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

1-PS4 Waves and their Application in Technologies for Information Transfer

<https://www.nextgenscience.org/dci-arrangement/1-ps4-waves-and-their-applications-technologies-information-transfer>

The chart below makes one set of connections between the instruction outlined in this article and the *NGSS*. Other valid connections are likely; however, space restrictions prevent us from listing all possibilities. The materials, lessons, and activities outlined in the article are just one step toward reaching the performance expectation listed below.

**Science and Engineering Practice**

Constructing Explanations and Designing Solutions

**Connection to Classroom Activity**

* Students worked together to design and construct a light obstacle course.

## Disciplinary Core Idea [1-PS4-3: Waves and Their Applications in Technologies for Information Transfer](https://www.nextgenscience.org/pe/1-ps4-3-waves-and-their-applications-technologies-information-transfer)

**Connection to Classroom Activity**

* Students worked with transparent, translucent, opaque, and reflective materials to construct a light obstacle course. Students needed to have light from a flashlight hit three objects before reaching a target.

**Crosscutting Concepts**

Cause and Effect

**Connection to Classroom Activity**

* Students explored the effect of various materials on a beam of light.

Structure and Function

**Connection to Classroom Activity**

* Students noticed that material that the objects were made out of seemed to be related to how light interacted with it, such that shiny objects tended to reflect the light.

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

|  |  |
| --- | --- |
| **ELA**  [CCSS.ELA-Literacy.SL.1.1.b](http://www.corestandards.org/ELA-Literacy/SL/1/1/b/)  Build on others' talk in conversations by responding to the comments of others through multiple exchanges.  [CCSS.ELA-LITERACY.W.1.8](http://www.corestandards.org/ELA-Literacy/W/1/8/) With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. | Students depicted one of the constructions with drawing and writing. |
| **Mathematics**  [CCSS.MATH.CONTENT.1.MD.A.2](http://www.corestandards.org/Math/Content/1/MD/A/2/) Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. *Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps*.  [CCSS.MATH.CONTENT.1.MD.C.4](http://www.corestandards.org/Math/Content/1/MD/C/4/) Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.  [CCSS.MATH.CONTENT.1.G.A.1](http://www.corestandards.org/Math/Content/1/G/A/1/) Distinguish between defining attributes (e.g., triangles are closed and three-sided) versus non-defining attributes (e.g., color, orientation, overall size); build and draw shapes to possess defining attributes. | Students added and took away blocks to make structures taller or shorter in order to hold objects at the height they wanted.  Students drew objects from their obstacle courses with various 2-dimensional shapes. |