teachers of students in grades 4-12. Feedback from the teacher participants will be used to improve the workshops and field trips and to address requested workshop topics. The evaluations support the effectiveness and usefulness of the Saturday workshops and field trips which were designed to address standards-based earth science concepts and teaching strategies.

**Appendix A: List of Saturday Workshops/Field Trips and Participants
(2003-2008)**

Date	Topic	Instructor(s)*	Number of Participants	# included in Report
2003				
January 23	El Nino	JC	19	Missing
July 15 – 17	Maps! Maps! Maps!	RS, EM, P. Messina	33	Missing
October 18	Field trip to Castle Rock State Park/ Sanborn County Park	PS	51 (21 teachers)	35
November 15	Mars!	EM	18	17
2004				
January 24	Weather	EC, JC, Mike Voss	24	22
April 24	The Search for Life on Mars	SETI Institute, EM	19	Missing
May 1	Field trip to the Pinnacles	RS, EM	29	10
May 15	Plate Tectonics	EM	19	17
July 7	Field trip: Moss Beach to Mussel Rock	RS	Unknown	20
October 9	Field trip to the Coast	RS, EM	49 (13 teachers)	9
November 13	Volcanoes and the Earth System	EM	27	25
November 20	Effects of Earthquakes on People and the Landscape	RS	21	20
2005				
February 12	Asian Tsunami and Earthquake	EM	27	Missing
March 5	California's Water	RS	24	19
April 24	Field trip: Hayward Fault	RS, EM	75 (5 teachers)	6
April 30	Field trip: Santa Teresa Hills	RS, EM	23 (16 teachers)	17
September 17	Geologic Hazards	EM	19	18
October 15	Field trip: Hayward Fault/Coyote Hills	RS, EM	71 (16 teachers)	10
October 29	Using Authentic Data to Teach Meteorology	JC	15	12
November 19	Shaping Earth's Surface	RS	19	17
2006				
January 14	Earthquakes: Faults and Hazards	RS	17	11
February 4	Rocks and Minerals	H. Scherer, EM	24	23
February 11	Field Trip to Santa Teresa Hills (1/2 Day)	RS, EM	34 (4 teachers)	4
March 4	Sun-Earth Connections	EM	22	21
April 22	Understanding Earth Science Through Problem-Based Learning	JC	19	18

Date	Topic	Instructor(s)*	Number of Participants	# included in Report
2006 continued...				
May 2	Field trip to Alum Rock Park	EM	Unknown	Missing
May 20	Field trip to San Lorenzo Creek/ Loma Prieta Summit	PS	14	2
September 16	Climate Change	EM	20	19
October 7	Field trip: Coastal Geology	RS, EM	65 (19 teachers)	17
November 18	California's Water	RS	22	21
2007				
January 13	Dynamic Earth: Plate Tectonics	RS	10	10
January 20	Earthquakes and Volcanoes	EM	13	9
March 31	Field trip: Coyote Lake-Harvey Bear Co. Park	PS	18	14
April 1	Field trip: Coyote Lake-Harvey Bear Co. Park	PS	16	same teachers above
April 14	Global Warming	EC	20	20
May 19	Field trip to the Pinnacles	RS,EM	36 (13 teachers)	12
September 22	Field trip to the Santa Cruz Area	PS	28	15
October 20	Field trip to Mt. Diablo	Northern CA Geological Society	16	16
October 27	Astronomy	MK	20	16
2008				
March 15	Models for Teaching Earth Science	JC	20	15
April 5	Exploring for Oil and Gas (Chevron in San Ramon/Mt. Diablo field trip)	Angela Hessler (Chevron)	16	14
September 27	Global Warming Food Connections	EC, RS	23	23
November 15	Earth and Life Through Time	JH, EM, L. Flammer	27	26
December 6	Energy, Minerals, and the Future	RS	22	19

Instructor(s)*

EC: Eugene Cordero (SJSU Meteorology)

EM: Ellen Metzger (SJSU Geology)

JC: Joan Carter: Branham High School; SJSU Geology

JH; Jonathan Hendricks (SJSU Geology)

MK: Michael Kauffman (SJSU Physics)

PS: Phil Stoffer (United States Geological Survey)

RS: Richard Sedlock (SJSU Geology)

Note: # included in Report = Teacher Participants.

Field trips are in rows shaded in light blue.

5-year Total: 27 Workshop Activities and 17 Field Trips

5-year Total **Included in this Report:** 23 Workshop Activities and 16 Field Trips (N=39)