**[6-12+ version](http://teachergeek.org/breaking_bridges_overview_secondary_v1.0.docx)** available at [**teachergeek.com/bridges**](http://teachergeek.com/bridges)

**Grades**

**3-5**

Getting Started

At TeacherGeek, we strive to make our activities as simple as possible for you to implement, while giving you the flexibility to cater the activity to your class. All of our documents are available on our website, TeacherGeek.com, in both PDF and Microsoft Word so that you can customize them and make them your own!



Standards

**Go Guide**

 NGSS p. 2

 CCSS Math p. 3-4

 CCSS ELA p. 4

**Distance Challenge**

 NGSS p. 5

 CCSS ELA p. 6

**The parts of the standard we address are bold**, the rest isn’t.

Activities & Documents

Recommended Group Size: 2-3 students

[**Testing Guide**](http://teachergeek.org/breaking_bridges_testing_guide_v1.0.docx) – You need to make a testing station so students can test their bridges. This guide walks you through setting up your testing station using common, inexpensive supplies, and provides instructions for how to test bridges.

[**Go Guide**](http://teachergeek.org/breaking_bridges_go_guide_elementary_v1.0.docx) – Give it to your students and go! This is the essential document to get students started, and it culminates in an engineering challenge.

[**Optional Distance Challenge**](http://teachergeek.org/breaking_bridges_distance_challenge_v1.0.docx) – Students must build the longest bridge possible.

[**Optional Engineering Notebook**](http://teachergeek.org/breaking_bridges_engineering_notebook_v1.0.pdf) – Students document and reflect on their use of the engineering design process. Students also calculate efficiency of their bridge.

[**Optional** **Market-It Sheet**](http://teachergeek.org/Market-It_STEAM_TeacherGeek_Sheet.docx) – Students turn their design into a retail product with the
4 Ps of Marketing.

TeacherGeek is designed to bring your students to higher cognitive domains while addressing standards.



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Math Standards

**Reason with shapes and their attributes.**

**[CCSS.Math.Content.3.G.A.1](http://www.corestandards.org/Math/Content/3/G/A/1/)**
**Understand that shapes in different categories (e.g., rhombuses, rectangles, and others) may share attributes (e.g., having four sides),** and that the shared attributes can define a larger category (e.g., quadrilaterals). **Recognize rhombuses**, rectangles, **and squares as examples of quadrilaterals**, and draw examples of quadrilaterals that do not belong to any of these subcategories.

**Represent and solve problems involving multiplication and division.**

[**CCSS.Math.Content.3.OA.A.3**](http://www.corestandards.org/Math/Content/3/OA/A/3/) **Use multiplication** and division **within 100 to solve word problems in situations involving equal** groups, arrays, and **measurement quantities**, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.

**Use place value understanding and properties of operations to perform multi-digit arithmetic.**

[**CCSS.Math.Content.4.NBT.B.4**](http://www.corestandards.org/Math/Content/4/NBT/B/4/) **Fluently add and subtract multi-digit whole numbers using the standard algorithm.**

[**CCSS.Math.Content.4.NBT.B.5**](http://www.corestandards.org/Math/Content/4/NBT/B/5/)
**Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations.** Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

**Generalize place value understanding for multi-digit whole numbers.**

[**CCSS.Math.Content.4.MD.A.2**](http://www.corestandards.org/Math/Content/4/MD/A/2/) **Use the four operations to solve word problems involving distances**, intervals of time, liquid volumes, masses of objects, and money, **including problems involving simple** fractions or **decimals**, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.

**Perform operations with multi-digit whole numbers and with decimals to hundredths.**

[**CCSS.Math.Content.5.NBT.B.5**](http://www.corestandards.org/Math/Content/5/NBT/B/5/) **Fluently multiply multi-digit whole numbers using the standard algorithm.**

[**CCSS.Math.Content.5.NBT.B.7**](http://www.corestandards.org/Math/Content/5/NBT/B/7/) **Add**, subtract, **multiply**, and **divide decimals to hundredths**, using concrete models or drawings and **strategies based on place value**, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

****Math Standards (continued)

**Apply and extend previous understandings of multiplication and division.**

[**CCSS.Math.Content.5.NF.B.3**](http://www.corestandards.org/Math/Content/5/NF/B/3/) **Interpret a fraction as division of the numerator by the denominator (*a*/*b* = *a* ÷ *b*).** Solve word problems involving division of whole numbers leading to answers in the form of fractions or mixed numbers, e.g., by using visual fraction models or equations to represent the problem. *For example, interpret 3/4 as the result of dividing 3 by 4, noting that 3/4 multiplied by 4 equals 3, and that when 3 wholes are shared equally among 4 people each person has a share of size 3/4. If 9 people want to share a 50-pound sack of rice equally by weight, how many pounds of rice should each person get? Between what two whole numbers does your answer lie?*

ELA Standards

**Craft and Structure:**

**[CCSS.ELA-Literacy.RI.3.4](http://www.corestandards.org/ELA-Literacy/RI/3/4/)**
**Determine the meaning of general academic and domain-specific words and phrases in a text** relevant to a *grade 3 topic or subject area*.

**[CCSS.ELA-Literacy.RI.3.5](http://www.corestandards.org/ELA-Literacy/RI/3/5/)**
**Use text features** and search tools **(e.g., key words,** sidebars, hyperlinks) **to locate information relevant to a given topic efficiently.**

**[CCSS.ELA-Literacy.RI.4.4](http://www.corestandards.org/ELA-Literacy/RI/4/4/)**
**Determine the meaning of general academic and domain-specific words or phrases in a text** relevant to a *grade 4 topic or subject area*.

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**Determine the meaning of general academic and domain-specific words and phrases in a text** relevant to a *grade 5 topic or subject area*.

**Integration of Knowledge and Ideas:**

**[CCSS.ELA-Literacy.RI.3.7](http://www.corestandards.org/ELA-Literacy/RI/3/7/)**
**Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text** (e.g., where, when, why, and how key events occur).

**[CCSS.ELA-Literacy.RI.4.7](http://www.corestandards.org/ELA-Literacy/RI/4/7/)**
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