

UbD-Related Websites

Compiled by Jay McTighe

I have compiled the following collection of websites in support of curriculum and assessment design using the Understanding by Design (UbD)® framework. Please e-mail me (jaymctighe@verizon.net) if you discover outdated links as well as other useful sites that you find so that I can add to this list.

Key: ** Highly Recommended * Recommended

STAGE 1 – UNDERSTANDINGS and ESSENTIAL QUESTIONS for MATHEMATICS

* A sample unit in Mathematics (“Geometric Transformations”) developed by the **Delaware DOE**. Click on “Model Units” to view.

http://www.doe.k12.de.us/infosuites/staff/ci/content_areas/math.shtml

** 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.

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

* **SpringBoard®** Mathematics with Meaning™ from The College Board presents curriculum maps with Essential Questions for mathematics Middle and High School Levels (Grades 6-12), including pre-Algebra, Algebra 1, Geometry, Algebra 2, and pre-Calculus.). Click on links to view.

<http://springboardprogram.collegeboard.org/components>

* **Engage New York** offers a searchable database of curriculum and assessment resources aligned to the Common Core Standards Click on “Mathematics” to view.

<https://www.engageny.org>

* **New York City** a searchable database of curriculum and assessment resources. Click on “Mathematics” and then selected to view grade levels.

<https://www.weteachnyc.org/>

Colorado DOE offers teacher created math units at:

<https://www.cde.state.co.us/standardsandinstruction/instructionalunits-math>

Illinois DOE offers model curriculum units based on UbD.

<https://www.isbe.net/Pages/Model-Mathematics-Curriculum.aspx>

* These two websites offer practical resources for developing the CCSS **Mathematical Practices**, K - 6. Click on one of the standards and it takes you to posters with student-friendly language and examples.

<http://elemmath.jordandistrict.org/mathematical-practices-by-standard/>

<http://www.rosedalecurriculum.com/mathematical-practices-resources.html>

** **Georgia DOE** has developed mathematics units for K-12 aligned to the CCSS and reflecting the UbD framework. These units include Understandings, Essential Questions and Performance Tasks. Click on the grade band links below; then, you can select specific grades to view the units.

<https://www.georgiastandards.org/Common-Core/Pages/Math-K-5.aspx>

<https://www.georgiastandards.org/Common-Core/Pages/Math-6-8.aspx>

<https://www.georgiastandards.org/Common-Core/Pages/Math-6-8.aspx>

AERO Standards for International Schools include a set of Understandings and Essential Questions in Mathematics. See pp. 8, 17, 33, 49, and 59.

Elementary – http://www.projectaero.org/aero_standards/mathematics-framework/AERO-MathematicsCurriculumFramework.pdf

Secondary – http://www.projectaero.org/aero_standards/math-standards/2011AEROHighSchoolMathStandards.pdf

* 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 overarching (program level) big ideas, understandings and essential questions developed by the **New Jersey DOE**. Click this link to download a pdf file and scroll down to page 10 to view.

<http://www.nj.gov/education/aps/njscp/Phase1allAreas.pdf#page=10>

* A collection of overarching (program level) essential questions developed by the **Delaware DOE**. Click on “Clarification of the Math Standards” to view.

http://www.doe.k12.de.us/infosuites/staff/ci/content_areas/math.shtml

District curriculum in **Montgomery County, MD** identifies Understandings and Essential Questions for the mathematics curriculum. Click on Elementary, Middle, High School; then, click on grades/courses; then on Content Maps.

<http://www.montgomeryschoolsmd.org/curriculum/math/>

Video exploring “real world” mathematics in geometry.

<https://www.teachingchannel.org/videos/real-world-geometry-lesson>

* **Ohio DOE** provides model curriculum units tied to the Common Core Mathematics Standards. The Mathematics units include Common student misconceptions.

<http://www.education.ohio.gov/GD/Templates/Pages/ODE/ODEDetail.aspx?page=3&TopicRelationID=1696&ContentID=83819&Content=121448>

* **Science Atlas of Scientific Literacy** (AAAS Project 2061)

While the focus of this website is primarily science, it includes a basic set of “big ideas” in mathematics, organized as K-12 concept maps. Click on VIEW SAMPLE MAPS:

Atlas 1 – Scroll to PROPORTIONAL REASONING Ratios and Proportionality and click on the link to view.

Atlas 2 – THE NATURE OF MATHEMATICS and click on the link to view.

<http://www.project2061.org/publications/atlas/default.htm>

GENERAL WEBSITES

STATES/PROVINCES

The following websites provide examples of *Understanding by Design*® curriculum work in **States/Provinces**, **School Districts**, and **Schools**.

** **Massachusetts DOE**

Through the Race to the Top Initiative, teams of educators from across the state 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, the arts 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

* A series of classroom videos showing some of these units in use.

<http://www.doe.mass.edu/candi/model/videos/MCUs.html>

* **New Jersey DOE** – Use this link to download a pdf file containing a collection of overarching (program level) understandings and essential questions.

<http://www.nj.gov/education/aps/njscp/Phase1allAreas.pdf>

* **Ohio DOE** provides model curricula tied to the Common Core Standards in E/LA, Mathematics, Science and Social Studies, along with strategies for working with diverse learners. The E/LA curriculum models include Enduring Understandings; the Social Studies units contain Essential Questions; and the Mathematics units include Common Misconceptions. From “Topics”, select subject area of interest.

<http://www.education.ohio.gov/Topics/Ohios-Learning-Standards>

* **Engage New York** offers a searchable database of curriculum and assessment resources aligned to the Common Core Standards for pre-K – 12 in E/LA and Mathematics.

<https://www.engageny.org>

New York City a searchable database of curriculum and assessment resources. Click on “filters” to search via grade levels and subjects.

<https://www.weteachnyc.org/>

Pennsylvania – The Pennsylvania Department of Education has established the Standards Aligned System (SAS) containing curriculum resources. Select a content area (e.g., SAS Applied to Mathematics), a grade range (e.g., 6 – 8) or a Grade/Course (e.g., Pre-Algebra) to view Big Ideas (understandings) and Essential Questions.

<http://www.pdesas.org/module/sas/curriculumframework/>

INTEL – Unit plans in various subjects and grades developed by Intel Education contain Essential Questions. Scroll to the bottom to Education Resources and Programs, then select Lesson Plans and Project Ideas.

<http://www.intel.com/content/www/us/en/education/solutions/lesson-plans.html>

STAGE 2 – PERFORMANCE ASSESSMENTS and RUBRICS

I have worked with Defined Learning to develop:

1. Seven blogs on the design & use of Performance Tasks (right side of screen)
2. A set of on-line PD modules (left side of screen)

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

** **The Performance Assessment Resource Bank (SCALE)** is a recently posted online resource developed at Stanford University. The site offers a searchable database of curated performance assessments and associated resources that support their use by educators, schools, and systems and is designed as a platform to build a rapidly expanding collection of curated resources. This was a closed site but is now available nationally!

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

** **Colorado Professional Learning Network**

Offers an assessment resource bank that includes performance tasks in a searchable database. Search by subject, grade level, item type, and cost (many of the assessments are free).

<http://www.coloradoplc.org/assessment/assessments>

**** New York State Performance Standards Consortium** provides a collection of quality performance tasks and rubrics in various subject areas.

<http://performanceassessment.org>

*** The Virginia State Superintendents Association (VASS)** provides a collection performance tasks and rubrics developed in Virginia school divisions.

<http://vassonline.org/Page/291>

**** 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

**** A collection of LDC tasks are available on the PA Standards Aligned System (SAS) website.**

<http://www.iu17-2.pdesas.org/module/content/search/#search>

*** New Zealand Assessment Resource Bank**

Note: While it appears that you have to be New Zealand educator to access these website, but the search feature seems to work. Give it a try...

<https://arbs.nzcer.org.nz/>

<http://www.tki.org.nz/r/assessment/exemplars/>

**** 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.

In addition to the basic tasks, Defined STEM offers a set of electronic design tools allow teachers to customize the tasks and rubrics. 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.

This is a paid site. To view samples, go to: <http://www.definedstem.com>

**** The Buck Institute** offers a searchable database of projects for Project-based Learning.

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

*** The Pennsylvania DOE** offers a set of project-based assessments.

<http://www.pdesas.org/Page?pagelid=1>

****** A collection of quality performance tasks developed by the **Alberta Assessment Consortium, CN**. Browse 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/assessment-materials-2/>

* Examples of authentic projects with rubrics and student samples developed at **High Tech High School** in San Diego, CA

<http://www.hightechhigh.org/projects/>

**** TUVA LABS** offers a variety of data-related projects and analysis tools. Requires a free sign up to access the resources.

<https://tuvalabs.com/>

**** 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/>

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

* **Exemplars** – A collection of “authentic” 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. <http://www.exemplars.com/>

A good Problem-Solving Rubric is available for download at:

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

* **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/greataasks.html>

* **MARS Assessment Project** 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>

* **Illustrative Mathematics** offers illustrative problems/tasks aligned to the CCSS Standards. On the left panel, click on either “Content Standards” or “Practice Standards” to see illustrative examples and videos of students demonstrating the practices.

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

** **TuVu Labs** offers tools for engaging students to think critically about real data, ask meaningful questions, make evidence-based conclusions, and communicate their findings. Good resources for inquiry-based activities and lessons in Math, Science, and Social Studies aligned with the CCSS.

<https://tuvalabs.com/>

* The **CCSS Toolkit (Hawaii DOE)** contains math assessments for grades K-2 aligned to the domains of the CCSS. *Note: You may have to “cut and paste” the URL to access the site if the hotlink doesn’t work.*

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

* **Albuquerque, NM Public Schools** have developed sets of E/LA tasks and writing rubrics (at the secondary level) aligned to the Common Core Standards. Search by “Math” and grade level to view.

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

A set of modules and resources (sample problems) linked to the Common Core Mathematical Practices Standards.

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

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

Magnify Learning – Offers a variety of teacher developed math task and project ideas.

<https://www.rose-prism.org/moodle/prism/icpbl/?page=library>

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://map.mathshell.org/materials/tasks.php>

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

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

* A collection of mathematics problems developed by the math department at **Phillips Exeter Academy**

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

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

http://www.exeter.edu/academics/72_6539.aspx

* **CORD** offers a collection of contextualized lessons and tasks for algebra and geometry.

http://www.cord.org/cord_resources_ctl.php

* **Georgia DOE** has developed mathematics units for K-12 aligned to the CCSS and reflecting the UbD framework. These units include Understandings, Essential Questions and Performance Tasks. Click on the grade band links below; then, you can select specific grades to view the units.

<https://www.georgiastandards.org/Common-Core/Pages/Math-K-5.aspx>

<https://www.georgiastandards.org/Common-Core/Pages/Math-6-8.aspx>

<https://www.georgiastandards.org/Common-Core/Pages/Math-9-12.aspx>

The Minnesota Mathematics Partnership has developed a collection of short, constructed response problems (grades 2 – High School) with companion rubrics and student samples developed by

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

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

* **Stanford University** offers performance tasks in Mathematics, searchable by grade level, math concepts and/or math practices

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

PBL Pathways contains project ideas for advanced mathematics.

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

* **Real World Math** – This site contains a collection of free math activities based on using Google Earth. *Note: You may have to “cut and paste” the URL to access the site if the hotlink doesn’t work.*

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

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>

** This 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>

* **New York Times offers** ideas for “real world” tasks in Algebra.

<http://learning.blogs.nytimes.com/2012/09/26/n-ways-to-apply-algebra-with-the-new-york-times/>

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

http://www.nationalstemcentre.org.uk/elibrary/file/1950/investigations_tn_2_1-30.pdf

<https://nrich.maths.org/8517>

A set of **primary math tasks**. While most are not “authentic”, they call for problem solving and reasoning appropriate for the primary grades.

<http://nrich.maths.org/10334> Search by topic at this site -

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

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