

5-ESS1-1 Earth's Place in the Universe

California Science Test—Item Content Specifications

5-ESS1-1 Earth's Place in the Universe

Students who demonstrate understanding can:

Support an argument that the apparent brightness of the sun and stars is due to their relative distances from the Earth.

[Clarification Statement: Absolute brightness of stars is the result of a variety of factors. Relative distance from Earth is one factor that affects apparent brightness and is the one selected to be addressed by the performance expectation.] [*Assessment Boundary: Assessment is limited to relative distances, not sizes, of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, stage).*]

| Science and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
| --- | --- | --- |
| Engaging in Argument from EvidenceEngaging 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).Support an argument with evidence, data, or a model. | ESS1.A: The Universe and its Stars1. The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth.
 | Scale, Proportion, and QuantityNatural objects exist from the very small to the immensely large. |

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

#### ESS1.A.2

* Identify the Sun as a star
* Recognize that stars are natural bodies that give off their own light
* Describe how a luminous object that is close will appear larger and brighter than a similar one that is far away
* Explain that stars range greatly in their distances from Earth

Crosscutting Concept Assessment Target(s)

CCC3 Identify that natural objects exist from the very small to the immensely large

Examples of Integration of Assessment Targets and Evidence

Note that the list in this section is not exhaustive.

Task provides a description of two stars that vary in apparent size and brightness:

* Constructs an argument, containing a claim, evidence/data, and appropriate reasoning, about how the apparent brightness of stars is due to their relative distances from the Earth (7.1.1, ESS1.A.2, and CCC3)
* Assembles an argument, containing a claim, evidence/data, and appropriate reasoning, about how the apparent brightness of stars is due to their relative distances from the Earth (7.1.1, ESS1.A.2, and CCC3)

Task provides evidence/data to support a claim about how the apparent brightness of stars is due to their relative distances from the Earth:

* Explains why the evidence/data are or are not relevant and sufficient to justify the claim (7.1.2, ESS1.A.2, and CCC3)
* Provides correct reasoning to explain how the evidence/data support the claim (7.1.3, ESS1.A.2, and CCC3)

Task provides a claim about how the apparent brightness of stars is due to their relative distances from the Earth:

* Identifies relevant, valid, and/or reliable piece(s) of evidence/data that support the claim (7.1.2, ESS1.A.2, and CCC3)

Task provides multiple pieces of evidence/data from different sources, such as science journals, news reports, and fiction books, or provides arguments that include different amounts of relevant evidence/data to support a claim about how the apparent brightness of stars is due to their relative distances from the Earth:

* Evaluates the strength of the arguments based on how reliable the sources of the evidence/data are (7.1.2, ESS1.A.2, and CCC3)
* Evaluates the strength of the arguments based on the number of sources (of similar strength and reliability) of relevant evidence/data (7.1.2, ESS1.A.2, and CCC3)

Task provides a list of arguments with different justifications for a claim about how the apparent brightness of stars is due to their relative distances from the Earth:

* Applies scientific concepts to correctly select the argument with the most convincing and appropriate justification (7.1.3, ESS1.A.2, and CCC3)

Possible Phenomena or Contexts

Note that the list in this section is not exhaustive.

* The Sun appears brighter than other more distant stars.
* Distant stars appear dimmer than similar stars that are closer to Earth.
* The Sun is much brighter than other objects in the solar system.
* The apparent brightness of the Sun is greater on Venus than on Saturn.
* Measurements of light intensity can be used at varying distances from a light source.

Common Misconceptions

Note that the list in this section is not exhaustive.

* The Sun is bigger and brighter than all other stars.
* All stars are the same size.

Additional Assessment Boundaries

None listed at this time.

Additional References

5-ESS1-1 Evidence Statement [https://www.nextgenscience.org/sites/default/files/evidence\_statement/black\_white/5-ESS1-1 Evidence Statements June 2015 asterisks.pdf](https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/5-ESS1-1%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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