Standards Based NGSS H/S Activity Pools: for The Living Earth Three Course Model

Sequenced Learning Activities from Project Wet, NOAA, and the California Coastal Commission (Organized via the BSCS 5E Instructional Model)

(Format Draft for Consideration Only)

Pool Title: A Systems Approach to Ecosystem Analysis & Action for Coastal California – (California Science Framework – Living Earth: Ecosystem Interactions, Stability and Climate Change in California, p-781 and p-830) (CCV Connection: Making Sense of the Beach and Concrete Questions

This sequence of learning activity pools is for educators who recognize that using existing inquiry resources from Project WET and other high-quality sources is a pragmatic, cost effective, method of enhancing/creating three-dimensional instructional sequences. This approach exceeds the requirements of California Next Generation Science Standards (CA-NGSS) and is endorsed by the California Science Framework (CSF). This guide is not meant to be an exhaustive list; instead, we provide clear guidance for time pressed teachers choosing to implement ambitious NGSS instruction using the 5E instructional model as our foundation. Our primary goal is to provide classroom ready instructional sequences built from existing resources and connected to a bundle of performance expectations drawn directly from California Science Framework (CSF).

Additionally, we have included anchor phenomena and real-world performance tasks drawn directly from NGSS evidence statements, ensuring that participating teachers are meeting, typically exceeding, all applicable state standards (CC/NGSS/HSS). Finally, we provide complementary resources from selected partners (NOAA/CCC/USGS) for ambitious teachers who wish to customize learning or outcomes for their learners.

Standards (Bundle) See attached evidence sheets detailing observable, measurable learning outcomes (Let Achieve do all of this, just get it online)
HS-LS-2-1, 2-2, 2-7 and 2-7
HS-LS-4-6
HS-ESS-3-5 and 3-6
HS-ETS1.1, 1.2, and 1.

Anchor Phenomenon: Earth's Changing Climate (See National Geographic: https://www.nationalgeographic.org/activity/earths-changing-climates/

Pool Driving Question(s): How is climate change impacting life in South Coast watersheds? How is climate change impacting natural systems and biodiversity in coastal watersheds in California? How can we design solutions that will help restore ecosystem functioning in coastal watersheds, lagoons and beaches, given the complexity?

Guiding Questions & Activity Pools (In the 5E Sequence Instructional Sequence): Created around smaller scale **investigable phenomena** to stimulate and focus student thinking progressing through the instructional sequence. The first activity in each pool represents our implementation recommendation and is a proven inquiry activity supporting that stage of that 5E sequence.

Pathway One: Headwaters Pool - Guiding Questions from California Science Framework (page 781 and 830) and Related PWet Activity = Least Work for Teachers

Pathway Two: Pools of Empire are More Ambitious, providing an Integrated Approach that connects Academics to Action in the Community

Pathway Three: Resilient Pools are for teachers choosing the PBL approach to instruction.

Ecosystem Interactions within Coastal Watersheds (A Systems Thinking Focus)

What factors affect the size of populations within Watershed ecosystems?
What are common threats to watershed ecosystems and biodiversity?
How can these threats to watersheds be reduced?

	1-Headwater Pool: Water Connects all Earth Systems **(5E Instructional Sequence for Integrated Science from the Cal Sci Framework)**	**2-Pools of Empire: Water Systems are Managed** **(Supports Integration of Science, Language Arts, and HSS via Systems Thinking)**	**3-Resilient Pool: Water is Essential for Life on Earth** **(Supports a "Gold Standard" PBL Approach with Student Voice and Choice, Merges PWet and CCV)**
Engage with Phenomena	Driving Question: How do Earth systems connect watersheds and the coastal ocean? -Blue Planet (Page-125) - River Talk (Page-)	Driving Questions: How can we use science & engineering practices to protect watershed systems? -8-4-1: One for All (page 299)	Driving Question: How can we design climate resilient communities and watersheds? -Water Audit:
Explore Questions	Guiding Question(s): What is an Earth system? How can we investigate Earth systems?	Guiding Question(s): What types of interdependent relationships exist between	Guiding Question(s): What types of interdependent relationships exist

	What distinctive properties of water enable life on our planet -Seeing Coastal Watersheds (Adapted from Page-187) -Blue River (Page-) -Back to the Future	the living and non-living communities within watersheds? -Seeing Coastal Watersheds (Adapted from Page-187) -Incredible Journey (Page155) From CCV: A Place-Based Perspective on the California Coast (P-18)	between the living and non-living communities within watersheds? How is biodiversity measured and monitored in watersheds? -Seeing Coastal Watersheds (Adapted from Page-187) -Incredible Journey (Page155)
Explain Concepts, Refine Vocabulary	Guiding Question: How can we make sense of complex Earth systems? -Sum of the Parts Going Deep Jigsaw Readings (SERC-Carleton) 1 What Constitutes a Complex System? 2 How do the geosphere, atmosphere, and biosphere, influence our coastal oceans (the hydrosphere)?	Guiding Question: How can we make sense of complex Earth systems? NOAA: Data in the Classroom Activity Link: https://dataintheclassroom.noaa.gov/content/water-quality	Guiding Question: Learner Driven using the Question Formulation Technnique
Elaborate and Extend into Action	Guiding Questions: How can we take action? -Storm Water (Page-395) -Schoolyard Clean-Up (CCC)	Guiding Question: How can we take action?	Guiding Question: How can we take action?
Evaluation (Summative) with Public Product	Guiding Question: How can we use science to advocate for the protection of natural systems in coastal watersheds? Sense of the Coast (Page-27) and Written Product	Guiding Question: How can we use science to advocate for the protection of natural systems in coastal watersheds? Speaking up for the Beach (CCV-Page 55)Testify at Public Hearing Related to	Guiding Question: How can we use science to advocate to protect and enhance natural systems in coastal watersheds? Restoring our Land and Sea (Page-97)