

MS-ESS3-3 Earth and Human Activity

California Science Test—Item Content Specifications

# MS-ESS3-3 Earth and Human Activity

Students who demonstrate understanding can:

Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

[Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).]

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 |
| --- | --- | --- |
| Constructing Explanations and Designing Solutions  Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.  Apply scientific principles to design an object, tool, process or system. | ESS3.C: Human Impacts on Earth Systems   1. Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth’s environments can have different impacts (negative and positive) for different living things. 2. Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise. | Cause and Effect  Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.  Connections to Engineering, Technology, and Applications of Science  Influence of Science, Engineering, and Technology on Society and the Natural World  The uses of technologies and any limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions. Thus technology use varies from region to region and over time. |

## 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.

6E.1 Ability to solve design problems

### 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.

6E.1.1 Ability to solve design problems by engaging in a systematic, iterative process that results in structures or processes, or the plans for structures or processes

6E.1.2 Ability to generate multiple solutions for a design problem that meet design criteria and constraints

6E.1.3 Ability to solve a design problem by constructing a device or generating a design solution

6E.1.4 Ability to apply relevant scientific knowledge and/or evidence in designing solutions

### Disciplinary Core Idea Assessment Targets

#### ESS3.C.3

* Identify potential negative impacts that a given human activity may have on the environment
* Identify social wants or needs that are satisfied by a human activity that has the potential to negatively impact the environment

#### ESS3.C.4

* Describe how various technologies can monitor or minimize the negative impact on the environment
* Describe the relationship between population size and per capita resource consumption
* Draw inferences about changes to existing social wants or needs based on existing trends in growth to population size or per capita resource consumption
* Consider the role of economic conditions in the viability of a proposed technology to limit the negative impacts of human activity on the environment

### Crosscutting Concept Assessment Target(s)

CCC2 Classify relationships as causal or correlational

## Examples of Integration of Assessment Targets and Evidence

Note that the list in this section is not exhaustive.

Task provides a scenario describing how a human activity negatively impacts the environment:

* Describes a process to monitor and/or minimize the impact of the human activity (6.E.1.1, ESS3.C.3, and CCC2)
* Proposes several different processes to monitor and/or minimize the impact of the human activity (6.E.1.2, ESS3.C.4, and CCC2)
* Describes a prototype of a device to monitor and/or minimize the impact (6.E.1.3, ESS3.C.3, and CCC2)
* Creates an annotated visual representation of a device to monitor and/or minimize the impact (6.E.1.4, ESS3.C.3, and CCC2)

Task provides a description of several proposed processes to monitor or minimize a negative environmental impact of human activity:

* Describes the advantages and disadvantages of each monitoring process (6.E.1.2, ESS3.C.4, and CCC2)

Task provides a description of a proposed process to monitor or minimize a negative environmental impact of human activity:

* Proposes an improvement to the process based on his/her understanding of human population growth and per capita consumption of natural resources (6.E.1.2, ESS.C.4, and CCC2)

## California Environmental Principles and Concepts

* EP1: 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.
* EP2: The long-term functioning and health of terrestrial, freshwater, coastal, and marine ecosystems are influenced by their relationships with human societies.

## Possible Phenomena or Contexts

Note that the list in this section is not exhaustive.

* Urbanization
* Water or land usage (e.g., deforestation)
* Analysis of pollution data (e.g., for future monitoring or to minimize impact of contaminants)
* Reuse and recycling of materials
* Wetlands management or coastal erosion

## Common Misconceptions

Note that the list in this section is not exhaustive.

* Every solution to a potential environmental problem is economically feasible.
* Economically infeasible solutions in the past will continue to be infeasible in the future.

## Additional Assessment Boundaries

None listed at this time.

## Additional References

MS-ESS3-3 Evidence Statement [https://www.nextgenscience.org/sites/default/files/evidence\_statement/black\_white/MS-ESS3-3 Evidence Statements June 2015 asterisks.pdf](https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/MS-ESS3-3%20Evidence%20Statements%20June%202015%20asterisks.pdf)

California Environmental Principles and Concepts <http://californiaeei.org/abouteei/epc/>

California Education and the Environment Initiative <http://californiaeei.org/>

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>

Appendix 2: Connections to California Environmental Principles and Concepts <https://www.cde.ca.gov/ci/sc/cf/documents/scifwappendix2.pdf>

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