

Coastal Voices: More than a Career

A California Coastal Voices Student-Driven Project

Morro Rock. Photo: Sam Peck

Challenging Question: How can I make protecting and enhancing coast and ocean environments into a career?

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Teacher Guide: More Than a Career

Many meaningful careers relate to the coast and ocean, in science, policy, technology, education, and communication fields. In order to access opportunities students must first know that they exist and be properly supported in their career progression. Bringing more people into coast and ocean careers will benefit the fields as well as the individuals by broadening the perspectives, voices, and talents that are working to protect the coast and ocean.



Aquarists at Aquarium of the Bay

In order to answer the Challenging Question, students will form groups of four to focus upon a particular coast or ocean profession and present it in a career fair. Individual students will create a profile of a coastal professional, including a sample resume, and will perform a job shadow (or acceptable alternative as negotiated with you).

In this project, students will exercise a variety of writing and speaking/listening skills as directed by the California Common Core State Standards as they conduct interviews, write resumes, and present their findings at the career fair. This project may also take the student into greater understanding of the “Nature of Science” as they explore real science careers and “Science as a Human Endeavor.” Students will be learning and using 21st Century Skills, particularly “Life and Career Skills” as they take part in a job shadow. Student work on this project is likely to focus on one or more of the following Principles from California’s Environmental Principles and Concepts: “People Depend on Natural Systems,” “People Influence Natural Systems,” and “Decisions Affecting Resources and Natural Systems are Complex and Involve Many Factors.”



Photo: William Sutton

Teacher Preparation Tasks:

- Review the *Teacher Checklist for Student-Driven Projects*, found in the “Readings and Resources” section. Review suggestions for Personalized Learning Plans and Group Contracts and decide if or how you will use these with your students.
- Review all student readings and handouts, listed on this project’s cover sheet. Make copies for students as needed, or share electronically. Refer back to the Teacher Support Materials in *California Coastal Voices* as needed.
- Contact coast and ocean organizations and lay the foundation for student job shadows. For the project’s entry event, arrange for a few inspiring professionals to speak to the class about their coastal careers. Alternately or in addition, preview coastal career videos available on the *Coastal Voices Website* and select several for classroom viewing.
- Coordinate with the administration of your school or other venue on logistics of the Coast & Ocean Career Fair. If the school already holds a regular career fair, collaborate with the organizers rather than duplicating or competing with the existing event.
- Determine what paperwork needs to be completed to support the job shadowing activities.
- For use as a “bell warmer” in your classroom, choose Daily Phenomena from the Thematic Slideshows of Coastal Images or coastal career videos available on the *Coastal Voices Website*, www.coastal.ca.gov/coastalvoices.



Photo: Tolowa Dunes Stewards

Invitation to Engage:

Protecting the Coast and Ocean as a Life's Work

Challenging Question: How can I make protecting and enhancing coast and ocean environments into a career?

Imagine yourself at work building the California Coastal Trail, or as a lawyer making arguments on the value of coastal access, or a lifeguard saving swimmers caught in a rip tide. Jobs exist (or can be created!) that go far beyond the beach into environmental justice, marine and coastal engineering, or policy analysis. Coast and ocean lovers work in aquariums, government agencies, and on board ships at sea. The possibilities are as extensive as the Pacific and there is an ocean of opportunity for those who want to make protecting and enhancing California's coast their profession.



Photo: National Park Service

Many coastal careers can be organized into three, broad categories:

- 1. Coastal science careers such as geologists, marine biologists, GIS specialists, habitat restoration practitioners, or science communicators.** Many important roles exist in this category, ranging from enforcing fishing regulations as an onboard fishery observer, to the pursuit of new knowledge as a satellite oceanographer working at NASA's Jet Propulsion Lab, to developing habitat restoration plans as a consultant, to working as a ranger in a coastal park. These careers typically weave technology into daily activities. Some jobs offer the opportunity to work outside. Other professionals work to bring marine science to communities as, for example, a writer, artist, video producer, aquarium exhibit designer, or classroom educator. Coastal science jobs are found everywhere from nonprofits like Heal the Bay in Los Angeles to government agencies such as California State Parks, to schools and universities.
- 2. Coast and ocean engineering careers such as hydrographic surveyors, Remotely Operated Vehicle technicians, or aquaculturists.** This broad exciting career area focuses on making choices in the application of scientific, cultural, mathematical, technical, and practical knowledge to innovate, create, invent, and solve many types of issues. On the coast, engineers are devising habitat-protecting access routes and operating underwater robots. Engineers are maintaining ships, designing wave energy machines, and creating

structures and processes that will help coastal communities adapt to rising sea levels. Coastal engineers are working to understand shoreline processes as they interact with shoreline structures. With only five percent of the world's ocean explored, career prospects are ripe for engineering solutions that support exploration and discovery.

- 3. Coastal policy careers such as government officials, research analysts, urban planners, policy advocates, financial analysts, economists, and lawyers.** Leadership opportunities abound for young people who choose coastal planning and public policy as a field. These professionals apply environmental planning, science, and engineering to real-world decision making. Coastal policy professionals are cross-boundary thinkers who are called upon to deploy knowledge of the California Coastal Act and other laws, varied science disciplines, and knowledge of coastal community issues to protect and enhance the coast. Financial analysts and economists can apply their skills to budgeting, grants, and valuation of coastal resources. Climate change and associated sea level rise are critical issues for planners working along the coast, as is agricultural sustainability and affordability for residents and visitors. The same type of integrative policy skills may be brought to bear in government, nonprofit settings, and the private sector.



Photo: Victor Simon, NOAA/NMFS/NWFSC

The Issue:

The California coast is and will remain vulnerable to a host of threats, human and otherwise. More voices, more perspectives, and more talents are needed to succeed in the goal of protecting the coast and ocean.

Objective:

To explore a range of coastal careers and the paths to reaching them. To enhance college, career, and civic readiness through guided practice in key job seeking skills.

Audience for Public Presentation:

Students from your school and nearby schools, churches, after-school clubs, or siblings; parents, college students, and coastal champions of every type.

What will students do?

1. Teams of four students (assigned by your teacher) will focus upon a particular coast or ocean profession. Teams will explore at least three coastal professions before selecting one profession for their group work. The team will develop guiding questions that focus upon investigating that profession, establish a group work contract, and launch their investigation into their team's chosen career. Each team will work together to identify a professional to interview in their group's chosen career, draft interview questions, and set up and conduct the interview.



Personnel of NOAA Ship THOMAS JEFFERSON
Collection of Gretchen Imahori, NOAA/NOS/OCS

2. Each student will also choose a career to profile individually (which must be different from their team's chosen career). Students will identify a coastal professional in their individually-chosen career, draft interview questions, and set up and conduct the interview. Students will draft, revise, and finalize a profile of an early career coastal professional in their individually-chosen career. Although drawing from the interview and additional research, the profile will be of a fictional person (not the person interviewed). Digital products are encouraged if the technology is available. Profiles should include a course of study leading to the profession, including examples of classes or experiences that could prepare for that work. Individual students will also develop and submit an example resume reflective of an early career professional in the field.
3. Students will perform a job shadow, or acceptable alternative as negotiated with their learning advisors.
4. Teams will organize and lead a Coast & Ocean Career Fair. Each team of students will represent their team's chosen coastal profession at the event. Teams will develop a table display including visual aid and multimedia exhibit if technology permits. Students will be prepared to discuss and answer questions about their group's career. Teachers will support teams by providing class time and insight, but students are responsible for designing, organizing, and delivering the experience to career fair attendees.
5. Throughout the project, individual students will maintain a project notebook detailing their questions, appointments, notes from interviews and job shadow, and progress toward their project goals.

Student Checklist: Coast and Ocean Careers

Challenging Question: How can I make protecting and enhancing coast and ocean environments into a career?

Add due dates to the following tasks and phases as instructed by your teacher.

Phase 1: Invitation to Engage, Explore Challenging Question, & Organize

Ask significant questions and define problems as you launch your project.

- Read *Invitation to Engage: Protecting the Coast and Ocean as a Life's Work*. Review rubrics.
- Review *Student's Guide to Personalized Learning Plans* and develop a Personalized Learning Plan.
- Form your project team as assigned by your teacher.
- Read *Exploring Coastal Careers*.
- Create an initial need-to-know list of relevant questions to launch your investigations into coastal careers. What will you need to know in order to develop a career profile and a Career Fair exhibit? Separate but related, create an initial list of questions to ask the professionals you'll be interviewing.
- In your group, explore at least three professions and then work together to decide on a career for your group profile.
- Begin research on your job shadow target and interview subjects. Initiate contact.

Phase 2: Explore Questions and Knowledge

Your task during the second phase of the project is to explore, analyze, and interpret qualitative and quantitative data related to your need-to-know questions. You will make arrangements for your interviews and job shadow, and begin organizing for the career fair.

- Review *Exploring Coastal Careers*. Refine your need-to-know list of relevant questions developed in Phase 1.
- Decide which team members will investigate which need-to-know questions. Conduct research to respond to your questions.
- Choose a career for your individual profile.
- Read *Guide to Informational Interviewing* and revise your interview questions.
- Set up appointments for interviews.
- Individually, perform a self-assessment of Phase 1 and write a brief plan of improvement to turn in to your teacher.

- Work on individual career profile and create a template for the resume.
- With your group, create a project plan for your Career Fair table and submit to your teacher.
- Follow up on arrangements for your job shadow.

Phase 3: Explain and Evaluate

- Review the *Guide to Informational Interviewing* and complete interviews.
- Organize and classify your group's need-to-know questions and associated research evidence. Share them as directed by your teacher, and revise based on feedback.
- Read *Tips for Effective Communication in Public Settings*.
- With your group, complete planning for the Career Fair table. Practice your public interaction and review it with the presentation rubric.
- Individually, perform a self-assessment and write a plan of improvement, as directed by your teacher. Submit project notebook to teacher for review.
- Confirm details of your job shadow.

Phase 4: Extend into Action: Communicate About Your Coast and Ocean Career

- Perform technology checks on any equipment that will be needed for final presentation. Present your Career Fair product to your audience.
- Complete your job shadow.
- Perform self-assessment and peer reviews, as directed by your teacher.
- Submit individual project notebook to teacher for review.
- Complete and submit individual career profile and resume to teacher for review.

Phase 5: Reflecting, Evaluating, and Celebrating

Ask yourself how you could improve while your successes and failures are still fresh in your mind.

- Organize a group debrief with teacher. Have any new questions emerged?
- Write thank you notes to any adult mentors and partners.
- Perform a final self-evaluation, as directed by your teacher.
- Celebrate with your hard working team!

Exploring Coastal Careers

This project is focused on exploring a rewarding career. To help organize that outcome we will use a conceptual model from the sustainable business community called the “triple bottom line,” a concept that imagines a world where work is valued based on the financial, environmental, and social benefits it produces. John Elkington developed the concept to help corporations fully assume responsibility for their actions. During your exploration of careers you can begin engineering a triple bottom line



Photo: Bette Boren

outcome for yourself. One way to do this is to draw a chart with three columns, labeled People, Planet, and Profit. For each career you evaluate, rate it under each category on a scale from one to ten. For example, how well does a career address the way you want to work with others? Place that rating under People. How well do you see the career addressing environmental issues? Place that rating under Planet. How much money are you likely to make in this career? Place that rating under Profit. These ratings are yours alone and might look different for someone else evaluating a given career. What is also individual is how much you value each of the categories. Looking at these factors and their relation to your values can help you make conscious decisions as you plan a path to your future career (and to the products of this school project).

A Survey of Coastal Careers

First, let's survey the available careers on the coast. The following five sites should be investigated before you go into a brainstorming session with your partners. Some of the sites are national in scope, but similar jobs exist on the California coast.

www.marinecareers.net

Be sure to look at the overview and to individually examine each type of work: science, engineering, and policy. The first question in the FAQ page addresses your interview assignment. One of the ocean professionals profiled is George Matsumoto, Biological Oceanographer and Educator, who speaks about being able to combine research and education in his role at the Monterey Bay Aquarium Research Institute. The site is maintained by NOAA's Sea Grant office.

www.womenoceanographers.org

This site celebrates and makes visible the ocean science accomplishments of female oceanographers. Consider a web search for each scientist to get updates

on her career. One of the scientists profiled is Dawn Wright, also called Deep Sea Dawn, who is a leading authority in the field of marine GIS. This career blends ocean science with tech innovation.

www.oceanexplorer.noaa.gov/edu/oceanage

Nice photographs show the job activities, work setting, and other important factors. Don't miss the profile of submarine driver Hugo Marrero. Ocean exploration is a growing field. Technically inclined people can find work at universities, private companies, or government agencies. Also profiled is underwater filmmaker and photographer Jill Heinerth, who explains how her career requires technical expertise, communication skills, and artistic talent.

www.marinetech.org/workforce

This Monterey Peninsula College website offers both career guidance and projects you can do while still in high school. This site includes knowledge and skill guidelines for a variety of technical careers, especially those related to Remotely Operated Vehicles. ROVs are underwater robots that offer safety, economy, and reliability to ocean explorers. Jobs in this field as operators/technicians are examples of what is possible with the right two-year degree from a community college.

More Examples:

Coastal Careers with Government Agencies: Federal, State and Local

NOAA, the National Oceanographic and Atmospheric Administration, offers many jobs, for many education levels, located in many different regions and settings. NOAA's career site describes the mission this way: "Unlock secrets in the deep oceans, track rapidly moving storms, operate state of the art environmental satellites, chart the Nation's waterways, formulate models to forecast climate trends, protect and preserve our living marine resources. It's all in a day's work at the National Oceanic and Atmospheric Administration! Join a dedicated workforce committed to a vital mission: safeguarding the public, protecting natural resources, strengthening the economy. NOAA: a career that makes a world of difference!"



Photo: Deborah Leon

The California Coastal Commission is a small state agency charged with protecting and enhancing California's coast and ocean for present and future generations. It does so through careful planning and regulation

of environmentally-sustainable development, rigorous use of science, strong public participation, education, and effective intergovernmental coordination. Employees at the Commission work on a broad range of issues to plan for and manage coastal land uses while protecting important coastal resources including habitats that support rare and endangered species, scenic landscapes and views to the sea, public shoreline access, coastal agriculture, and recreational opportunities. The Commission's staff includes planners, biologists, geologists, engineers, environmental scientists, educators, GIS specialists, attorneys, and administrative staff. The Commission's main office is in San Francisco, with five smaller district offices located to the north and south. The Coastal Commission's "sister" agencies are the State Coastal Conservancy and the San Francisco Bay Conservation and Development Commission (BCDC). The State Coastal Conservancy is a non-regulatory state agency based in Oakland that supports projects to protect coastal and watershed resources and increase opportunities for the public to enjoy the coast. BCDC is a state planning and regulatory agency based in San Francisco, with regional authority over the San Francisco Bay and its shoreline. Its mission is to protect and enhance San Francisco Bay and to encourage the Bay's responsible and productive use for this and future generations.



Photo: Allen Shimada, NOAA/NMFS/OST

County and city governments provide many of the functions that people associate with beach living. Lifeguards and firefighters keep residents and visitors safe. In government offices, other professionals plan adaptation strategies for sea level rise or help improve access and transportation to finite resources like beach access. Many of these organizations have programs that prepare young people for careers on the waterfront. For example, the LA County Junior Guards program has a long history of providing a pathway to coveted jobs at the beach.

Park rangers and naturalists work in city, state, and national parks to protect natural resources and engage with visitors.

Coastal Careers with Nonprofit Organizations

The nonprofit sector has many opportunities to explore, with a large number of these careers being found in conservation organizations, aquariums, and other institutions. These organizations may employ just a few people or more than a thousand. You'll find positions in community organizing, policy research and advocacy, volunteer management, habitat restoration, environmental education, veterinary services, law, recreation, communication, and much more. Often in

these organizations, volunteering is the way to learn the ropes and get a leg up on a paying job.

Coastal Careers in Business

Your ideal coastal job may be in a private company. This category of career also runs the gamut. You might choose to work in sustainable fishing or aquaculture, responsible whale watching, marina management, surfboard designing, ocean-friendly landscaping, environmental consulting as a biologist or geologist or economist, or countless other opportunities.

General Guiding Questions for Career Exploration (From San Jose State)

Explore the following questions as you develop your career profiles, resumes, and career fair booth.

My Function:

- What type of activity motivates me to get up in the morning?
- What tasks do I enjoy performing?
- Is working with machines, or writing, or leading groups satisfying to me?
- What class activities work for me? What does this say about how I learn?

Working with People, or Not:

Do I prefer to work mostly with people or do I prefer working mostly by myself? What kinds of people (e.g., youth, students, working adults, seniors) do I like to work with as colleagues or clients?



Photo: Ian Barin

Physical Setting:

- Where do I see myself working? Is it a quiet environment or a busy, hectic setting?
- Is the work always changing, or predictable?
- Do I prefer to work more with machines and technology or answering questions and assisting people?
- Do I want a work setting that is academic or corporate, highly structured or more informal?

“Planning your Future” is an online resource from UC Berkeley’s Career Center that describes eight specific tasks all career explorers should consider: career.berkeley.edu/Plan/Plan

All URLs will be kept updated on the Coastal Voices Website:
www.coastal.ca.gov/coastalvoices

A Guide to Informational Interviewing

Informational interviewing is an important skill and a particularly effective means of making sense of the world of work. In this project you will interview two working professionals (one with your group and one individually) and if possible execute a teacher-supported job shadow. Since you will be asking professionals for their valuable time, it is incumbent on you to be prepared, well-informed about their field, and sincere. Interviewers also must know how the material will be used, for example for a school project, research on future careers, or as a path to finding an internship.



Photo: Officers and Crew of NOAA Ship PISCES

Four Rules of Interviewing...

1. Learn about your target and their work. This is respectful, encourages conversation, and enables you to say things like: "I read your article in Coastal Planning about desalination plants. Your thoughts on how desalination technology is evolving are interesting, can you tell me more?" Right away you will have a friendly conversation instead of an awkward formal interview.
2. Prepare relevant, thoughtful, and open-ended questions. Except for warm up questions, avoid simple yes or no types of questioning. See UC Berkeley's page on informational interviewing for examples: career.berkeley.edu/Info/InfoQuestions
3. Practice, practice, and practice again. One very useful technique is to have a friend video you doing mock interviews and also to watch videos of other interviewers at work. Some videos from NOAA can be found at www.voices.nmfs.noaa.gov. As you seek interviewers to emulate, avoid commercial media sources.
4. Act in a professional manner signaling your intention to be serious and productive. If conducting your interview in person or over video, dress professionally and make eye contact. If interviewing over the phone, be sure to have good reception before making your call. Start by introducing yourself and thanking your subject for their time. Use titles (e.g. Dr., Captain, Mr., Ms.) unless asked to do otherwise. This is a formal setting, like a job or college entrance interview.



Potato Harbor, Santa Cruz Island. Photo: Chuck Graham

Informational Interview Guide

Adopted from UC Berkeley Career Center's Six-Step Process

1. Research coast and ocean career fields.
2. Identify people to interview, through means such as teacher connections, staff contact webpages, professional organizations, and authors of articles and reports.
3. Initiate contact with potential interviewees. Start this as soon as you are able to identify potential targets. It can take a long time to secure a meeting in this busy world and you must be persistent. Persistence for the purposes of this project means three documented attempts before asking for help from your teacher.
4. Prepare for the interview.
5. Conduct the interview. If possible, one of your interviews should be in person so make that your scheduling priority. If this interview can be coordinated with the job shadow, that will ease the demands on your time.
6. Follow up with a thank you note. This often leads to more conversations and is respectful. Most people are pleasantly surprised to get a hand-written thank you, so consider that approach.



Photo: U.S. Army Corps of Engineers

Job Shadowing

Spending a day or a half-day with a coastal professional is often very rewarding, but it takes work and persistence to arrange. Call or email a professional organization related to your interest to ask for help. Make a call to the human resources department of your desired organization or business to ask if they can put you in touch with an employee you might shadow. Many local governments and professional organizations have workforce development boards that may be able to help. Your teacher will provide assistance as needed.

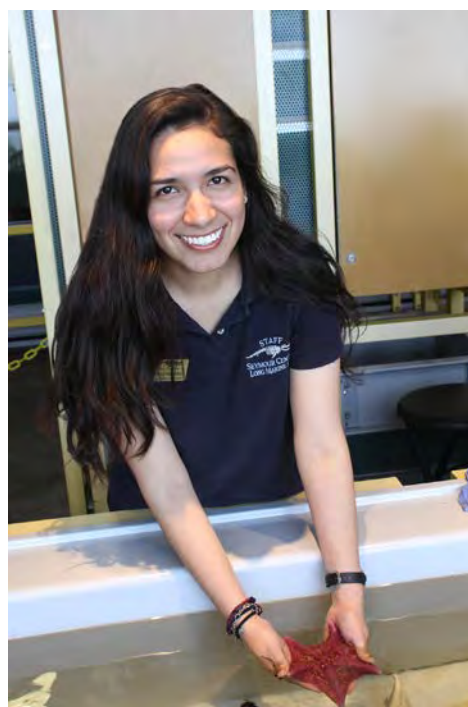


Photo: Seymour Marine Discovery Center

Student Guide to Personalized Learning Plans

A Personalized Learning Plan should include your personal learning goals for the project and the steps you will take to reach the goals. This plan will help you and your teacher track your progress toward mutually agreed upon learning outcomes.

Write **two personal learning goals** for use with the project. These goals can personalize the challenging question, refine the project products, modify the learning process, or connect your project to more than one subject area. Goals 1 and 2 should be:

1. An interest-based goal related to the project topic, your desired new knowledge, and/or how to apply the knowledge.
2. A Habits of Mind goal specifically related to applying knowledge in the real world.

List the steps you will take to reach each goal. How will you attain your goal? Try to phrase these steps as “I will” statements.

Specific:

Journalists ask themselves five questions when attempting to get complete stories: what, who, when, where and why. You can use this approach to write specific goal statements. For instance “What human actions (what) pose a risk to blue whales (who and why) in the Santa Barbara Channel (where) during the busy summer months (when)?”

16 Habits of Mind Goals:

- Persisting
- Managing impulsivity
- Listening with understanding and empathy
- Thinking flexibly
- Thinking about thinking (metacognition)
- Striving for accuracy
- Questioning and posing problems
- Applying past knowledge to new situations
- Thinking and communicating with clarity and precision
- Gathering data through all senses
- Creating, imagining, innovating
- Responding with wonderment and awe
- Taking responsible risks
- Finding humor
- Thinking interdependently
- Remaining open to continuous learning

Arthur L. Costa and Bena Kallick, 2000

Measurable (Observable):

What will your peers and teachers see and hear that demonstrates your success? For example, a choice to focus on developing your ability to persist to completion despite distractions would:

- Look like you continuing to work on your project tasks despite a busy classroom.
- Sound like you asking clarifying questions, considering alternative problem solving strategies, and asking for help when needed.

Consider quantifying your goals. For example, if asking clarifying questions is tough for you, set a goal of speaking twice per class period, even simple restatements or observations. If staying on task is an issue for you, set a goal of sitting where you will not be distracted by others or concentrating for increasing amounts of time.

Attainable:

Ask yourself if this is achievable goal? Removing an obsolete dam in just six weeks is an unrealistic goal. By contrast, bringing public attention to the damage caused by the dam to local watersheds and beaches by writing editorials, creating podcasts, or by taking local officials to the site is both doable and extremely valuable.

Relevant to your own life and education requirements:

Is the goal consistent with your greater needs and desires? Those students preparing for immediate college attendance after high school may want to set goals related to expected majors. A student planning to spend the summer watching their younger siblings might be interested in issues affecting children. Your teacher will lead the co-authoring of the education requirements section of the personal learning plan.

Timely:

Be sure to include realistic target dates for all elements of your plan.

NOTES FOR YOUR PERSONALIZED LEARNING PLAN:

Group Work Contract

Goals of the Group Contract

TEAM MEMBER NAME	TEXT NUMBER	EMAIL ADDRESS

Team Member's Role and Name	Team Member's Responsibilities. Be as specific as possible. Include performance indicators, tasks, and due dates.
Principal Investigator	
Scientist	
Engineer	
Policy Manager	

Option for Team Members: Share a goal from your Personalized Learning Plan

Group Agreements

Consequences for Breaking Agreements

1. Team members will issue one friendly reminder, as needed.
2. Team will issue a written formal joint warning. Teacher must know that warning was issued, but does not need to be involved.
3. Team member will be removed from the group and given an opportunity to re-join the group after make up work is performed. Team must schedule a problem-solving conference.
4. Team member will be removed permanently from the group. Team meets with teacher during office hours prior to permanent removal. If a team member is “fired,” that person is responsible for completing an alternative project of the teacher’s design.

Group Contract Signature Page

We have co-authored this contract, understand its contents, and agree to abide by every word. I am acknowledging my willingness to be held accountable to the group with my signature below.

Printed Name:

Signature:

Printed Name:

Signature:

Printed Name:

Signature:

Printed Name:

Signature:

Teacher Checklist for Student-Driven Projects

Prepare for Projects (3 to 6 weeks prior to entry event)

This is always the busiest time for a project-based teacher. With planning most projects go well, if not exactly where you thought they would. This is normal and expected in student-driven project-based learning environments.

- Review project materials, standards, and teacher support pieces.
- Organize a local guest speaker, videoconference, or a phenomenon for the project's Entry Event. Arrange space for public presentations of learning products if appropriate, and invite audience. Arrange speakers, adult mentors, and transportation for off-site activities.
- Contact teachers from other departments and propose partnerships.
- Perform a safety survey of any outdoor sites involved with the project.
- Prepare for "just in time teaching" by reading the project's *Teacher Guide*.
- Identify mutually reinforcing activities from existing curriculum guides.

Most importantly, prepare students for collaborative work, self-assessment, and sense-making conversations. See Create a Culture of Inquiry discussion in the Teacher Support reading titled *Organizing for Student Success*.

Launch Projects with an Engaging Entry Event (first week of project)

Your primary task when launching the project is to ensure a truly engaging entry event. Be sure that your speaker is prepped, knows how to connect to teenagers, and has visual aids or activities that prompt need-to-know questions. If quality speakers can't be found consider videos or video conferencing. Students receive the *Invitation to Engage* reading, *Rubrics*, and their *Student Checklist*; followed by the *Asking the Right Questions* reading.

- Help students interact with guest speaker, video, or a natural phenomenon. Introduce the Challenging Question.
- Encourage discussion of science, engineering, and policy viewpoints as students will be assuming these roles.
- Check for prior knowledge and build place-based connections
- Post the Challenging Question and create a calendar with student tasks. Use or revise the *Student Checklist* provided with the project or develop your own. (The *Student Checklist* and selected other documents are available in Word on the *Coastal Voices Website*, www.coastal.ca.gov/coastalvoices.)
- Review the procedures for creating group contracts and personalized learning plans, if you are using them. Assign teams and create contracts. Make students aware of your grading procedure. One option is for groups to agree that they will be the ones responsible for dividing up points based on the level of work each student does on the group project.
- Define the major learning products, which are typically the project notebook and a public presentation.

Manage the (Potentially) Messy Middle of Projects (3 to 4 weeks long)

This period of time is a cycle of questioning, knowledge building, explaining, revising understanding, and reflecting. Rarely is the middle of a project linear or predictable. Students may need all sorts of support ranging from direct instruction in process skills such as evaluating resources for bias, validity, and authority, to structured homework activities to clarify significant science concepts.

- Distribute the readings: *Claims, Evidence, and Reasoning*, followed by the field experience reading, *Tips for Effective Communication in Public Settings*, and any readings specific to the particular project. An additional reading is available titled, *Students Taking Action on Science & Policy and Communicating to Public Audiences*.
- In the second week, have students perform self assessment and write plans of improvement.
- Use a Daily Phenomenon (as described in the Teacher Support piece, Organizing for Student Success) to build shared knowledge as needed.
- Review project notebooks as often as time allows to ensure your ability to provide frequent feedback to students. Use exit tickets to track content knowledge and progress. Evaluate with rubrics.
- Have content resources ready that relate to students' "need-to-knows" and personalized learning plans. Deliver when students ask. Resist the impulse to front load or deliver lectures. Remember, this is "just in time" instruction.
- Perform weekly check-ins with groups using Habits of Mind descriptions. Perform additional team building activities as needed, however students should manage their own groups. In week three, meet with each group for debriefing on group work.
- As you get to week three increase the frequency of formative feedback. Be sure to review drafts of any written products and especially the project notebook.
- Use gallery walks as foundations for self- and peer-review.
- Provide frequent opportunities for students to practice.
- Confirm arrangements for public presentations and further adult mentoring opportunities. Send reminders to invited audiences.

Celebrate Student Work in Public Settings (last week of project)

Your primary role towards the end of the project is to facilitate reflection, support accurate student thinking by formally correcting when needed, and to celebrate the growth that you have noted during your regular formative assessment sessions.

- Perform system checks on any technology that will be used in presentations at least two days prior.
- Review rubrics, personalized learning plans, and performance expectations.
- Review the questions created at the beginning of the project.
- Have students perform self-assessment, lead reflection discussions, and write plans of improvement.
- Meet with each group for debriefing on group work. Have students divide points per original contract agreements, if applicable.

Tips for Effective Communication in Public Settings

Public speaking is a fundamental challenge, potentially stressful or frightening for many people, both adults and students. To find your voice, speak intelligently from evidence, and be self-confident when challenged about the questions of the day, is to find your own power and your own chance to change the world. Speaking in 2014, 17 year old Nobel Prize winner Malala Yousafzai said: “We should not wait for someone else to come and raise our voice. We should do it by ourselves.”

Since sharing your work in public through presentations, field experiences, or media is central to this project, to civic participation, and to changing the world, this document describes some techniques of public speaking that with practice will grant anyone the ability to move from academics to action.

- 1. Prepare well.** Georgia State Professor Michael Mescon puts it this way: “The best way to conquer stage fright is to know what you are talking about.” This is a close cousin to the US Navy’s principle of 7Ps. Here is the cleaned up, non-sailor version: Prior Planning, Preparation, and Practice Prevents Poor Performance. Reinforcing this from ancient Greece is Epictetus, who spoke to the importance of listening and learning before speaking with this anatomically apt reminder: “We have two ears and one mouth so we may listen twice as much as we speak.” Listening is preparing. Once you are in command of the facts, the evidence, and the reasoning, it becomes natural to assert your claim.
- 2. Practice, practice, practice, and practice again.** Audiences are forgiving of mistakes, nervousness, and stage fright; however, it is disrespectful to waste their time though lack of preparation.
- 3. Speak only about what you know to be true and don’t fake it.** In his letters home from the Middle East, Malcolm X wrote, “I’m for truth, no matter who tells it. I’m for justice, no matter who it’s for or against.” Speak only about what you know and be happy to offer a professional “I don’t know but I will find out and get back to you.” Once again, audiences expect you to be knowledgeable about your message, prepared to deliver in an effective manner, and honest, but no one expects you to know everything.
- 4. Speak slowly and clearly.** Many people speed up their speech when they are nervous, but that makes you harder to understand and the audience might miss parts of what you are saying. Slow down your speech and take your time.
- 5. Make eye contact with the audience.** This is a tip that will help engage your audience in what you are saying—making it feel more like a conversation than a speech. Don’t just scan the audience—look at individual audience members one at a time. Try to give them an entire sentence or thought before moving on to another person.
- 6. Say thank you.** Your audience’s presence and applause are a gift. At the end of your presentation, always acknowledge your audience by thanking them.

CREATIVITY & INNOVATION RUBRIC

Courtesy of the Buck Institute for Education

PROCESS:

	Below Standard	Approaching Standard	At Standard	Above Standard
<p>Creativity & Innovation Opportunity at Phases of a Project</p> <p><i>Launching the Project:</i> Define the Creative Challenge</p>	<ul style="list-style-type: none"> • may just “follow directions” without understanding the purpose for innovation or considering the needs and interests of the target audience 	<ul style="list-style-type: none"> • understands the basic purpose for innovation but does not thoroughly consider the needs and interests of the target audience 	<ul style="list-style-type: none"> • understands the purpose driving the process of innovation (Who needs this? Why?) • develops insight about the particular needs and interests of the target audience 	
<p><i>Building Knowledge, Understanding, and Skills:</i> Identify Sources of Information</p>	<ul style="list-style-type: none"> • uses only typical sources of information (website, book, article) • does not offer new ideas during discussions 	<ul style="list-style-type: none"> • finds one or two sources of information that are not typical • offers new ideas during discussions, but stays within narrow perspectives 	<ul style="list-style-type: none"> • in addition to typical sources, finds unusual ways or places to get information (adult expert, community member, business or organization, literature) • promotes divergent and creative perspectives during discussions (CC 11-12.SL.1c) 	
<p><i>Developing and Revising Ideas and Products:</i> Generate and Select Ideas</p>	<ul style="list-style-type: none"> • stays within existing frameworks; does not use idea-generating techniques to develop new ideas for product(s) • selects one idea without evaluating the quality of ideas • does not ask new questions or elaborate on the selected idea • reproduces existing ideas; does not imagine new ones • does not consider or use feedback and critique to revise product 	<ul style="list-style-type: none"> • develops some original ideas for product(s), but could develop more with better use of idea-generating techniques • evaluates ideas, but not thoroughly before selecting one • asks a few new questions but may make only minor changes to the selected idea • shows some imagination when shaping ideas into a product, but may stay within conventional boundaries • considers and may use some feedback and critique to revise a product, but does not seek it out 	<ul style="list-style-type: none"> • uses idea-generating techniques to develop several original ideas for product(s) • carefully evaluates the quality of ideas and selects the best one to shape into a product • asks new questions, takes different perspectives to elaborate and improve on the selected idea • uses ingenuity and imagination, going outside conventional boundaries, when shaping ideas into a product • seeks out and uses feedback and critique to revise product to better meet the needs of the intended audience (CC 6-12.W.5) 	

CREATIVITY & INNOVATION RUBRIC, PROCESS, continued

	Below Standard	Approaching Standard	At Standard	Above Standard
Creativity & Innovation Opportunity at Phases of a Project				
<i>Presenting Products and Answers to Driving Question: Present Work to Users/Target Audience</i>	<ul style="list-style-type: none"> • presents ideas and products in typical ways (text-heavy slides, recitation of notes, no interactive features) 	<ul style="list-style-type: none"> • adds some interesting touches to presentation media • attempts to include elements in presentation that make it more lively and engaging 	<ul style="list-style-type: none"> • creates visually exciting presentation media • includes elements in presentation that are especially fun, lively, engaging, or powerful to the particular audience 	

PRODUCT:

	Below Standard	Approaching Standard	At Standard	Above Standard
Originality	<ul style="list-style-type: none"> • relies on existing models, ideas, or directions; it is not new or unique • follows rules and conventions; uses materials and ideas in typical ways 	<ul style="list-style-type: none"> • has some new ideas or improvements, but some ideas are predictable or conventional • may show a tentative attempt to step outside rules and conventions, or find new uses for common materials or ideas 	<ul style="list-style-type: none"> • is new, unique, surprising; shows a personal touch • may successfully break rules and conventions, or use common materials or ideas in new, clever and surprising ways 	
Value	<ul style="list-style-type: none"> • is not useful or valuable to the intended audience/user • would not work in the real world; impractical or unfeasible 	<ul style="list-style-type: none"> • is useful and valuable to some extent; it may not solve certain aspects of the defined problem or exactly meet the identified need • unclear if product would be practical or feasible 	<ul style="list-style-type: none"> • is seen as useful and valuable; it solves the defined problem or meets the identified need • is practical, feasible 	
Style	<ul style="list-style-type: none"> • is safe, ordinary, made in a conventional style • has several elements that do not fit together; it is a mish-mash 	<ul style="list-style-type: none"> • has some interesting touches, but lacks a distinct style • has some elements that may be excessive or do not fit together well 	<ul style="list-style-type: none"> • is well-crafted, striking, designed with a distinct style but still appropriate for the purpose • combines different elements into a coherent whole 	

Note: The term "product" is used in this rubric as an umbrella term for the result of the process of innovation during a project. A product may be a constructed object, proposal, presentation, solution to a problem, service, system, work of art or piece of writing, an invention, event, an improvement to an existing product, etc.

PRESENTATION RUBRIC

Courtesy of the Buck Institute for Education

	Below Standard	Approaching Standard	At Standard	Above Standard
Explanation of Ideas & Information	<ul style="list-style-type: none"> • does not present information, arguments, ideas, or findings clearly, concisely, and logically; argument lacks supporting evidence; audience cannot follow the line of reasoning • selects information, develops ideas and uses a style inappropriate to the purpose, task, and audience (may be too much or too little information, or the wrong approach) • does not address alternative or opposing perspectives 	<ul style="list-style-type: none"> • presents information, findings, and supporting evidence in a way that is not always clear, concise, and logical; line of reasoning is sometimes hard to follow • attempts to select information, develop ideas and use a style appropriate to the purpose, task, and audience but does not fully succeed • attempts to address alternative or opposing perspectives, but not clearly or completely 	<ul style="list-style-type: none"> • presents information, findings, arguments and supporting evidence clearly, concisely, and logically; audience can easily follow the line of reasoning (CC 9-12.SL.4) • selects information, develops ideas and uses a style appropriate to the purpose, task, and audience (CC 9-12.SL.4) • clearly and completely addresses alternative or opposing perspectives (CC 11-12.SL.4) 	
Organization	<ul style="list-style-type: none"> • does not meet requirements for what should be included in the presentation • does not have an introduction and/or conclusion • uses time poorly; the whole presentation, or a part of it, is too short or too long 	<ul style="list-style-type: none"> • meets most requirements for what should be included in the presentation • has an introduction and conclusion, but they are not clear or interesting • generally times presentation well, but may spend too much or too little time on a topic, a/v aid, or idea 	<ul style="list-style-type: none"> • meets all requirements for what should be included in the presentation • has a clear and interesting introduction and conclusion • organizes time well; no part of the presentation is too short or too long 	
Eyes & Body	<ul style="list-style-type: none"> • does not look at audience; reads notes or slides • does not use gestures or movements • lacks poise and confidence (fidgets, slouches, appears nervous) • wears clothing inappropriate for the occasion 	<ul style="list-style-type: none"> • makes infrequent eye contact; reads notes or slides most of the time • uses a few gestures or movements but they do not look natural • shows some poise and confidence, (only a little fidgeting or nervous movement) • makes some attempt to wear clothing appropriate for the occasion 	<ul style="list-style-type: none"> • keeps eye contact with audience most of the time; only glances at notes or slides • uses natural gestures and movements • looks poised and confident • wears clothing appropriate for the occasion 	

PRESENTATION RUBRIC, continued

	Below Standard	Approaching Standard	At Standard	Above Standard
Voice	<ul style="list-style-type: none"> • mumbles or speaks too quickly or slowly • speaks too softly to be understood • frequently uses “filler” words (“uh, um, so, and, like, etc.”) • does not adapt speech for the context and task 	<ul style="list-style-type: none"> • speaks clearly most of the time • speaks loudly enough for the audience to hear most of the time, but may speak in a monotone • occasionally uses filler words • attempts to adapt speech for the context and task but is unsuccessful or inconsistent 	<ul style="list-style-type: none"> • speaks clearly; not too quickly or slowly • speaks loudly enough for everyone to hear; changes tone and pace to maintain interest • rarely uses filler words • adapts speech for the context and task, demonstrating command of formal English when appropriate (CC 9-12.SL.6) 	
Presentation Aids	<ul style="list-style-type: none"> • does not use audio/visual aids or media • attempts to use one or a few audio/visual aids or media, but they do not add to or may distract from the presentation 	<ul style="list-style-type: none"> • uses audio/visual aids or media, but they may sometimes distract from or not add to the presentation • sometimes has trouble bringing audio/visual aids or media smoothly into the presentation 	<ul style="list-style-type: none"> • uses well-produced audio/visual aids or media to enhance understanding of findings, reasoning, and evidence, and to add interest (CC 9-12.SL.5) • smoothly brings audio/visual aids or media into the presentation 	
Response to Audience Questions	<ul style="list-style-type: none"> • does not address audience questions (goes off topic or misunderstands without seeking clarification) 	<ul style="list-style-type: none"> • answers audience questions, but not always clearly or completely 	<ul style="list-style-type: none"> • answers audience questions clearly and completely • seeks clarification, admits “I don’t know” or explains how the answer might be found when unable to answer a question 	
Participation in Team Presentations	<ul style="list-style-type: none"> • Not all team members participate; only one or two speak 	<ul style="list-style-type: none"> • All team members participate, but not equally 	<ul style="list-style-type: none"> • All team members participate for about the same length of time • All team members are able to answer questions about the topic as a whole, not just their part of it 	

COLLABORATION RUBRIC

Courtesy of the Buck Institute for Education

<i>Individual Performance</i>	Below Standard	Approaching Standard	At Standard	Above Standard
Takes Responsibility for Oneself	<ul style="list-style-type: none"> • is not prepared, informed, and ready to work with the team • does not use technology tools as agreed upon by the team to communicate and manage project tasks • does not do project tasks • does not complete tasks on time • does not use feedback from others to improve work 	<ul style="list-style-type: none"> • is usually prepared, informed, and ready to work with the team • uses technology tools as agreed upon by the team to communicate and manage project tasks, but not consistently • does some project tasks, but needs to be reminded • completes most tasks on time • sometimes uses feedback from others to improve work 	<ul style="list-style-type: none"> • is prepared and ready to work; is well informed on the project topic and cites evidence to probe and reflect on ideas with the team (CC 6-12.SL.1a) • consistently uses technology tools as agreed upon by the team to communicate and manage project tasks • does tasks without having to be reminded • completes tasks on time • uses feedback from others to improve work 	
Helps the Team	<ul style="list-style-type: none"> • does not help the team solve problems; may cause problems • does not ask probing questions, express ideas, or elaborate in response to questions in discussions • does not give useful feedback to others • does not offer to help others if they need it 	<ul style="list-style-type: none"> • cooperates with the team but may not actively help it solve problems • sometimes expresses ideas clearly, asks probing questions, and elaborates in response to questions in discussions • gives feedback to others, but it may not always be useful • sometimes offers to help others if they need it 	<ul style="list-style-type: none"> • helps the team solve problems and manage conflicts • makes discussions effective by clearly expressing ideas, asking probing questions, making sure everyone is heard, responding thoughtfully to new information and perspectives (CC 6-12.SL.1c) • gives useful feedback (specific, feasible, supportive) to others so they can improve their work • offers to help others do their work if needed 	
Respects Others	<ul style="list-style-type: none"> • is impolite or unkind to teammates (may interrupt, ignore ideas, hurt feelings) • does not acknowledge or respect other perspectives 	<ul style="list-style-type: none"> • is usually polite and kind to teammates • usually acknowledges and respects other perspectives and disagrees diplomatically 	<ul style="list-style-type: none"> • is polite and kind to teammates • acknowledges and respects other perspectives; disagrees diplomatically 	

COLLABORATION RUBRIC, continued

<i>Team Performance</i>	Below Standard	Approaching Standard	At Standard	Above Standard
<p>Makes and Follows Agreements</p>	<ul style="list-style-type: none"> • does not discuss how the team will work together • does not follow rules for collegial discussions, decision-making and conflict resolution • does not discuss how well agreements are being followed • allows breakdowns in teamwork to happen; needs teacher to intervene 	<ul style="list-style-type: none"> • discusses how the team will work together, but not in detail; may just “go through the motions” when creating an agreement • usually follows rules for collegial discussions, decision-making, and conflict resolution • discusses how well agreements are being followed, but not in depth; may ignore subtle issues • notices when norms are not being followed but asks the teacher for help to resolve issues 	<ul style="list-style-type: none"> • makes detailed agreements about how the team will work together, including the use of technology tools • follows rules for collegial discussions (CC 6-12.SL.1b), decision-making, and conflict resolution • honestly and accurately discusses how well agreements are being followed • takes appropriate action when norms are not being followed; attempts to resolve issues without asking the teacher for help 	
<p>Organizes Work</p>	<ul style="list-style-type: none"> • does project work without creating a task list • does not set a schedule and track progress toward goals and deadlines • does not assign roles or share leadership; one person may do too much, or all members may do random tasks • wastes time and does not run meetings well; materials, drafts, notes are not organized (may be misplaced or inaccessible) 	<ul style="list-style-type: none"> • creates a task list that divides project work among the team, but it may not be in detail or followed closely • sets a schedule for doing tasks but does not follow it closely • assigns roles but does not follow them, or selects only one “leader” who makes most decisions • usually uses time and runs meetings well, but may occasionally waste time; keeps materials, drafts, notes, but not always organized 	<ul style="list-style-type: none"> • creates a detailed task list that divides project work reasonably among the team (CC 6-12.SL.1b) • sets a schedule and tracks progress toward goals and deadlines (CC 6-12.SL.1b) • assigns roles if and as needed, based on team members’ strengths (CC 6-12.SL.1b) • uses time and runs meetings efficiently; keeps materials, drafts, notes organized 	
<p>Works as a Whole Team</p>	<ul style="list-style-type: none"> • does not recognize or use special talents of team members • does project tasks separately and does not put them together; it is a collection of individual work 	<ul style="list-style-type: none"> • makes some attempt to use special talents of team members • does most project tasks separately and puts them together at the end 	<ul style="list-style-type: none"> • recognizes and uses special talents of each team member • develops ideas and creates products with involvement of all team members; tasks done separately are brought to the team for critique and revision 	

CRITICAL THINKING RUBRIC

Courtesy of the Buck Institute for Education

	Below Standard	Approaching Standard	At Standard	Above Standard
<p><i>Critical Thinking Opportunity at Phases of a Project</i></p> <p><i>Launching the Project:</i> Analyze Challenging Question and Begin Inquiry</p>	<ul style="list-style-type: none"> sees only superficial aspects of, or one point of view on, the Challenging Question 	<ul style="list-style-type: none"> identifies some central aspects of the Challenging Question, but may not see complexities or consider various points of view asks some follow-up questions about the topic or the wants and needs of the audience or users of a product, but does not dig deep 	<ul style="list-style-type: none"> shows understanding of central aspects of the Challenging Question by identifying in detail what needs to be known to answer it and considering various possible points of view on it asks follow-up questions that focus or broaden inquiry, as appropriate (CC 6-12.W.7) asks follow-up questions to gain understanding of the wants and needs of audience or product users 	
<p><i>Building Knowledge, Understanding, and Skills:</i> Gather and Evaluate Information</p>	<ul style="list-style-type: none"> is unable to integrate information to address the Challenging Question; gathers too little, too much, or irrelevant information, or from too few sources accepts information at face value (does not evaluate its quality) 	<ul style="list-style-type: none"> attempts to integrate information to address the Challenging Question, but it may be too little, too much, or gathered from too few sources; some of it may not be relevant understands that the quality of information should be considered, but does not do so thoroughly 	<ul style="list-style-type: none"> integrates relevant and sufficient information to address the Challenging Question, gathered from multiple and varied sources (CC 6,11-12.RI.7) thoroughly assesses the quality of information (considers usefulness, accuracy and credibility; distinguishes fact vs. opinion; recognizes bias) (CC 6-12.W.8) 	
<p><i>Developing and Revising Ideas and Products:</i> Use Evidence and Criteria</p>	<ul style="list-style-type: none"> accepts arguments for possible answers to the Challenging Question without questioning whether reasoning is valid uses evidence without considering how strong it is relies on “gut feeling” to evaluate and revise ideas, product prototypes or problem solutions (does not use criteria) 	<ul style="list-style-type: none"> recognizes the need for valid reasoning and strong evidence, but does not evaluate it carefully when developing answers to the Challenging Question evaluates and revises ideas, product prototypes or problem solutions based on incomplete or invalid criteria 	<ul style="list-style-type: none"> evaluates arguments for possible answers to the Challenging Question by assessing whether reasoning is valid and evidence is relevant and sufficient (CC 6-12.SL.3, RI.8) justifies choice of criteria used to evaluate ideas, product prototypes or problem solutions revises inadequate drafts, designs or solutions and explains why they will better meet evaluation criteria (CC 6-12.W.5) 	

CRITICAL THINKING RUBRIC, continued

	Below Standard	Approaching Standard	At Standard	Above Standard
<p><i>Critical Thinking Opportunity at Phases of a Project</i></p> <p><i>Presenting Products and Answers to Driving Question: Justify Choices, Consider Alternatives & Implications</i></p>	<ul style="list-style-type: none"> chooses one presentation medium without considering advantages and disadvantages of using other mediums to present a particular topic or idea cannot give valid reasons or supporting evidence to defend choices made when answering the Challenging Question or creating products does not consider alternative answers to the Challenging Question, designs for products, or points of view is not able to explain important new understanding gained in the project 	<ul style="list-style-type: none"> considers the advantages and disadvantages of using different mediums to present a particular topic or idea, but not thoroughly explains choices made when answering the Challenging Question or creating products, but some reasons are not valid or lack supporting evidence understands that there may be alternative answers to the Challenging Question or designs for products, but does not consider them carefully can explain some things learned in the project, but is not entirely clear about new understanding 	<ul style="list-style-type: none"> evaluates the advantages and disadvantages of using different mediums to present a particular topic or idea (CC 8.RI.7) justifies choices made when answering the Challenging Question or creating products, by giving valid reasons with supporting evidence (CC 6-12.SL.4) recognizes the limitations of an answer to the Challenging Question or a product design (how it might not be complete, certain, or perfect) and considers alternative perspectives (CC 11-12.SL.4) can clearly explain new understanding gained in the project and how it might transfer to other situations or contexts 	

APPLICATION OF CONTENT KNOWLEDGE: FORMAL WRITTEN REPORTS AND PUBLIC PRESENTATIONS RUBRIC

Indicators of Achievement Adapted from Costa and Kallick, NCTE, and NGSS

<i>Habit of Mind</i>	Unsatisfactory	Growing to Competency	Competent (State Standard)	Distinguished
Striving for Accuracy	Sloppy or incomplete work with no evidence of revision or editing process. Feedback from peer reviewers and adult collaborators is not incorporated into work.	Student occasionally reviews checklists, rubrics, and peer feedback to enhance written communications. Care is taken to convey significant science concepts with examples and data.	Student understands and can apply two to three relevant science concepts in a written sequence of claims, evidence, and reasoning. Student works with peers as instructional resources.	Without sacrificing scientific accuracy, student constructs a coherent storyline referencing California places, issues, and connections to his or her own life. Student demonstrates a command of writing mechanics, organization, and ability to revise and edit.
Creative Questioning	Student does not initiate questioning in any written or verbal form. When questions are asked, they focus on meeting minimum requirements as articulated by adults.	Student initiates science-based questioning with support from peers or teachers. The value of questioning is understood, but the habit is still being cultivated.	Student independently produces original questions, considers questions from multiple perspectives, and produces original answers. Student brainstorms with others during the questioning process and listens carefully to arguments made by peers.	Student uses science and engineering practices to develop personalized place-based driving questions with connections to science concepts and to the ideas of classmates. Student considers alternative perspectives and nurtures an inclination to question daily.
Applying Past Knowledge to New Situations	Science notebooks, feedback from peers, and previous experience does not inform actions or writing.	When reminded and supported, prior knowledge is accessed and used to improve speaking and written communications.	Student consistently uses prior knowledge to investigate new phenomena. Reference to previous experience or careful use of analogies may be seen.	Student consistently uses prior knowledge to investigate new phenomena. Reference to previous experience or careful use of analogies may be seen.
Thinking and Communicating with Clarity and Precision	Use of vague and imprecise language leads to confusion about meaning. Science vocabulary is missing or used incorrectly.	Science concepts and ideas are communicated using analogies from everyday life, but subtle distinctions are lost due to a lack of vocabulary or incomplete grasp of scientific concepts.	Student avoids generalizations and distortions of fact while clearly defining science terms, concepts, and ideas. Student can distinguish between closely related science topics (e.g. weather and climate, or heat and temperature).	Students use exact language to convey science concepts and emerging ideas. Claims are supported with evidence and reasoning that is grounded in place, personal experience, and relevant science concepts. Writing is concise, descriptive, and coherent.

SCIENCE NOTEBOOK AND EXIT TICKET RUBRIC

<i>NGSS Element</i>	Unsatisfactory	Growing to Competency	Competent (State Standard)	Distinguished
Crosscutting Concepts	Student does not show connections across content area boundaries. Most learning activity is limited to memorizing facts without context.	Student identifies patterns and classifies relationships as causal or correlational. Student understands that events that occur closely in time may or may not be related.	Student places significant knowledge in context using systems, models, and causal analysis. Student evaluates questions and models for testability, arguments for validity, and solutions for practicality.	Explanatory power of crosscutting concepts is fully utilized to think and write as scientists do while addressing real world environmental problems. Alternative explanations are routinely considered, as is instrument error.
Science and Engineering Practices	Student identifies testable questions and performs simple qualitative investigations, but fails to recognize the many ways that scientists perform their work.	Student specifies relationships, between variables and clarifies arguments, but rarely evaluates or proposes solutions.	Student uses evidence and computational thinking to analyze geoscience data, construct arguments, develop conceptual models, plan investigations, and propose science-based actions.	Science and engineering practices are habitually referenced in writing. System level thinking is demonstrated in reference to boundaries, interactions, and constraints posed by methods, society, or environmental concerns.
Disciplinary Core Ideas	Student does not demonstrate understanding of science content; science vocabulary is wholly absent.	Student can identify components, yet understandings about relationships between components are elusive. Placing knowledge in context, using thinking tools like the crosscutting concepts is rare, but increasing.	Student presents Earth systems that are dynamic, interactive, and composed of both living and non-living features, with feedback effects that may be altered by human activity. Science vocabulary is wielded with precision and clarity.	Writing is precise and clear with no composition or style errors leading to elegant place-based expression of science concepts. Student makes a personal connection to the information and acts upon valid science information.
Conceptual Models	Work is inaccurate, lacking most needed components; messy craftsmanship detracts from overall presentation and obscures meaning.	Poor craftsmanship obscures meaning. Model is missing an element needed to completely understand science concepts or make predictions.	Model is neat; all depictions are accurate, legible, and scientifically defensible. Models have components, relationships, and connections labeled. Predictions about future conditions may be made.	Models can be used to evaluate the merits and disadvantages of various actions, generate predictions, and quantify relationships between components or variables.