

Alignment of the Ocean Literacy Framework to the NGSS

GRADES K THROUGH 2

Standards by Disciplinary Core Idea (DCI)	OLP 1	OLP 2	OLP 3	OLP 4	OLP 5	OLP 6	OLP 7	Specific DCI & Performance Expectations (PE)
K-2-ETS1 Engineering Design						3	3	ETS1.A, B, C
K-ESS2 Earth's Systems			4			2		ESS2.D, E; ESS3.C
K-ESS3 Earth and Human Activity				2	2	1	2	ESS3.A, B, C
K-LS1 From Molecules to Organisms: Structures and Processes					3	3		LS1.C
K-PS2 Motion and Stability: Forces and Interactions		3						PS2.B
K-PS3 Energy			4					PS3.B
1-ESS1 Earth's Place in the Universe								
1-LS1 From Molecules to Organisms: Structures and Processes					3			LS1.A, B, C
1-LS3 Heredity: Inheritance and Variation of Traits					4			LS3.A, B
1-PS4 Waves and Their Applications in Technologies for Information Transfer							3	PS4.C
2-ESS1 Earth's Place in the Universe		3						ESS1.C
2-ESS2 Earth's Systems	1	1						ESS2.A, B, C
2-LS2 Ecosystems: Interactions, Energy, and Dynamics					3			LS2.A
2-LS4 Biological Evolution: Unity and Diversity					1			LS4.D
2-PS1 Matter and Its Interactions	3							PS1.A

Explanation for Ratings

K through 2 ETS1 Engineering Design

OLP 6. This is a rating of 3 because people need to be able to design solutions to keep the ocean healthy and utilize ocean resources to improve our lives. Human interconnections with the ocean provide many examples (OLFC 6B, D, G; S&S grades K through 2, C strand) that illustrate and optimize the need for design solutions (DCI ETS1.A, B, C).

OLP 7. This is a rating of 3 because the ocean provides many examples (OLFC 7D, E, F; S&S grades K through 2, B2, B4) of engineering

challenges (DCI ETS1.A, B, C) related to ocean exploration and opportunities ahead.

K-ESS2 Earth's Systems

OLP 3. This is a rating of 4 because learners need to understand what weather is and that weather changes (DCI ESS2.D) in order to understand what causes weather (OLFC 3A, D; S&S grades K through 2, A3).

OLP 6. This is a rating of 2 because understanding biogeology and human impacts on Earth systems (DCI ESS2.E, ESS3.C) would be incomplete without inclusion of ways humans impact the ocean. People

change the environment, e.g., pollution, physical modifications (OLFC 6D, F; S&S grades K through 2, B, C1, and C3 strands), as they engage in activities to live comfortably. Everyone can make choices to reduce their impact and be responsible for caring for the ocean (OLFC 6G; S&S grades K through 2, C5 strand).

K-ESS3 Earth and Human Activity

OLP 4. This is a rating of 2 because understanding the natural resources living things need (DCI ESS3.A) is not complete without knowing that life as we know it does not exist without water (S&S grades K through 2, A). Almost all the water on Earth is in the ocean (S&S grades K through 2, B), and the ocean provided and continues to provide water, oxygen, and nutrients needed for life to exist on Earth (OLFC 4C).

OLP 5. This is a rating of 2 because understanding the natural resources living things need (DCI ESS3.A) is not complete without considering the ocean as an environment and habitat where organisms live (S&S grades K through 2, B).

OLP 6. This is a rating of 1 because human activities to live comfortably (DCI ESS3.B, C) involve use of resources from the ocean (OLFC 6B, C; S&S grades K through 2, A and B strands), and thus have an impact on the ocean (S&S grades K through 2, C strand). Everyone can make choices to reduce their impact and be responsible for caring for the ocean (OLFC 6G; S&S grades K through 2, C strand).

OLP 7. This is a rating of 2 because understanding that life on Earth depends on the ocean (OLFC 7A; S&S grades K through 2, A) and that people explore the ocean (S&S grades K through 2, B strand) are essential to understanding the natural resources that living things need to survive (DCI ESS3.A). Exploring the ocean helps us understand the health of the ocean and helps us find new medicines, food for humans, and new resources for energy for human activities (S&S grades K through 2, B2).

K-LS1 From Molecules to Organisms: Structures and Processes

OLP 5. This is a rating of 3 because the ocean (OLFC 5B, D; S&S grades K through 2, B2) provides many important examples of the organization for matter and energy flow in organisms (DCI LS1.C).

OLP 6. This is a rating of 3 because recognizing the ocean as a fundamental source of food and water (OLFC 6A, B; S&S grades K through 2, A2 and A3) is a good example of how all animals need food and all plants and algae need water and light to live and grow (DCI LS1.C).

K-PS2 Motion and Stability: Forces and Interactions

OLP 2. This is a rating of 3 because water in motion carries Earth materials from one place to another, especially in the coastal zone, leading to erosion and accretion (OLFC 2C; S&S grades K through 2, A strands). This is an important example of when objects touch or collide they push on one another and can change motion (DCI PS2.B).

K-PS3 Energy

OLP 3. This is a rating of 4 because learners need to understand that sunlight warms Earth's surface (DCI PS3.B) in order to understand the ocean absorbs heat energy from the sun (OLFC 3B).

1-ESS1 Earth's Place in the Universe

No alignment between OL and NGSS.

1-LS1 From Molecules to Organisms: Structures and Processes

OLP 5. This is a rating of 3 because there is a greater diversity of organisms in the ocean than are found on land (OLFC 5A, C, D; S&S grades K through 2, A strand). The variety of different structures and behaviors that marine organisms have to help them

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survive (S&S grades K through 2, A4) provide unique and important examples for understanding structure and function (DCI LS1.A), growth and development of organisms (DCI LS1.B), and how organisms process information for growth and survival (DCI LS1.C).

1-LS3 Heredity: Inheritance and Variation of Traits

OLP 5. This is a rating of 4 because inheritance of traits and variation of traits (DCI LS3.A, B) are building blocks for understanding the great diversity of organisms in the ocean (OLFC 5A, C; S&S grades K through 2, A strand).

1-PS4 Waves and Their Applications in Technologies for Information Transfer

OLP 7. This is a rating of 3 because existing ocean technology for exploration and communication, including sensors (e.g., side-scan, multi-beam, and lidar) that rely on sound waves for information transfer, are expanding our ability to explore the ocean and provide novel examples of information technologies and instrumentation (DCI PS4.C).

2-ESS1 Earth's Place in the Universe

OLP 2. This is a rating of 3 because the DCI, OLP, and S&S encourage direct examination of evidence to make Earth processes visible. Accretion, erosion, and associated coastline changes (OLFC 2C; S&S grades K through 2, A strands) are important examples for illuminating Earth events and timescales (DCI ESS1.C). Observing or experimenting with currents, waves, erosion, and deposition provide natural starting points for understanding these concepts.

2-ESS2 Earth's Systems

OLP 1. This is a rating of 1 because the OLP (OLFC 1A, E, and G) describe and elaborate the concept that water is found in the ocean, rivers, lakes, and ponds (DCI ESS2.C). In order for students to understand that maps show where things are located and that one can

map the shapes and kinds of land and water in any area (DCI ESS2.B), they must understand that the ocean is the defining feature on the planet (OLFC 1A; S&S grades K through 2, B). Geologic features on the ocean floor (plains, valleys, mountains, volcanoes), which are shown on bathymetric maps and are similar to those on land (OLFC 1B; S&S grades K through 2, D strand), provide important and unique examples of the shapes and kinds of land and water in any area (DCI ESS2.B).

OLP 2. This is a rating of 1 because the concept that moving water can change the shape of the land is nearly identical in the DCI (ESS2.A), OLFC 2C, and S&S grades K through 2, A strands).

2-LS2 Ecosystems: Interactions, Energy, and Dynamics

OLP 5. This is a rating of 3 because photosynthetic microbes in the ocean (OLFC 5B) are examples of primary producers that depend on water and light to grow (DCI LS2.A).

2-LS4 Biological Evolution: Unity and Diversity

OLP 5. This is a rating of 1 because the DCI introduces the concept of many different kinds of organisms living in many different places on land and water (DCI LS4.D), which is essentially the concept represented in OLFC 5A through G, and I; and in S&S grades K through 2, A and B strands, related to the diversity of life and ecosystems in the ocean.

2-PS1 Matter and Its Interactions

OLP 1. This is a rating of 3 because understanding the unique structure and properties of seawater (OLFC 1E; S&S grades K through 2, A strand) are important and instructive examples of how matter has different observable structure and properties (DCI PS1.A). The freezing point of seawater (OLFC 1E) is a good example of how the heating or cooling of a substance may cause changes that can be observed (DCI PS1.B).