**Connecting to the Next Generation Science Standards (NGSS Lead States 2013):**

|  |  |
| --- | --- |
| **Science and Engineering Practices** | **Connections to Classroom Activity** |
| Constructing Explanations and Designing Solutions | * Students designed a simple quadrant out of everyday materials to measure the angular height of distant objects. |
| **Disciplinary Core Ideas** |  |
| ETS1.C: Developing Possible Solutions  • Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and constraints.  ESS1.B Earth and Solar System  • The orbits of Earth around the Sun and of the Moon around Earth, together with the rotation of Earth, can cause observable patterns. | * Students used a criteria rubric to quantify test results for the simple quadrants when used to measure the angular height of a distant object. * Students used simple quadrants to infer how the Moon moves between rise and set. |
| **Crosscutting Concepts** |  |
| Structure and Function  Patterns | * Students reverse engineered manufactured quadrants to determine how they work prior to designing simple quadrants. * Students used simple quadrants to infer the patterns of movement of the Moon between rise and set. |

**Performance Expectations**

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

**Connecting to the *Common Core State Standards* (NGAC and CCSSO 2010):**

**Mathematics:**

Fourth Grade: Geometric measurement: understand concepts of angle and measure angles.

* Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement.
* Measure angles in whole-number degrees using a protractor.