

Principle I Summary

People Depend on Natural Systems.

The continuation and health of individual human lives and of human communities and societies depend on the health of the natural systems that provide essential goods and ecosystem services.

Concept A: Students need to know that the goods produced by natural systems are essential to human life and to the functioning of our economies and cultures.

Concept B: Students need to know that the ecosystem services provided by natural systems are essential to human life and to the functioning of our economies and cultures.

Concept C: Students need to know that the quality, quantity, and reliability of the goods and ecosystem services provided by natural systems are directly affected by the health of those systems.

NGSS Standard:	Concept A	Concept B	Concept C	Notes:
K-2-ETS1 Engineering Design	3	3	3	
K-ESS2 Earth's Systems	3	3	3	
K-ESS3 Earth and Human Activity	1	3	3	PE: K-ESS3-1; DCI: ESS3.A
K-LS1 From Molecules to Organisms: Structures and Processes	1	3	3	PE: K-LS1-1; DCI: LS1.C
K-PS2 Motion and Stability: Forces and Interactions	3	3	3	
K-PS3 Energy	3	1	3	DCI: PS3.B
1-ESS1 Earth's Place in the Universe	3	3	3	
1-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	
1-LS3 Heredity: Inheritance and Variation of Traits	3	3	3	
1-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	3	
2-ESS1 Earth's Place in the Universe	3	3	3	
2-ESS2 Earth's Systems	2	3	3	Concept A is a 2 because it is related to DCI ESS2.A and ESS2.C, but the DCI does not include the connection to human life called for in the concept.
2-LS2 Ecosystems: Interactions, Energy, and Dynamics	2	2	3	Concepts A and B are 2s because they are related to DCI LS2.A, but the DCI does not include the connection to human life called for in the concepts.
2-LS4 Biological Evolution: Unity and Diversity	3	3	3	
2-PS1 Matter and Its Interactions	3	3	3	
3-5-ETS1 Engineering Design	3	3	2	Concept A is a 2 because it is related to the Crosscutting Concept "Influence of Science, Engineering, and Technology on Society and the Natural World" but the CCC does not include the connection to natural systems called for in the concept.
3-ESS2 Earth's Systems	3	2	3	Concept A is a 2 because it is related to DCI ESS2.D, but the DCI does not include the connection to human life called for in the concept.
3-ESS3 Earth and Human Activity	3	3	3	
3-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	
3-LS2 Ecosystems: Interactions, Energy, and Dynamics	3	3	3	
3-LS3 Heredity: Inheritance and Variation of Traits	3	3	3	
3-LS4 Biological Evolution: Unity and Diversity	2	2	2	Concepts A, B, and C are 2s because they are related to DCI LS2.C and LS2.D, but the DCI does not include the direct connection to natural systems called for in the concept.

Principle I Summary *continued*

NGSS Standard:	Concept A	Concept B	Concept C	Notes:
3-PS2 Motion and Stability: Forces and Interactions	3	3	3	
4-ESS1 Earth's Place in the Universe	3	3	3	
4-ESS2 Earth's Systems	1	2	2	DCI ESS2.A Concept B is a 2 because it is related DCI ESS2.A, but the DCI does include the process leading to rainfall called for in the concept. Concept C is a 2 because it is related DCI ESS2.A, but the DCI does include a connection to the health of the system called for in the concept.
4-ESS3 Earth and Human Activity	1	2	3	PE 4-ESS3-1, DCI ESS3.A Concept B is a 2 because it is related to DCI ESS3.A, but the DCI does not address ecosystem services related to energy and fuel that are called for in the concept.
4-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	
4-PS3 Energy	2	3	3	Concept A is a 2 because it is related to PE 4-PS3-4, but the PE does directly address solar energy as an ecosystem service as called for in the concept.
4-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	3	
5-ESS1 Earth's Place in the Universe	3	3	3	
5-ESS2 Earth's Systems	2	2	2	Concepts A, B, and C are 2s because they are related to PE ESS2-1 and PE ESS2, but the PEs do not make the direction connection to human life called for in the concepts.
5-ESS3 Earth and Human Activity	2	2	1	PE ESS3-1 Concept A is a 2 because it is related to PE ESS3-1, but the PE does directly address specific ecosystem goods as called for in the concept. Concept B is a 2 because it is related to PE ESS3-1, but the PE does directly address specific ecosystem services as called for in the concept.
5-LS1 From Molecules to Organisms: Structures and Processes	3	2	3	Concept B is a 2 because it is related to PE 5-LS1-1, but the PE does not include the direct connection to humans as called for in the concept.
5-LS2 Ecosystems: Interactions, Energy, and Dynamics	1	1	2	PE 5-LS2-1, DCI LS2.A. Concept C is a 2 because it is related to PE LS2-1, DCI LS2.A, and DCI LS2.B, but the PE and DCIs do not address how the quality of the ecosystem goods and services change according to the health of the system as called for in the concept.
5-PS1 Matter and Its Interactions	3	3	3	
5-PS2 Motion and Stability: Forces and Interactions	3	3	3	
5-PS3 Energy	1	1	3	PE 5-PS3-1
MS-ESS1 Earth's Place in the Universe	3	3	3	
MS-ESS2 Earth's Systems	2	2	3	Concept A is a 2 because it is related to DCI ESS-2.A, DCI ESS-2.C and DCI ESS-2.D, but the DCIs do not address water a product that is essential for human life as called for in the concept. Concept B is a 2 because it is related to DCI ESS-2.A, DCI ESS-2.C and DCI ESS-2.D, but the DCIs do not address the services of the water cycle and weather as essential for human life as called for in the concept.
MS-ESS3 Earth and Human Activity	1	1	1	DCI MS-ESS3-1, DCI MS-ESS3-3 and DCI MS-ESS3-4
MS-LS1 From Molecules to Organisms: Structures and Processes	1	1	3	PE MS-LS1-6; DCI LS1.C, and DCI PS3.C
MS-LS2 Ecosystems: Interactions, Energy, and Dynamics	1	1	1	PE MSLS2-1, PE MSLS2-5, DCI LS4.D, and Crosscutting Concept "Stability and Change"

Principle I Summary *continued*

NGSS Standard:	Concept A	Concept B	Concept C	Notes:
MS-LS3 Heredity: Inheritance and Variation of Traits	3	3	3	
MS-LS4 Biological Evolution: Unity and Diversity	3	3	3	
MS-PS1 Matter and Its Interactions	3	3	3	
MS-PS2 Motion and Stability: Forces and Interactions	3	3	3	
MS-PS3 Energy	3	3	3	
MS-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	3	
MS-ETS1 Engineering Design	1	2	2	PE MS-ETS1-1 and the CCC "Influence of Science, Engineering, and Technology on Society and the Natural World." Concepts B and C are 2s because they are related to PE MS-ETS1-1, but the PE does not directly address the connection to natural systems and their health as called for in the concept.
MS-ETS1 Engineering Design	1	2	2	MS-ETS1-1 and the CCC All human activity draws on natural resources. A connection could be made to Concept B and C by linking to natural systems and their health.
HS-ESS1 Earth's Place in the Universe	2	3	3	Concept A is a 2 because it is related to DCI PS3.D, but the DCI does not include the connection to nuclear fusion as essential to human life that the concept requires.
HS-ESS2 Earth's Systems	2	2	1	PE HS-ESS2-7 and DCI ESS2.D Concepts A and B are 2s because they are related to PE HS-ESS2-5, PE HS-ESS2-7, and DCI ESS2.C and DCI ESS2.D, but the PEs and DCIs do not make the connection that the natural systems mentioned are an essential good or service for human life that the concept requires.
HS-ESS3 Earth and Human Activity	1	1	1	Concept A: HS-ESS3-1,2 3 and 6 Concept B: HS-ESS3-3 and 4, and DCI ESS3.D Concept C: HS-ESS3-4, 5, and 6, and DCI ESS3.C
HS-LS1 From Molecules to Organisms: Structures and Processes	3	1	3	PE: HS-LS2-3; DCI: LS2.B
HS-LS2 Ecosystems: Interactions, Energy, and Dynamics	1	1	1	PE: HS-LS1-1, HS-LS1-2, HS-LS1-4, HS-LS1-5, HS-LS1-6, HS-LS1-7; DCI: LS1.A, LS1.B, LS1.C
HS-LS3 Heredity: Inheritance and Variation of Traits	3	3	3	
HS-LS4 Biological Evolution: Unity and Diversity	1	1	1	DCI LS4.D
HS-PS1 Matter and Its Interactions	3	3	3	
HS-PS2 Motion and Stability: Forces and Interactions	3	3	3	
HS-PS3 Energy	3	2	3	Concept B is a 2 because it is related to PE HS-PS3-3 and DCI PS3.B, but the PE and DCI do not make the connection to human life that the concept requires.
HS-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	3	

Principle I Summary *continued*

NGSS Standard:	Concept A	Concept B	Concept C	Notes:
HS-ETS 1 Engineering Design	1	2	2	<p>CI ETS1.A</p> <p>Concept B is a 2 because it is related to DCI ETS1.A, but the DCI does not directly address specific ecosystem services as called for in the concept.</p> <p>Concept C is a 2 because it is related to DCI ETS1.A, but the DCI does not make the connection to ecosystem health as the concept requires.</p>

Key

- 1

The language (or explicit intent) of the NGSS standard is a direct or near direct match with the EP&C
- 2

The EP&C could naturally and effectively be addressed as part of this NGSS standard, but the NGSS language is not explicitly a match to the EP&C
- 3

There is no substantive match, explicit or otherwise, between the EP&C and the NGSS standard

Principle II Summary

People Influence Natural Systems

The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

Concept A. Students need to know that direct and indirect changes to natural systems due to the growth of human populations and their consumption rates influence the geographic extent, composition, biological diversity, and viability of natural systems.

Concept B. Students need to know that methods used to extract, harvest, transport, and consume natural resources influence the geographic extent, composition, biological diversity, and viability of natural systems.

Concept C. Students need to know that the expansion and operation of human communities influences the geographic extent, composition, biological diversity, and viability of natural systems

Concept D. Students need to know that the legal, economic, and political systems that govern the use and management of natural systems directly influence the geographic extent, composition, biological diversity, and viability of natural systems.

NGSS Standard:	Concept A	Concept B	Concept C	Concept D	Notes:
K-2-ETS1 Engineering Design	3	3	3	3	
K-ESS2 Earth's Systems	2	1	2	2	DCI ESS3.C Concept A is a 2 because it is related to DCI ESS3.C, but the DCI does not make the connection to population growth that the concept requires. Concept C is a 2 because it is related to DCI ESS3.C, but the DCI does not make the connection to the operation of human communities that the concept requires. Concept D is a 2 because it is related to DCI ESS3.C, but the DCI does not make the connection to decision-making that the concept requires.
K-ESS3 Earth and Human Activity	1	1	1	2	PE: K-ESS3-3. DCI: ESS3-C, ESS3.A Concept D is a 2 because it is related to PE K-ESS3-3, DCI ESS3-C, and DCI ESS3.A, but the PE and DCIs do not make the connection to decision-making that the concept requires.
K-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	3	
K-PS2 Motion and Stability: Forces and Interactions	3	3	3	3	
K-PS3 Energy	3	3	3	3	
1-ESS1 Earth's Place in the Universe	3	3	3	3	
1-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	3	
LS3 Heredity: Inheritance and Variation of Traits	3	3	3	3	
1-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	3	3	
2-ESS1 Earth's Place in the Universe	3	3	3	3	
2-ESS2 Earth's Systems	3	3	2	3	Concept C is a 2 because it is related to PE ESS2-1, but the PE does not make the connection to the operation of human communities that the concept requires.
2-LS2 Ecosystems: Interactions, Energy, and Dynamics	3	3	3	3	
2-LS4 Biological Evolution: Unity and Diversity	3	3	3	3	
2-PS1 Matter and Its Interactions	3	3	3	3	
3-5-ETS1 Engineering Design	2	2	2	3	Concepts A, B, C are 2s because they are related to the PE: 3-5-ETS1-1, but the PE does not make the connection to natural systems that the concepts require.

Principle II Summary *continued*

NGSS Standard:	Concept A	Concept B	Concept C	Concept D	Notes:
3-ESS2 Earth's Systems	3	3	3	3	
3-ESS3 Earth and Human Activity	3	3	3	3	
3-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	3	
3-LS2 Ecosystems: Interactions, Energy, and Dynamics	3	3	3	3	
3-LS3 Heredity: Inheritance and Variation of Traits	3	3	3	3	
3-LS4 Biological Evolution: Unity and Diversity	3	3	3	3	
3-PS2 Motion and Stability: Forces and Interactions	3	3	3	3	
4-ESS1 Earth's Place in the Universe	3	3	3	3	
4-ESS2 Earth's Systems	2	2	2	2	Concepts A, B, C, and D are 2s because they are related to DCI ESS2.E, but the DCI does not make the connection to human impacts that the concepts require.
4-ESS3 Earth and Human Activity	2	1	2	3	ESS3.A Concept A is a 2 because it is related to DCI ESS3.A, but the DCI does not make the connection to population growth that the concept requires. Concept C is a 2 because it is related to DCI ESS3.A, but the DCI does not make the connection to the operation of human communities that the concept requires.
4-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	3	
4-PS3 Energy	3	3	3	3	
4-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	3	3	
5-ESS1 Earth's Place in the Universe	3	3	3	3	
5-ESS2 Earth's Systems	3	3	3	3	
5-ESS3 Earth and Human Activity	2	1	1	2	PE: 5-ESS3-1, DCI: ESS3.C Concept A is a 2 because it is related to PE 5-ESS3-1 and DCI ESS3.C, but the PE and DCI do not make the connection to population growth that the concept requires. Concept D is a 2 because it is related to PE 5-ESS3-1 and DCI ESS3.C, but the DCI do not make the connection to decision-making that the concept requires.
5-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	3	
5-LS2 Ecosystems: Interactions, Energy, and Dynamics	3	3	3	3	
5-PS1 Matter and Its Interactions	3	3	3	3	
5-PS2 Motion and Stability: Forces and Interactions	3	3	3	3	
5-PS3 Energy	3	3	3	3	
MS-ESS1 Earth's Place in the Universe	3	3	3	3	
MS-ESS2 Earth's Systems	3	3	3	3	
MS-ESS3 Earth and Human Activity	1	1	1	1	PE: MS-ESS3-4, MS-ESS3-5; DCI: ESS3.A, ESS3.C, ESS3.D and The Crosscutting Concept "Influence of Science, Engineering, and Technology on Society and the Natural World"

Principle II Summary *continued*

NGSS Standard:	Concept A	Concept B	Concept C	Concept D	Notes:
MS-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	3	
MS-LS2 Ecosystems: Interactions, Energy, and Dynamics	2	2	2	2	Concepts A, B, C, and D are 2s because they are related to PE MS-LS2-5, but the PE does not make the connection to human impacts that the concepts require.
MS-LS3 Heredity: Inheritance and Variation of Traits	3	3	3	3	
MS-LS4 Biological Evolution: Unity and Diversity	3	3	2	2	Concepts C and D are 2s because they are relate to DCI LS4.B, but the DCI does not include a connection to human impacts such as how human selection has effected natural systems over time or the impact of GMOs on biodiversity, that the concepts require.
MS-PS1 Matter and Its Interactions	3	3	3	3	
MS-PS2 Motion and Stability: Forces and Interactions	3	3	3	3	
MS-PS3 Energy	3	3	3	3	
MS-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	3	3	
MS-ETS1 Engineering Design	2	2	2	2	PE MS-ETS1-1 Concept A is a 2 because it is related to PE MS-ETS1-1, but the PE does not make the connection to population growth that the concept requires. Concept B is a 2 because it is related to PE MS-ETS1-1, but the PE does not make the connection to the extraction of resources that the concept requires. Concept C is a 2 because it is related to PE MS-ETS1-1, but the PE does not make the connection to the operation of human communities that the concept requires. Concept D is a 2 because it is related to PE MS-ETS1-1, but the PE does not make the connection to decision-making that the concept requires.
HS-ESS1 Earth's Place in the Universe	3	3	3	3	
HS-ESS2 Earth's Systems	2	2	2	2	Concepts A, B, C, and D are 2s because they are related to DCI ESS2.D, but the PE does not make the connection to human impacts that the concepts require.
HS-ESS3 Earth and Human Activity	1	1	1	1	PE: HS-ESS3-3, HS-ESS3-4, HS-ESS3-6; DCI: ESS3.A, ESS3.C
HS-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	3	
HS-LS2 Ecosystems: Interactions, Energy, and Dynamics	1	1	1	2	DCI: LS2.A LS2.C, LS4.D Concept D is a 2 because it is related to DCIs LS2.A, LS2.C, LS4.D, but the DCIs do not make the connection to decision-making that the concept requires.
HS-LS3 Heredity: Inheritance and Variation of Traits	3	3	3	3	
HS-LS4 Biological Evolution: Unity and Diversity	1	1	1	2	DCI LS4.D Concept D is a 2 because it is related to DCI LS4.D, but the DCI does not make the connection to decision-making that the concept requires.
HS-PS1 Matter and Its Interactions	3	3	3	3	
HS-PS2 Motion and Stability: Forces and Interactions	3	3	3	3	
HS-PS3 Energy	3	3	3	3	
HS-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	3	3	

Principle II Summary *continued*

NGSS Standard:	Concept A	Concept B	Concept C	Concept D	Notes:
HS-ETS 1 Engineering Design	2	1	2	2	PE: HS-ETS1-3, DCI: ETS1.A Concept A is a 2 because it is related to PE HS-ETS1-3 and DCI ETS1.A, but the PE and DCI do not include a connection to population growth which the concept requires. Concept C is a 2 because it is related to PE HS-ETS1-3 and DCI ETS1.A, but the PE and DCI do not include a connection to the operation of human communities which the concept requires. Concept D is a 2 because it is related to PE HS-ETS1-3 and DCI ETS1.A, but the PE and DCI do not include a connection to decision-making which the concept requires.

Key

- 1 The language (or explicit intent) of the NGSS standard is a direct or near direct match with the EP&C
- 2 The EP&C could naturally and effectively be addressed as part of this NGSS standard, but the NGSS language is not explicitly a match to the EP&C
- 3 There is no substantive match, explicit or otherwise, between the EP&C and the NGSS standard

Principle III Summary

Natural Systems Change in Ways that People Benefit from and can Influence

Natural systems proceed through cycles that humans depend upon, benefit from, and can alter.

Concept A. Students need to know that natural systems proceed through cycles and processes that are required for their functioning.

Concept B. Students need to know that human practices depend upon and benefit from the cycles and processes that operate within natural systems.

Concept C. Students need to know that human practices can alter the cycles and processes that operate within natural systems.

NGSS Standard:	Concept A	Concept B	Concept C	Notes:
K-2-ETS1 Engineering Design	2	2	2	Concepts A, B, and C are 2s because they are related to PEs K-2-ETS1-1, -2 and -3, but the PEs do not make the connection to natural systems that the concepts require.
K-ESS2 Earth's Systems	1	2	1	PE ESS3-3, DCI ESS3.C. Concept B is a 2 because it is related to PE K-ESS2-2 and DCI ESS3.C, but the PE and DCI do not make the connection to change over time that the concept requires.
K-ESS3 Earth and Human Activity	1	1	1	PE K-ESS3-1, PE K-ESS3-3
K-LS1 From Molecules to Organisms: Structures and Processes	1	1	3	DCI LS1.C
K-PS2 Motion and Stability: Forces and Interactions	3	3	3	
K-PS3 Energy	3	3	3	
1-ESS1 Earth's Place in the Universe	1	2	3	1-ESS1-1 Concept B is a 2 because it is related to DCI ESS1.B, but the DCI does not make the connection to human practices that the concept requires.
1-LS1 From Molecules to Organisms: Structures and Processes	1	1	3	DCI LS1.D
1-LS3 Heredity: Inheritance and Variation of Traits	3	3	3	
1-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	3	
2-ESS1 Earth's Place in the Universe	3	3	3	
2-ESS2 Earth's Systems	1	2	1	PE 2-ESS2-1, DCI ESS2.A, and DCI ESS2.C Concept B is a 2 because it is related to DCI ESS2.A, and DCI ESS2.C, but the DCIs do not make the connection to human practices that the concept requires.
2-LS2 Ecosystems: Interactions, Energy, and Dynamics	1	1	3	DCI LS2.A
2-LS4 Biological Evolution: Unity and Diversity	3	3	3	
2-PS1 Matter and Its Interactions	3	3	3	
3-5-ETS1 Engineering Design	2	2	2	Concepts A, B, and C are 2s because they are related to PE 3-5-ETS1-1, PE 3-5-ETS1-2, and PE 3-5-ETS1-3, but the PEs do not have an explicit connection to natural systems that the concepts require.
3-ESS2 Earth's Systems	1	2	3	DCI ESS2.D Concept B is a 2 because it is related to DCI ESS2.D, but the DCI does not make the connection to human practices that the concept requires.
3-ESS3 Earth and Human Activity	3	3	3	
3-LS1 From Molecules to Organisms: Structures and Processes	1	2	3	PE 3-LS1-1, DCI LS1.B Concept B is a 2 because it is related to the PE 3-LS1-1 DCI LS1.B, but the PE and DCI does not make the connection to human practices that the concept requires.
3-LS2 Ecosystems: Interactions, Energy, and Dynamics	2	2	3	Concept A and B are 2s because they are related to DCI LS2.D, but the DCI does not the connection to human practices that the concept requires.

Principal III Summary *continued*

NGSS Standard:	Concept A	Concept B	Concept C	Notes:
3-LS3 Heredity: Inheritance and Variation of Traits	3	3	3	
3-LS4 Biological Evolution: Unity and Diversity	1	2	2	DCI LS4.D Concept B and C are 2s because they are related to DCI LS4.D, but the DCI does not make the connection to human practices that the concept requires.
3-PS2 Motion and Stability: Forces and Interactions	3	3	3	
4-ESS1 Earth's Place in the Universe	2	3	3	Concept A is a 2 because it is related to DCI ESS1.C, but the DCI does not make an explicit connection to cycles, such as the rock cycle, that the concept requires.
4-ESS2 Earth's Systems	1	2	2	DCI ESS2.A Concepts B and C are 2s because they are related to DCI ESS2.A, but the DCI does not make the connection to human practices that the concept requires.
4-ESS3 Earth and Human Activity	2	1	1	PE 4-ESS3-1 and 4-ESS3-2. Concept A is a 2 because it is related to DCI ESS3.B, but the DCI does not make a connection to specific natural cycles that the concept requires.
4-LS1 From Molecules to Organisms: Structures and Processes	1	1	3	PE 4-LS1-1
4-PS3 Energy	3	3	3	
4-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	3	
5-ESS1 Earth's Place in the Universe	1	2	3	DCI ESS1.B Concept B is a 2 because it is related to DCI ESS1.B, but the DCI does not make the connection to human benefits that the concept requires.
5-ESS2 Earth's Systems	1	2	2	PE 5-ESS2-1 Concept B is a 2 because it is related to PE 5-ESS2-1, but the PE does not make the connection to human benefits that the concept requires. Concept C is a 2 because it is related to PE 5-ESS2-1, but the PE does not make the connection to human influence that the concept requires.
5-ESS3 Earth and Human Activity	3	1	1	PE 5-ESS3-1
5-LS1 From Molecules to Organisms: Structures and Processes	2	2	3	Concept A is a 2 because it is related to PE 5-LS1-1 and DCI LS1.C, but the PE and DCI do not make the connection to natural systems that the concept requires. Concept B is a 2 because it is related to PE 5-LS1-1 and DCI LS1.C, but the PE and DCI do not make the connection to human practices that the concept requires.
5-LS2 Ecosystems: Interactions, Energy, and Dynamics	1	1	2	Concept A: DCI LS2.B; Concept B: LS2.A Concept C is a 2 because it is related to PE 5-LS2-1 and DCI LS2.A, but the PE and DCI do not make the connection to human practices that the concept requires.
5-PS1 Matter and Its Interactions	3	3	3	
5-PS2 Motion and Stability: Forces and Interactions	3	3	3	
5-PS3 Energy	1	1	3	PE 5-PS3-1
MS-ESS1 Earth's Place in the Universe	1	2	3	PE MS-ESS1-1 Concept B is a 2 because it is related to PE MS-ESS1-1, but the PE does not make the connection to human practices that the concept requires.
MS-ESS2 Earth's Systems	1	2	2	PE MS-ESS2-4, DCI ESS2-C, and DCI ESS2-D Concept B and C are 2s because they relate to PE MS-ESS2-4, DCI ESS2-C, and DCI ESS2-D, but the PE and DCIs do not make the connection to human practices that the concepts require.
MS-ESS3 Earth and Human Activity	1	1	1	DCI ESS3-A, DCI ESS3-C, DCI ESS3-D
MS-LS1 From Molecules to Organisms: Structures and Processes	1	1	3	PE MS-LS1-2, PE MS-LS1-4, PE MS-LS1-6

Principal III Summary *continued*

NGSS Standard:	Concept A	Concept B	Concept C	Notes:
MS-LS2 Ecosystems: Interactions, Energy, and Dynamics	1	1	2	Concept A: PE MS-LS2-3 and DCI LS2.B; Concept B: DCI LS4.D Concept C is a 2 because it is related to PE MS-LS2-3, DCI LS2.B, and DCI LS4.D, but the PE and DCI do not make the connection to how human practices influence natural systems that the concept requires.
MS-LS3 Heredity: Inheritance and Variation of Traits	2	2	3	Concept A is a 2 because it is related to PE MS-LS3-1, DCI LS1.B, DCI LS3.A, and DCI LS3.B, but the PE and DCIs do not make the connection to natural systems that the concept requires. Concept B is a 2 because it is related to PE MS-LS3-1, DCI LS1.B, DCI LS3.A, and DCI LS3.B, but the PE and DCIs do not make the connection to human practices that the concept requires.
MS-LS4 Biological Evolution: Unity and Diversity	1	2	1	Concept A: MS-LS4-3; Concept C: PE MS-LS4-5 and DCI LS4.B Concept B is a 2 because it is related to PE MS-LS4-1, PE MS-LS4-4, and MS-LS4-6, DCI LS4.B, and DCI LS4.C, but the PEs and DCIs do not make the connection to human practices that the concept requires.
MS-PS1 Matter and Its Interactions	2	2	3	Concept A is a 2 because it is related to PE MS-PS1-3, but the PE does not make the connection to specific cycles and process that the concept requires. Concept B is a 2 because it is related to PE MS-PS1-3, but the PE does not make the connection to human benefits that the concept requires.
MS-PS2 Motion and Stability: Forces and Interactions	2	2	3	Concept A is a 2 because it is related to PE MS-PS2-4 and DCI PS2.B, but the PE and DCI do not make the connection to natural systems that the concept requires. Concept B is a 2 because it is related to PE MS-PS2-4 and DCI PS2.B, but the PE and DCI do not make the connection to human practices that the concept requires.
MS-PS3 Energy	1	2	3	PE MS-PS3-2 and PE MS-PS3-3 Concept B is a 2 because it is related to PE MS-PS3-2 and PE MS-PS3-3, but the PEs do not make the connection to human practices that the concept requires.
MS-PS4 Waves and Their Applications in Technologies for Information Transfer	1	2	3	PE MS-PS4-1, DCI PS4.A, and DCI P4.B. Concept B is a 2 because it is related to DCI PS4.C, but the DCI does not make the connection to human practices that the concept requires.
MS-ETS1 Engineering Design2	2	1	1	PE ETS1-1 Concept A is a 2 because it is related to PE ETS1-1, but the PE does not make the connection to specific natural cycles or processes that the concept requires.
HS-ESS1 Earth's Place in the Universe	1	2	3	PE HS-ESS1-1, PE HS-ESS1-3, DCI ESS1.A, DCI ESS1.C, DCI ESS2.B, DCI PS1.C, DCI PS3.D, DCI PS4.B Concept B is a 2 because it is related to PE HS-ESS1-1, PE HS-ESS1-3, DCI ESS1.A, DCI ESS1.C, DCI ESS2.B, DCI PS1.C, DCI PS3.D, DCI PS4.B, but the PEs and DCIs do not make the connection to human practices that the concept requires.
HS-ESS2 Earth's Systems	1	1	1	PE HS-ESS2-6, PE HS-ESS2-7, PE HS-ESS2-4, PE HS-ESS2-3, PE HS-ESS2-2
HS-ESS3 Earth and Human Activity	1	1	1	PE HS-ESS3-4, PE HS-ESS3-5, PE HS-ESS3-6, PE HS-ESS3-3, PE HS-ESS3-2
HS-LS1 From Molecules to Organisms: Structures and Processes	1	1	3	PE HS-LS1-1, PE HS-LS1-2
HS-LS2 Ecosystems: Interactions, Energy, and Dynamics	1	1	1	PE HS-LS2-5, PE HS-LS2-8, PE HS-LS2-7
HS-LS3 Heredity: Inheritance and Variation of Traits	1	2	3	DCI LS3.B Concept B is a 2 because it is related to DCI LS3:B, but the DCI does not make the connection to human practices that the concept requires.
HS-LS4 Biological Evolution: Unity and Diversity	1	1	1	DCI LS4.D
HS-PS1 Matter and Its Interactions	2	3	3	Concept A is a 2 because it is related to PE HS-PS1-6 and DCI PS1.B, but the PE and DCI do not make the connection to natural systems that the concept requires.

Principal III Summary *continued*

NGSS Standard:	Concept A	Concept B	Concept C	Notes:
HS-PS2 Motion and Stability: Forces and Interactions	2	2	3	Concept A is a 2 because it is related to DCI PS2.A, DCI PS2.B, and DCI PS3.A, but the DCIs do not make the connection to natural systems that the concept requires. Concept B is a 2 because it is related to DCI PS2.A, DCI PS2.B, and DCI PS3.A, but the DCIs do not make the connection to human practices that the concept requires.
HS-PS3 Energy	1	2	3	DCI PS3.B Concept B is a 2 because it is related to DCI PS3.B, but the DCI does not make the connection to human practices that the concept requires.
HS-PS4 Waves and Their Applications in Technologies for Information Transfer	2	2	3	Concept A is a 2 because it is related to DCI PS4.B, but the DCI does not make the connection to natural systems that the concept requires. Concept B is a 2 because it is related to DCI PS4.B, but the DCI does not make the connection to human practices that the concept requires. DCI PS4.B
HS-ETS 1 Engineering Design	2	1	1	DCI ETS1.A Concept A is a 2 because it is related to DCI PS4.B, but the DCI does not make an explicit connection to natural systems that the concept requires.

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Principle IV Summary

There are no Permanent or Impermeable Boundaries that Prevent Matter from Flowing Between Systems

The exchange of matter between natural systems and human societies affects the long-term functioning of both.

Concept A. Students need to know that the effects of human activities on natural systems are directly related to the quantities of resources consumed and to the quantity and characteristics of the resulting byproducts.

Concept B. Students need to know that the byproducts of human activity are not readily prevented from entering natural systems and may be beneficial, neutral, or detrimental in their effect.

Concept C. Students need to know that the capacity of natural systems to adjust to human-caused alterations depends on the nature of the system as well as the scope, scale, and duration of the activity and the nature of its byproducts.

NGSS Standard:	Concept A	Concept B	Concept C	Notes:
K-2-ETS1 Engineering Design	3	3	3	
K-ESS2 Earth's Systems	3	3	3	
K-ESS3 Earth and Human Activity	1	3	3	PE K-ESS3-3, DCI ESS3.C
K-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	
K-PS2 Motion and Stability: Forces and Interactions	3	3	3	
K-PS3 Energy	3	3	3	
1-ESS1 Earth's Place in the Universe	3	3	3	
1-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	
1-LS3 Heredity: Inheritance and Variation of Traits	3	3	3	
1-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	3	
2-ESS1 Earth's Place in the Universe	3	3	3	
2-ESS2 Earth's Systems	3	3	3	
2-LS2 Ecosystems: Interactions, Energy, and Dynamics	3	3	3	
2-LS4 Biological Evolution: Unity and Diversity	3	3	3	
2-PS1 Matter and Its Interactions	3	3	3	
3-5-ETS1 Engineering Design	2	2	2	Concepts A, B, and C are 2s because they are related to the DCI ETS1.A and the Crosscutting Concept, but the DCI and CCC do not explicitly make the connection to natural systems and human activities that the concepts require.
3-ESS2 Earth's Systems	3	3	3	
3-ESS3 Earth and Human Activity	3	3	3	
3-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	
3-LS2 Ecosystems: Interactions, Energy, and Dynamics	3	3	3	
3-LS3 Heredity: Inheritance and Variation of Traits	3	3	3	
3-LS4 Biological Evolution: Unity and Diversity	3	3	3	
3-PS2 Motion and Stability: Forces and Interactions	3	3	3	

Principle IV Summary *continued*

NGSS Standard:	Concept A	Concept B	Concept C	Notes:
4-ESS1 Earth's Place in the Universe	3	3	3	
4-ESS2 Earth's Systems	3	3	3	
4-ESS3 Earth and Human Activity	1	2	2	PE 4-ESS3-1 and DCI ESS3.A Concept B is a 2 because it is related to DCI ESS3.A, but the DCI does not make the connection to how byproducts of human activity enter natural systems. Concept C is a 2 because it is related to DCI ESS3.A, but the DCI does not make the connection to the standard doesn't specifically mention that the resiliency of natural systems that the concept requires.
4-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	
4-PS3 Energy	3	3	3	
4-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	3	
5-ESS1 Earth's Place in the Universe	3	3	3	
5-ESS2 Earth's Systems	3	2	3	Concept B is a 2 because it is related to PE 5-ESS2-1 and DCI ESS2.A, but the PE and DCI do not make the connection to byproducts of human activity and how it enters natural systems that the concept requires.
5-ESS3 Earth and Human Activity	2	2	2	Concepts A, B, and C are 2s because they are related to PE 5-ESS3-1 and DCI ESS3.C, but the PE and DCI do not make the connection to byproducts and impacts of human activity that the concepts require.
5-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	
5-LS2 Ecosystems: Interactions, Energy, and Dynamics	3	2	3	Concept B is a 2 because it is related to PE 5-LS2-1 and DCI LS2.B, but the PE and DCI do not make the connection to human activities that the concept requires.
5-PS1 Matter and Its Interactions	3	2	3	Concept B is a 2 because it is related to PE 5-PS-1 and PE 5-PS1-2, but the PEs do not make the connection to human activity that concept requires.
5-PS2 Motion and Stability: Forces and Interactions	3	3	3	
5-PS3 Energy	3	3	3	
MS-ESS1 Earth's Place in the Universe	3	3	3	
MS-ESS2 Earth's Systems	3	2	3	Concept B is a 2 because it is related to PE MS-ESS2-1, PE MS-ESS2-4, DCI ESS2.A, and DCI ESS2.C, but the PEs and DCIs do not make the connection to human activity that concept requires.
MS-ESS3 Earth and Human Activity	1	1	1	Concept A: PE ESS3-1, -3, -4, -5; DCI ESS3.A, ESS3.C, ESS3.D Concept B: PE ESS3-3, -4, -5; DCI ESS3.C, ESS3.D Concept C: PE ESS3-3, -4; DCI ESS3.C, ESS3.D
MS-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	

Principle IV Summary *continued*

NGSS Standard:	Concept A	Concept B	Concept C	Notes:
MS-LS2 Ecosystems: Interactions, Energy, and Dynamics	2	2	2	Concept A is a 2 because it is related to DCI LS4.D, but the DCI does not make the connection to human activities that the concept requires. Concept B is a 2 because it is related to DCI LS2.B, but the DCI does not make the connection to human activities that the concept requires. Concept C is a 2 because it is related to DCI LS4.C, but the DCI does not make the connection to human activities that the concept requires.
MS-LS3 Heredity: Inheritance and Variation of Traits	3	2	2	Concept B is a 2 because it is related to DCI LS3.A, but the DCI does not make the connection to human activity (such as genetically modified foods) that the concept requires. Concept C is a 2 because it is related to DCI LS3.A, but the DCI does not make the connection to human activity and natural system resiliency that the concept requires.
MS-LS4 Biological Evolution: Unity and Diversity	3	2	2	Concept B is a 2 because it is related to PE LS4-5, but the PE does not make the connection to human activities that the concept requires. Concept C is a 2 because it is DCI LS3.B, but the DCI does not make the connection to human activity and natural system resiliency that the concept requires.
MS-PS1 Matter and Its Interactions	3	3	3	
MS-PS2 Motion and Stability: Forces and Interactions	3	3	3	
MS-PS3 Energy	3	3	3	
MS-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	3	
MS-ETS1 Engineering Design ²	2	1	2	PE ETS1-1 and Crosscutting Concept "Influence of Science, Engineering, and Technology on Society and the Natural World" Concept A is a 2 because it is related to PE ETS1-1, but the PE does not make the connection to specific constraints and criteria that the concept requires. Concept C is a 2 because it is related to the Crosscutting Concept, but the Crosscutting Concept does not make the connection to capacity, scope, scale, and duration that the concept requires.
HS-ESS1 Earth's Place in the Universe	3	3	3	
HS-ESS2 Earth's Systems	1	1	1	Concept A: PE HS-ESS2-2, ESS2-6 and DCI ESS2.D Concept B: PE HS-ESS2-2, ESS2-4, ESS2-6, and DCI ESS2.D Concept C: PE ESS2-2 and DCI ESS2.D
HS-ESS3 Earth and Human Activity	1	1	1	Concept A: PE ESS3-1, -3, -6; and DCI ESS2.D, ESS3.A, ESS3.C, ESS3.D Concept B: PE ESS3-4, -5, -6, and ESS2.D, ESS3.A; and DCI ESS3.C, ESS3.D Concept C: PE ESS3-5, -6
HS-LS1 From Molecules to Organisms: Structures and Processes	3	3	3	
HS-LS2 Ecosystems: Interactions, Energy, and Dynamics	1	2	1	Concept A: PE LS2-6, -7, and DCI LS2.C Concept C: PE LS2,-2 and DCI LS2.C Concept B is a 2 because it is related to DCI LS4.D, but the DCI does not make the connection to the resiliency of natural systems or the earth as a system that the concept requires.
HS-LS3 Heredity: Inheritance and Variation of Traits	3	3	3	
HS-LS4 Biological Evolution: Unity and Diversity	1	2	1	Concept A: PE LS4-5, -6 and DCI LS4.C, LS4.D Concept C: DCI LS4.C Concept B is a 2 because it is related to DCI LS4.D, but the DCI does not make the connection to how byproducts of human activity enter and impact natural systems.
HS-PS1 Matter and Its Interactions	2	3	3	Concept A is a 2 because it is related to PE HS-PS1-7, but the PE does not make the connection to human activity that the concept requires.

Principle IV Summary *continued*

NGSS Standard:	Concept A	Concept B	Concept C	Notes:
HS-PS2 Motion and Stability: Forces and Interactions	3	3	3	
HS-PS3 Energy	3	3	3	
HS-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	3	
HS-ETS 1 Engineering Design	2	2	2	Concepts A, B, and C are 2's because they are related to PE HS-ETS1-1, PE HS-ETS1-2, PE HS-ETS1-3, PE HS-ETS1-4, and the Crosscutting Concept "Influence of Science, Engineering, and Technology on Society and the Natural World", but the PEs and CCC do not require the connection to human activity that the concepts require.

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Principle V Summary

Decisions Affecting Resources and Natural Systems are Complex and Involve Many Factors

Decisions affecting resources and natural systems are based on a wide range of considerations and decision-making processes.

Concept A. Students need to know the spectrum of what is considered in making decisions about resources and natural systems and how those factors influence decisions..

Concept B. Students need to know the process of making decisions about resources and natural systems, and how the assessment of social, economic, political, and environmental factors has changed over time.

NGSS Standard:	Concept A	Concept B	Notes:
K-2-ETS1 Engineering Design	2	3	Concept A is a 2 because it is related to PE K-2-ETS1-1, PE K-2-ETS1-2, and PE K-2-ETS1-3, but the PEs do not make the direct connection to resources and natural systems that the concept requires.
K-ESS2 Earth's Systems	1	2	DCI ESS3.C Concept B is a 2 because it is related to DCI ESS3.C, but the DCI does not make the connection to the historical context or political process that the concept requires.
K-ESS3 Earth and Human Activity	1	2	PE ESS3-3 and DCI ESS3.C Concept B is a 2 because it is related to DCI ESS3.C, but the DCI does not make the connection to the historical context or political process that the concept requires.
K-LS1 From Molecules to Organisms: Structures and Processes	3	3	
K-PS2 Motion and Stability: Forces and Interactions	3	3	
K-PS3 Energy	3	3	
1-ESS1 Earth's Place in the Universe	3	3	
1-LS1 From Molecules to Organisms: Structures and Processes	3	3	
1-LS3 Heredity: Inheritance and Variation of Traits	3	3	
1-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	
2-ESS1 Earth's Place in the Universe	3	3	
2-ESS2 Earth's Systems	2	3	Concept A is a 2 because it is related to DCI ETS1.C, but the DCI does not make the direct connection to resources and natural systems that the concept requires.
2-LS2 Ecosystems: Interactions, Energy, and Dynamics	3	3	
2-LS4 Biological Evolution: Unity and Diversity	3	3	
2-PS1 Matter and Its Interactions	3	3	
3-5-ETS1 Engineering Design	2	2	Concept A is a 2 because it is related to DCI ETS1.B, but the DCI does not make the direct connection to resources and natural systems that the concept requires. Concept B is a 2 because it is related to PE 3-5-ETS1-1, PE 3-5-ETS1-2, and PE 3-5-ETS1-3, but the PEs do not make a direct connection to resources and natural system that the concept requires.
3-ESS2 Earth's Systems	3	3	
3-ESS3 Earth and Human Activity	2	2	Concept A is a 2 because it is related to PE 3-ESS3-1, but the PE does not make a direct connection to factors that influence decision-making that the concept requires. Concept B is a 2 because it is related to PE 3-ESS3-1, but the PE does not make a direct connection to decision-making over time that the concept requires.
3-LS1 From Molecules to Organisms: Structures and Processes	3	3	
3-LS2 Ecosystems: Interactions, Energy, and Dynamics	3	3	

Principle V Summary *continued*

NGSS Standard:	Concept A	Concept B	Notes:
3-LS3 Heredity: Inheritance and Variation of Traits	3	3	
3-LS4 Biological Evolution: Unity and Diversity	2	2	Concept A and B are 2s because they are related to PE LS4-3, DCI LS4.D, and DCI LS2.C, but the PE and DCIs do not make the connection to decision-making and human activity that the concepts require.
3-PS2 Motion and Stability: Forces and Interactions	3	3	
4-ESS1 Earth's Place in the Universe	3	3	
4-ESS2 Earth's Systems	3	3	
4-ESS3 Earth and Human Activity	1	2	PE ESS3-1 Concept B is a 2 because it is related to PE ESS3-1, but the PE does not make the connection to change over time that the concept requires.
4-LS1 From Molecules to Organisms: Structures and Processes	3	3	
4-PS3 Energy	2	3	Concept A is a 2 because it is related to PE 4-PS3-4, but the PE does not make the connection to the natural world that the concept requires.
4-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	
5-ESS1 Earth's Place in the Universe	3	3	
5-ESS2 Earth's Systems	3	3	
5-ESS3 Earth and Human Activity	1	1	Concept A: PE ESS3-1; Concept B: DCI ESS3.C
5-LS1 From Molecules to Organisms: Structures and Processes	3	3	
5-LS2 Ecosystems: Interactions, Energy, and Dynamics	3	3	
5-PS1 Matter and Its Interactions	3	3	
5-PS2 Motion and Stability: Forces and Interactions	3	3	
5-PS3 Energy	3	3	
MS-ESS1 Earth's Place in the Universe	3	3	
MS-ESS2 Earth's Systems	3	3	
MS-LS1 From Molecules to Organisms: Structures and Processes	3	3	PE MS-ESS3-1, -2, -3, -4, -5; DCI ESS3.A, .B, .C, .D
MS-LS2 Ecosystems: Interactions, Energy, and Dynamics	1	2	PE LS2-5 Concept B is a 2 because it is related to PE LS2-5, but the PE does not make the direct connection to change over time and the political context of environmental decision-making that the concept requires.
MS-LS3 Heredity: Inheritance and Variation of Traits	3	3	
MS-LS4 Biological Evolution: Unity and Diversity	2	3	Concept A is a 2 because it is related to PE LS4-5, but the PE does not make the connection to decision-making that the concept requires.
MS-PS1 Matter and Its Interactions	3	3	
MS-PS2 Motion and Stability: Forces and Interactions	3	3	
MS-PS3 Energy	3	3	

Principle V Summary *continued*

NGSS Standard:	Concept A	Concept B	Notes:
MS-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	
MS-ETS1 Engineering Design	1	2	PE MS-ETS1-1, and Crosscutting Concept “Influence of Science, Engineering, and Technology on Society and Natural World” Concept B is a 2 because it is related to the PE MS-ETS1-1, but the PE does not make the connection to change over time and the political context of environmental decision-making that the concept requires.
HS-ESS1 Earth’s Place in the Universe	3	3	
HS-ESS2 Earth’s Systems	1	2	PE ESS2-2 and Crosscutting Concept “Influence of Science, Engineering, Technology and Science on Society and the Natural World” Concept B is a 2 because it is related to PE ESS2-2, but the PE does not make the connection to the political context of environmental decision-making that the concept requires.
HS-ESS3 Earth and Human Activity	1	2	PE ESS3-1 and DCI ESS3.C and Crosscutting Concept “Influence of Science, Engineering, Technology and Science on Society and the Natural World” Concept B is a 2 because it is related to PE ESS3-1 and DCI ESS3.C, but the PE and DCI do not make the connection to change over time and the political context of environmental decision-making that the concept requires.
HS-LS1 From Molecules to Organisms: Structures and Processes	3	3	
HS-LS2 Ecosystems: Interactions, Energy, and Dynamics	1	2	PE LS2-7, DCI ETS1.B, DCI LS4.D and Science and Engineering Practice “Constructing Explanations and Design Solutions” Concept B is a 2 because it is related to PE LS2-7, DCI ETS1.B, and DCI LS4.D, but the PE and DCIs do not make the connection to change over time that the concept requires.
HS-LS3 Heredity: Inheritance and Variation of Traits	3	3	
HS-LS4 Biological Evolution: Unity and Diversity	1	2	PE LS4-5, -6 Concept B is a 2 because it is related to PE LS4-5 and PE LS4-6, but the PEs do not make the connection to change over time and the political context of environmental decision-making that the concept requires.
HS-PS1 Matter and Its Interactions	3	3	
HS-PS2 Motion and Stability: Forces and Interactions	3	3	
HS-PS3 Energy	2	3	Concept A is a 2 because it is related to PE PS3-3, but the PE does not make the connection to change over time and the political context of environmental decision-making that the concept requires.
HS-PS4 Waves and Their Applications in Technologies for Information Transfer	3	3	
HS-ETS 1 Engineering Design	1	2	PE ETS1-3, DCI ETS1.A, and the Crosscutting Concept “Influence of Science, Engineering, Technology and Science on Society and the Natural World” Concept B is a 2 because it is related to PE ETS1-3 and DCI ETS1.A, but the PE and DCI do not make the connection to the historical or political context of environmental decision-making that the concept requires.

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Principles I-V At-a-Glance			Principle I			Principle II				Principle III			Principle IV			Principle V	
Grade	Domain	Standard	A	B	C	A	B	C	D	A	B	C	A	B	C	A	B
K-2	ETS	ETS1	3	3	3	3	3	3	3	2	2	2	3	3	3	2	3
K	ESS	ESS2	3	3	3	2	1	2	2	1	2	1	3	3	3	1	2
K	ESS	ESS3	1	3	3	1	1	2	2	2	1	1	1	3	3	1	2
K	LS	LS1	1	3	3	3	3	3	3	1	1	3	3	3	3	3	3
K	PS	PS2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
K	PS	PS3	3	1	3	3	3	3	3	3	3	3	3	3	3	3	3
1	ESS	ESS1	3	3	3	3	3	3	3	1	2	3	3	3	3	3	3
1	LS	LS1	3	3	3	3	3	3	3	1	1	3	3	3	3	3	3
1	LS	LS3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
1	PS	PS4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2	ESS	ESS1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2	ESS	ESS2	2	3	3	3	3	2	3	1	2	1	3	3	3	2	3
2	LS	LS2	2	2	3	3	3	3	3	1	1	3	3	3	3	3	3
2	LS	LS4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2	PS	PS1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
3-5	ETS	ETS1	3	3	2	2	2	2	3	2	2	2	2	2	2	2	2
3	ESS	ESS2	3	2	3	3	3	3	3	1	2	3	3	3	3	3	3
3	ESS	ESS3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2
3	LS	LS1	3	3	3	3	3	3	3	1	2	3	3	3	3	3	3
3	LS	LS2	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
3	LS	LS3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
3	LS	LS4	2	2	2	3	3	3	3	1	2	2	3	3	3	2	2
3	PS	PS2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
4	ESS	ESS1	3	3	3	3	3	3	3	2	3	3	3	3	3	3	3
4	ESS	ESS2	1	2	2	2	2	2	2	1	2	2	3	3	3	3	3
4	ESS	ESS3	1	2	3	2	1	2	3	2	1	1	1	2	2	1	2
4	LS	LS1	3	3	3	3	3	3	3	1	1	3	3	3	3	3	3
4	PS	PS3	2	3	3	3	3	3	3	3	3	3	3	3	3	2	3
4	PS	PS4	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Principles I-V At-a-Glance <i>continued</i>			Principle I			Principle II				Principle III			Principle IV			Principle V	
Grade	Domain	Standard	A	B	C	A	B	C	D	A	B	C	A	B	C	A	B
5	ESS	ESS1	3	3	3	3	3	3	3	1	2	3	3	3	3	3	3
5	ESS	ESS2	2	2	2	3	3	3	3	1	2	2	3	2	3	3	3
5	ESS	ESS3	2	2	1	2	1	1	2	3	1	1	2	2	2	1	1
5	LS	LS1	3	2	3	3	3	3	3	2	2	3	3	3	3	3	3
5	LS	LS2	1	1	2	3	3	3	3	1	1	2	3	2	3	3	3
5	PS	PS1	3	3	3	3	3	3	3	3	3	3	3	2	3	3	3
5	PS	PS2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
5	PS	PS3	1	1	3	3	3	3	3	1	1	3	3	3	3	3	3
MS	ESS	ESS1	3	3	3	3	3	3	3	1	2	3	3	3	3	3	3
MS	ESS	ESS2	2	2	3	3	3	3	3	1	2	2	3	2	3	3	3
MS	ESS	ESS3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MS	LS	LS1	1	1	3	3	3	3	3	1	1	3	3	3	3	3	3
MS	LS	LS2	1	1	1	2	2	2	2	1	1	2	2	2	2	1	2
MS	LS	LS3	3	3	3	3	3	3	3	2	2	3	3	2	2	3	3
MS	LS	LS4	3	3	3	3	3	2	2	1	2	1	3	2	2	2	3
MS	PS	PS1	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
MS	PS	PS2	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
MS	PS	PS3	3	3	3	3	3	3	3	1	2	3	3	3	3	3	3
MS	PS	PS4	3	3	3	3	3	3	3	1	2	3	3	3	3	3	3
MS	ETS	ETS1	1	2	2	2	2	2	2	2	1	1	2	1	2	1	2

Principles I-V At-a-Glance <i>continued</i>			Principle I			Principle II				Principle III			Principle IV			Principle V	
Grade	Domain	Standard	A	B	C	A	B	C	D	A	B	C	A	B	C	A	B
HS	ESS	ESS1	2	3	3	3	3	3	3	1	2	3	3	3	3	3	3
HS	ESS	ESS2	2	2	1	2	2	2	2	1	1	1	1	1	1	1	2
HS	ESS	ESS3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	2
HS	LS	LS1	3	1	3	3	3	3	3	1	1	3	3	3	3	3	3
HS	LS	LS2	1	1	1	1	1	1	2	1	1	1	1	2	1	1	2
HS	LS	LS3	3	3	3	3	3	3	3	1	2	3	3	3	3	3	3
HS	LS	LS4	1	1	1	1	1	1	2	1	1	1	1	2	1	1	2
HS	PS	PS1	3	3	3	3	3	3	3	2	3	3	2	3	3	3	3
HS	PS	PS2	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
HS	PS	PS3	3	2	3	3	3	3	3	1	2	3	3	3	3	2	3
HS	PS	PS4	3	3	3	3	3	3	3	2	2	3	3	3	3	3	3
HS	ETS	ETS1	1	2	2	2	1	2	2	2	1	1	2	2	2	1	2

Key

1

The language (or explicit intent) of the NGSS standard is a direct or near direct match with the EP&C

2

The EP&C could naturally and effectively be addressed as part of this NGSS standard, but the NGSS language is not explicitly a match to the EP&C

3

There is no substantive match, explicit or otherwise, between the EP&C and the NGSS standard

Relationship by Standard and Grade

Grade	K	1	2	K-2	3	4	5	3-5	MS	HS	Average
ESS1 There is limited opportunity to connect the NGSS ESS1 Standards to the EP & C's.											
Principle I Average		3.0	3.0			3.0	3.0		3.0	2.7	2.9
Principle II Average		3.0	3.0			3.0	3.0		3.0	3.0	3.0
Principle III Average		2.0	3.0			2.7	2.0		2.0	2.0	2.3
Principle IV Average		3.0	3.0			3.0	3.0		3.0	3.0	3.0
Principle V Average		3.0	3.0			3.0	3.0		3.0	3.0	3.0
ESS2 The opportunity exists to connect the NGSS ESS2 Standard to the EP&C's, but significant modifications would be required.											
Principle I Average	3.0		2.7		2.7	1.7	2.0		2.3	1.7	2.3
Principle II Average	1.8		2.8		3.0	2.0	3.0		3.0	2.0	2.5
Principle III Average	1.3		1.3		2.0	1.7	1.7		1.7	1.0	1.5
Principle IV Average	3.0		3.0		3.0	3.0	2.7		2.7	1.0	2.6
Principle V Average	1.5		2.5		3.0	3.0	3.0		3.0	1.5	2.5
ESS3 The connections between the NGSS ESS3 Standard and the EP&C's are very strong, particularly in middle and high school.											
Principle I Average	2.3				3.0	2.0	1.7		1.0	1.0	1.8
Principle II Average	1.3				3.0	2.0	1.5		1.0	1.0	1.6
Principle III Average	1.0				3.0	1.3	1.7		1.0	1.0	1.5
Principle IV Average	2.3				3.0	1.7	2.0		1.0	1.0	1.8
Principle V Average	1.5				2.0	1.5	1.0		1.0	1.5	1.4
ETS1 The opportunity exists to connect the NGSS ETS1 Standard to the EP & C's, but with significant modifications.											
Principle I Average				3.0				2.7	1.7	1.7	2.3
Principle II Average				3.0				2.3	2.0	1.8	2.3
Principle III Average				2.0				2.0	1.3	1.3	1.7
Principle IV Average				3.0				2.0	1.7	2.0	2.2
Principle V Average				2.5				2.0	1.5	1.5	1.9
LS1 There is limited opportunity to connect the NGSS LS1 Standard to the EP&C's, apart from Principle III, where the opportunity exists but would require modification.											
Principle I Average	2.3	3.0			3.0	3.0	2.7		1.7	2.3	2.6
Principle II Average	3.0	3.0			3.0	3.0	3.0		3.0	3.0	3.0
Principle III Average	1.7	1.7			2.0	1.7	2.3		1.7	1.7	1.8
Principle IV Average		3.0	3.0			3.0	3.0		3.0	3.0	3.0
Principle V Average		3.0	3.0			3.0	3.0		3.0	3.0	3.0




Relationship by Standard and Grade *continued*

Grade	K	1	2	K-2	3	4	5	3-5	MS	HS	Average
LS2 The opportunity exists to connect the NGSS LS2 Standard to the EP&C's, but significant modifications would be required.											
Principle I Average			2.3		3.0		1.3		1.0	1.0	1.7
Principle II Average			3.0		3.0		3.0		2.0	1.3	2.5
Principle III Average			1.7		2.3		1.3		1.3	1.0	1.5
Principle IV Average			3.0		3.0		2.7		2.0	1.3	2.4
Principle V Average			3.0		3.0		3.0		1.5	1.5	2.4
LS3 There is limited opportunity to connect the NGSS LS3 Standard to the EP&C's.											
Principle I Average		3.0			3.0				3.0	3.0	3.0
Principle II Average		3.0			3.0				3.0	3.0	3.0
Principle III Average		3.0			3.0				2.3	2	2.7
Principle IV Average		3.0			3.0				2.3	3.0	2.6
Principle V Average		3.0			3.0				3.0	3.0	3.0
LS4 The opportunity exists to connect the NGSS LS4 Standard to the EP&C's, but significant modifications would be required.											
Principle I Average			3.0		2.0				3.0	1.0	2.3
Principle II Average			3.0		3.0				2.5	1.3	2.4
Principle III Average			3.0		1.7				1.3	1.0	1.8
Principle IV Average			3.0		3.0				2.3	1.3	2.4
Principle V Average			3.0		2.0				2.5	1.5	2.3
PS1 There is limited opportunity to connect the NGSS PS1 Standard to the EP&C's.											
Principle I Average			3.0				3.0		3.0	3.0	3.0
Principle II Average			3.0				3.0		3.0	3.0	3.0
Principle III Average			3.0				3.0		2.3	2.7	2.8
Principle IV Average			3.0				2.7		3.0	2.7	2.8
Principle V Average			3.0				3.0		3.0	3.0	3.0
PS2 There is limited opportunity to connect the NGSS PS2 Standard to the EP&C's.											
Principle I Average	3.0				3.0		3.0		3.0	3.0	3.0
Principle II Average	3.0				3.0		3.0		3.0	3.0	3.0
Principle III Average	3.0				3.0		3.0		2.3	2.3	2.7
Principle IV Average	3.0				3.0		3.0		3.0	3.0	3.0
Principle V Average	3.0				3.0		3.0		3.0	3.0	3.0

Relationship by Standard and Grade *continued*

Grade	K	1	2	K-2	3	4	5	3-5	MS	HS	Average
PS3 There is limited opportunity to connect the NGSS PS3 Standard to the EP&C's.											
Principle I Average	2.3					2.7	1.7		3.0	2.7	2.5
Principle II Average	3.0					3.0	3.0		3.0	3.0	3.0
Principle III Average	3.0					3.0	1.7		2.0	2.0	2.3
Principle IV Average	3.0					3.0	3.0		3.0	3.0	3.0
Principle V Average	3.0					2.5	3.0		3.0	2.5	2.8
PS4 There is limited opportunity to connect the NGSS PS4 Standard to the EP&C's.											
Principle I Average		3.0				3.0			3.0	3.0	3.0
Principle II Average		3.0				3.0			3.0	3.0	3.0
Principle III Average		3.0				3.0			2.0	2.3	2.6
Principle IV Average		3.0				3.0			3.0	3.0	3.0
Principle V Average		3.0				3.0			3.0	3.0	3.0

Key

-  The language (or explicit intent) of the NGSS standard is a direct or near direct match with the EP&C
-  The EP&C could naturally and effectively be addressed as part of this NGSS standard, but the NGSS language is not explicitly a match to the EP&C
-  There is no substantive match, explicit or otherwise between the EP&C and the NGSS standard

Relationship by Domain and Grade										
Grade	K	1	2	K-2	3	4	5	3-5	MS	HS
Principle I										
ESS	2.7	3.0	2.8		2.8	2.2	2.2		2.1	1.8
LS	2.3	3.0	2.7		2.8	3.0	2.0		2.2	1.8
PS	2.7	3.0	3.0		3.0	2.8	2.6		3.0	2.9
ETS				3.0				2.7	1.7	1.7
Average Principle I	2.6	3.0	2.8	3.0	2.8	2.6	2.3	2.7	2.4	2.2
Principle II										
ESS	1.5	3.0	2.9		3.0	2.3	2.5		2.3	2.0
LS	3.0	3.0	3.0		3.0	3.0	3.0		2.6	2.1
PS	3.0	3.0	3.0		3.0	3.0	3.0		3.0	3.0
ETS				3.0				2.3	2.0	1.8
Average Principle II	2.4	3.0	3.0	3.0	3.0	2.7	2.8	2.3	2.6	2.4
Principle III										
ESS	1.2	2.0	2.2		2.5	1.9	1.8		1.6	1.3
LS	1.7	2.3	2.3		2.3	1.7	1.8		1.7	1.4
PS	3.0	3.0	3.0		3.0	3.0	2.6		2.2	2.3
ETS				2.0				2.0	1.3	1.3
Average Principle III	2.0	2.4	2.4	2.0	2.4	2.2	2.1	2.0	1.8	1.6
Principle IV										
ESS	2.6	3.0	3.0		3.0	2.6	2.6		2.2	1.7
LS	3.0	3.0	3.0		3.0	3.0	2.8		2.4	2.2
PS	3.0	3.0	3.0		3.0	3.0	2.9		3.0	2.9
ETS				3.0				2.0	1.7	2.0
Average Principle IV	2.9	3.0	3.0	3.0	3.0	2.8	2.8	2.0	2.5	2.3
Principle V										
ESS	1.5	3.0	2.8		2.5	2.5	2.3		2.3	2.0
LS	3.0	3.0	3.0		2.8	3.0	3.0		2.5	2.3
PS	3.0	3.0	3.0		3.0	2.8	3.0		3.0	2.9
ETS				2.5				2.0	1.5	1.5
Average Principle V	2.4	3.0	2.9	2.5	2.7	2.7	2.8	2.0	2.5	2.3

There is variance in how well certain EP&Cs are addressed by NGSS between grade bands. Specifically, Principle III has the strongest connections to the NGSS, while Principles IV and V have very limited connections. Additionally, while every principle is addressed at some level in middle and high school, very few principles are addressed in K - 4. Some EP&Cs may well be better suited to address through instruction in History/Social Science than through instruction related to NGSS.

For NGSS support for teachers, principals, and district leaders, please contact:
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