California Department of Fish and Wildlife

# Classroom Aquarium Education Program Correlations
# Next Generation Science Standards and Common Core English/Language Arts Standards

Written by
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The Classroom Aquarium Education Program (CAEP) provides many great opportunities for learning that supports the Next Generation Science Standards (NGSS) and Common Core English and Language Arts Standards. This document is intended to help you, the classroom teacher, expose your students to the amazing experience of hatching fish in your classroom while still meeting mandated requirements.

The Next Generation Science Standards were adopted in California in 2013. They are very different from the 1998 Science Standards in that the 1998 standards were generally vocabulary or fact-based, while the NGSS are more process-based. For example, almost all of the 1998 standards begin with the phrase "Students know…". The NGSS start with phrases like "Develop a model of …" or "Analyze and interpret data…"

Many of the **Next Generation Science Standards** (a.k.a. Performance Expectations) and Common Core English/Language Arts standards can be addressed through the Classroom Aquarium Education Program (CAEP) activities. The list below is not intended to be complete. Rather, it indicates some of the standards that are most strongly or obviously addressed through participation in the CAEP.

The **Common Core English/Language Arts** standards include emphasis on applying skills in content areas. Some notes on the correlation of CAEP and the English/Language Arts Common Core standards follow the Next Generation Science Standards correlation table. (See page 23.).

The Classroom Aquarium Education Program activities are meant to **supplement** a rigorous classroom curriculum. They can help teachers teach the standards; they are not intended to be the complete science curriculum. They can help students achieve mastery of standards; they do not, by themselves, guarantee mastery of standards.

Many participants in the Classroom Aquarium Education Program receive the ***Project WILD Aquatic K-12 Curriculum & Activity Guide*.** Activities that are particularly well suited for CAEP classrooms are indicated the table that follows the NGSS/CAEP correlation tables (See page 19.). Correlations between the *WILD Aquatic Guide* and the NGSS can be found at:

http://www.projectwild.org/documents/AquaticWILDNGSSCorrelations01.15.16.pdf

**Note**: In *the Project Wild Aquatic* Correlations document, the correlations are ranked on a 3-tiered scale. In this document, only *Project WILD Aquatic* activities with the two top rankings are included, i.e., only the most well-aligned activities are listed.

Teachers participating in the Classroom Aquarium Education Program may also be interested in the units developed through the **Education and the Environment Initiative (EEI).** Some of the appropriate EEI units are indicated after the NGSS correlations table (See page 22.). For more information on the EEI, go to:

www.californiaeei.org

## Next Generation Science Standards (NGSS):

**The NGSS have four components**

- Performance Expectations (What students should be able to do…These connect the three dimensions listed below)
- Dimension 1: Science and Engineering Practices: major practices that scientists and engineers employ as they "do" science and engineering
- Dimension 2: Crosscutting Concepts: Ideas and practices that cut across the science disciplines (life, physical, earth science)
- Dimension 3: Disciplinary Core Ideas: core ideas…foundational knowledge (rather than trying to teach all information)

In this summary, we will consider the Performance Expectations to be "standards", but will also include notes on Science and Engineering Practices, Crosscutting Concepts, and Disciplinary Core Ideas as appropriate. Most Performance Expectations include the three Dimensions.
Many environmental education providers focus on the Crosscutting Concepts in the activities that they provide.

**Crosscutting Concepts:**

1. Patterns
2. Cause and Effect: Mechanisms and Explanation
3. Scale, Proportion, and Quantity
4. Systems and System Models
5. Energy and Matter: Flows, Cycles, and Conservation of
6. Structure and Function
7. Stability and change

**Regarding the numbering of the Performance Expectations:**

e.g.: 2-LS3-1 would indicate 2nd grade **L**ife **S**cience standard (Performance Expectation) no. 3-1.

- The first number identifies the grade level or grade level span. In the example, it would be second grade.
- The letter/number combination identifies the content area (Life Science) and numbering system as identified in the National Research Council's *Framework for K-1`2 Science Education* (2012). In this case, it would be Core Idea 3 (Scale, Proportion, and Quantity), expectation #1.

**PS** indicates **Physical Science**
**LS** indicates **Life Science**
**ESS** indicates **Earth and Space Science**
**ETS** indicates **Engineering, Technology and Applications of Science**, sometimes referred to as **Engineering Design.**

Note that, in the NGSS, almost all Performance Expectations also include "Clarification Statement(s)." These give examples and other clarifications. They also include "Assessment Boundaries" that help explain what should and should not be included in assessment at that grade level. The Clarification Statements and Assessment Boundaries are not included here.

**Next Generation Science Standards that are most strongly or clearly correlated to the Classroom Aquarium Education Program**

The notes are for the teacher. They include information that might be taught, but also information that may not be developmentally appropriate for students at the given grade level; some is just for the teacher's edification.

| Grade | NGSS Performance Expectation | Crosscutting Concepts | Disciplinary Core Ideas | Science and Engineering Practices | Notes |
|---|---|---|---|---|---|
| **K** | **K-LS1-1:** Use observations to describe patterns of what plants and animals (including humans) need to survive. | Patterns | LS1.C:Organization for Matter and Energy Flow in Organisms | Analyzing and Interpreting Data | In the classroom, the importance of clean water, cool water, and food will be an important part of students' experiences. The images on the Wild About Trout CD emphasize the importance of appropriate food as well as cool, clean water. |
| | **K-ESS3-1:** Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. | Systems and System Models | ESS3.A: Natural Resources | Developing and Using Models | Formation of redds requires appropriately sized gravel and the absence of much silt.<br>Class discussions can (and should) include reference to human impacts and how we can provide suitable habitats/environments. For example, silt fences and straw wattle help reduce siltation, and gravel can be brought in to restore degraded habitat. Planting native plants such as willows along streams can help stabilize the soil, provide shade (cool water) for salmonids, and provide habitat for food species such as insects.<br>Dams can help regulate water flow for the benefit of fish, but they can also block access to spawning streams. Water conservation can help by leaving more water for salmonids in streams and lakes.<br>Sunlight warms water, and salmonids need cool water. |
| | **K-ESS3-3:** Communicate solutions that will reduce the impact of humans on land, water, air, and/or other living things in the local environment. | Cause and Effect | ESS3.C: Human Impacts on Earth Systems | Obtaining, Evaluating, and Communicating Information | |
| | **K-PS3-1:** Make observations to determine the effect of sunlight on Earth's surface. | Cause and Effect | PS3.B: Conservation of Energy and Energy Transfer | Planning and Carrying out Investigations | |

**DO NOT MAKE THE DISCUSSION A "DOWNER"! At this age, emphasis should be on getting kids excited about fish and the environment, not hitting them with a bunch of bad news!**

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|---|---|---|---|---|---|
| **1** | **1-LS1-1:** Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs. | Structure and Function | LS1.A: Structure and Function | Constructing Explanations and Designing Solutions | Discussion can include how salmonids use their tails to make redds, how they find and capture food, how they use their fins to move around, including migrating to and from the ocean, and how they migrate to find more resources, with comparisons to analogous human activities. |
| | **1-LS1-2:** Read texts and use media to determine patterns of behavior of parents and offspring that help the offspring survive. | Patterns | LS1.B: Growth and Development of Organisms | Obtaining, Evaluating, and Com-municating Information | While this standard is about how offspring differ from their parents, it is an opportunity to look at the differences between adults and juvenile fish.<br><br>It is also an opportunity to discuss how people can assist the fish by such things as removing migration barriers, adding woody debris, etc. |
| | **1-LS3-1:** Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. | Patterns | LS3.A: Inher-itance and Traits<br><br>LS3.B: Varia-tion of Traits | Constructing Explanations and Designing Solutions | Students can observe the fry in the tank and compare their appearance to pictures of adult fish. |

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|---|---|---|---|---|---|
| **2** | **2-LS4-1:** Make observations of plants and animals to compare the diversity of life in different habitats. | Patterns | LS4.D: Biodi-versity and Humans | Planning and Carrying Out Investi-gations | The Wild About Trout CD can be used to compare aquatic life, including food organisms, to terrestrial organisms, possibly including adaptations for living in the different environments. |
| | **2-ESS2-2:** Develop a model to represent the shapes and kinds of land and bodies of water in an area. | Patterns | ESS2.B: Plate Tectonics and large-Scale System Interactions | Developing and Using Models | Students should learn about watersheds, including the concepts that we all live in a watershed and that whatever enters a stream can affect whatever is downstream. Various watershed models can be used for this. |

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|---|---|---|---|---|---|
| **K-2**<br>**Engineering Design** | **K-2-ETS1-1:** Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool. | Structure and Function | ETS1.A: Defining and Delimiting Engineering Problems | Asking Questions and Defining Problems | "Object or tool" can be defined loosely to include such things as hatcheries, stream bank plantings, fish ladders, etc. |
| | **K-2-ETS1-2:** Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem. | Structure and Function | ETS1B: Developing Possible Solutions | Developing and Using Models | See above |

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### Next Generation Science Standards that are most strongly or clearly correlated to the Classroom Aquarium Education Program

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| **3** | **3-LS1-1:** Develop models to describe that organisms have unique and diverse life cycles but all have in common birth, growth, reproduction, and death. | Patterns | LS1.B: Growth and Development of Organisms | Developing and Using Models | Students participating in the Classroom Aquarium Education Program will learn about the life cycles of fish and also some food organisms. Salmonids' migration to and from the ocean, while not unique, is unusual. Discuss why it is an advantage to the fish. |
| | **3-LS4-3:** Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. | Cause and Effect | LS4.C: Adap-tation | Engaging in Argument from Evidence | Students participating in the Classroom Aquarium Education Program will learn about a variety of watershed-related problems such as erosion, littering, over fishing, warming of water, and others, and will discuss possible solutions to those problems. Such mitigations as wattles, regulations, and streamside restoration (including shade producing plants) may be discussed. |
| | **3-LS4-4:** Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change. | Systems and System Models | LS2.C: Eco-system Dynamics, Functioning and Resilience<br><br>LS4.D: Biodi-versity and Humans | Engaging in Argument from Evidence | The importance of macroinvertebrates is shown in the Wild About Trout CD. See the note above…be sure to discuss both positive and negative changes. |

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The notes are for the teacher. They include information that might be taught, but also information that may not be developmentally appropriate for students at the given grade level; some is just for the teacher's edification.

| Grade | NGSS Performance Expectation | Crosscutting Concepts | Disciplinary Core Ideas | Science and Engineering Practices | Notes |
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| **4** | **4-LS1-1:** Construct an argument that plants and | Systems and | LS1.A: Structure and Function | Engaging in Argument | Students participating in the CAEP will learn about fish anatomy. The Wild About Trout CD can also be used to |

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| | animals have internal and external structures that function to support survival, growth, behavior, and reproduction. | System Models | | from Evidence | learn about the anatomy of insects and other food organisms. |
| | **4-LS1-2:** Use a model to describe that animals receive different types of information through their senses, process the information I their brain, and respond to the information in different ways. | Systems and System Models | LS1.D: Informa-tion Processing | Engaging in Argument from Evidence | Discussion should focus not on just learning the names of body parts, but on how those body parts help the organisms survive. |
| | **4-ESS3-2:** Generate and compare multiple solutions to reduce impacts of natural Earth processes on humans | Cause and Effect | ESS2.B: Plate Tectonics and Large-Scale System Interactions | Analyzing and Interpreting Data | Heavy rain years and drought years are natural Earth processes that affect humans and salmonids. People build dams to try to mitigate flood and drought, and the dams affect fish. Students can learn about steps taken to try to reduce dams' negative impacts on fish.<br><br>See the notes above. |

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| **5** | **5-LS2-1:** Develop a model to describe the movement of matter among plants, animals, | Systems and System | LS2.A: Inter-dependent Relationships in | Developing and Using Models | Students participating in Classroom Aquarium Education Program will learn about fish and how they feed. Studies can/should include food webs, macroinvertebrates, and |

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| | decomposers, and the environment.<br><br>**5-ESS2-1:** Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. | Models<br><br>Systems and System Models | Ecosystems<br><br>LS2.B: Cycles of Matter and Energy Transfer in Ecosystems<br><br>ESS2.A: Earth Materials and Systems | <br><br>Developing and Using Models | fish predators.<br><br>Throughout the Classroom Aquarium Education Program, students see how the geosphere, hydrosphere, and atmosphere affect fish. For example, successful spawning require a suitable (gravel) substrate, and too much silt can kill the eggs. Polluted water, or water that is too warm, can kill fish. Sunlight can warm the water, and oxygen comes from the air.<br><br>Classroom studies should include the water cycle. |
| | **5-ESS3-1:** Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. | Systems and System Models | ESS3.C: Human Impacts on Earth Systems | Evaluating and Communi-cating Information | Students should learn about ways that they and others in their community can help protect salmonid habitat, including water conservation, reducing pollution, streamside improvements, citizen science, storm water runoff and remediation, support for conservation, and other methods. |

**At this age, kids can begin to comprehend environmental (and other) problems without getting too discouraged. Be sure to emphasize things that they can do to help protect the environment, both now and when they are adults.**

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The notes are for the teacher. They include information that might be taught, but also information that may not be developmentally appropriate for students at the given grade level; some is just for the teacher's edification.

| Grade | NGSS Performance Expectation | Crosscutting Concepts | Disciplinary Core Ideas | Science and Engineering Practices | Notes |
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| **3-5 Engineer-ing Design** | **3-5-ETS1-2:** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and | Influence of Engineering, Technology and Science on Society | ETS1.B: Devel-oping Possible Solutions | Constructing Explanations and Designing Solutions | Discussion of environmental problems such as erosion, littering, and overfishing will help students understand their role in finding solutions to such problems.<br><br>Emphasize both things that they can do now and when |

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| | constraints of the problem. | and the Natural World | | | they are adults. |

**At around fourth grade, kids can begin to comprehend environmental (and other) problems without getting too discouraged. Be sure to emphasize things that they can do to help protect the environment, both now and when they are adults.**

**Next Generation Science Standards that are most strongly or clearly correlated to the Classroom Aquarium Education Program**

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| Grade | NGSS Performance Expectation | Crosscutting Concepts | Disciplinary Core Ideas | Science and Engineering Practices | Notes |
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| **6** | **MS-LS1-8:** Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories. | Systems and System Models<br><br>Structure and Function | LS1.A: Structure and Function | Obtaining, Evaluating, and Communi-cating Information | Salmonid anatomy studies should include the lateral line, and how anadromous fish use their sense of smell to find their "home" stream. |

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| | **MS-ESS3-3:** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. | Cause and Effect | ESS3.C: Human Impacts on Earth Systems | Constructing Explanations and Designing Solutions | The Classroom Aquarium Education Program includes efforts to minimize negative human environmental impact.<br>Discuss possible solutions to problems faced by salmonids and factors that might be monitored to determine whether the solutions are effective. For example:<br>• # of redds formed in a stretch of stream before and after various modifications<br>• # of salmon in a watershed over a period of years before and after various modifications<br>• Macroinvertebrate studies |

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| Grade | NGSS Performance Expectation | Crosscutting Concepts | Disciplinary Core Ideas | Science and Engineering Practices | Notes |
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| **7** | **MS-LS2-1:** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. | Cause and Effect | LS2.A: Interdepen-dent Relationships in Ecosystems<br>LS2.B: Cycle of Matter and Energy Transfer in Ecosystems | Analyzing and Interpreting Data | "Resources" includes not only food, but suitable habitat (cool water, not too much silt, well oxygenated water). |
| | **MS-LS2-3:** Develop a model to describe the cycling of matter and flow of energy among living and non-living parts of an | Energy and Matter | LS2.C: Eco-system Dynamics, Functioning, and | Developing and Using Models | Cycling of matter and the flow of energy are included as part of the Wild About Trout CD and discussion of food webs. |

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| | ecosystem.<br><br>**MS-LS2-4:** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.<br><br>**MS-LS2-5:** Evaluate competing design solutions for maintaining biodiversity and ecosystem services. | Stability and Change<br><br>Stability and Change | Resilience<br><br>LS2.C: Eco-system Dynamics, Functioning, and Resilience<br><br>LA4.D: Biodiver-sity and Humans<br><br>ETS1.B: Devel-oping Possible Solutions | Engaging in Argument from Evidence<br><br>Stability and Change<br><br>Engaging in Argument from Evidence | "Changes" can be positive (such as improving fish habitat) or negative (such as pollution, changes in substrate, removal of food species, over fishing, etc.) And they can be natural or man-made. Be sure to include positive changes such as tree planting in the riparian zone and returning stream channels to their natural state, as well as negative changes.<br><br>See above |

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| Grade | NGSS Performance Expectation | Crosscutting Concepts | Disciplinary Core Ideas | Science and Engineering Practices | Notes |
|---|---|---|---|---|---|
| **8** | **MS-ESS3-4**: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. | Cause and Effect | ESS3.C: Human Impacts on Earth Systems | Engaging in Argument from Evidence | Discuss overfishing and the necessity of limits on fish taken…the finiteness of Earth's resources. |

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|---|---|---|---|---|---|
| **6-8 Engineering Design** | **MS-ETS1-1:** 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. | Influence of Science, Engineering, and Technology on Society and the Natural World | ETS1.A: Defining and Delimiting Engineering Problems | Asking Questions and Defining Problems | Students participating in the Classroom Aquarium Education Program learn about environmental problems affecting watersheds, waterways, and fish, and discuss possible solutions to those problems. Discuss pros and cons of various solutions such as fish ladders, stream restoration, fishing limits, selection for particular genes, hatcheries, etc. |

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| Grade | NGSS Performance Expectation | Crosscutting Concepts | Disciplinary Core Ideas | Science and Engineering Practices | Notes |
|---|---|---|---|---|---|
| **H.S.**<br>**Life Science/ Biology** | **HS-LS2-6:** Evaluate claims, evidence, and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions, but changing conditions may result in a new ecosystem<br><br>**HS-LS2-7:** Design, evaluate, and refine a solution for reducing the impacts of human activities on the environment and biodiversity. | Stability and Change<br><br>Stability and Change | LS2.C: Eco-system Dynamics, Functioning and Resilience<br><br>LS2.C: Eco-system Dynamics, Functioning and Resilience | Engaging in Argument from Evidence<br><br>Constructing Explanations and | High school biology/life science classes include studies of ecology and population dynamics. Studies of freshwater stream ecology can include salmonids and factors that affect populations both positively and negatively. Consider changes in water flows due to dams or removal of water from streams fur human use, including agriculture, industry, and use in the home and lawns.<br><br>Classroom Aquarium Education Project activities and discussions can include steps that people have taken to try to protect and increase salmonid populations, such as breeding |

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| | | | LS4.D: Biodi-versity and Humans<br><br>ETS1.B: Devel-oping Possible Solution | Designing Solutions | programs (hatcheries), fishing regulations, fish ladders, stream restoration (streamside, placement of large woody debris, gravel mining regulations). etc. |

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|---|---|---|---|---|---|
| **H.S.**<br><br>**Earth Science** | **HS-ESS2-2:** Analyze geosciences data to make the claim that one change to Earth's surface can create feedbacks that cause changes to other Earth Systems | Stability and Change | ESS2.A: Earth Materials and Systems | Analyzing and Interpreting Data | Changes in streamside vegetation or other causes can result in erosion and siltation. Removal of ground water and water from streams affect fish, and various means can be used to mitigate.<br><br>Students should be studying climate change in Earth Science classes. What is the predicted affect of climate change on salmonids? How do changes on land, such as roads, agricultural practices, and building, affect fish? |
| | **HS-ESS3-4:** Evaluate or refine a technological solution that reduces impacts of human activities on natural systems. | Stability and Change | ESS3.C: Human Impacts on Earth Systems<br><br>ETS1.B: Devel-oping Possible | Constructing Explanations and Designing Solutions | Students can investigate things that people have done to try to protect salmonids, such as fishing regulations, stream restoration, hatcheries, fish ladders, road building and logging practice regulations, *et al.* |

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| | | | Solutions | | |

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|---|---|---|---|---|---|
| **H.S.**<br><br>**Physical Science (Chem-istry and Physics)** | None of the Physical Science Performance Expectations clearly connect with CAEP activities, although chemistry, pollution, water temperature, light and other physical phenomena are clearly important to fish.<br><br>However, the Engineering, | | | | Chemistry studies should include measurement of water chemistry (dissolved oxygen, phosphates, nitrates, pollutants), and ways that temperature affects dissolved oxygen levels.<br><br>The physics and chemistry of climate change are also relevant topics.. |

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| | Technology and Science (Engineering Design) Performance Expectations, which apply to all science classes, do apply. See the next page. | | | | |

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|---|---|---|---|---|---|
| **H.S.**<br><br>**Engineer-ing Design** | **HS-ETS1-1**: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.<br><br>**HS-ETS1-2:** Design a solution to a complex real-world problem by breaking it down into smaller, more manageable problems that can be solved through engineering.<br><br>**HS-ETS1-3:** Evaluate a solution to a complex real-world problem based on prioritized criteria and tradeoffs that account for a range of constraints, including cost, safety, reliability, and aesthetics, as well as possible social, cultural, | Systems and System Models | ETS1.A: Defining and Delimiting Engineering Problems<br><br>ETS1.B: Developing Possible Solutions | Asking Questions and Defining Problems | Chemistry studies should include measurement of water chemistry (dissolved oxygen, phosphates, nitrates, other pollutants), and ways that temperature affects dissolved oxygen.<br><br>The physics and chemistry of climate change are also relevant topics. |

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| | and environmental impacts. | | | | |

# Correlations between the Classroom Aquarium Education Project (CAEP)
and activities in the
## *Project WILD Aquatic K-12 Curriculum and Activity Guide.*

Many participants in the Classroom Aquarium Education Program receive the ***Project WILD Aquatic K-12 Curriculum & Activity Guide.*** Activities that are particularly well suited for CAEP classrooms are indicated the table below. Correlations between the *WILD Aquatic Guide* and the NGSS can be found at:

http://www.projectwild.org/documents/AquaticWILDNGSSCorrelations01.15.16.pdf

**Note**: In *the Project Wild Aquatic* Correlations document, the correlations are ranked on a 3-tiered scale. In this document, only *Project WILD Aquatic* activities with the two top rankings are included, i.e., only the most well-aligned activities are listed.

| Grade | NGSS Standard | WILD Aquatic activities that support the NGSS Standard |
|---|---|---|
| **K** | K-LS1-1 | Fashion a Fish Water Plant Art Water Safari |
| | K-ESS3-1 | Water Safari |
| | K-ESS3-3 | Water Safari |
| | K-PS3-1 | |
| **1** | 1-LS1-1 | Are You Me? |
| | 1-LS1-2 | Are You Me? |
| | 1-LS3-1 | Are You Me? |
| **2** | 2-LS4-1 | Aquatic Roots Are You Me? Water Plant Art Water Safari |
| | 2-ESS2 | |
| **3** | 3-LS1-1 | Fashion a Fish Sockeye Scents Turtle Hurdles Water Plant Art |

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|---|---|---|
| | 3-LS4-3 | Aquatic Roots Blue Ribbon Niche Designing a Habitat Edge of Home<br>Fishy Who's Who Got Water? Kelp Help Marsh Munchers<br>Turtle Hurdles Water Plant Art |
| | 3-LS4-4 | Aquatic Roots Blue Ribbon Niche Conservation Messaging Dragonfly Pond<br>Fishy Who's Who Got Water? Silt: A Dirty Word |
| **4** | 4-LS1-1 | Fashion a Fish Kelp Help Micro Odyssey |
| | 4-LS1-2 | Sockeye Scents |
| | 4-ESS3-2 | |
| **5** | 5-LS2-1 | Kelp Help Marsh Munchers Micro Odyssey<br>Turtle Hurdles Water Plant Art |
| | 5-ESS2-1 | |
| | 5-ESS3-1 | Alice in Waterland Aquatic Roots Blue Ribbon Niche<br>Dragonfly Pond Waterworks |
| **3-5 Engineering Design** | 3-5-ETS1-2 | Designing a Habitat |
| **6** | MS-LS1-8 | |
| | MS-ESS3-3 | Alice in Waterland Blue Ribbon Niche Conservation Messaging<br>Dam Design Edge of Home Fishable Waters<br>Migration Headache Net Gain, Net Effect Something's Fishy Here!<br>Urban Waterway Checkup Water Canaries Water Works<br>What's in the Air? What's in the Water? Where Does Water Run? |
| **7** | MS-LS2-1 | Gone Fishing! Hooks and Ladders Migration Headache<br>Puddle Wonders! Urban Waterway Checkup |
| | MS-LS2-2 | Edge of Home Migration Headache |
| | MS-LS2-4 | Blue Ribbon Niche Dam Design Fishable Waters<br>Hooks and Ladders Migration Headache Puddle Wonders!<br>Turtle Hurdles Urban Waterway Checkup |

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|---|---|---|
| | MS-LS2-5 | Water Canaries What's in the Air? What's in the Water? Where Have All the Salmon Gone?<br><br>Dam Design Net Gain, Net Effect |
| **8** | MS-ESS3-4 | Net Gain, Net Effect (low correlation) |
| **6-8 Engineering Design** | MS-ETS1-1 | Dam Design Puddle Wonders! |
| **H.S. Biology/ Life Science** | HS-LS2-6<br><br>HS-LS2-7 | Conservation Messaging Dam Design Fishable Waters<br>Gone Fishing! Water Canaries What's in the Air?<br>Where Does Water Run? |
| **H.S. Earth Science** | HS-ESS2-2<br><br>HS-ESS3-4 | Fishable Waters Where Does Water Run? |
| **H.S. Physical Sciences** | | |
| **H.S. Engineering Design** | HS-ETS1-1<br><br>HS-ETS1-2<br><br>HS-ETS1-3 | Dam Design<br><br>Dam Design |

## Education and the Environment Unit Correlations with the Classroom Aquarium Education Program

The Education and the Environment (EEI) units in the table below are identified in the EEI NGSS Correlation Guides as especially valuable in teaching the Performance Expectations listed in the table above. The EEI units were written before the NGSS were adopted, and some topics in the EEI units were shifted to different grade levels in the NGSS. Therefore, the grade level designations may differ. For information on the EEI units, go to:

http://www.californiaeei.org/Curriculum/ . For more information on correlations, go to: http://www.californiaeei.org/curriculum/correlations/nextgenscience/ ,

| Grade | Performance Expectations | EEI Units |
|---|---|---|
| **K** | K-LS1-1, K-ESS3-1,K-ESS3-3, K-PS3-1 | K.3.a. *The World Around Me*, K.3.c. *A Day in My Life* |
| **1** | 1-LS1-1, 1-LS1-2, 1-LS3-1 | 1.2.a. *Surviving and Thriving*, 1.2.c. *Finding Shelter*, 1.2.d. *Open Wide! Look Inside!* |
| **2** | 2-LS4-1 | 2.2.c. and 2.2.d. *Alike and Different* |
| **K-2** | K-2-ETS1-1, K-2-ETS1-2 | 1. 2.c. *Finding Shelter* |
| **3** | 3-LS1-1, 3-LS4-3, 3-LS4-4 | 2.2.e and 2.2.f. *Flowering Plants in Our Changing Environment*, 3.3.a. *Structures for Survival in a Healthy Ecosystem*, 3.3.c and 3.3.d. Living Things in Changing Environments |
| **4** | 4-LS1-1. 4-LS1-2, 4-ESS3-2 | 3.3.a. Structures for Survival in a Healthy Ecosystem, 3.3.c and 3.3.d. Living Things in Changing Environments, 4.2.b. *The Flow of Energy Through Ecosystems* |
| **5** | 5-LS2-1, 5-ESS2-1. 5-ESS3-1 | 4.2.b. *The Flow of Energy Through Ecosystems*, 4.2.c. *Life and Death with Decomposers*, 5.3.a. *Earth's Water*, 5.3.c. *Precipitation, People, and the Natural World*, 5.3.d. *Our Water: Sources and Uses* |
| **3-5** | 3-5-ETS1-2 | 4.2.c. *Life and Death with Decomposers*, 5.3.a. *Earth's Water* |
| **6** | MS-ESS3-3 | 5.3.c. *Precipitation, People, and the Natural World* |
| **7** | MS-LS2-1, MS-LS2-3, MS-LS2-4, MS-LS2-5 | 5.3.c. *Precipitation, People, and the Natural World*, 7.3.e. *Responding to Environmental Change*, 7.4.g. *Extinction: Past and Present* |
| **8** | MS-ESS3-4 | 7.3.a. *Shaping Natural Systems Through Evolution*; 7.3.e. Responding to Environmental Change, 7.4.g. *Extinction: Past and Present* |
| **Life Sci.** | HS-LS2-6, HS-LS2-7 | B.6.a. *Biodiversity: The Keystone to Live on Earth*, B.6.b. *Ecosystem Change in California*, B.8.a. *Differential Survival of Organisms*, B.8.b. *Biological Diversity: The World's Riches*, B.8.d. *The Isolation of Species*, E.4.c. *The Greenhouse Effect on Natural Systems*, E.5.d. *Ocean Current and Natural Systems*, E.7.b. *The Life and Times of Carbon*, E.9.c. *Liquid Gold: California's Water* |
| **Earth Sci.** | HS-ESS2-2, HS-ESS3-4 | B5.c. *High Tech Harvest: Genetic Engineering and the Environment*, B.6.a. *Biodiversity: The Keystone to Life on Earth*, E.4.c. *The Greenhouse Effect on Natural Systems*, E.5.d. *Ocean Current and Natural Systems*, E.5.e. *Rainforests and Deserts: Distribution, Uses, and Human Influence*, E.7.b. *The Life and Times of Carbon*, E.9.c. *Liquid Gold: California's Water* |
| **H.S. ETS** | HS-ETS1-1, HS-ETS1-2, HS-ETS1-3 | B5.c. *High Tech Harvest: Genetic Engineering and the Environment*, E.7.b. *The Life and Times of Carbon*, B.6.b. *Ecosystem Change in California*, E.4.c *The Greenhouse Effect on Natural Systems*, |

| | | |
|---|---|---|
| | | E.5.d. *Ocean Current and Natural Systems,* E.9.c. *Liquid Gold: California's Water* |

## Common Core Standards in English/Language Arts

The Common Core Standards in English/Language Arts are divided into standards for Reading, Writing, Speaking and Listening, and Language. Some of the activities in the Classroom Aquarium Education Program curriculum guide *Learning to Fish, Fishing to Learn* can help teach writing, reading, and language skills as well as speaking and listening. See that guide for more specific correlations.

Most Classroom Aquarium Education Program activities involve discussion and do support the development of speaking, listening, and language skill development. The standards at each grade level are fairly similar in the specific skills that they address, so we have not listed them for each activity.

Here is a brief summary of some of the speaking/listening and language skill standards that can be supported through the Classroom Aquarium Education Program:

**Speaking and Listening Standards (SL):**

SL1: *lower grades*: Participate in collaborative conversations with diverse partners about … topics … with peers and adults in small and larger groups.
SL1: *upper grades*: Engage effectively in … discussions
SL2: *lower grades*: Confirm understanding of … information presented orally … by asking and answering questions and requesting clarification if something is not understood.
SL2: *upper grades*: Determine main the main ideas … , Paraphrase …, Summarize …
SL3: Ask and answer questions in order to seek help, get information, or clarify something that is not understood.
SL4: *lower grades*: Describe … things and events with relevant details, expressing ideas and feelings clearly
SL4: *upper grades*: Report … on a topic … sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas …
SL6: Speak audibly and express thoughts, feelings, and ideas clearly. Produce complete sentences when appropriate …

**Language Standards (L):**

L1: Demonstrate command of the conventions of standard English grammar and usage when ... speaking.
L4: Determine or clarify the meaning of unknown and multiple-meaning words and phrases …
L6: *lower grades*: Use words and phrases acquired through conversations …
L6: *upper grades*: Acquire and use accurately grade-appropriate general academic and domain specific words and phrases …