

3-ESS3-1 Earth and Human Activity

California Science Test—Item Content Specifications

# 3-ESS3-1 Earth and Human Activity

Students who demonstrate understanding can:

Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.

[Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.]

Continue to the next page for the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts.

| Science and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
| --- | --- | --- |
| Engaging in Argument from Evidence  Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).  Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem. | ESS3.B: Natural Hazards   1. A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. *(Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)* | Cause and Effect  Cause and effect relationships are routinely identified, tested, and used to explain change.  Connections to Engineering, Technology, and Applications of Science  Influence of Engineering, Technology, and Science on Society and the Natural World  Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones).  Connections to Nature of Science  Science is a Human Endeavor  Science affects everyday life. |

## Assessment Targets

Assessment targets describe the focal knowledge, skills, and abilities for a given three-dimensional Performance Expectation. Please refer to the Introduction for a complete description of assessment targets.

### Science and Engineering Subpractice(s)

Please refer to appendix A for a complete list of Science and Engineering Practices (SEP) subpractices. Note that the list in this section is not exhaustive.

7.1 Ability to construct scientific arguments

### Science and Engineering Subpractice Assessment Targets

Please refer to appendix A for a complete list of SEP subpractice assessment targets. Note that the list in this section is not exhaustive.

7.1.1 Ability to identify evidence/data that supports a claim

7.1.2 Ability to develop scientific arguments that are supported by evidence/data

7.1.3 Ability to use reasoning to explain how relevant evidence/data supports or refutes the claim; the reasoning should reflect application of scientific concepts, principles, ideas, and models

### Disciplinary Core Idea Assessment Targets

#### ESS3.B.2

* Identify weather-related hazards
* Describe the kinds of damage weather-related hazards can cause
* Identify potential design solutions that may reduce the impacts of weather-related hazards
* Identify how humans can decide which hazard impacts are important to mitigate
* Describe the costs and benefits of an impact-reducing solution in terms of human society’s needs/wants

### Crosscutting Concept Assessment Target(s)

CCC2 Identify and test cause and effect relationships to explain change

## Examples of Integration of Assessment Targets and Evidence

Note that the list in this section is not exhaustive.

Task describes a design solution for reducing the impacts of a weather-related hazard:

* Constructs an argument, containing a claim, evidence/data, and reasoning, about how the design solution can reduce the impacts of the weather-related hazard (7.1.1, ESS3.B.2, and CCC2)

Task provides a design solution for reducing the impacts of a weather-related hazard along with evidence/data and reasoning:

* Completes the argument by selecting the appropriate claim about how the design solution can reduce the impacts of the weather-related hazard (7.1.1, ESS3.B.2, and CCC2)

Task provides evidence to support a claim about how a design solution can reduce the impacts of a weather-related hazard:

* Explains why the evidence/data is or is not relevant and sufficient to justify the claim (7.1.2, ESS3.B.2, and CCC2)

Task provides a claim about how a design solution can reduce the impacts of a weather-related hazard:

* Identifies relevant, valid, and/or reliable piece(s) of evidence/data that support the claim (7.1.2, ESS3.B.2, and CCC2)

Task provides multiple pieces of evidence/data from different sources, such as science journals, news reports, and fiction books, to support a claim that a particular design solution can reduce the impacts of a weather-related hazard:

* Evaluates the strength of the claim based on whether it is supported by evidence or data from multiple sources of similar strength and reliability (7.1.2, ESS3.B.2, and CCC2)

Task provides both a claim about how a design solution can reduce the impacts of a weather-related hazard and a piece of evidence/data to support it:

* Provides reasoning to explain how the evidence/data support the claim (7.1.3, ESS3.B.2, and CCC2)

Task provides a claim and a list of arguments with different justifications for how a design solution can reduce the impacts of a weather-related hazard:

* Applies scientific concepts to correctly select the argument with the most convincing and appropriate justifications in support of the claim (7.1.3, ESS3.B.2, and CCC2)

## Possible Phenomena or Contexts

Note that the list in this section is not exhaustive.

* Fire-resistant building materials
* Reduced-vegetation fire-safety zones around homes and other buildings
* Design features that mitigate heat retention in buildings (ventilated roofs, open-air corridors, etc.)
* Structural designs (based on evidence) that help reduce the impact of hazards such as:
  + - Tornados
    - Hurricane winds
    - Severe winter weather
    - Landslides
    - Severe drought
    - Coastal storm surge
    - Flooding from severe thunderstorms

## Common Misconceptions

Note that the list in this section is not exhaustive.

* Humans can successfully protect themselves from all natural hazards.
* Humans cannot take steps to reduce the impacts of natural hazards.

## Additional Assessment Boundaries

Avoid the use of traumatic weather-related hazards as much as possible.

## Additional References

[3-ESS3-1 Evidence Statement](https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/3-ESS3-1%20Evidence%20Statements%20June%202015%20asterisks.pdf) <https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/3-ESS3-1%20Evidence%20Statements%20June%202015%20asterisks.pdf>

The *2016 Science Framework for California Public Schools Kindergarten through Grade 12*

Appendix 1: Progression of the Science and Engineering Practices, Disciplinary Core Ideas, and Crosscutting Concepts in Kindergarten through Grade 12 <https://www.cde.ca.gov/ci/sc/cf/documents/scifwappendix1.pdf>

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