

Resources for Mathematics and STEM

Compiled by Jay McTighe

I have compiled the following collection of websites in support of performance task design in mathematics. Please e-mail me (jaymctighe@verizon.net) if you discover outdated links as well as other useful sites that you find so that I can add to this list.

Leadership in Mathematics Education Group (NCSM)

A collection of “great tasks” – performance tasks in mathematics linked to the Common Core Mathematics Standards. This project is a collection of tasks to support implementation of the CCSS. Many of these tasks are drawn from existing sources. Each task includes:

- Teacher Notes that provide an overview of the task, the Common Core State Standards Content and Practices standards that the task requires
- Activity Launch that addresses key prerequisite understandings and assesses student readiness for the task
- Core Task and Extension Activities

Click on “Great Tasks” link to view samples.

<http://www.mathedleadership.org/ccss/materials.html>

A set of modules and resources (sample problems) linked to the Standards of mathematical practices.

<http://www.mathedleadership.org/ccss/itp/index.html>

MARS Assessment Project, part of the Math Design Collaborative, offers a collection of formative and summative assessment tasks and “challenges” aligned to the Common Core content and practices in Mathematics.

<http://map.mathshell.org/materials/index.php>

Tasks in Mathematics

Stanford University offers a collection of math tasks, searchable by grade level, math concepts and/or math practices.

<http://youcubed.stanford.edu/tasks/>

Illustrative Mathematics offers illustrative problems/tasks aligned to the CCSS Standards. Click on “Practice Standards” to see illustrative examples and videos of students demonstrating the practices. The website includes ideas to guide curriculum mapping.

<http://www.illustrativemathematics.org/>

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An **Algebra I** course developed in Alexandria City, VA Public Schools using UbD. Under “Curriculum Overviews” click on “Sample Algebra Course” to download a pdf file. Each unit includes an authentic performance task and related rubric.

<http://www.acps.k12.va.us/curriculum/design/>

National Security Agency offers High School mathematics – offers sets of math investigations/tasks for high school mathematics courses

http://www.nsa.gov/academia/early_opportunities/math_edu_partnership/collected_learning/high_school/index.shtml

Real World math and science tasks.

<http://www.ck12.org/teacher/>

Math Tasks – Primary Grades

The CCSS Toolkit (Hawaii DOE) contains math assessments for grades K-2 aligned to the domains of the CCSS.

<http://standardstoolkit.k12.hi.us/common-core/mathematics/mathematics-assessments/>

UbD Units with Embedded Performance Tasks

Supported through the Race to the Top Initiative, teams of educators from Massachusetts used the UbD Framework to develop more than 100 pre-k to grade 12 model curriculum units in English language arts and literacy, history/social science, mathematics, and science and technology/ engineering. A free registration is required to access these materials at the following website:

http://www.doe.mass.edu/candi/model/download_form.aspx

The **New York City BOE Common Core Library** includes a searchable database of assessment tasks aligned to the Common Core Standards for pre-K – 12 in Mathematics and other subjects.

<http://schools.nyc.gov/Academics/CommonCoreLibrary/TasksUnitsStudentWork/default.htm>

Exemplars

A collection of performance assessment tasks in mathematics, are available through a paid subscription (school and district licenses). The assessment tasks include annotated examples of student responses illustrating different performance levels. Sample tasks are available on line. A good Problem-Solving Rubric is available for download.

<http://www.exemplars.com/>

Albuquerque, NM Public Schools have developed sets of math tasks aligned to the Common Core Standards. Choose “math” and grade level to view. (Not all are “authentic” problems).

http://rda.aps.edu/RDA/Performance_Task_Bank/index.cfm

Updated 2/25/15

Math Matters – The PBL Academy at Indiana University provides a variety of teacher developed math task and project ideas. You can access most of these resources by signing in as a “guest.”

<http://iuedmoodle.educ.indiana.edu/moodle/course/category.php?id=5>

Emergent Math – A blog containing ideas for interesting math tasks and projects.

<http://emergentmath.com/>

The Balanced Assessment Project contains a library of over 300 mathematics assessment tasks and scoring guides for K-12. Although most are not framed as “authentic” problems, the website provides many useful and challenging assessment items.

<http://balancedassessment.concord.org/>

A collection of challenging mathematics tasks developed by The Mathematics Assessment Resource Service (MARS) -- Michigan State, Berkeley, and the Shell Center.

<http://www.nottingham.ac.uk/education/MARS/tasks/>

NCTM has established a library of “reasoning task” ideas linked to the CCSS for the high school level.

<http://www.nctm.org/rsmtasks/>

Phillips Exeter Academy developed a collection of mathematics problems for their high school courses.

<http://www.exeter.edu/documents/math1all.pdf>

<http://www.exeter.edu/documents/math2all.pdf>

Mathematical Moments offers sets of 8.5" x 11" pdf cards offer ideas for real-world math tasks and projects.

<http://www.ams.org/samplings/mathmoments/browsemoments?cat=all>

The Minnesota Mathematics Partnership offer a collection of short, constructed response problems short, constructed response problems for Algebra and Geometry developed by Click on the various “CABS” to view.

http://www4.uwm.edu/Org/mmp/_resources/HSpaage.htm

http://www4.uwm.edu/Org/mmp/_resources/CR_Items.htm

Connecticut DOE – A searchable database of assessment tasks in various subjects and grade levels developed in the. Click on STUDENTS ASSESSMENT TASKS, then enter your search criteria.

<http://www.ctcurriculum.org/>

Updated 2/25/15

A collection of project-based units in mathematics developed for gifted Students – from the University of Connecticut.

<http://www.gifted.uconn.edu/projectm3/index.html>

A collection of mathematics assessments and associated resources developed in the United Kingdom. Most are decontextualized (i.e., not authentic).

<http://nrich.maths.org/public/>

Search by topic at this site -

<http://nrich.maths.org/public/leg.php>

Alberta Assessment Consortium has developed a set of performance tasks, searchable by grade and subject. Some of the collection is in open space and some is member protected which will be evident from the sub-page menus.

<http://www.aac.ab.ca/PerformanceAssessments.html>

Ontario, CN Ministry of Education offer a collection of authentic tasks, rubrics and student exemplars developed by the. Click on “Exemplars” to view.

<http://www.edu.gov.on.ca/eng/curriculum/secondary/math.html>

TUVA LABS – Tools for Data Analysis

Offers a variety of authentic data-related projects and analysis tools. Free sign up for teachers and their students.

<https://tuvalabs.com/>

View this illustrative video:

<http://www.edutopia.org/blog/helping-students-develop-digital-literacy-suzie-boss>

Smarter Balanced Assessment Consortium (SBAC)

SBAC has released sample performance tasks. To view these, click “Sign in” (no need to enter anything), Select “grade level”, then “Yes,” then “Start E/LA G__ Performance Task,” then “Select,” then “Yes, start my test,” finally click on Green Arrow (“next page”)

<https://sat1.sbacpt.tds.airast.org/Student/Pages/TestShellModern.aspx>

Project M3 – A collection of project-based units in mathematics developed for gifted students at the University of Connecticut.

<http://www.gifted.uconn.edu/projectm3/index.html>

Share my Lesson – A free sharing site by and for teachers sharing ideas and resources for math lessons and tasks.

Primary (grades K-2)

<http://www.sharemylesson.com/early-elementary-math-teaching-resources/>

Elementary (grades 3-5)

<http://www.sharemylesson.com/late-elementary-math-teaching-resources/>

Middle school

<http://www.sharemylesson.com/middle-school-math-teaching-resources/>

High school

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<http://www.sharemylesson.com/teaching-resource/PBL-activities-for-high-school-math-50009214/>

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Mathematical Moments offers sets of 8.5" x 11" pdf cards offer ideas for real-world math tasks and projects.

<http://www.ams.org/samplings/mathmoments/browsemoments?cat=all>

Real World Math – This site contains a collection of free math activities based on using Google Earth.

<http://www.realworldmath.org/project-based-learning.html>

TED-Ed offers a library of interesting videos from which teachers can create customized mathematics lessons.

<http://ed.ted.com/series/math-in-real-life>

The WPI Industrial Mathematics Project for High School Students has developed over twenty industrial mathematics projects for high school students. Best of all these were drawn from a variety of real-world situations. These engaging projects are available for every level of high school mathematics, from Algebra to Calculus and Statistics. The length and scope of these projects is flexible. Each project contains enough material for a major, semester-long endeavor, but its component parts can be used in a shorter project of for scaffolding activities.

<http://www.wpi.edu/academics/math/CIMS/IMPHSS/projects.html>

Project-Based Instruction in Mathematics for the Liberal Arts (PBI-MLA) was developed at the University of South Carolina. The site offers teaching resources and ideas for projects applicable to post-algebra high school mathematics.

http://faculty.uscupstate.edu/mulmer/PBI_Index.shtml

PBL Pathways contains project ideas for advanced mathematics.

<http://www.pblpathways.com/projects.html>

Dan Meyer’s Blog – Offers many examples and ideas of authentic math tasks and projects.

<http://blog.mrmeyer.com/>

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STEM

Defined STEM has developed 100+ performance tasks/projects and associated rubrics based on various career areas. The tasks use the GRASPS format from UbD to establish an authentic scenario. A unique feature is the inclusion of a motivating video that shows “real world” applications of knowledge to set up the task.

Click on “Performance Tasks” to view many examples. While the title suggests that the tasks fall into the STEM arena, there are tasks in English/Language Arts and History/Social Studies as well. In addition to the basic tasks, Defined STEM offers a set of electronic design tools allow teachers to customize the tasks and rubrics.

To view, go to: <http://www.definedstem.com>

Use Access Code # **STEMACCESS**

You will be prompted to create your own user name and password.

CK-12 Foundation is a non-profit that creates and aggregates high quality curated STEM content for mathematics and science. Find a collection of rich tasks and projects via a searchable database. A free “sign-up” is required.

<http://www.ck12.org/about/>

NRICH – A collection of STEM assessment tasks developed in the United Kingdom. Click on “StemNRICH” (on right side of screen) to see tasks in Biology, Chemistry, Physics, and Engineering.

<http://nrich.maths.org/public/>

A collection of **STEM projects** in various categories.

<http://www.k12science.org/currichome.html>

Challenge Based Learning Tasks

Apple Education has developed a collection of multidisciplinary tasks to use engaging students in applying technology to solve real-world problems. The tasks are collaborative and hands-on around authentic issues and problems.

<http://www.challengebasedlearning.org/challenges>

<http://www.nmc.org/projects/challenge-based-learning>

RUBRIC RESOURCES

New York State Performance Assessment Consortium offers a collection of quality rubrics.

<http://performanceassessment.org/performance/prubrics.html>

Winona State University has compiled a wide variety of rubrics in various courses and subject areas.

<http://course1.winona.edu/shatfield/air/rubrics.htm>

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Exemplars company offers a five-trait rubric for use with mathematics tasks available from Exemplars.com assesses *Problem Solving, Reasoning & Proof, Communications, Connections and Representations*. Click on the link to download a pdf file.

<http://www.exemplars.com/resources/rubrics/assessment.php>

Rubrics for Science and Mathematics

An excellent book containing 100 ready-to-use performance lists, holistic rubrics, and analytic rubrics for a wide range of science and math products and performances K-12.

<http://www.corwin.com/books/Book225952>

A collection of quality rubrics developed through the New York State Performance Assessment Consortium.

<http://performanceassessment.org/performance/prubrics.html>

A collection of solid rubrics in various subject areas developed by Quakertown, PA Schools

<http://www.qcsd.org/21307386221332/site/default.asp>