

5-ESS1-2 Earth's Place in the Universe

California Science Test—Item Content Specifications

# 5-ESS1-2 Earth's Place in the Universe

Students who demonstrate understanding can:

Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.

[Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.] [*Assessment Boundary: Assessment does not include causes of seasons.*]

| Science and Engineering Practices | Disciplinary Core Ideas | Crosscutting Concepts |
| --- | --- | --- |
| Analyzing and Interpreting Data  Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.  Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. | ESS1.B: Earth and the Solar System   1. The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. | Patterns  Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena. |

## 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.

4.1 Ability to record and organize data

4.2 Ability to analyze data to identify relationships

### 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.

4.1.1 Ability to record information and represent data in tables and graphical displays

4.1.3 Ability to organize data in a way that facilitates analysis and interpretation

4.2.1 Ability to use empirical data to describe patterns and relationships

4.2.2 Ability to identify patterns (qualitative or quantitative) among variables represented in the data

### Disciplinary Core Idea Assessment Targets

#### ESS1.B.2

* Relate the length and direction of shadows to the time of day as the Earth rotates on its axis
* Identify moon phase changes as the Moon orbits around the Earth
* Recognize change in the duration of sunlight, as determined by sunrise and sunset times, as it relates to the time of year as the Earth orbits the Sun
* Describe how some stars and/or constellations can be seen in the sky all year while others appear only at certain times of the year

### Crosscutting Concept Assessment Target(s)

CCC1 Use similarities and differences in patterns to sort, classify, communicate, and analyze simple rates of change for natural phenomena

## Examples of Integration of Assessment Targets and Evidence

Note that the list in this section is not exhaustive.

Task provides a description/list of the length and direction of shadows over the course of a day:

* Records information and data using a method appropriate for communicating observations and ideas (4.1.1, ESS1.B.2, and CCC1)

Task provides a description/list of sunrise and sunset times over the course of a year:

* Records data using an appropriate method to reveal patterns (4.1.1, ESS1.B.2, and CCC1)

Task provides a description/list of lunar phases over a period of weeks or months:

* Organizes the data in a way to reveal patterns or relationships that make predictions possible (4.1.3, ESS1.B.2, and CCC1)

Task provides a line graph comparing the length of noontime shadows over the course of several months:

* Uses the data to describe relationships (4.2.1, ESS1.B.2, and CCC1)

Task provides a description of an astrolabe along with a table/graph showing the measured angle of a visible star over time:

* Uses the data to identify patterns and make a prediction (4.2.2, ESS1.B.2, and CCC1)

## Possible Phenomena or Contexts

Note that the list in this section is not exhaustive.

* The length of shadow at noontime over the course of the year
* The pattern of daylight (i.e., length of daylight) during regular intervals over the course of a year
* The path of the Sun and stars across the sky as they rise and set
* Stars in the sky that are viewable during some times of the year but not others
* The movement, length, or both, of shadows cast by an object and the movement of the Sun throughout the day

## Common Misconceptions

Note that the list in this section is not exhaustive.

* Celestial objects orbit around a stationary Earth.
* The pattern of the visible stars does not change throughout the night.
* Stars are only around at night and the Sun is only around during the day.
* Everyone on Earth experiences day/noon/night at the same time.
* The Sun emits different amounts of light at different times of the year.
* The Sun is closer to Earth in July and farther from Earth in January.

## Additional Assessment Boundaries

None listed at this time.

## Additional References

5-ESS1-2 Evidence Statement [https://www.nextgenscience.org/sites/default/files/evidence\_statement/black\_white/5-ESS1-2 Evidence Statements June 2015 asterisks.pdf](https://www.nextgenscience.org/sites/default/files/evidence_statement/black_white/5-ESS1-2%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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