**Instructional Resources**

**NCTM Illuminations** [(http://illuminations.nctm.org)](file:///C%3A%5CDocuments%20and%20Settings%5COS_User%5CLocal%20Settings%5CTemp%5C%28http%3A%5Cilluminations.nctm.org%29)

**Equations of Attack:** When one end of a wooden board is placed on a bathroom scale and the other end is suspended on a textbook, students can "walk the plank" and record the weight measurement as their distance from the scale changes. The results are unexpected— the relationship between the weight and distance is linear, and all lines have the same x‑intercept. This investigation leads to a real world occurrence of negative slope, examples of which are often hard to find.

<http://illuminations.nctm.org/LessonDetail.aspx?id=L782>

**Amazing Profit:** Students use equations to determine eBay profit on new technology. EBay is an online auction agency. For a limited time after a “new” product’s street release date, it is possible to track the profit that sellers make for auctioning them on eBay. Students use previous data of selling prices to derive a linear equation for the “closing bid price” on a product.

<http://illuminations.nctm.org/LessonDetail.aspx?id=L799>

**Finding Our Top Speed:** This lesson sets the stage for a discussion of travel in the solar system. By considering a real-world, hands-on activity, students develop their understanding of time and distance. Finally, students plot the data they have collected.

<http://illuminations.nctm.org/LessonDetail.aspx?id=L254>

**Bouncing Ball:** Students develop their skills in collecting and recording data using the real-world situation of a bouncing tennis ball. They use the data collected to formulate the relationship between the dependent and independent variable in their experiment.

<http://illuminations.nctm.org/LessonDetail.aspx?id=L246>

**Exploring Linear Data:** Students model linear data in a variety of settings that range from car repair costs to sports to medicine. Students work to construct scatterplots, interpret data points and trends, and investigate the notion of line of best fit.

<http://illuminations.nctm.org/LessonDetail.aspx?id=L298>

**Texas Instruments**

**Discount Savings (TI-73):** In this activity, students will find discounts and sale prices for items selling at 20% off and 40% off by using tables. They will then find the general rules, using a variable, for finding those discounts and prices.

<http://education.ti.com/calculators/timiddlegrades/US/Activities/Detail?s=Math&id=13573>

**Growing the Green (TI-73):** Students will explore percentage increase over time and consider the power of compounding using percents.

<http://education.ti.com/calculators/downloads/US/Activities/Detail?id=8455>

**Geogebra**

            Proportions in Similar Triangles

            <http://www.geogebra.org/en/upload/files/english/duane_habecker/similar_tri.html>

**Explorelearning, Gizmos!** (<http://www.explorelearning.com>)

**Points, Lines, and Equations:** Compare the graph of a linear function to its rule and to a table of its values. Change the function by dragging two points on the line. Examine how the rule and table change.

<http://www.explorelearning.com/index.cfm?method=cResource.dspView&ResourceID=275>

**Direct Variation**: Adjust the constant of variation and explore how the graph of the direct variation function changes in response

http://www.explorelearning.com/index.cfm?method=cResource.dspView&ResourceID=130

**Slope:** Compare the slope‑intercept form of a linear equation to its graph. Find the slope of the line using a right triangle on the graph. Vary the coefficients and explore how the graph changes in response.

<http://www.explorelearning.com/index.cfm?method=cResource.dspDetail&ResourceID=88>

**TEXTEAMS Rethinking Middle School Mathematics: Proportionality**

<http://www.mansfieldisd.org/curriculum/mathematics/pdf/6th/texteams%20Proportionality.pdf>

 Here is an example of one of the activities available:

**Jet Ski Rental:**  Distinguish between a proportional and non-proportional situation using the characteristics of a proportional relationship.

**Short Stack:** Investigate proportional and non-proportional relationships by measuring the heights of stacked objects.

**Thinking Rationally about Fractions, Decimals, and Percent:  Instructional Activities for Grades 4 through 8:**

This resource, developed by the Virginia Department of Education,  has a large number of activities and lessons to provide instruction to middles grades students in fractions, decimals and percent.

<http://www.doe.virginia.gov/instruction/mathematics/elementary/think_rationally_fractions_dec_prcnt.pdf>

**Other Resources**

**Calculation Nation:** The games of Calculation Nation® are organized around content from the upper elementary and middle grades math curriculum. By becoming a citizen of Calculation Nation®, your child or student will play online math strategy games that allow them to learn about fractions, factors, multiples, symmetry and more, as well as practice important skills like basic multiplication and calculating area — all while having fun.

<http://calculationnation.nctm.org/>

**Figure This!**  Math Challenges for Families has a variety of problems for students to solve.  There is a Math Index, which sorts the problems by math content.

<http://www.figurethis.org/index.html>

**Weekly Problems for Middle School Students:  Past Problems and Solutions**

<http://www.nctm.org/resources/archive.aspx?id=3604&journalid=3>

**Proportional Reasoning Math Skills - Scale City:** This site is for grades 6-8 and provides a variety of fun activities using proportional reasoning.  Each activity provides an entertaining video of real-life uses for proportions related to the name of the activity.  There is also an assessment covering all the ideas in the site.  Activities include:  Dinosaur World (one-dimensional scaling), World of Mural Painting (two dimensional scaling), Miniature Land (three dimensional scaling), World Chicken Festival (scaling recipes), Louisville Slugger Museum (Similar Triangles), Sky-Vue Drive-In (Introducing Inverse Proportions), Belle of Louisville (proportions and Music), Kentucky Horse park (Speed, Distance, and Time)

<http://www.ket.org/scalecity/index.html>

This applet allows students to explore how change the values of slope and y-intercept change the graph of a linear equation.

<http://www.shodor.org/interactivate/activities/SlopeSlider/>

            An online lesson introducing the lines and slope.

<http://mathforum.org/cgraph/cslope/>

Students pass a "hand squeeze" around a circle and measure the amount of time that it takes for the hand squeeze to pass around the circle.

<http://math.rice.edu/~lanius/Algebra/hndsq.html>

**Assessment**

Interactive Algebra Quiz

<http://www.shodor.org/interactivate/activities/AlgebraQuiz/>

**Professional Resources**

**NCTM (**[www.nctm.org](file:///E%3A%5CCCSS_Math_Grades_6-11%5Cwww.nctm.org)**)**

**Yearbook:** NCTM's 2002 Yearbook emphasizes that although fractions, ratios, and proportions are pivotal concepts in the middle school, their development and understandings begin in the elementary school. The companion booklet presents activities that illustrate some of the ideas in the yearbook and that go beyond the content of the yearbook itself. Teachers' notes and handouts are designed to bring the yearbook to life in the classroom.

<http://www.nctm.org/catalog/product.aspx?ID=12244>

**Essential Understanding Series:** Developing Essential Understanding of Ratios, Proportions, and Proportional Reasoning for Teaching Mathematics: Grades 6-8. This book goes beyond a simple introduction to ratios, proportions, and proportional reasoning. It will help broaden and deepen your mathematical understanding of one of the most challenging topics for students.

<http://www.nctm.org/catalog/product.aspx?ID=13482>

**Navigating through Algebra in Grades 6–8:** This book shows how middle school students  can use mathematical models and represent and analyze mathematical situations and structures to explore the concept of function. The activities and problems require students to use representations related to work with functions, and they highlight some of the interactions that may occur among these representations.

**Articles from National Council of Teachers of Mathematics (**[www.nctm.org](file:///E%3A%5CCCSS_Math_Grades_6-11%5Cwww.nctm.org))

Articles are available as free downloads to NCTM members, or for a fee to non-members.

Lanius, C. and Williams, S., (2003).  Proportionality:  A Unifying Theme for the Middle Grades. Mathematics Teaching in the Middle School, 8(8), 392-396.  Retrieved March 7, 2011 from

 <http://www.nctm.org/eresources/article_summary.asp?URI=MTMS2003-04-392a&from=B>

Chapin, S., and Anderson, N., (2003).  Crossing the Bridge to Formal Proportional Reasoning. Mathematics Teaching in the Middle School, 8(8), 420-425.  Retrieved March 7, 2011 from

 <http://www.nctm.org/eresources/article_summary.asp?from=B&uri=MTMS2003-04-420a>

Stump, S. (2000).  Doing Mathematics with Bicycle Gear Ratios.  Mathematics Teacher, 93(9), 762-765.  Retrieved March 7, 2011 from <http://www.nctm.org/eresources/article_summary.asp?from=B&uri=MT2000-12-762a>