

Cameo Lakey, CE 13b and Science Obs Event (Lesson 1)

Lesson by Cameo Lakey (created 02/06/18 with the CalStateTEACH Lesson Plan Assistant)

ATTACHED FILES AND VIDEOS

[Lakey_Cameo_Module_13_ErosionbyWater_Lab.docx](#)
[Lakey_CE13bandScienceObsEvent_Lesson_enc.mp4](#)

GENERAL COMMENTS

I. ESTABLISHING GOALS AND STANDARDS

Subject Area(s)

Science

Central Focus

Make observations and measurements to provide evidence of the rate of erosion by water. Measure the volume of objects, formulate predictions based on cause-and-effect relationships, conduct trials to test a prediction. Systematically collect data. Write fluidly and legibly in cursive or joined italic, frame a question about a situation, use simple and compound sentences in writing and speaking, give precise directions, use details or experiences to explain information. Engage effectively in a range of collaborative discussions with diverse partners on grade 4 topics, building on others' ideas and expressing their own clearly, make comments that contribute to the discussion and link to the remarks of others.

Standards

Next Generation Science Standards

Science, Grade 4

Science | 4 Earth's Systems: Processes that Shape the Earth

- Standard 4-ESS2-1: Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.

California Academic Content Standards

Science, Grade 4

Earth Sciences | 5 Waves, wind, water, and ice shape and reshape Earth's land surface. As a basis for understanding this concept:

- Standard 5a: Students know some changes in the Earth are due to slow processes, such as erosion, and some changes are due to rapid processes, such as landslides, volcanic eruptions, and earthquakes.

Earth Sciences | 5 Waves, wind, water, and ice shape and reshape Earth's land surface. As a basis for understanding this concept:

- Standard 5c: Students know moving water erodes landforms, reshaping the land by taking it away from some places and depositing it as pebbles, sand, silt, and mud in other places (weathering, transport, and deposition).

Investigation and Experimentation | 6 Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

- Standard 6b: Measure and estimate the weight, length, or volume of objects.

Investigation and Experimentation | 6 Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

- Standard 6c: Formulate and justify predictions based on cause-and-effect relationships.

Investigation and Experimentation | 6 Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations. Students will:

- Standard 6d: Conduct multiple trials to test a prediction and draw conclusions about the relationships between predictions and results.

Mathematics, Grade 4

Statistics, Data Analysis & Probability | 1.0 Students organize, represent, and interpret numerical and categorical data and clearly communicate their findings:

- Standard 1.1: Formulate survey questions; systematically collect and represent data on a number line; and coordinate graphs, tables, and charts.

English-Language Arts, Grade 4

Writing | 1.0 Writing Strategies | Penmanship

- Standard 1.4: Write fluidly and legibly in cursive or joined italic.

Writing | 2.0 Writing Applications (Genres and Their Characteristics)

- Standard 2.3a: Using the writing strategies of grade four outlined in Writing Standard 1.0, students write information reports: Frame a central question about an issue or situation.

Written & Oral English Language Conventions | 1.0 Written and Oral English Language Conventions | Sentence Structure

- Standard 1.1: Use simple and compound sentences in writing and speaking.

Listening and Speaking | 1.0 Listening and Speaking Strategies | Comprehension

- Standard 1.4: Give precise directions and instructions.

Listening and Speaking | 1.0 Listening and Speaking Strategies | Organization and Delivery of Oral Communication

- Standard 1.7: Emphasize points in ways that help the listener or viewer to follow important ideas and concepts.

Listening and Speaking | 1.0 Listening and Speaking Strategies | Organization and Delivery of Oral Communication

- Standard 1.8: Use details, examples, anecdotes, or experiences to explain or clarify information.

Listening and Speaking | 1.0 Listening and Speaking Strategies | Organization and Delivery of Oral Communication

- Standard 1.9: Use volume, pitch, phrasing, pace, modulation, and gestures appropriately to enhance meaning.

Listening and Speaking | 2.0 Speaking Applications (Genres and Their Characteristics)

- Standard 2.1c: Using the speaking strategies of grade four outlined in Listening and Speaking Standard 1.0, students make narrative presentations: Provide insight into why the selected event or experience is memorable.

Common Core Standards

English-Language Arts, Grade 4

Writing Standards | Production and Distribution of Writing

- Standard 4: Produce clear and coherent writing (including multiple-paragraph texts) in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1-3 above.)

Speaking and Listening Standards | Comprehension and Collaboration

- Standard 1: Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly. a) Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion. b) Follow agreed-upon rules for discussions and carry out assigned roles. c) Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others. d) Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.

Speaking and Listening Standards | Presentation of Knowledge and Ideas

- Standard 6: Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion); use formal English when appropriate to task and situation. (See grade 4 Language standards 1 for specific expectations.)

Language Standards | Conventions of Standard English

- Standard 1: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. a) Write fluidly and legibly in cursive or joined italics. b) Use interrogative, relative pronouns (who, whose, whom, which, that) and relative adverbs (where, when, why). c) Form and use the progressive (e.g., I was walking; I am walking; I will be walking) verb tenses. d) Use modal auxiliaries (e.g., can, may, must) to convey various conditions. e) Order adjectives within sentences according to conventional patterns (e.g., a small red bag rather than a red small bag). f) Form and use prepositional phrases. g) Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons.* h) Correctly use frequently confused words (e.g., to, too, two; there, their).*

Language Standards | Conventions of Standard English

- Standard 2: Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing. a) Use correct capitalization. b) Use commas and quotation marks to mark direct speech and quotations from a text. c) Use a comma before a coordinating conjunction in a compound sentence. d) Spell grade-appropriate words correctly, consulting references as needed.

Language Standards | Knowledge of Language

- Standard 3: Use knowledge of language and its conventions when writing, speaking, reading, or listening. a) Choose words and phrases to convey ideas precisely.* b) Choose punctuation for effect.* c) Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion).

California English Language Development Standards

Listening and Speaking, Grades 3-5

Strategies and Applications | Intermediate ELD level | Comprehension

- Standard : Ask and answer instructional questions with some supporting elements (e.g., "Is it your turn to go to the computer lab?").

Strategies and Applications | Intermediate ELD level | Comprehension

- Standard : Listen attentively to stories and information and identify important details and concepts by using both verbal and nonverbal responses.

Strategies and Applications | Intermediate ELD level | Comprehension and Organization and Delivery of Oral Communication

- Standard : Make oneself understood when speaking by using consistent standard English grammatical forms and sounds; however, some rules may not be followed (e.g., third-person singular, male and female pronouns).

Strategies and Applications | Intermediate ELD level | Comprehension and Organization and Delivery of Oral Communication

- Standard : Participate in social conversations with peers and adults on familiar topics by asking and answering questions and soliciting information.

Writing, Grades 3-5

Strategies and Applications | Intermediate ELD level | Organization and Focus

- Standard : Produce independent writing that is understood when read but may include inconsistent use of standard grammatical forms.

English-Language Conventions | Intermediate ELD level | Capitalization, Punctuation, and Spelling

- Standard : Produce independent writing that may include some inconsistent use of capitalization, periods, and correct spelling.

English-Language Conventions | Intermediate ELD level | Sentence Structure, Grammar, and Spelling

- Standard : Use standard word order but may have inconsistent grammatical forms (e.g., subject/verb agreement).

Technology Standards

NETS (National Educational Technology Standards), Grades K-12

NETS for Students | 6. Technology Operations and Concepts

- Standard a: Students understand and use technology systems.

Grade/Level

4

Content Objective

Fourth grade students will show their understanding of how erosion by water works by conducting experiments to determine what material(s) and variable(s) cause more erosion to occur and will develop deeper questions to explore based off of their observations and experiment outcomes. Students will keep record of specified data to collect, what they observed/learned, and what deeper questions they have on a sheet of paper.

75% of the class will meet the objective.

Academic Language Demands

The academic language students will be strengthening will be erosion, sediment, deposition, experiment, prediction, and data. The language demands to be reinforced will be engaging in collaborative discussion, talking about the outcome of an experiment, sharing ideas with group members, and using metric terminology. Students will understand the vocabulary and demonstrate their ability to perform the language demands through saying or hearing the meaning of vocabulary terms; saying the vocabulary terms out loud; looking at images showing some of the vocabulary; watching an example experiment being modeled to them; completing their own experiments in small groups; collaborating, using academic language, and sharing ideas with group members; writing down their findings, and sharing their findings with the class.

II. LEARNING ABOUT STUDENTS

Class Information

- Total Number of students: 29
 - Number of boys: 14
 - Number of girls: 15
 - African American: 3
 - Caucasian: 15
 - Hispanic/Latino Americans: 9
 - Two or More Races: 2
 - English Language Learners: 1 (Spanish) [Overall: Intermediate | Listening: Intermediate | Speaking: Early Advanced | Reading: Beginning | Writing: Early Intermediate]
 - CELDT RFEP students: 1 (Portuguese) [Overall: Early Advanced | Listening: Early Advanced | Speaking: Advanced | Reading: Advanced | Writing: Early Advanced] (RFEP in May 2017)
 - Special Needs: IEPs - 9 (Speech - 2 , Health related - 7) | 504 - 1
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III. MAKING ADAPTATIONS

Adaptations

Wait Time, Grouping, Preferred Seating, Other Resources

Adaptation Details

Students who did not turn in permission slips to be videotaped will still be taught the lesson; however, they will be placed in a single group for completing the experiments and will be seated/materials will be provided to them accordingly so that they will not be shown in the video. English Learners (ELs) will be provided with a sheet of paper with vocabulary terms, definitions of each term, and visuals to accompany the vocabulary words; I will model expectations and how to conduct the experiments; they will be grouped with, and will perform discussions with, English fluent students for scaffolding; they will be provided with sentence frames for completing the what I learned section; and I will listen to their verbal responses to what they observed/learned and the deeper questions they have so that I can assess both their writing as well as their verbal responses for assessment of their understanding of the content. For speech students, I will provide them with the time they need to formulate verbal responses and they will be in groups with students who are not in speech during verbal discussions for scaffolding. The student with the 504 plan will be allowed to take extra time if needed in order to finish their work. I will also walk the room while students are completing activities in order to assist any struggling students, to make sure students are on task, and to provide them with questions that will challenge them to think deeper into their inquiry experiments. Lastly, the students will have answered questions about the material prior to beginning this lesson so that I can have a better understanding of what the students already know and how to place them within their experiment groups with the beginnings of implementing differentiated instruction in mind.

IV. ANALYSIS OF STUDENT LEARNING

Assessment

Formative

Description of Assessment

Students will be given a sticky note in which they will be required to write their name and one thing they learned about erosion from conducting their experiments in a complete sentence. When finished, students will place their sticky note on a "What we Learned about Erosion" poster which will be hanging on the wall.

V. PROCEDURE

Prerequisite Background Knowledge/Skills

Students must know how to understand and follow both verbal and visual directions and expectations, how to write legibly and in complete sentences, and how to complete a job which has been assigned to them. Students additionally must know how to find measurements using a ruler and a measuring cup.

Materials

Technological Materials:

- Computer
- ELMO Projector
- SMART Board

Experiment Materials:

- soft sand
- potting soil
- gravel
- rocks
- plastic containers
- measuring cups
- rulers
- water
- pouring containers
- plastic spoons
- buckets

Other Materials:

- Experiment Worksheets
 - Lesson Objective
 - Sticky Notes
 - rags (for clean up)
 - plastic sheets (for preventing messes)
 - green, red, and yellow cups
 - "What we learned about Erosion" poster
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INSTRUCTIONAL STRATEGIES

Open

LINKS TO PAST LEARNING:

1. I call on students to tell me the meaning of some of the vocabulary terms they have learned from a previous lesson in preparation for this one (weathering, erosion, sediment, deposition).

STATE THE OBJECTIVE:

2. Using a sheet of paper on the whiteboard, we read the lesson objective together as a class. "Students will show their understanding of how erosion by water works by conducting experiments to determine what material(s) and variable(s) cause more erosion to occur and will develop deeper questions to explore based off of their observations and experiment outcomes."

WHAT THEY WILL BE LEARNING:

3. I tell the students that today they will be learning about how erosion by water works by completing hands-on experiments in small groups (they will be in groups of 5-6 students, which will be done prior to the beginning of the lesson).

4. We also read the vocabulary terms together, which will be written on the whiteboard.

5. Using the SMART Board, I show students a few images of examples of water erosion in real-life places and present them with the question I want them to inquire about in their experiments: (What causes more erosion and deposition to happen?)

Body

MODELING:

1. I show the students what materials they have to use to complete their experiments.
2. Using the ELMO Projector, I model one experiment completion to them (including how to set it up, how to form a prediction, how to correctly measure and label the data, how to clean it up when finished, and how to brainstorm for the next experiment based off of the results).

GUIDED PRACTICE:

3. While modeling, we will complete how to fill out the information they need to provide on their worksheets (prediction, data collection, outcome, observations/what they learned, and deeper question(s) from the observation and experiment outcome) together as a class. Students will be instructed to complete the data collection and outcome sections with their group and the prediction, observation/what they learned, and deeper question(s) sections on their own. [see attachment: Lakey_Cameo_Module13_ErosionbyWater_Lab]
4. I also tell the students the procedures they need to follow if they need assistance/have questions, the jobs for each member of their group (material gatherers, water gatherer, and cleanup persons), and that they need to complete at least two additional experiments within their groups.

INDEPENDENT PRACTICE:

5. I project a count down timer on the board (for 15 minutes).
 6. I start the timer and students complete their experiments and fill out the group and independent sections of their worksheets as well.
 7. After the time is up, students will be given a few minutes to share the deeper questions they came up with to the rest of their group members and they will be instructed to pick which question they want to conduct experiments on for the next sequential inquiry lesson.
 8. Students write down the question they have chosen and I collect them.
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Close

ASSESSMENT:

1. Each student will be provided with a sticky note.
2. Students will write their name and one thing they learned about erosion from the experiments they completed.
3. When finished, students will place their sticky notes onto a paper on the wall titled "What we learned about erosion"

WHAT THEY LEARNED:

4. Each group will share what they learned from their experiments to the class.

SELF-EVALUATION:

5. Students will be provided with sentence frames to share how they think they performed during the lesson and why.

~END OF LESSON~

VI. ANALYSIS AND REFLECTION

Analysis and Reflection

The parts of the lesson I felt were effective included the visual examples of water erosion, having the students complete the worksheet while I was modeling it to them, having students complete their own experiments, the colored cups for students to let me know if they need my assistance, me asking students to explain their reasoning, and the assessment and self-reflection activities. From me showing them the visuals of the Grand Canyon and Antelope Canyon, one of the students shared to the class that her mother was at the Grand Canyon a few weeks ago and another student shared that one of her favorite images on her computer at home is of Antelope Valley, though she did not previously know the name of the place or where it was located. While the students were completing the two experiments on their own, there was no confusion or questions concerning how to fill out the data and information on their worksheets. There was a lot of information for them to provide, so I was proud of them for being able to correctly fill this out on their own, which came from the modeling I did for them along with having them fill out their worksheets while I was filling out mine during the demonstration. The experiment portion of the lesson, I believe, was the strongest part of the lesson, it was great seeing the amount of engagement and energy in the room and I was impressed with how some of the table groups worked together and were able to come to final decisions on what they wanted to do. I also received feedback from several of the students in their self-reflections that performing the experiments really helped them in being able to understand how water erosion works and removed the confusion that they previously had. I enjoyed walking the room and having groups explain their reasoning to me, which I felt was very beneficial to the students by having them think about why they chose the variables that they did. During the assessment and self-reflection activities, I had no behavioral problems concerning students not wanting to complete their work and they also were very beneficial in showing me what the students are understanding and what they need clarification on and assistance with for the next lesson.

The changes I would make to my instruction to better support student learning includes adding strategies while I modeled the process and information to them, assisting students in developing what variables to change in their experiments, and being more specific and clear to the students as to what information I am looking for when I want them to share what they have learned. Instead of just having the students complete the worksheet with me, I could of also had them complete the actual experiment with me as well. I was successful at having the students understand how to complete the worksheet, though them just watching me model the completion of the experiment to them left some confusion concerning how to perform each job and how to perform the different steps of the experiment. The strategy of having them complete their jobs and the experiment with me would of added tactile and kinesthetic elements into their learning, which would have also greatly assisted those who learn within these modalities. This addition would have assisted the students in being able to complete their two experiments more quickly and smoothly. I additionally could have provided each group with a list of what variables to change for their experiments (materials to use, placing materials into the container, slope of the container, adding the water, etc.) since the students were struggling with coming up with ideas on their own. This could be a support I can provide for them and then remove when they are no longer struggling in this area. Lastly, the students did successfully share one thing they learned about water erosion; however, I would like for them to be more specific and descriptive in their responses. With this, I need to convey my specific expectations to them and explicitly teach them how to create descriptive responses (i.e. do not just tell me that you learned water makes materials erode, tell me how much of each material eroded, tell me how the water was added that caused this erosion to happen, etc.) and to work with them on developing and strengthening this way of thinking.

My objective goal was for 75% of the class (or about 19 out of 25 students) to conduct at least two experiments and develop deeper water erosion questions from these experiments and for them to write one thing that they learned about water erosion. 88% of students (or 22 of 25) completed and filled out the data information for their two experiments, 76% of students (or 19 of 25) developed at least one deeper question for each experiment (or at least two in all), and 76% of the class (or 19 of 25) wrote one specific thing they learned about erosion. (see application/next steps below for what I would do with this information).

Application/Next Steps

For the completion of the prediction/data/observation portion, the three students who did not fill out all of this information on their worksheets was the group of students who could not be shown in the video since they did not turn in their video permission slips. They only completed one experiment within the time I gave them due to their choice in behavior. I had to reprimand one of the students for playing with the cups instead of performing his job and their group as a whole on getting started with their experiment. They initially were confused on what they needed to do for the experiment, though they still were slow at getting started after I assisted them. These students were reminded of my expectations to them and that I still expect them to complete their work, even though they are not in the video.

For the developing of deeper questions portion, the 6 students who did not fully meet this requirement did so because they only provided one deeper question for one of the experiments, instead of at least one deeper question for both experiments. This shows me that I should of been more specific in telling them that I expect them to write at least one question per experiment, not just one question overall. Additionally, I will make this clear to the students for the sequential inquiry lesson on Wednesday.

For the writing of one specific thing they learned about erosion section, the 6 students who did not meet this requirement did so because the information they provided was not descriptive enough (i.e. I learned more about water erosion, I learned that doing experiments is fun, etc.). As mentioned in the analysis and reflection section above, this shows that I need to tell them what I specifically expect when I have them share what they learned and to continue to work with them on strengthening their responses in this area. I will be explicitly telling them my expectations for when they need to write about what they learned during the sequential inquiry lesson on Wednesday.

Lastly, 8% of the class felt that they had learned nothing on water erosion from this lesson (they were the students in the group that was not shown in the video), 40% of the class felt this helped them to understand how water erosion works, but there are still aspects of it that they are confused about, and 52% of the class felt that this lesson was very beneficial and they understand a whole lot more about water erosion and are no longer confused about it.

I felt this lesson was successful overall and I definitely want to continue teaching science inquiry lessons and strengthening my implementation of them when I am a teacher.
