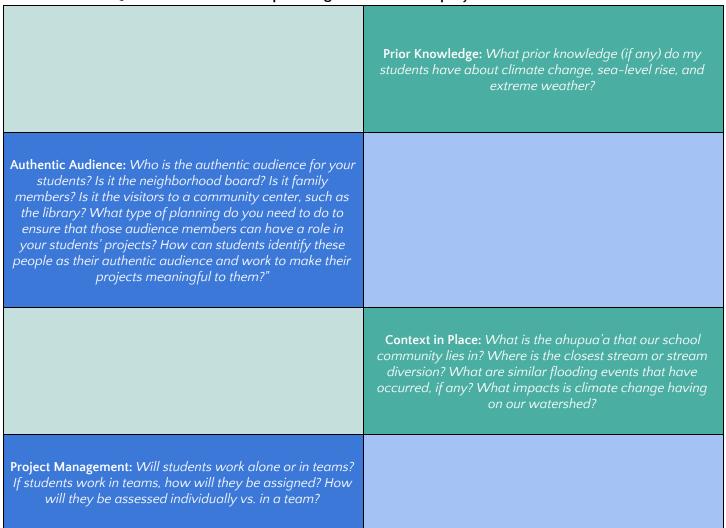# Understanding the Flood Zone

> **The project:** In this project, students will explore their community's watershed through the lens of climate change, learning about the short and long term impacts of extreme weather such as flooding. Students will design and present a Stream Plan to address flooding in Hawaii.

## TEACHER TIP || Questions to ask when planning to roll-out this project*:

| | |
|---|---|
| | **Prior Knowledge:** *What prior knowledge (if any) do my students have about climate change, sea-level rise, and extreme weather?* |
| **Authentic Audience:** *Who is the authentic audience for your students? Is it the neighborhood board? Is it family members? Is it the visitors to a community center, such as the library? What type of planning do you need to do to ensure that those audience members can have a role in your students' projects? How can students identify these people as their authentic audience and work to make their projects meaningful to them?"* | |
| | **Context in Place:** *What is the ahupua'a that our school community lies in? Where is the closest stream or stream diversion? What are similar flooding events that have occurred, if any? What impacts is climate change having on our watershed?* |
| **Project Management:** *Will students work alone or in teams? If students work in teams, how will they be assigned? How will they be assessed individually vs. in a team?* | |

*__Project-based learning vs. traditional lesson planning:__ In the midst of project-based learning, students are actively doing the work, learning, creating, and inquiring - eventually heading towards their end goal or product. Often misunderstood is that the organized chaos of what you might see in a PBL environment is carefully and intentionally designed by the teacher well before the project begins. The questions above should allow you to set the stage for student learning to unfold in the following project. Anticipating student questions and areas of need will help you to feel planned and ready in advance of a project.

# Understanding the Flood Zone

| Project Essential Question: | How can we better understand and predict the behavior of our local stream, and prepare for the future? |
|---|---|

**\*Skills and content needed to answer the Driving Question:** *Refine these skills and content standards to the scope and need of your project. This project is designed to be interdisciplinary – but if you don't teach a subject, it doesn't mean that that skill or standard can't still play a role in the experience! – These selected skills and content will be supported throughout the project with activities, formative assessments and additional resources.*

| Skills | Content/Standards |
|---|---|
| <ul><li>Collaboration</li><li>Communication</li><li>Reflection</li><li>Inquiry</li><li>Story-telling</li><li>Data collection</li><li>Persuasive speaking/writing</li><li>Research</li><li>Understanding multiple perspectives</li><li>*\*Add other skills to practice in this project*</li></ul> | **MS-LS2-1 Ecosystems: Interactions, Energy, and Dynamics** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.<br><br>**MS-ETS1-1 Engineering Design** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.<br><br>**C3 Framework D2.Geo.2.6-8.** Use maps, satellite images, photographs, and other representations to explain relationships between the locations of places and regions, and changes in their environmental characteristics.<br><br>**C3 Framework D2.Geo.4.6-8.** Explain how cultural patterns and economic decisions influence environments and the daily lives of people in both nearby and distant places.<br><br>**C3 Framework D4.2.6-8.** Construct explanations using reasoning, correct sequence, examples, and details with relevant information and data, while acknowledging the strengths and weaknesses of the explanations.<br><br>**CCSS.ELA-LITERACY.RST.6-8.7** Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).<br><br>*\*Add or remove standards to practice and assess in this project* |

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**Activities, Products, and Assessments:** *Below you will find the proposed activities, student products and assessments for this project. Refine them to match the scope and need of your project, making sure that they align with the skills and content you chose to drive from in the previous section.*

## Final project & summative assessments:

Present prototype of Stream Plan to select authentic audience.

**Teacher Tip: Present the project calendar early on to show students where they are headed.** *Students should know what is expected at the end from the beginning of the project. Use the templates provided to plan out the scope and sequence of the project. Include students in this process.*

| | |
|---|---|
| # Ahupuaʻa and the konohiki<br><br>Who were the konohiki of our ahupuaʻa? What was the role of the ancient Hawaiians in protecting the watershed, from mountain to the sea? What is the konohiki role today?<br><br>**Explore these questions with your students in a variety of ways: Launch the project by** watching the film segment on the **Tyson family** from *A Climate for Change* to learn about the families generational ties to the river. **Invite a guest speaker** who can share stories (moʻolelo) about the nearby streams. **Talk to local kupuna** about the konohiki of the past and present. Explore [maps](#) to learn about the closest stream in the area.<br><br>**Konohiki: headman of an ahupuaʻa land division under the chief; land or fishing rights under control of the *konohiki.***<br><br>**Set up a visit** to a nearby stream. | **What to collect from students:**<br>–Students complete a [reflection](#) based on the launch of the project that includes their new understandings and lingering questions moving forward.<br><br>**Type of assessment:**<br>–Formative<br><br>**Skills and content:**<br>–Reflection<br><br>–Inquiry |
| # Data collection<br><br>How do we understand what is happening in a stream? What kind of data can we collect? Who are the experts in the field that know the risks of flooding? This stream doesn't look like it has ever flooded, but is it still at risk of being impacted by climate change?<br><br>*Explore* these questions with a ***visit to*** a nearby stream. If possible, **invite an expert** who can speak about flooding and other weather impacts on the stream to join you and your students.<br><br>If a stream visit is not possible, **use tools such as [DLNR's Flood Hazard Assessment Tool](#),** students can view the flood hazards in their community. *(Click for parcel details >> download report for more information).* | **What to collect from students:**<br>–Students complete a [guided data collection](#) at the stream site.<br><br>**Type of assessment:**<br>–Formative<br><br>**Skills and content:**<br>–Collaboration<br><br>–Analyze and Interpret |

| | Data (NGSS.MS-LS2-1) |
|---|---|
| Before heading to the stream, review the guided data collection sheet. They can complete the sections on <u>rainfall and climate beforehand.</u> (Modify this sheet to the type of data that your group will collect).<br><br>**Resources and links:**<br>● <u>Climate Hawaii</u> – U.S. Climate Data<br>● <u>Rainfall in Hawaii</u> – Weather & Climate<br><br>*Optional extension:*<br>*Repeat the data collection cycle more than once. If it's not possible to revisit the stream, practice collecting other data, such as rainfall and other weather patterns. Students can use the data to make predictions.* | |
| **Research & storytelling**<br>What is the primary cause of flooding to streams in Hawaii? What types of risks does our local stream have in the case of a big storm? How is climate change impacting the typical stream flow? What risk does a flooding stream pose to the community?<br><br>*Students will explore the answers to these questions by conducting research.* Begin as a whole class by exploring Blue Planet's **Blue Line Cards** to learn about the coastal flooding that is projected to occur across the islands.<br><br>Then, set up **learning stations** for students to explore different sources, or send them on an **independent research** journey – *use the <u>research notetaker</u>*<br><br>Group resources to explore:<br>● <u>Introduction to flooding in Hawaii</u> – Weather.gov<br>● <u>Flooding in Hauula</u> – Hawaii News Now<br>● <u>How The Ala Wai Flood Project Illustrates The Challenge Of Adapting To Climate Change</u> – Hawaii Public Radio<br>● <u>Hina and the Wailuku River</u> – excerpt from Legends of Maui<br>● <u>Flooding and Climate Change</u> – Natural Resources Defense Council<br><br>**Getting the story:**<br>Have students conduct an interview with someone in the community *(could be a family member, auntie or uncle, staff member at the school, kupuna)* to learn more about the stories surrounding the stream, **and how it has changed over time.**<br><br>**Independent research:** Reflecting on the information they found in the group research + their interview, students come up with <u>3 research questions</u> to explore further through independent research. Remind students that they are working to get closer to answering the essential question of the project. | **What to collect from students:**<br>–Students complete the <u>research notetaker</u> during learning stations and conduct an informal **interview** with a community member.<br><br>–They then conduct <u>independent research</u><br><br>**Type of assessment:**<br>–Formative<br><br>**Skills and content:**<br>–Explain Cultural Patterns (C3 Framework D2.Geo.4.6–8)<br><br>–Research<br><br>–Inquiry<br><br>–Understanding multiple perspectives<br><br>–Storytelling |

## Audience + Scope. As you move into the next stage of the project, start determining who the final audience of the project will/can be, and what the scope of the project will be.

**Consider the following** *(use the planning document):*
A. Audience:
   a. **Who is a feasible audience? How can I set this up prior to rolling out the next stage with students?** (i.e. Can students present to the neighborhood board? A city council member? Will we host an exhibition night?)
   b. **How is the selected audience authentic to what students will be creating?** (ex: If students are developing plans that pertain to themselves and their family, who else should know about and benefit from this new knowledge?)
B. Scope:
   a. **What scope of the final product do you want to work towards with your students?**
      i. **Individual scope:** Students individually produce a final product, *their emergency plan.*
      ii. **Group scope:** Students work in student teams to produce a final product, *their emergency plan.*
      iii. **Whole class scope:** Students work together towards a whole class product, such as a community event, *such a stream restoration event or stream clean-up.*
      iv. **Combination of the above**

# Designing a prototype

What did I learn about my local stream? How will I prepare myself and others to adapt to the changing climate?

Students will explore these questions by creating the first draft of their Emergency Plan.

**Explore other "plans"** to better understand what the options are. An Emergency Plan might consist of a step-by-step action plan (as seen below) for a student and their family, or it might be something more **actionable** such as Uncle's hanging buoy from the film clip – the buoy helped him to measure the increasing height of the stream during heavy rains. This was his actionable plan to prepare his family to safety.

- State of Hawaii Public Resources for Flash Flood
- Newsweek "Hawaii Braces for Flash Flood"
- Hawaii Pacific Health "Ten Tips for Flash Flood Safety"
- American Rivers Why We Need to Restore Floodplains
- Does your community have an **Emergency Response Team?** If so, contact them and see if they can present to your students.

**Brainstorm.** As a class, brainstorm all of the important features of an Emergency Plan. Draw lines to connect the ideas for a **plan** with who it might **impact.** When guiding students through the reflection, consider the following:

**What to collect from students:**
–First plan draft + checklist

**Type of assessment:**
–Formative (at this stage)

**Skills and content:**
–Design the criteria constraints of a problem (MS-ETS1-1 Engineering Design)

–Construct explanations using reasoning (C3 Framework D4.2.6-8)

–Integrate quantitative or technical information visually (CCSS.ELA-LITERACY.RST.6-8.7)

- *How will kids know what to do in a flood?*
- *How does the plan impact the most people?*
- *What goes into an effective plan?*
- *What are some "don'ts" during a flash flood? (i.e. taking photos and video footage near electric poles)*
- *How is this plan unique?*

Based on the class brainstorm, fill in the **First Draft Checklist.**

**Create the first draft.** Whatever scope you've selected for the final product, all students should create the first draft or proposal for their plan. The plan should be ready to receive feedback on.

Communication

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**Teacher Tip: Giving and receiving feedback.** *Feedback is an essential part of Project-Based Learning! To be able to give and receive feedback is a skill that can be taught and practiced. If your students are new to peer critique, start small: provide sentence starters, show examples, and have them reflect on how the feedback they received impacted their work.*

# Getting feedback

What can I do to improve my plan? Does my plan connect to the essential question of the project? How can I give my peers feedback that will improve their plans?

*If students are new to giving and receiving feedback, show the video [Austin's Butterfly](#), and review what [Kind, Specific and Helpful feedback](#) looks like.*

**Set up the feedback round.** Pair students up (randomly or intentionally) as feedback partners. You have the option to run this in any way that works for you and your students. A more formal option is to set up a [Tuning Protocol.](#) However, if students are finishing their first drafts at different rates, you could also have them pair up as they finish to give and receive feedback from one another. They should complete a feedback form (or index card) for each person they give feedback to, and receive one in return.

**Work on finishing touches.** Make sure to give students plenty of time to take into account the feedback they received to improve their plans.

**While students are working, conference with students.** This is a chance for you to meet with students in groups or 1-1, with the project rubric in hand. Think of it as a *final check-in* before the final project is complete. You may need to remind students to take a step back to the research stage.

Consider asking students:
- *How does this connect to the essential question?*
- *What part of the rubric do you think you still need to include in your project?*
- *What peer feedback did you receive that was helpful?*

**What to collect from students:**
–Feedback forms from peers

**Type of assessment:**
–Formative

**Skills and content:**
–Reflection

–Inquiry

- *What other information does your plan need to include?*

**Prepare to present!** Depending on the type of presentation you've selected, students will need to prepare in different ways.
- Practice with a partner
- Fishbowl practice presentations
- Mock presentations
- View an exemplar presentation

# Presenting
How can we better understand and predict the behavior of our local stream, and prepare for the future? How can I communicate this to an audience with my Stream Plan?

**Through their final presentation, students will answer the essential question of the project and consider how they can communicate this effectively to their audience.** Have students present to an authentic audience, at your school, or in a public or community space – to inform a greater audience of their learning.

*Ideas may include:*
- Neighborhood board
- Library
- Family night exhibition

**After the public presentation,** reflection can take place in writing, verbally, through student-conferencing, or through whole-class discussion. Option to use the Project Reflection template as a tool.

Some **reflection questions** to guide your students through:
- What kind of feedback and questions did my audience ask me? What did I learn from this?
- What was the most challenging component of this project?
- Why is it important that we are connected to and understand the health and life of our community stream?
- Think back to the Tyson family's story – what did we learn from their story and how can we inspire others to be aware?
- Now that the project is complete, how would you answer the EQ? *How can we better understand and predict the behavior of our local stream, and prepare for the future?*

**What to collect from students:**
–Students complete a Project Reflection

–Collect the final products before or after final presentations

**Type of assessment:**
–Formative + Summative

**Skills and content:**
–Reflection

–Inquiry

–Design the criteria constraints of a problem (MS-ETS1-1 Engineering Design)

–Construct explanations using reasoning (C3 Framework D4.2.6-8.)

– Integrate quantitative or technical information visually (CCSS.ELA-LITERACY.RST.6-8.7)

**Assessment Tip:** *Determine before the final presentation day whether you will assess the final projects/presentations before or after the public presentation. If you decide to wait until after, students can be given a chance to reflect on how the public presentation went, make any final changes, and then submit to you for assessment.*