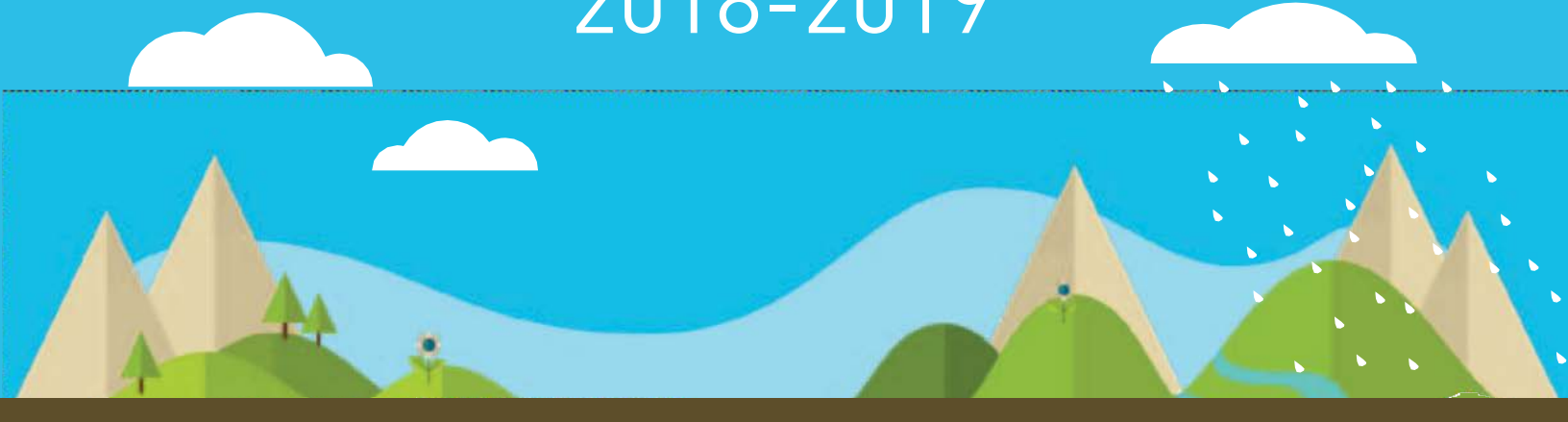
CAL WATER H2O CHALLENGE

Handbook for 5th Grade

2018-2019



Handbook

TABLE OF CONTENTS

TABLE OF CONTENTS (Continued)

Appendices

Foreword

The Cal Water H_2O Challenge is a whole-class project-based, environmentally-focused competition for grade 4-6 students. The **Cal Water H_2O Challenge** offers a unique opportunity for teachers to facilitate their students' learning of standards-based content, while developing the core understanding of environmental principles necessary to becoming science-literate citizens. Research indicates that interactive, collaborative, student-centered learning provides a meaningful way to make STEM come alive for students.

The program emphasizes Common Core State Standards-ELA (CCSS-ELA) and Mathematics (CCSS-M) and the Next Generation Science Standards (NGSS). It incorporates 21st century skills including the ability to identify problems connected with human activity, propose solutions based on research and evidence, and apply science in a local context to help solve both local and global concerns. As such the **Cal Water H_2O Challenge** is a unique way to blend science, technology, engineering and mathematics (STEM) with English Language Arts and the Visual and Performing Arts.

Learning Goals

The **Cal Water H_2O Challenge** has three student goals. These goals are for students to:

1. Identify and focus on **one** water issue in their local area, learn about and investigate ways to address the issue, and develop and take action to improve the issue. This water issue must focus on caring for water (water conservation, water quality, protecting the water supply, etc.) in the local context.

2. Develop content understanding, through project-based learning, that align with CaCCSS in English-language arts, mathematics (and literacy in science and history/social science), science in the California Next Generation Science Standards (CaNGSS), and visual and performing arts.

3. Develop confidence and self esteem in developing and completing a long-term project as informed problem solvers and decision makers.

The following CaCCSS, CaNGSS, and Visual and Performing Arts standards are strongly suggested as a starting point for identifying grade 4-6 student learning goals for the **Cal Water H_2O Challenge**:

- Science: Life, Earth and space, physical science and engineering performance expectations
- Mathematics: mathematical practices, number and quantity, statistics and probability, represent and interpret data, graphing

- English-Language Arts: writing, reading, speaking, and listening

- Visual and Performing Arts--creative expression and web-based technology

Some examples of possible Cal Water H_2O Challenges include:

- Organize a water conservation program, which will continue in the future.
- Develop a way to protect the water quality in the community, your school or in your local area.
- Develop a water conservation program for families to use at home.
- Start a native plant garden, designed to be drought resistant, at your school to encourage schools, families and businesses to plant drought resistant plants.

Using the Cal Water H_2O Challenge Handbook

The Cal Water H_2O Challenge is a **student-driven project** in which the student's role is to plan, design, implement, publicize, and evaluate the impact of their Cal Water H_2O Challenge. Your role as the teacher is to facilitate the Challenge process. The **Cal Water H_2O Challenge Handbook** provides Teacher Outlines to facilitate the Challenge Process and Student Pages to guide student thinking, planning, activities and evaluation.

Challenge Process Flow

The following Teacher Outlines and Student Pages are suggested as a guide to complete The **Cal Water H_2O Challenge**. The actual time for each part will vary depending on the topic and the complexity of the question the students are investigating:

Part 1 Brainstorm Topics

Students brainstorm possible topics for the Cal Water H_2O Challenge. Students will refine their Cal Water H_2O Challenge and questions after further content input in Part 2 and additional research in Part 3.
Estimated Teaching Time: 1 class period

Part 2 Do Some science

When students have selected a preliminary topic, the teacher selects appropriate science standards to address as a foundation for students to begin their challenge. For example, if the Cal Water H_2O Challenge is about water quality, the students should understand the specific grade science content standards that address water quality.

In addition, if the students are doing an Engineering Problem, the teacher should select science concepts that are related to the problem. For example, if students will solve a problem about getting water out of a well, students should experience concepts from physical science (e.g., energy) in addition to concepts from life, earth or physical science that support understanding water quality.

It is important for students to understand science concepts before engaging on engineering problems.
Estimated Teaching Time: 1-3 class periods

Part 3 Select Topic and Refine Questions

Students use their knowledge from Part 2, their ideas from Part 1, and further investigation to refine their topic and the Cal Water H_2O Challenge's investigation questions.
Estimated Teaching Time: 2-5 class periods spread over a couple of weeks

Part 4 Write Goals and Action Plan

With a refined topic and questions, students now determine the actual goal(s) of their Cal Water H_2O Challenge and describe their action plan to reach these goals.

Estimated Teaching Time: 1-3 class periods

Part 5 Conduct Research

During this part, students use many means of "research" to gather information about their Cal Water H_2O Challenge. This includes reading, internet searches, conducting interviews, having guest speakers, etc. It also includes learning about special components of the Cal Water H_2O Challenge. For example, if students are making community booklets, they would investigate how to design, print, and distribute the booklets.

Estimated Teaching Time: Many class periods spread over a few weeks depending on the complexity of the Cal Water H_2O Challenge

Part 6 Conduct Science Experiment

If the Cal Water H_2O Challenge lends itself to scientific experimentation where students can discover cause-and-effect relationships, Part 6 helps students learn the skills to conduct an experiment with controls and variables. Not all Cal Water H_2O Challenges have a testable question for experimentation. However, Cal Water H_2O Challenges with an experimental component are desirable.

Estimated Teaching Time: Several to many class periods depending on the complexity of the experiment(s)

Part 7 Do Engineering

Engaging in an Engineering Problem offers students the opportunity in engage in the Engineering Design Process and solve a real world problem.

Estimated Teaching Time: 1-3 class periods

Part 8 Synthesize Learning and Reflect on the Process

Students have been involved in many activities and investigations. Part 8 helps students summarize their findings and make conclusions about the effectiveness of their actions. This part also allows students to reflect on their efforts.

Estimated Teaching Time: 3-8 class periods spread over several weeks

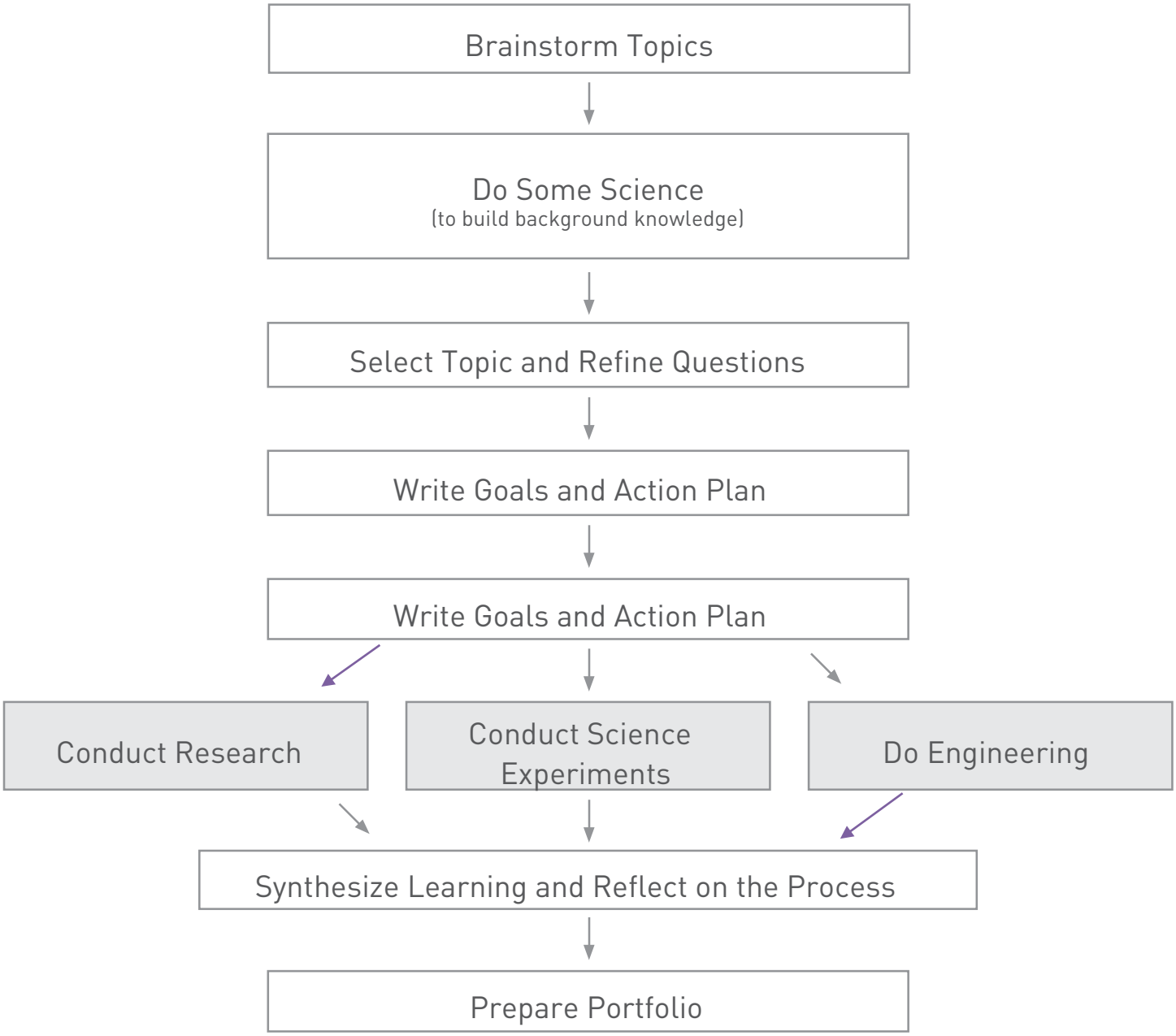
Part 9 Prepare Portfolio

The Cal Water H_2O Challenge is complete when it is displayed in a portfolio and submitted to the Cal Water H_2O Challenge. This part helps students think creatively about the best way to display their question(s), action plan, and findings as well as their hard work.

Estimated Teaching Time: 4-6 class periods spread over several weeks

Cal Water H_2O Challenge Flow

The Handbook provides a suggested "flow" of activities for students to complete their Cal Water H_2O Challenge. This graphic represents that flow. One of the three grey-scaled boxes must be part of the Cal Water H_2O Challenge. If possible, incorporate all three.



Part 1: Brainstorm Topics

Teacher Role: Facilitate student brainstorm of local water environmental issues (e.g., water usage, water conversation) as possible topics to research for the Cal Water H_2O Challenge.

Student Outcome: Students will select a preliminary topic to research for the Cal Water H_2O Challenge

Time: 40-60 minutes

Standards: CCSS ELA that help students clarify and support spoken ideas with evidence and examples.

Advance Preparation: Have students gather information about local water issues (e.g., newspaper, state agencies, local agencies, discuss with parents)

Outline

- Explain the Cal Water H_2O Challenge
- Ask students to discuss what is meant by an environmental issue, and then think about environmental issues that involve water.
- Divide the class into small working groups. Use **Student Page** for students to brainstorm their ideas and then star their top two choices. Ask groups to share their top two choices with the whole class. Tally student choices.
- Tally choices and have class vote for their top choice.
- Discuss how class might gather more information about the topic: Who can be called to come and give a talk? What local agencies should be contacted? Who might be an expert in this area? What books might be helpful?
- Make a class list of the suggestions.
- For homework, direct students to share the topic with their parents and get suggestions from them regarding a possible Cal Water H_2O Challenge project, information needed, and possible contacts. Add these suggestions to the class list.

Teacher Note: Retain the list of suggestions to use in Part 3.

CAL WATER H2O CHALLENGE
TOPIC LIST

When choosing a topic for your Cal Water H_2O Challenge, you may decide on any local water issue for your class project, focusing around caring for water and studying water as a local and global resource. To help you brainstorm ideas, you can find a list of possible topics with sample project ideas below. You are by no means limited to this list, and may choose to tackle any local water issue even if it is not listed below.

- *Water Conservation*
  - Implementation of School/Community Wide Water Conservation Practices
- *Water Quality*
  - Drain Labeling
  - Informing Community About Safe Oil Disposal
  - Composting Instead of Usage of Garbage Disposals
  - Water Quality Testing as Research into Reclamation of Local Body of Water
- *Water Reliability*
  - Installing School/Community Water Catchment and Low Flow Devices for Water Preservation
  - Installation of a Tank Banks (Bricks or Bottles in Toilet Tanks to Reduce Water Usage) in School/Community Toilets
- *Alternative Water Sources*
  - Outreach on Waterless Car Washing
  - Outreach on Drought Tolerant and Xeriscape Planting
  - Replacement of Traditional Gardens with Drought Tolerant/Native Gardens
- *Water Cleanup*
  - Water Quality Testing as Research into Reclamation of Local Body of Water
  - Community Education around Where Drain Water Goes
  - Shore Clean Up of Water Body
  - Creation of a Water Garden in and around a Wetland Area
- *Protecting the Watershed*
  - Education and Outreach on Watershed Issues
  - Creation of Water Gardens in and around a Wetland Area
- *Other*
  - Any local issue involving caring for water within your community

Student Page

Brainstorming Your Cal Water H2O Challenge

What water topics would you like to investigate? In brainstorm, list all your ideas.
Remember, in brainstorming, all ideas are IMPORTANT.
Think of as many as you can...
*STAR your top 2 ideas to share with the class!

Part 2: Do Some Science

Teacher Role: Facilitate student learning of the science behind the topics they are thinking about for their Cal Water H_2O Challenge.

Student Outcome: Students will understand the science behind their water issue.

Teacher Note: In the Appendix is a sample science lesson that a teacher might use to build science background for students before they get too far into the Cal Water H_2O Challenge. The actual lesson(s) will depend on the topic the students select, the NGSS the teacher has selected, and the amount of science background students will need to refine their Cal Water H_2O Challenge and questions in Part 3.

We provide one example of a background science lesson; however, it may be necessary to provide additional background science lessons to help students to fully understand the science learning to be gained through the Cal Water H_2O Challenge.

Part 3: Select Topic and Refine Questions

Teacher Role: Using student knowledge of science and their ideas from Part 1, facilitate students' discussions to refine their topic and the Cal Water H_2O Challenge's investigation questions.

Student Outcome: Students will select a topic to research for the Cal Water H_2O Challenge

Time: 40-60 minutes

Standards: CCSS-ELA
Speaking and Listening: Clarify and support spoken ideas with evidence and examples.

Reading Comprehension: Discern main ideas and concepts presented in texts; identify and assess evidence that supports those ideas. Draw inferences, conclusions, or generalizations about text and support them with textual evidence and prior knowledge.

Writing Strategies: Use argumentative or informational writing. Establish a topic, important ideas, or events in chronological order. Provide details and transitional expressions that link one paragraph to another in a clear line of thought. Offer a concluding paragraph that summarizes important ideas and details.

NGSS, CCSS-Mathematics and History Social Science
Depends on the content of the research

Advance Preparation: Determine who can be called to give a talk, what local agencies should be contacted who might be an expert in this area, what books might be helpful. Schedule speakers and gather materials.

Outline

- Have students refer to the topics that were brainstormed in Part 1.
- Of those topics, which ones might be useful or helpful for the community or school?
- Facilitate a discussion with the following questions: What could be the goal for the project? How will the project impact the community or school?
- Choose the topic for the Cal Water H_2O Challenge.

- Make a KWL chart and have students discuss what they know about the selected topic.
- Have groups research and report on possible questions they could address in the CalWater H_2O Challenge.
- Have students record class questions on the Student Page.
- Share questions and select the most appropriate questions for the CalWater H_2O Challenge. Write the questions in the "W" part of the KWL chart.
- Have students record the final questions in the next section of the Student Page.
- Have speakers address the students and questions in the KWL chart.
- Have students research questions generated in the "W" part of the KWL chart and share their findings. Fill in the "L" part of the KWL chart.
- Have students record their findings in the last section of the Student Page, "Here is what we found out".

Student Page

Selecting Questions for our Cal Water H2O Challenge

Do your RESEARCH and use your imagination to determine questions you would like to INVESTIGATE.

Here are our questions:

These are the questions our class decided to investigate:

Here is what we found out:

Part 4: Write Goals and Action Plan

Teacher Role: With a refined topic and questions, facilitate students to determine the actual goal(s) of their Cal Water H_2O Challenge, develop an action plan and a timeline that includes sustainability beyond the school year.

Student Outcome: Students will determine goals and develop an action plan

Time: 40-60 minutes

Standards: CCSS ELA that help students clarify and support spoken ideas with evidence and examples.

Advance Preparation: Determine resources necessary for doing the challenge and secure those resources and materials, pre-think some specific project goals to help guide the students (if necessary), consider ways to share the Cal Water H_2O Challenge with the community, plan for student reflections throughout the Cal Water H_2O Challenge.

Outline

- Help students determine the goals for the challenge. Make sure the goal is realistic and meaningful to the students.
- Facilitate discussion to determine goal(s).
- Have students record the goal(s) under number one on Student Page #1,
- Determine ways to analyze the impact of the challenge. How will we know our project did what we intended? How will this project impact the issue we selected?
- Have students record the evidence they will use to see if their project is successful under number two on Student Page #1.
- Have students complete prompts 3 & 4 on Student Page #1
- Provide tools and resources for students to plan and conduct their project. Facilitate a discussion of needs for completion of the project and use Student Page #2 to help facilitate discussion and have students record ideas.
- Form student action committees such as publicity, funding, research, historian, materials and artwork.

- Help students develop an action plan (who/ does what/ bywhen): things to do, resources to use, people to contact, other. Use Student Page #3, and have students fill in as discussion proceeds.

- Make a large class chart of Student Page #4. As a class, determine what needs to be done and by when, the timeline. Have students fill in Student page #4 individually.

Student Page #1

Our Goal

1. Our Water quality or water conservation goal(s) is...

2. The evidence we will use to know that we me our goal is...

3. Our goal is important because...

4. Explain how meeting this goal can make a difference and last over time.

Student Page #2

Planning the Cal Water H2O Challenge

Things to do:

Resources to use:

Equipment:

People to contact:

Other:

Student Page #3

Planning the Cal Water H2O Challenge

Activity	Persons Responsible	Materials Needed	Due Date

Student Page #4

Planning the Cal Water H2O Challenge
Personal, Group or Class Timeline

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday

Part 5: Conduct Research

Teacher Role: Facilitate students conducting additional research on the selected topic/issue.

Student Outcome: Students will read, research, and record information related to the Cal Water H_2O Challenge; they will implement the action plan

Time: Over multiple class periods

Standards: Review standards for English-language arts, science, social studies and mathematics to align with actions for this part of the Cal Water H_2O Challenge.

Advance Preparation:

- Help students gather reliable sources (e.g., books, Internet, newspapers/magazines, field trips, interviews, local, state, and federal agencies).
- Consider having different groups monitor different activities, or completing a large class chart of the activities

Outline

- Review goals and action plan from Part 4 and remind students to record activities as they do them on Student Page Activity Record Log.

- Explain that students will be spending several class periods conducting additional research on their Cal Water H_2O Challenge and implementing their action plan.

- Have students conduct a pre-project observation to collect base-line data. Encourage students to sketch/write about the issue before it is addressed in the Cal Water H_2O Challenge. Have students record on Student Page: Pre Project Observations

- Display collected resources for students to use, determine the best ways to divide the information for student to research and have students record their notes on the Student Page.

- Help students decide on work groups (e.g. tour leaders, publicity committee, letter writing)

- Periodically provide time for students or groups to share information with the class.

- Display information for others to see and to have available during the course of implementing the Cal Water H_2O Challenge.

Student Page

Activity Record Log

Activity	Projected Outcome	Actual Outcome

Student Page

(Pre-Project Observations)

* Pre-project observations (include sketches)
    Explain the problem and use diagrams to help with your explanation

Student Page

(Information you want to REMEMBER!!!)

* This is a place to keep your notes from your Cal Water H_2O Challenge RESEARCH, SURVEYS, ETC...

Part 6 Conduct Science Experiment

Teacher Note. One of the activities related to the Cal Water H_2O Challenge may include an experiment with variables and controls. If so, use Part 6

Teacher Role: Provide a series of activities to help students understand and apply each stage of the experimental design process to the Cal Water H_2O Challenge question(s).

Student Outcome: Conduct an experiment related to their Cal Water H_2O Challenge

Time: Several days.

Standards: NGSS Science and Engineering Practices

Advance Preparation: Collect all hands-on materials related to investigation.

Outline

- Review the Challenge questions. Discuss which could be answered by conducting an experiment. Choose those that are testable and indicate a cause-and-effect relationship.
- Discuss controls and variables. Have them identify possible manipulated (independent) and responding (dependent) variables.
- Ask students to develop a testable question by completing this prompt: "How will changing (the type of soil) affect (the amount of soil and water run-off)?" and record the question on the Student Page.
- Help students develop a hypothesis (a cause-and-effect relationship) by changing their testable question into an "if/then" statement.
- Help students plan (develop a procedure for the experiment) and carry out the investigation
- Help students graphically display their data, then analyze and interpret it on the Student Page
- Help students construct a scientific explanation that includes a claim (answer to the question being investigated), evidence that is appropriate and sufficient to supports the claim and scientific reasoning that backs up the evidence and record it on the Student Page
- Have students add their findings to the K-W-L chart AND the Activity Log.

Student Page

Conducting Water-Related Experiments (A)

Testable Question:

Observations:

Construct a data table and enter your data

Student Page

Conducting Water-Related Experiments (B)

Construct a graph to display the data from your experiment.

Use the data from the experiment to make a claims and evidence statement.

I claim _____

My evidence is:

Part 7 Do Engineering

Teacher Role: Facilitate students engaging in the Engineering Design Process on a solution related to their Cal Water H_2O Challenge.

Student Outcome: Students will understand how engineers solve problems

Teacher Note: In the Appendix is a sample engineering lesson that a teacher might use. The actual lesson(s) will depend on the topic the students select, the NGSS the teacher has selected, and how the engineering problem relates to or builds on the science the students learned in Part 2.

Part 8: Synthesize Learning and Reflect on the Process

Teacher Role: Facilitate student discussions to summarize the findings from the Cal Water H_2O Challenge and reflect and evaluate the Cal Water H_2O Challenge's impact-and long-term benefit

Student Outcome: Students will summarize their findings and reflect and evaluate the goals at the completion of Cal Water H_2O Challenge

Time: Several class periods over a couple of weeks Part I: Drawing Conclusions
Part II: Evaluating Impact

Standards: Review standards for English-language arts, science, social studies and mathematics to align with actions for this part of the Cal Water H_2O Challenge.

Advance Preparation: Have students gather their explanations (e.g., comments/learning from all parts), as well as from their Activity Logs, previous reflections, and any other prompts that were used to synthesize information.

Outline
Part I: Drawing Conclusions:

- Congratulate student for their hard work and perseverance. Explain the next step is to synthesize what they learned and reflect on the Cal Water H_2O Challenge.
- Help students review and organize their data from the Cal Water H_2O Challenge in a manner others can understand.
- Help students document their results (e.g., amount of water saved, how the water was saved, or potential water savings over time), using the Activity Logs, notes from research, preliminary conclusion sentence strips, reflections etc. Record on the Student Page.
- When the class has had an opportunity to review the information from all groups, divide the class into small groups (preferably that worked on different parts of the Challenge) and ask them to brainstorm 3-5 major things they learned that they think others would want to know.
- Have each group share their ideas, then build consensus for the 3-5 major findings that will be used in the portfolio. Record on the Student Page.

Part II Evaluating the Impact of the Cal Water H_2O Challenge

- Have students reflect on their learning. One way to do this is to have small groups of students discuss the following prompts, and then have them complete their individual reflection (Student Page).

  - What was the overall effect of the Cal Water H_2O Challenge?
  - What were some of the issues and successes observed through this Cal Water H_2O Challenge?
  - What were some of the educational benefits of doing this Cal Water H_2O Challenge?
  - What is the long-term water environmental benefit for students, parents, and/or the community as result of doing this Cal Water H_2O Challenge
  - How have students grown/changed as a result of their participation? What responsible actions did they do, will continue to do now?
  - What are some possible next steps?

- Ask students how they would like to publicize their results to the school and to the community.

Teacher Note: Spread the word about your Cal Water H_2O Challenge! Invite the local press and the media to share your class's accomplishments. Involve the entire school, family members, friends and the community. Consider sharing your Cal Water H_2O Challenge with another school, at a board meeting, or other district professional development events.

Student Page

Evaluate the Cal Water H2O Challenge Group Reflection

Work in groups to review all your data, notes, and research.
Compare and contrast your Cal Water H2O Challenge pre-observations with your post observations.

Evaluate your work:

- What are the 3-5 major things you learned about water that you think others would want to know?
- Brainstorm ideas with your group and list them on this page.
- Why was this Cal Water H2O Challenge important?

Student Page

Individual Reflections

Student Name _____

School _____

Teachers: Your students may continue their comments on a new page, if necessary.

1. What were the different activities you did to learn about and to understand the water issue your class chose?

2. What things did you do to participate in the CalWater H2O Challenge project?

3. What are the major accomplishments of your Cal Water H2O Challenge project?

4. How has your thinking changed about water conservation?

5. What did you learn that you think others should know?

6. What personal actions will you change or what personal actions will you take as a result of this Cal Water H2O Challenge?

Teacher Page

Teacher Reflection

Write a 1-2 page reflection on the project. Include the following:

- Describe the Cal Water H2O Challenge project goal(s) and the overall EFFECTS.
- What were some of the CHALLENGES and SUCCESSES that you observed through your project?
- What were the educational benefits of the Cal Water H2O Challenge for the students?
- What are some possible "next steps" for continuation of the Cal Water H2O Challenge project?
- How has your Cal Water H2O Challenge project impacted your targeted audience?

Part 9: Prepare Portfolio

Teacher Role: To facilitate and guide students in putting the class portfolio together; to generate other ideas for sharing their Cal Water H2O Challenge.

Student Outcome: Students will compile artifacts and information to produce a completed portfolio.

Time: 4-6 Class periods over a period of several weeks.

Standards: Review standards for English-language arts and visual and performing arts to align with actions for this part of the Cal Water H2O Challenge.

Advance Preparation:

- Collect all pictures and artifacts taken/created during the Cal Water H2O Challenge.
- Complete Student Reflections and Teacher Reflection
- Make copies of the rubric (in Appendix) for each work group of students.

Teacher Note: The Cal Water H2O Challenge judges are classroom teachers, selected individuals from the different environmental agencies, and science professional development providers. They are trained to use the rubric to objectively score the Cal Water H2O Challenges. Thus it is important to help your students follow the rubric in assembling their portfolio.

Keep in mind that you and your students know your work best. Help your students tell their story clearly and concisely by making sure that all information included in the portfolio is linked to the Challenge's goals and action plan.

Outline

- Explain to students it is time for the whole class to put together a portfolio that shows the work that has been accomplished. Explain that they will work in groups to create the portfolio.

- Facilitate students selecting a work group: Who will do the "write-up" and explanation of how the Cal Water H2O Challenge was selected? Who will do the goal and what did the class hoped to accomplish? Who will summarize the findings?

- Review the Portfolio Checklist (Student Page).

- Distribute the copy of the rubric to each work group. Ask students to review and discuss in their group what they think needs to be included for a high score. Make sure their discussion includes what photos, articles, and student communications would be important to include?

- As students work, make sure students are aware of the guiding questions for their portion and make sure those questions are addressed in their information.

- Have each work group share the information they have gathered and explain how each piece is important to be included in the portfolio.

- Ask students how they want to address the rubric for the portfolio presentation Chart students' ideas and have them decide how the portfolio is going to be finalized.

- Have work groups work on their portion of the portfolio and then assemble the whole portfolio. As a class, re-check the checklist to make sure that the portfolio is complete.

- Make copies. Hard copy portfolios will not be returned. Scan or take photographs of your portfolio for your records.

- Submit your portfolio to Cal Water by the deadline.

Student Page

Portfolio Checklist

Be sure to review this list prior to submitting your portfolio to Cal Water H2O Challenge. Projects must be submitted or delivered by – **Thursday, February 28, 2019**

Portfolio basics

Every project concludes with the creation and submission of a portfolio. In that portfolio the competing classroom's students must explain the following:

- The Goals of Cal Water H2O Challenge Project
- Their Research
- Their Science and/or Engineering Experimentation/Application
- Their Actions to Solve a Local Water Issue
- Their Public/Community Outreach Efforts

Cal Water H2O Challenge Portfolio Specifications

- Must be created in PowerPoint, Keynote, Presenter, or Prezi software (see the Cal Water H2O Challenge website for version details).
- Digital Portfolio must be no more than 16 pages.
- Digital Pages must be at PowerPoint standard 10" x 7.5" in dimension.
- Hard Copy Portfolio may be no more than 16 pages, 8 pages front and back.
- Hard Copy pages may be no larger than 11" x 17".
- Must include 5-10 student reflections and a teacher reflection (student and teacher reflections are not counted as part of the 16 pages).
- The cover pages must be included and are not counted as part of the 16 pages. (Points will be docked if any of the documentation is missing).
- May include no more than 5 minutes of video.
- May include links but to no more than one class-created website.
- May include as many photographs as fit within the page constraints.

Your classroom portfolio should provide a clear description of your Cal Water H2O Challenge. When creating your portfolio, be sure to think through the following criteria our judges will be looking for:

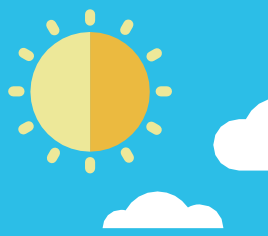
- How was your Cal Water H2O Challenge project selected?
- What was the project goal and what did the class hope to accomplish?
- How was the Cal Water H2O Challenge project implemented?
- Why was this Cal Water H2O Challenge important?
- Evaluation of the Cal Water H2O Challenge's impact?

Be sure to review the scoring rubric and judging criteria for detailed information on how your Cal Water H2O Challenge portfolio will be evaluated and to understand the scoring process. The rubric can be found at the back of this handbook or on the Cal Water H2O Challenge website.

Email Portfolios or Fileshare links to your portfolio to CalWaterChallenge@gmail.com
Hard Copy Portfolios can be mailed to:

Cal Water H2O Challenge
ATTN: Conservation Department
2632 West 237th Street
Torrance, CA 90505

2018-2019
Cal Water H2O Challenge Cover sheet
PAGE 1



School Name: _____

District: _____ County: _____

School Mailing Address: _____

City: _____ State: _____ Zip Code: _____ Phone: _____

Teacher's Name: _____ Best Time to Call: _____

Teacher's e-mail: _____ Class Grade Level: _____

Number of Students in Class: _____ Last Day of School _____

Principal's Name: _____ Spring Break Dates: _____

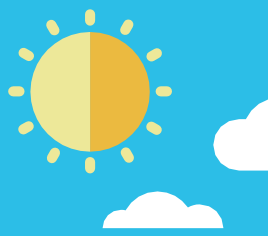
Did you reach out to your entire school? ☐ Yes ☐ No

Number of Community members reached by the Cal Water H2O Challenge: _____

Cal Water H2O Challenge Title: _____

Cal Water H2O Challenge Summary:

2018-2019
Cal Water H2O Challenge Cover sheet
PAGE 2

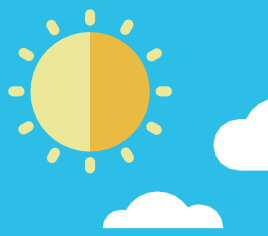


Project Goal(s):

Explain the significance, impact, or benefit of your Cal Water H2O Challenge:

Unique school characteristics:

2018-2019
Cal Water H2O Challenge Cover sheet
PAGE 3



Please list your class roster below with t-shirt sizes for yourself and each student

Appendices

Appendix A Science Lesson Appendix B Engineering Lesson
Appendix C 8-Week Project Timeline
Appendix D Submission Guidelines
Appendix E Rubric

Appendix A

5th Grade Vignette

An Example of How a Cal Water H2O Challenge Might Unfold

Sandy Waters, a 5th grade teacher in District USA, was excited about providing her students with a project- based learning experience that would integrate CCSS and NGSS and allow her students to use their creativity to demonstrate their learning. She read about the Cal Water H2O Challenge, decided it was the perfect opportunity to meet her learning goals, and meet her and her students interest in water quality and conversation! She was unsure of exactly where to begin.

She knew that project-based learning takes time and she new the importance of planning for student learning over time. So she decided to get a "jump start" by doing a little investigation of her own. Sandy realized that if she knew more about common water issues in her community, she would be able to help his students become more aware of local environmental issues. Sandy consulted the Cal Water H2O Challenge web site https://www.calwater.com/conservation/conservation-resources/ to get a list of agencies and organizations that address water-related environmental issues.

Sandy reviewed the California CCSS for ELA and Mathematics

CCSS ELA - http://www.cde.ca.gov/be/st/ss/documents/finalelaccssstandards.pdf

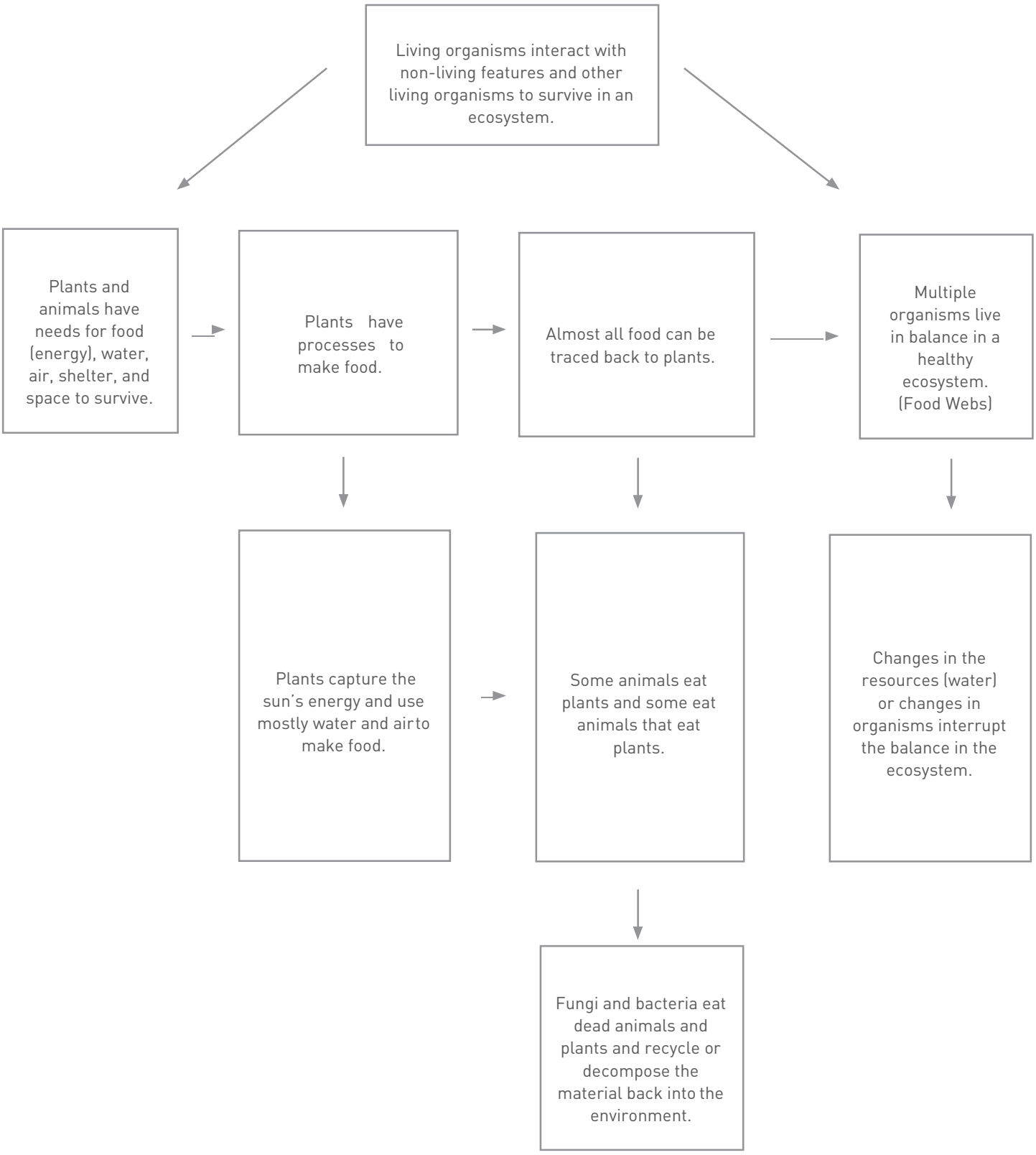
and Math - http://www.cde.ca.gov/be/st/ss/documents/ccssmathstandardaug2013.pdf,

and CaNGSS http://www.cde.ca.gov/pd/ca/sc/ngssintrod.asp that she thought might best be addressed in a project-based learning experience. She knew that this kind of learning would require English language arts (reading, writing, speaking and listening), mathematical practices as well as scientific and engineering practices. She knew the topic her students selected should resonate with one of the NGSS performance expectations for her grade level.

Sandy also recognized that she could incorporate the Visual and Performing Arts standards in how her students decided to design and display their portfolio. She consulted the **Cal Water H2O Challenge Handbook** for handy hints on how to manage the Cal Water H2O Challenge.

Sandy was now ready to prepare for teaching and facilitating the students' thinking and selection of a topic for their Cal Water H2O Challenge. She used Part 1 to help students brainstorm possible topics. The students selected the broad topic of Plant and Animal Needs forWater.

With the students' topic as a foundation, Sandy identified the appropriate Next Generation Science Standards and developed a conceptual flow. This is Sandy's conceptual flow. The grey-shaded boxes represent the science content embedded in the students' topic. The language arts, math, and science and engineering practices will be addressed throughout the Cal Water H2O Challenge.



Science and Engineering Practices: Ask questions; plan and conduct an investigation; analyze and interpret data; construct a scientific explanation or find a solution; obtain, evaluate and communicate information

Knowing what science concepts have to be reviewed or explored, Sandy is ready for Part 2 (which may be many lessons, depending on the science concepts necessary to build student understanding). The summation of understanding that "Changes in the resources (Water) in an ecosystem upsets the balance of living things" are addressed as an outcome of the entire Cal Water H2O Challenge. Part 2 addresses how "multiple organisms live in balance in a healthy ecosystem" (Food Webs) from Sandy's conceptual flow.

Sandy continues to facilitate her class as they use their language arts skills and understanding to research and refine their questions in Part 3. Sandy's class found out that "Changes in the resources (e.g., water) was impacting the balance of living things in the pine forest ecosystem". They refined their questions to include: What happens to living things in an ecosystem when the amount of available water changes? Which organisms thrive and which organisms are reduced? How might one organism's struggle to survive impact other organisms in the balance of the ecosystem?

In Part 4, Sandy's class determines their Cal Water H2O Challenge goals and action plan. The class wants to inform the community about the results they calculated about the amount of water that could be saved through human actions to conserve water for important uses in the ecosystem.

In Parts 5 and 6 students combine their science and engineering practices, mathematical practices, and language skills as they investigate their selected Cal Water H2O Challenge through research and experimentation. Sandy's class used the library, Internet and local environmental agencies to determine the impact. Students worked with the local water agencies to collect local data about average precipitation for the area compared to the increasing water needs for human use. The students charted and graphed the data, comparing it with other data released by the agency.

The class invited an Environmental Biologist from the local national forest demonstration forest to share their work about the impact of the lack of precipitation on the pine trees. They even had a councilman explain how the city council was trying to encourage residents to re-landscape using native low water plants.

Through their research, students realized that humans can protect available water resources by changing outdoor landscaping practices. In Part 7, the students use the engineering design process (ask, imagine, plan, create, improve) to design a way to restrict the water flow on hillsides.

In Parts 8 and 9 the students synthesize their learning and think about ways in which to communicate what they have learned. Sandy's class prepared their findings, backed with evidence from their research and experimentation, and made a portfolio to submit as their **Cal Water H2O Challenge project**. They practiced their presentation, and shared their learning with other classes and at a PTA meeting. Sandy made sure that they also sent a copy of their findings to the city council. And, lastly, they celebrated their hard work!

Part 2:
Background science Lesson(s) based on Learning Goals

Teacher Note: This is a sample lesson that a teacher might use to build science background for students before they get too far into the Cal Water H2O Challenge. The actual lesson(s) will be dependent on the topic the students select, the NGSS the teacher has selected, and the amount of science background students will need to refine their Cal Water H2O Challenge and questions in Part 3.

We provide one example of a background science lesson; however, it may be necessary to provide additional background science lessons to help students to fully understand the science learning to be gained through the Cal Water H2O Challenge.

This example is based on sandy Water's vignette. Sandy's students selected "Changes in the resources (Water) in an ecosystem upsets the balance of living things". sandy then selected the NGSS that addressed the importance of Multiple organisms live in balance in a healthy ecosystem. (food Webs)

Purpose: To connect students' prior knowledge that plants acquire the materials of growth, chiefly from air and water. (LS1.C) In addition, plants and animals have needs that are met within an ecosystem and changes in the ecosystem affect multiple living things.

Outcome: Develop a model (food web) to describe the movement of matter among plants, animals and decomposers within an ecosystem. Changes in the living things or resources within the ecosystem affect multiple living things.

Time: 90 minutes (over a two-day period)

Materials:

Class set of large cards:

Cards with pictures of producers, consumers, decomposers: (e.g. Bee, Snail, Butterfly, Spider, Lizard, Black Bear, Fox, Hawk, Rattlesnake, Deer, Bobcat, Bacteria, Raccoon, Grass, Mushroom, Jackrabbit, Oak tree, Blackberry Bush or other plants and animals in the school area.)

Student notebooks to record daily observations

Standards: PE 5-Ls2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. Plants use air, water and decomposed to make new matter.

DCI Ls2.A: Independent relationships in ecosystem. Animals eat plants or other animals. Plants are the primary producers of matter.

Advance Preparation:

1. Prepare sets of large cards for class whiteboard that represent words and pictures of producers, consumers, decomposers local to the area: (e.g. mountain area: Bee, Snail, Butterfly, Spider, Lizard, Black Bear, Fox, Hawk, Rattlesnake, Deer, Bobcat, Bacteria, Raccoon, Grass, Mushroom, Jackrabbit, Oak tree, Blackberry Bush.

2. Prepare multiple (15) sets of cards that match the large cards to be manipulated bypartners.

3. Download for resources about food webs:
   http://utahscience.oremjr.alpine.k12.ut.us/sciber99/8th/energy/sciber/foodweb.htm

4. Download for Bottle Biology Terrariums used prior to this lesson:
   http://www.waterwisesb.org/uploadedFiles/sbwater/education/BottleBiology.pdf

Procedure:

1. Ask students to think, pair, share, "What do living things (plants and animals) need to stay alive and grow? Chart responses on two columns on a chart.

Teacher Note: Listen for reference to water, space, shelter, food, air. If students do not mention water, air, or food, prompt them to think about earlier lessons about plant needs for air sun, and water to make food and animal needs to eat the plants or other animals. All living things must get water in a variety of ways.

2. Ask students to review the list charted in step #1 and compare the differences between what plants and animals need to stay alive. How are the needs the same? How are the needs different?
3. Display one "bottle biology terrarium" used for observation during the previous two weeks of class. Ask students to use their terrarium notebook observations and talk to a partner about what the plants in the "bottle biology terrarium" need? Chart responses
4. Ask students to think about the terrarium organisms (mushroom, praying mantis, roly poly, etc.) and discuss with a partner what each organism needs to stay alive? Chart responses.
5. Explain the terrarium is a small ecosystem that is a model for how one ecosystem can provide for needs of different plants and animals.
6. Explain that the (forest, mountain, valley, coastal, desert) where we live is also an ecosystem that can provide for living organisms and living plants as long as the ecosystem has what each living thing needs.
7. Display large food web cards on the class whiteboard. Ask students to talk to a partner about what they know about each living thing? What does each living thing eat or how does it make its food?
8. Ask individual students to come to the board and draw circles around living things that make their own food. Explain we call these producers since they make food from sun, water, and air.

9. Assign each set of partners or table groups one animal to research. Find out what the animal eats as well as what it needs for shelter. Use your IPAD (or other resource). Write what your animal eats and other needs in your notebooks.
10. Ask each group to come to the board and draw a line between the animal and all the living things the animal eats. Continue until all animals have lines drawn to one or more food source.
11. Explain to students that this is a model of a food web. Which animals ate other animals or plants? Draw a little mouth by these animals. Did you find any animals that eat dead animals and plants? These are called decomposers as they recycle dead parts of plants and animals. Draw something that reminds you of recycling by the decomposers.
12. Ask partners to discuss what would happen to other animals if plants stopped growing and making food. Share out in the class.
13. Distribute a small set of cards that are the same or similar to the larger cards on the whiteboard to each partner group. Ask partners to sort the cards into consumers, producers, and decomposers.

Trainer Note: Walk around the class confirming an understanding of which living things in the food web are consumers, producers, and decomposers. Students have opportunities to transfer knowledge if new living things are included in this set of cards. If they do not know if they are a consumer, producer, or decomposer, they can look it up.

14. Ask partners to use their cards to develop a food web drawing lines using string linked between living things and what they eat.
15. Ask each table group or partners to remove one living thing from their web. Draw a line through each living thing that may not live with the one assigned living thing removed.
16. Discuss what would happen to the food web once the living thing is gone. Write a summary statement on a sentence strip of the "chain reaction" when one living thing is removed from a food web.
17. Ask partners to share with one other group to compare how different missing living things affected the entire balance of the food web.
18. Lead a discussion about the balance in a food web using the following questions: What would happen to other living things in the food web if plants did not have enough water to grow their own food? How many other things in the food web might die if plants did not have water?
19. Ask: How do these ideas relate to their topic for the Challenge? Chart student ideas. Save the chart to begin Part 3.

Part 7:
Engineering Lesson(s) based on Learning Goals

Teacher Note: This is a sample lesson that a teacher might use to build engineering background for students. The actual lesson(s) is dependent on the topic the students select, the NGSS that supports those concepts, and the amount of science background students need to investigate their Cal Water H2O Challenge.

In Part 2, students learned about how limited water resources are impacted by human activity. In Parts 3-5 students refined their Cal Water H2O Challenge, identified goals and an action plan and conducted research. Through those efforts, the students realized that they could use engineering to solve a problem.

The Engineering Problem is: If the communities' hillsides contributed most of the runoff, how can they limit the runoff? The problem was how to limit the runoff without allowing plants that hold back the soil to die on the hillsides. The students wanted to design systems to limit the runoff.

Ms. Waters added a few lessons to address science concepts about gravity so that her students could proceed with their engineering design to interrupt the flow of water on hillsides where gravity's consistent downward pull on water impacts the speed of the flow.

Purpose: To test various materials to be used in solving an engineering design challenge.

Outcome: Students will describe the properties of various materials and test them for possible use in the engineering design challenge.

Time:
Part 1: 1 class period
Part 2: 1-2 class periods

Materials:
Part 1
Chart paper
Marking pens

For each group of four:

Materials for making a stream table using paint trays including grass, soil, and water in a pitcher.

Materials for flow restrictors e.g. boulders (small rocks), popsicle sticks representing redwood planks or cedar planks, small bags of sand, bark, hard-scope materials such of bricks, and cut pieces of garden hoses.

Part 2
Science notebooks (1 per student)

For each table group of students:
Materials from Part 1

At a side table - More materials available for use: see Part I materials and additional materials to set up stream tables for each potential solution by the group.

Standards: Common Core Language Arts Standards that help students clarify and support spoken ideas with evidence and examples.

5-Ps2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.

DCI – Ps2.b: Types of Interactions
The gravitational force of Earth acting on objects on the Earth's surface pulls that object (water) towards the planet's center. The cause and effect (CCC) relationship is identified to explain the relationship between water run-off and a flow that is not interrupted.

3-5 NGSS Engineering Standards:
ETs1-1 -- Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

ETs1-2 -- Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

ETs1-3 -- Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Advance Preparation:
Gather materials for testing and put into Baggies for each group of four.

Set up the stream tables (1 per group of four) for testing landscaping designs. See R1

Review Engineering Design Process See R2

Procedure:
Part 1 Testing Materials

Display a picture of recent run-off from sprinklers on a hill near the school. Have students think about their answer to the following prompt: "There is an issue of lost water through run-off from hillsides from both sprinklers and after rainstorms." Discuss what is causing the problem with a partner. Have partner groups share their responses with the entire class. Chart student responses. Facilitate a discussion to help students think about the issue and what might be some ways to resolve their problem. Allow 10 minutes.
Brainstorm some specific ideas of ways to solve the problem:
Have students do a think-pair-share of possible ways to control run-off on the hillsides throughout the community.
Ask students to do a quick-write on a possible way to restrict water. Ask students to include a rationale for their choice.

Teacher Note: Possible student responses may include: changing sprinklers if it is only landscaping water, placing objects on the hill to slow water movement down, digging trenches on the hill where water may collect, or adding boulders on the hill to limit water movement

Explain to students that there are objects that might limit the flow of water. What are some of the properties of objects that you think may slow down the water flow? Chart student responses.
Which properties are most important for slowing down water flow?
How do you think we could test our predictions of which objects could slow the flow?
Explain to students that today they will be testing the properties of different materials they will be using to place on the hill to slow down the flow of water. The testing of the material to see if it will slow water flow will be done on a model, so the materials we are using will be small scale objects that could be used on a larger hillside.

Teacher Note: Make a class chart like the following:

Materials and their Properties	
Material	Properties
Rocks for small size boulders Popsicle sticks representing wood planks Aluminum foil strips representing pipes Landscape bark Twine Netting Material Pieces of tiles representing brick materials Sand bags Cut garden hose	

1. Distribute Baggies of materials to each set of partners. For each item, ask students to list some of their properties. If students have difficulty listing properties, ask the following questions:
   - Is the material heavy or light?
   - What color is it?
   - Is it stiff or floppy?
   - Is it clear or opaque?
   - Is it malleable (easily bended)?
   - Does it hold its shape?
2. Ask, which properties do you think will be important when making a water flow restrictor on a hillside? Why?
3. Using materials in the baggie, have students work with a group of four to create designs to test. Explain that the flow restrictor designs must be placed on a "stream table" set up for each group. All plans or designs must slow the flow of water on the hillside as well as be attractive on the hillside.
4. As students design different materials to slow the flow of water, test each material on the stream-table.
   - Does the rate of water flow slow down?
   - How much does the rate slow down?
   - How would you re-design to slow the rate more? Why do you think that will work?
5. After testing, ask, "What properties of a water restrictor affect how well it slows down the flow of water?" "Would the material be attractive on a hillside?" or "Would the material be almost invisible on the hillside?"
   - Which materials made the best restrictors?
   - What properties do those materials have in common?
   - What do you think is the most important property to think about when designing an attractive restrictor?
6. Explain that in the next session, students will take their knowledge of materials and their properties including attractiveness to design a system to restrict the flow of water on large hills. You may have to select several types of materials for large hills.

Part 2

7. Ask students, in a think-pair-share to recall what they remember about materials that restrict the flow of water. What properties were important for restricting the flow of water and being attractive on the hillside? Chart responses.
8. Explain to students that their challenge is to make systems of restrictors on hillsides that when placed, will restrict the flow of the most water.

Trainer Note: The Engineering Design Process has five major components (see R2 for details)- Ask, Imagine, Plan, Create, Improve.

9. ASK! – What questions do you have before we start? Chart all the students' questions. Facilitate the discussion with students by prompting so they ask questions like:
   - What materials can we use to make our restrictors?
   - How many types of restrictors can be used in one system?
   - How much time do we have to build the final restricted hill?
   - How will we know if our restrictor design works?
10. Explain the "criteria" for a successful restrictor is that their restrictors must reduce the flow of water more than any other competing design in the class and be attractive. They may use any materials that they tested and materials on the side table. Give groups of four a set of materials and a stream table set as a high hill. Give the students a set amount of time for building system of restrictors for testing (suggestion 10-15 minutes).
11. IMAGINE! - Have students work in groups of four to brainstorm and design a hill with a set of restrictors.
12. PLAN! - Students should draw pictures of their hill restrictor designs, label the parts, and list the materials they will use.
13. CREATE! - Students should set their stream table at a 30-degree angle and place grass material over the soil. Measure how quickly one cup of water flows down the hill with no restrictors.
14. Once students have designed their restrictor system and placed it on the stream table, they are ready for testing.
15. First, ask students to test their restrictor system. Keep a chart of student names and how many fast and how much water flowed to the base of the stream table model of a hillside.
16. After everyone has tested their restrictor system, direct the class to discuss testing results. Which restrictor system slowed the run-off of water the most in the entire class?
17. Review and compare the restrictor designs – why do you think this system slowed down the movement of water the most? What materials were used? How well does the system meet the criteria for being attractive on the hill? Why do you think this design worked well?
18. IMPROVE! – Have students write on a piece of paper or in their notebooks how they would improve their restrictor system design and explain why this improvement would be better than their original design.
19. Have students write a letter to the community who needs an answer to the run-off problem.

Making the stream Table

Materials:

- Paint tray liner
- Sand or soil
- Grass to place on the hill
- One piece of two by four to use under the tall end of the slope
- One piece of plastic tubing 6 inches long
- One-liter container to collect water
- One-liter container to pour water

1. Drill a hole in the center of the low end of the paint tray. The hole should be the same size as the plastic tubing.
2. Place sand or soil in along the entire paint tray. Add grass material on top of the sand or soil.
4. Raise one end of the paint tray to approximately 30 degrees using the two by four
5. Attach the plastic tubing through the hole drilled in the paint tray.
6. Place one-liter container under the plastic tubing to collect run-off water.
7. Test the normal run-off by pouring ½ liter of water along the top of the slop and measuring how much is collected in the run-off container.
8. The goal of each restrictor design is to slow the water flow in the run-off container.

CAL WATER H2O CHALLENGE
8-WEEK PROJECT TIMELINE

The following timeline uses an 8-week schedule but can be compressed into 4 weeks or expanded into 16 weeks or more at your discretion.

Week 1: Choose a Topic
Students brainstorm possible water-related topics for the class project.

Week 1-2: Background Science Lessons, & Project Selection
Select and teach appropriate science standards to support chosen water-related topic. Students can refine their selected topic and draft investigative questions.

Week 2-3: Develop Project Goals and Plan
Students draft project goals and a plan to meet those goals.

Week 3–6: Conduct Research and implement Plan
Students research their selected project using various sources and methods and take action based on their plan.

Week 5-6: Conduct an Experiment
If applicable, students conduct an experiment around their water-related issue.

Week 6-7: Reflections
The classroom, both students and teachers, summarize findings and reflect upon their project actions and outcomes.

Week 7-8: Create Portfolio
Students design and develop their portfolio to best illustrate the questions, plan, and findings of the water-related project.

https://challenge.calwater.com

Submissions Guidelines

Overview

You've finished your project and now you're ready to submit it to the Cal Water H2O Challenge! Congratulations!

Follow our guide below to find out what your submission must entail, how to package your files, and how to submit your project to the competition. You will also find our contact information, in case you have any trouble with the submission process. All documents referenced can be found at: https://challenge.calwater.com/resources.htm

Remember that final submissions must be submitted or postmarked by 11:59 PM PST, February 28, 2019.

We hope that you have fun creating your portfolio, and we look forward to reading your classroom's submission.

Step-by-Step

1. **Review the Checklist:** Before getting started, please review the Cal Water H2O Challenge Portfolio Checklist. This PDF explains the basic subject matter covered by a portfolio and its specifications.
2. **Review the Rubric:** This document provides detailed information on how your Cal Water H2O Challenge portfolio will be evaluated.
3. **Create Your Portfolio:** Students should create the classroom portfolio to the specifications found in the Portfolio Checklist. For an example of how you might format your portfolio, please see the Portfolio Sample.
4. **Save Your Portfolio:** If you created your portfolio digitally in PowerPoint, Keynote, Presenter, or Prezi, you need to save it as the proper file type. We accept native files for the programs listed below. If you have an older version of the software, please save the file as a PDF or contact us at CalWaterChallenge@gmail.com if you are having trouble saving as an accepted format.
    a. Microsoft PowerPoint: Version 12+
    b. Keynote: Version 5+
    c. Adobe Presenter: Version 8+
    d. Prezi: Export as PDF.
5. **Save / Submit Your Supplementary Materials:** With your portfolio submission you must include:
    a. Coversheet (pages 1-3)
    b. Teacher reflection
    c. 5-10 student reflections

    If working digitally, these files may be saved within your portfolio or as separate PDF files. If submitting a hard copy, these documents should be attached to your portfolio, and will not count against your page count.

6. **Submit Your Files:** Final submissions must be submitted or delivered by 11:59 PM PST, February 28, 2019.

Digital Submission

a. Either attach all files to an email or a fileshare program of your choice (such as DropBox). They should include:

i. Portfolio file or PDF (if this includes your supplementary materials, it will be the only file)

ii. Cover Sheet PDF (pages 1 & 2)

iii. Teacher Reflection PDF

iv. 5-10 Student Reflections PDFs

Note: No additional files may be included in your submission package -- all supporting media (photos, videos, articles, etc.) must be included within the portfolio itself or the one allowed, class-created website. The link to any supporting website must also be contained within the portfolio.

b. Email Cal Water the files and/or a link to the fileshare where we can download the files.
Send all emails to CalWaterChallenge@gmail.com

c. If you have trouble uploading your files, email us CalWaterChallenge@gmail.com and we will help you with your submission.

Hard Copy Submission

a Check that all required documents are included.

i. Portfolio

ii. Cover Sheet (pages 1 & 2)

iii. Teacher Reflection

iv. 5-10 Student Reflections Note: No additional files may be included in your submission package -- all supporting media (photos, videos, articles, etc.) must be included within the portfolio itself or the one allowed, class-created website. The link to any supporting website must also be contained within the portfolio.

b. Mail the documents to the following address with a postmark no later than February 28, 2018. Cal Water H2O Challenge

ATTN: Conservation Department

2632 West 237th Street

Torrance, CA 90505

7. **Follow-Up:** We will contact you after we receive your submission. If you do not hear from us within two business days please contact us at CalWaterChallenge@gmail.com.

Having Trouble: If you are having trouble with any portion of this submission process, please reach out using the contact information above. We are happy to help.

Cal Water H2O Challenge Rubric

School Name	School District	Grade Level	Evaluator Name and Number

Teacher Name	Cal Water H2O Challenge Project Name	Total Score

COMPONENT	POSSIBLE POINTS	SCORE
1. CAL WATER H2O CHALLENGE IMPACT (40 Points)		
A. Importance of Cal Water H2O Challenge Topic	15	
B. Action Plan	10	
C. Long Term Environmental Impact	15	
2. IMPACT ON STUDENT LEARNING (45 Points)		
A. Integral to Student Learning	15	
B. Student Participation	15	
C. Student Reflection	15	
3. PRESENTATION (10 Points)		
A. Overall Quality of the Presentation of the Portfolio	10	
4. IMPACT ON TEACHER PRACTICE (5 Points)		
A. Teacher Reflection	5	

GRAND TOTAL

COMPONENT #1:
Cal Water H2O Challenge Impact
(Total possible points: 40)

A. Importance of Cal Water H2O Challenge Topic
(Total possible points: 15)

Guiding Questions:
- Why did the class choose to do this Cal Water H2O Challenge?
- Why would this Cal Water H2O Challenge be important to the school and community?

15 Points	10 Points	5 Points	1 Point
Cal Water H2O Challenge **FULLY DEMONSTRATES** student understanding of **ONE** key water issue or concern in the school AND local community based on science concepts with evidence that the topic of the Cal Water H2O Challenge is important to the community and school and addresses California's water supply.	Cal Water H2O Challenge **FULLY DEMONSTRATES** student understanding of **ONE** key water issue or concern in school OR local community based on science concepts with limited evidence that the topic of the Cal Water H2O Challenge is important to the community OR school and addresses California's water supply.	Cal Water H2O Challenge **DEMONSTRATES LIMITED** student understanding of **ONE** key water issue or concern in school and/or local community based on science concepts with some or little evidence that that topic of the Cal Water H2O Challenge is important to the community/school and may or may not address California's water supply.	Cal Water H2O Challenge includes **MORE THAN ONE** key water issues with multiple activities that may or may not connect to one another with some or little evidence that that topic of the Cal Water H2O Challenge is important to the community/ school and may or may not address California's water supply.

Use specific evidence from the portfolio to support your score.

POINTS

COMPONENT #1:
Cal Water H2O Challenge Impact
(Total possible points: 40)

B. action Plan
(Total possible points: 10)

Guiding Questions:
- What is the relationship between the goals, action plan and outcomes? How
- were results communicated to the school and community?

10 Points	5 Points	1 Point
There is a **CLEAR LINK** from the goals to the action plan and to the outcomes to address the identified water issue AND Actions/activities of the Cal Water H2O Challenge **ARE BASED** on sound scientific principles related to the topic AND Findings and applications from actions/activities **ARE COMMUNICATED** to school **AND** community	There is a **CLEAR OR MODERATE LINK** from the goals to the action plan and to the outcomes to address the identified water issue AND Actions/activities of the Cal Water H2O Challenge **ARE BASED** on sound scientific principles related to the topic AND Findings and applications from actions/activities **MAY or MAY NOT BE COMMUNICATED** to school	There is a **MODERATE OR NO LINK** from the goals to the action plan and to the outcomes to address the identified water issue AND Actions/activities of Cal Water H2O Challenge **MAY OR MAY NOT BE BASED** on sound scientific principles related to the topic AND Findings and applications from actions/activities **MAY OR MAY NOT BE COMMUNICATED** to school and/or community **OR** There is a **CLEAR OR MODERATE LINK** from the goals to the action plan and to the outcomes to address the identified water issue **BUT** The Cal Water H2O Challenge Action Plan was **NOT COMPLETED**

Use specific evidence from the portfolio to support your score.

POINTS

COMPONENT #1:
Cal Water H2O Challenge Impact
(Total possible points: 40)

C. Long Term Environmental Impact
(Total possible points: 15)

Guiding Questions:
- How was this Cal Water H2O Challenge important to students, the school and/or community?
- Will we see the effects of this Challenge in 5 years? What is (are) the enduring aspect(s) of this Cal Water H2O Challenge?

15 Points	10 Points	5 Points	1 Point
There is **CLEAR EVIDENCE** that the Cal Water H2O Challenge resulted in a change in student thinking about short- and long-term responsible actions related to the goal(s) of the Cal Water H2O Challenge. AND **Potential LONG-TERM** impact of the Cal Water H2O Challenge on water conservation within the school AND community are **CLEARLY EVIDENT**.	There is **CLEAR EVIDENCE** that the Cal Water H2O Challenge resulted in a change in student thinking about short- and long-term responsible actions related to the goal(s) of the Cal Water H2O Challenge. AND **Potential LONG-TERM** impact of the Cal Water H2O Challenge on water conservation within the school OR community is **CLEARLY EVIDENT**.	There is **CLEAR OR SOME EVIDENCE** that the Cal Water H2O Challenge resulted in a change in student thinking about short- and long-term responsible actions related to the goal(s) of the Cal Water H2O Challenge AND **Potential LONG-TERM** impact of the Cal Water H2O Challenge on water conservation within the school or community is **SOMEWHAT EVIDENT**.	A change in student thinking that may lead to short- and long-term responsible actions related to the goal(s) of the Cal Water H2O Challenge **IS NOT EVIDENT**. **OR** Only **SHORT-TERM** impact is **EVIDENT**.

Use specific evidence from the portfolio to support your score.

POINTS

COMPONENT #2:
Impact on Student Learning
(Total possible points: 45)

A. Integral to Student Learning
(Total possible points: 15)

Guiding Questions:

- How did this Cal Water H2O Challenge improve upon or enhance student learning beyond the regular classroom curriculum?
- In what ways did the Cal Water H2O Challenge help students use science and engineering practices, mathematical practices and English language arts skills to understand the issues and work collaboratively to address the issues?

15 Points	10 Points	5 Points	1 Point
Student work from the Cal Water H2O Challenge CLEARLY **DEMONSTRATES it** is an integral part of the regular classroom curriculum as defined by the NGSS and CCSS with an emphasis on students using the practices to build understanding. AND CLEARLY connects classroom learning with real world applications	Student work from the Cal Water H2O Challenge CLEARLY **DEMONSTRATES it** is an integral part of the regular classroom curriculum as defined by the NGSS and CCSS with an emphasis on students using the practices to build understanding. AND SOMEWHAT connects classroom learning with real world applications	Student work from the Cal Water H2O Challenge CLEARLY **DEMONSTRATES it** is an integral part of the regular classroom curriculum. AND HAS LIMITED OR NO connections with real world applications	Student work from the Cal Water H2O Challenge **DOES NOT INDICATE THAT IT IS AN INTEGRAL PART** of the regular classroom curriculum. AND HAS LIMITED OR NO connections with real world applications

Use specific evidence from the portfolio to support your score.

POINTS

COMPONENT #2:
Impact on Student Learning
(Total possible points: 45)

B. Student Participation
(Total possible points: 15)

Guiding Questions:

- In what ways were students actively involved in the selection, research, investigation and evaluation of the Cal Water H2O Challenge? In
- what ways did student thinking change because of their direct involvement in the Cal Water H2O Challenge?

15 Points	10 Points	5 Points	1 Point
Student work from the Cal Water H2O Challenge demonstrates **CLEAR EVIDENCE** that students were involved in **ALL** of the following: inquiry, design, research, implementation, evaluation and documentation.	Student work from the Cal Water H2O Challenge demonstrates **SOME EVIDENCE that** students were involved in **ALL** of the following: inquiry, design, research, implementation, evaluation and documentation.	Student work from the Cal Water H2O Challenge demonstrates **CLEAR OR SOME EVIDENCE** that students were involved in **SOME** of the following: inquiry, design, research, implementation, evaluation and documentation.	Student work from the Cal Water H2O Challenge demonstrates that students were involved in **FEW OR NONE** of the following: inquiry, design, research, implementation, evaluation and documentation.

Use specific evidence from the portfolio to support your score.

POINTS

COMPONENT #2:
Impact on Student Learning
(Total possible points: 45)

C. Student Reflection
(Total possible points: 15)

Guiding Questions:

- What evidence of student learning do I have? How will that learning be sustained?
- How did students move from awareness, to stewardship and possible long-term, responsible action?
- In what ways did the Cal Water H2O Challenge help students use critical thinking skills to evaluate water issues and make informed decisions to address those issues?

15 Points	10 Points	5 Points	1 Point
Student reflection indicates: **QUALITY LEARNING** (i.e., multiple opportunities to develop and demonstrate critical thinking to evaluate WATER ISSUES addressed in the Cal Water H2O Challenge and make informed decisions) AND **QUALITY LEARNING** (i.e., multiple opportunities to develop and demonstrate skills and knowledge) **ABOUT OTHER ASPECTS** of the Cal Water H2O Challenge (e.g., using technology, writing, art, working as a team, etc.) AND Identifies appropriate personal action to sustain **BOTH** learnings.	Student reflection indicates: **QUALITY LEARNING** (i.e., multiple opportunities to develop and demonstrate critical thinking to evaluate WATER ISSUES addressed in the Cal Water H2O Challenge and make informed decisions) **AND** **QUALITY LEARNING** (i.e., multiple opportunities to develop and demonstrate skills and knowledge) **ABOUT OTHER ASPECTS** of the Cal Water H2O Challenge (e.g., using technology, writing, art, working as a team, etc.) AND Identifies appropriate personal action to sustain **EITHER** learning.	Student reflection indicates: **QUALITY LEARNING** (i.e., multiple opportunities to develop and demonstrate critical thinking to evaluate WATER ISSUES addressed in the Cal Water H2O Challenge and make informed decisions) **OR** **QUALITY LEARNING** (i.e., multiple opportunities to develop and demonstrate skills and knowledge) **ABOUT OTHER ASPECTS** of the Cal Water H2O Challenge (e.g., using technology, writing, art, working as a team, etc.) AND **MAY OR MAY NOT** identify appropriate personal action to sustain **EITHER** learning	Student reflection indicates **LITTLE OR NO** meaningful learning or personal action.

Use specific evidence from the portfolio to support your score.

POINTS

COMPONENT #3:
Presentation
(Total possible points: 10)

A. Overall Quality of the Presentation of the Portfolio
(Total possible points: 10)

Guiding Questions:

- Can the reader understand the goals and outcomes of Cal Water H2O Challenge from the presentation? How
- does the presentation demonstrate originality and creative efforts by the students and teacher?
- How were students involved in completing the presentation of the Challenge?

10 Points	5 Points	1 Point
Portfolio **IS COMPLETE** and displays all Challenge components, linking goals with Cal Water H2O Challenge activities. AND Overall presentation of Cal Water H2O Challenge is original, creative, and artistic, showing **SUSTAINED EFFORT** and **QUALITY** attention to detail. AND There is **CLEAR EVIDENCE** that students were involved in the preparation of the portfolio	Portfolio **IS COMPLETE** and displays all Cal Water H2O Challenge components, linking goals with Cal Water H2O Challenge activities. AND Overall presentation of Cal Water H2O Challenge is **MODERATELY** creative, showing **SOME EFFORT** and attention to detail. AND There is **CLEAR EVIDENCE** that students were involved in the preparation of the portfolio.	Portfolio **IS NOT COMPLETE**. AND/OR Overall presentation of Cal Water H2O Challenge shows **LITTLE EFFORT** and attention to detail. AND/OR There is **SOME OR LITTLE EVIDENCE** that students were involved in the preparation of the portfolio.

Use specific evidence from the portfolio to support your score.

POINTS

COMPONENT #4:
Impact On Teacher Practice
(Total possible points: 5)

A. Teacher Reflection
(Total possible points: 5)

Guiding Questions:

- How do I know this Cal Water H2O Challenge was successful and is making a difference?
- What evidence of student learning do I have? How will that learning be sustained?
- How did this Cal Water H2O Challenge change my teaching practices to engage all students in meaningful learning experiences? How
- did this Cal Water H2O Challenge improve upon or enhance student learning beyond the regular classroom curriculum?

5 Points	1 Point
Teacher Reflection indicates **IN DEPTH REFLECTION** on topics such as: challenges and success; educational benefits such as changes in student learning, interactions, and classroom culture; next steps for sustainability; social responsibility for water conservation.	No teacher reflection included with Cal Water H2O Challenge. **OR** Teacher Reflection **OVERALL LACKS DEPTH** of reflection on topics such as: challenges and success; educational benefits such as changes in student learning, interactions, and classroom culture; next steps for sustainability; social responsibility for water conservation.

Use specific evidence from the portfolio to support your score.

POINTS