

NEBHE Developmental Math Demonstration Project User Guide

Version 1.4
June 2013



TABLE OF CONTENTS

| | |
|---|-----------|
| TABLE OF CONTENTS | 2 |
| INTRODUCTION | 3 |
| USING KHAN ACADEMY IN THE CLASSROOM | 6 |
| TOOLS AND RESOURCES FOR USING KHAN ACADEMY IN THE CLASSROOM..... | 8 |
| EXAMPLE: KHAN ACADEMY IN A DMDP CLASSROOM | 10 |
| EXAMPLE: KHAN ACADEMY IN THE CLASSROOM (A) | 18 |
| EXAMPLE: KHAN ACADEMY IN THE CLASSROOM (B) | 19 |
| GETTING STARTED | 20 |
| HOW TO: CREATE AN ACCOUNT | 21 |
| HOW TO: TRACK STUDENT USAGE | 22 |
| HOW TO: GENERATE STUDENT REPORTS | 24 |
| EXAMPLE: PLANNING YOUR DATA COLLECTION AND REPORTING | 26 |
| EXAMPLE: SETTING UP DATA COLLECTION AT A DMDP SITE | 27 |
| EXAMPLE: FIRST DAY OF CLASS AGENDA | 28 |
| EXAMPLE: STUDENT HANDOUT AND OPT-IN ON DMDP | 29 |

Introduction

Welcome

Thank you for your participation in NEBHE’s Developmental Math Demonstration Project (DMDP)! NEBHE is excited to partner with you and your colleagues in demonstrating the impact of Khan Academy materials on student experiences and outcomes in developmental math courses across the New England region.

The following training guide is intended to provide guidance and resources for participating math departments and faculty. In particular, the following sections will focus on:

- Examples of Khan Academy usage in math courses
- Overview of the Khan Academy website
- Instructions for setting up Khan Academy accounts for faculty and students
- Ideas for your first day of class
- Tracking student progress

We trust that this training guide will be informative, and evolve with your input. Please address comments and feedback to Stafford Peat, Project Director, at speat@nebhe.org or (617) 357-9620 x109.

Project Implementation Timeline

| Project Activity | Key Dates |
|--|-------------------|
| LOI to participate released | November 8, 2012 |
| Project webinar for prospective sites | November 19, 2012 |
| LOI to participate due | December 15, 2012 |
| Pilot site notification | December 21, 2012 |
| Project Memorandum of Understanding signed | February 2013 |
| One-day orientation of pilot site staff | March 2013 |
| Data Share Agreements due | May 2013 |
| Summer semester startup (including summer bridge programs) | June/July 2013 |
| Pilot site baseline data due | August 2013 |
| Pilot site networking meeting | Summer 2013 |
| Fall semester startup | September 2013 |
| Pilot site summer data due | October 2013 |
| Spring semester startup | January 2014 |
| Pilot site data due for fall semester | February 2014 |
| Summer semester startup | June 2014 |
| Pilot site networking meeting | Summer 2014 |
| Pilot site data due for spring semester | August 2014 |
| Fall semester startup | September 2014 |
| Pilot site summer data due | October 2014 |
| Spring semester startup | January 2015 |
| Pilot site data due for fall semester/longitudinal data | February 2015 |
| Pilot site data due for spring semester/longitudinal data | Summer 2015 |

About NEBHE

The New England Board of Higher Education is a congressionally authorized six-state compact committed to promoting greater postsecondary educational opportunities and services for the residents of New England.

Through DMDP, NEBHE will partner with New England states and community colleges in order to:

- Create a community of Khan Academy users in a variety of delivery models and instructional settings
- Build a learning community for college math faculty to share tools, ideas, and strategies for improving developmental math instruction
- Augment strategies already underway to redesign developmental math curricula and increase the number of students entering and succeeding in college-level math courses

To accomplish this work, two NEBHE staff members are committed to supporting pilot institutions participating in DMDP. They are:

- Stafford Peat, Project Director, speat@nebhe.org, (617) 357-9620 x109
- Monnica Chan, Project Research and Evaluation Coordinator, mchan@nebhe.org, (617) 357-9620 x130

NEBHE has also created three additional part-time positions focused exclusively on supporting the DMDP:

- *Amanda Bigelow, Math Content Specialist, abigelow@nebhe.org* — Amanda is responsible for aligning Khan Academy content to participating community college developmental course outcomes; the Common Core State Standards; as well as the College Board's Accuplacer math exam topics. In addition, Amanda will assist in identifying, modifying and/or developing model developmental math courses.
- *Peter Mili and Tim O'Connor, Implementation Coaches, pmili@nebhe.org and toconnor@nebhe.org* — Peter is responsible for providing technical support to community college sites in Connecticut, Massachusetts and Rhode Island. Tim is responsible for supporting community college sites in New Hampshire and Vermont. Through webinars, site visits and other forms of communication, the Implementation Coaches will also help identify and disseminate exemplary practices using Khan Academy materials among demonstration sites. The Implementation Coaches will also assist in organizing regional training and pilot site convenings, as well as managing the dissemination and collection of quantitative and qualitative data.

About Khan Academy

Khan Academy was incorporated as a 501c(3) non-profit in 2008 with a mission to provide a free world-class education for anyone anywhere. This is accomplished through the organization's website, KhanAcademy.org, which hosts free academic content in the form of short informational videos and content-specific exercises.

The academic content is organized by subject area (Math, Science & Economics, Humanities, etc) and sub-topic (ex. Arithmetic and Pre-algebra). Sub-topic areas are each associated with a number of videos and exercise sets.

Users who choose to create an account on Khan Academy are able to track their progression through each of the academic subject and sub-topic areas. Site usage is measured in a number of ways, such as:

- How many videos have been watched?
- How many exercise sets within an academic sub-topic have been completed?
- How many exercise sets is a student proficient in?
- How many minutes have been spent on each exercise problem?

Educators and students around the world have leveraged Khan Academy user data to facilitate innovations in teaching and learning. Some instructors, for example, have assigned Khan Academy video and exercises as homework, and then used the platform's student-level data to customize their teaching and intervention strategies for students during class time.

Khan Academy can thus be a tool for customizing the flow of a course to meet student needs. As a free resource, it may also help to lower some of the instructional costs to students. Khan Academy is not, however, a replacement for teaching. The platform lacks assessments (although diagnostic exams are currently in development) and does not offer a direct communication platform between users.

Through DMDP, we're looking forward to exploring the utility and impact of these materials for developmental math (DM) across New England.

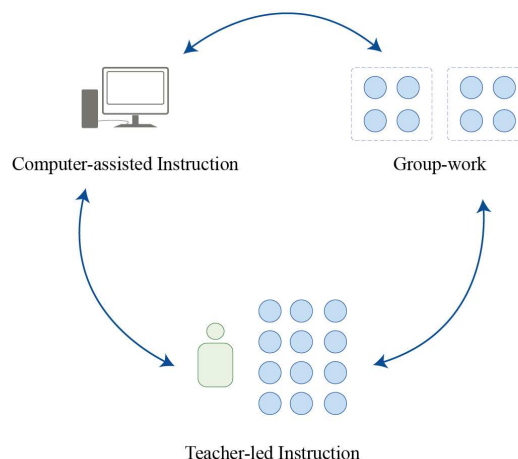
Note: Please be aware that Khan Academy is an ever-changing resource. Although links to videos and exercises should redirect to any changes made on the website, you may notice that the website layout/design may change over the course of this demonstration project. If you have any questions, concerns or feedback, please contact Stafford Peat as speat@nebhe.org or the Implementation Coach.

Using Khan Academy in the Classroom

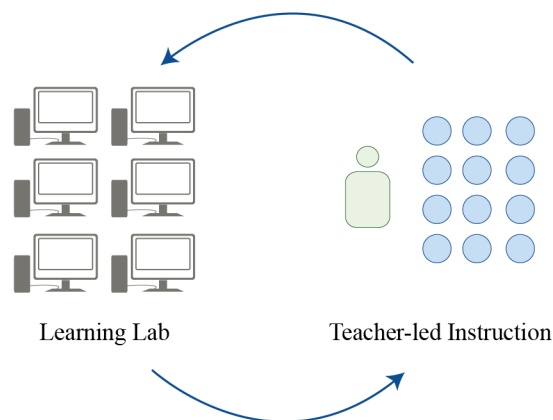
Listed below are examples of how Khan Academy might be used in a postsecondary developmental math (DM) course or course module:

- *Supplemental Material* — Khan Academy videos and practice sets are assigned to students as extra resources. Videos and practice sets can be assigned weekly for the whole class and/or to individual students struggling with mastering a concept or course sub-topic. Some faculty members may choose to set a minimum amount of time students spend on Khan Academy e.g. 30 minutes per week.
- *Blended Learning Tool* — Khan Academy materials are used in conjunction with some time spent in a classroom or computer lab under the supervision of a faculty member.¹ Models for blended learning using Khan Academy vary and may include:

Station-Rotation: Student rotate through stations, either as individuals, in small groups, or as an entire class.

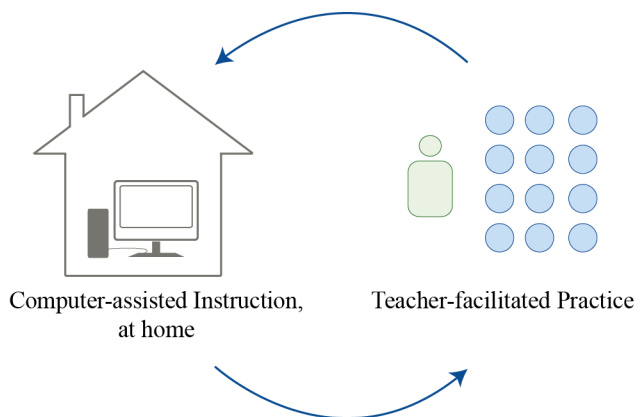


Lab-Rotation: Course sessions rotate between a traditional classroom and one with a computer lab.

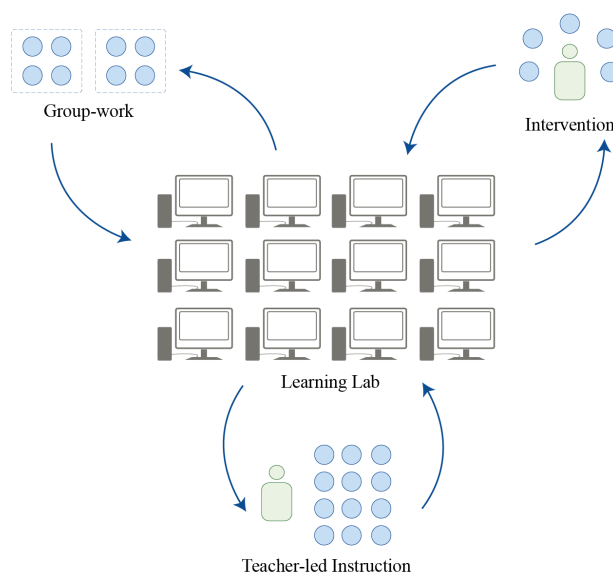


¹ This definition is adopted from the Innosight Institute's definition of blended learning.

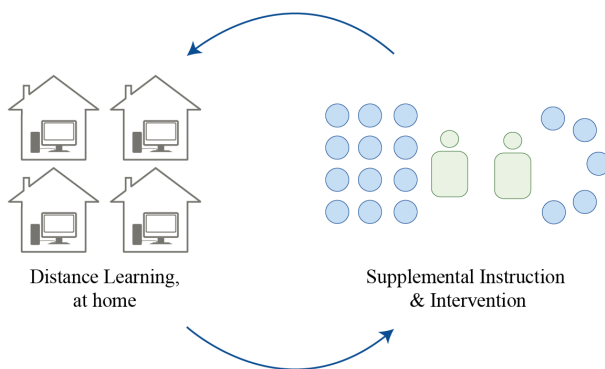
Flipped Classroom:
 Students conduct all on-line activity outside of class time. Class time is used for face-to-face guided practice, extra help and mastery of material.



Learning Lab: Course sessions rotate between a traditional classroom and one with a computer lab. All students are based in a computer lab with faculty supervision. Students rotate out, as needed, to small group stations featuring direct instruction, intervention, seminars, project-based learning, and other pedagogical models.



Enriched-Distance Learning Course:
 Students take the course online. Face-to-face interaction between the faculty and student is reserved for supplemental instruction.



Listed below are examples of how Khan Academy might be used in pre-matriculation programs:

- *Accuplacer Preparation* — Incoming college students or students still in high school take the Accuplacer Math Diagnostic. The results of the assessment are used to determine where students need extra help. Using NEBHE’s Khan Resources Match Chart, faculty members can match a student’s area of weakness on the Accuplacer diagnostic with Khan Academy videos and practice sets.
- *Summer Bridge Programs* — Summer Bridge Program staff assign Khan Academy videos and practice tests as a refresher, especially for students who have not recently taken a math course in high school.

Khan Academy can also be used in college-level course work, such as foundational courses in a technical program:

- *Embedded Academic Math Content* — Technical instructors identify key math concepts and topics essential to their career field. Using NEBHE’s Khan Resources Alignment Maps, technical instructors then can assign Khan Academy videos and practice sets e.g., adding and subtracting fractions.

Tools and Resources for Using Khan Academy in the Classroom

There are many tools available to determine what Khan Academy content might be most appropriate for your course outcomes and goals. These include:

- *NEBHE’s Khan Resources Alignment Maps* — This resource series is available online at <http://www.nebhe.org/nebhe-developmental-math-demonstration-project/resources/> and include:
 - Alignment of Accuplacer Math Topics with Khan Academy, the Common Core and Applied Tasks
 - Alignment of Developmental Math Topics with Khan Academy, the Common Core and Applied Tasks
 - Alignment of Nashua Community College Automotive and Machine Technology Math Content Skills with Khan Academy Videos and Practice Sets
- *Khan Academy* — The Khan Academy website also features tools for faculty. Examples include:
 - Community questions (and answers) can be found under the newly updated Coach Resource page: <https://www.khanacademy.org/coach-res/d>. Please note that questions (and answers) rise to the top through a user voting process.

- Khan Academy's Quick Start Guide is a comprehensive six-step guide to incorporating Khan Academy in your classroom. Highlights include a sample first-day-of-class agenda and suggestions for when Khan Academy might be used to engage different learners. The guide can be downloaded from this Khan Academy webpage: <https://www.khanacademy.org/coach-res/for-teachers/classroom-quick-start/a/quick-start-guide>
- Alignment of Khan Academy materials with the Common Core State Standards. An interactive table can be found at www.khanacademy.org/commoncore.

Example: Khan Academy In a DMDP Classroom

| | | |
|------------------------|----------------|----------|
| Khan Academy Boot Camp | Scott Holbrook | Syllabus |
|------------------------|----------------|----------|



| | |
|----------------|--|
| Course: | Khan Academy Boot Camp (Algebra) |
| Instructor: | Scott Holbrook |
| E-mail: | scottbholbrook@gmail.com |
| Times: | July 15 – July 25 MTWR from 9 am – 12 pm (8 classes total) |
| Room: | 171 - Nashua CC Main Building |

COURSE DESCRIPTION

A two week workshop that deals with basic and intermediate algebra topics including solving equations and inequalities; systems of linear equations; factoring and simplifying algebraic expressions; basic graphing techniques and applications of all skills.

COURSE COMPETENCIES

At the end of two weeks, students will have gained competency in topic(s) like:

1. perform algebraic operations.
2. solve linear equations and inequalities including those with absolute values.
3. graph linear equations and inequalities.
4. determine the equation of a line.
5. solve systems of linear equations and inequalities.
6. perform operations on polynomials.
7. use factoring to simplify rational algebraic expressions and solve factorable higher degree equations.
8. apply knowledge of ratio and proportions to problem solving.
9. apply mathematical concepts to problem solving.

ASSIGNMENTS

This class will have assignments such as watching videos of various topics as well as completing exercises on these topics. Students can re-watch and re-do videos and exercises, respectively, as many times as they would like. Students are also recommended to use Google, the math tutoring center in Room 100 of Nashua Community College (the Learning Commons) and any other appropriate resources in order to aid in their learning experience.

There is no grade/credit for this course. It is meant to build and reinforce math skills.

ACCOMMODATIONS

Students who have a documented disability (physical, learning, or mental health) and require reasonable accommodations must meet with the Disabilities Support Coordinator to set up a NCC Reasonable Accommodation Plan. If you had an IEP or 504 in high school you may qualify for a plan. If you would like more information or if you are not sure if you qualify for a plan, please contact Melissa Olson, Disabilities Support Coordinator, located in the Learning Commons (room 100), 603-578-8900 extension 1451. In order to receive classroom accommodations, it is the student's responsibility to meet with his/her instructor privately and provide a hard copy of the signed plan.

COURSE ATTENDANCE

Students are expected to attend every single class, as there are only 8 total classes for this Boot Camp. If you are going to be absent, please email the instructor to let them know and accommodations can be made for getting back on track; as work can be outside of class.

LEARNING COMMONS - TUTORING

The Tutoring and Writing Center, located at The Learning Commons in room 100, is open to all NCC students. The Learning Commons are open Mon-Fri 8:00 am–4:00 pm (on Tues, they're open until 6:00 pm) – they have a computer lab! The NCC Library is also open Mon-Thurs 8:00 am–8:00 pm and 8:00 am–4:30 pm Fri. The Library has computer lab(s) as well.

SUMMER HOURS FOR MATH TUTORING (room 100):

Mon 10:30 - 3:00 // Tues 12:00 - 6:00 // Wed 10:00 - 5:00 // Thurs 10:30 - 3:30

WHAT IS KHAN ACADEMY? www.khanacademy.org

Khan Academy is a free, online, educational community which offers lessons, videos, examples and so much more in a variety of subjects all for the purpose of educating its users in topics of their choice. In particular, many students use Khan Academy as a supplemental resource to reinforce skills previously or currently learned whether from elementary school or graduate school! For the most part, each topic and subtopic has a group of videos (of an instructor teaching the topic, as it would be in a regular classroom) – as well as a forum for users to ask questions to the community – which then follows to a grouping of 8 exercises on that topic. These exercises reflect what is taught in the videos and can be done infinitely many times. You can also watch the videos as many times as you'd like and even skip over parts, like a YouTube video. Khan Academy can be accessed anywhere there's an internet connection, so your learning doesn't just end in the classroom.

SETTING UP YOUR KHAN ACADEMY ACCOUNT

- Go to **www.khanacademy.org** and click "Sign up with email"
- Fill out all the necessary information, register and write down your username and password – you can use your username OR email to sign in
- Once you're finally logged in, go to the top right of the page and click on your username (a drop down menu will appear, click on your username there) – this brings you to your PROFILE PAGE
- On this new page, look to the left and you will see "Coaches" at the bottom of the left column. Click on that and add scottbholbrook@gmail.com as a coach
- You're now officially enrolled in this boot camp and can get started! You can always go back to your PROFILE PAGE to track your progress.

USING KHAN ACADEMY

Even though this site is extremely user friendly, the most efficient way to navigate through this site (and Boot Camp course) is to follow the syllabus itinerary at the end of this syllabus. You will **search** for things in the search bar of Khan Academy, find what you're looking for and then complete videos/exercises. When you search for something, you will notice that it could reference a Topic, a Video (represented by the ▶ symbol) or an Exercise (represented by the ★ symbol). The syllabus itinerary will be specific for what you need to search for and complete, using literal wording which directly correlates with Khan Academy.

The New England Board of Higher Education Developmental Math Demonstration Project (DMDP)

The Developmental Math Demonstration Project (DMDP) is a collaborative of community colleges across Connecticut, Massachusetts, New Hampshire, Rhode Island and Vermont. These colleges will be using Khan Academy videos and exercise problems in math classes and math review sessions.

As part of the project, the colleges of the Community College System of New Hampshire will be sending data on course outcomes to the New England Board of Higher Education (the organization coordinating the project). All student data sent outside of the college will be anonymous—although course grades and other information will be sent, it will be impossible for those outside of the college to identify your performance in the course.

If you would like to opt-out of having your course performance included in the data collection process, please fill out the information below:

Name: _____

Student ID Number: _____

Course: _____

Signature: _____

Date: _____

Khan Academy Boot Camp Scott Holbrook Syllabus

“What to Search” is what you type in the search bar. What you are looking for is written exactly as shown here, and a ▶ symbol means “Video” and a ☆ symbol means “Exercise”. Each exercise set has a stack of 8 problems.

| Day | Material to be covered | What to Search |
|-----|---|--|
| 1 | -Order of Operations -Operations on Real Numbers -Basic Exponent Rules -Mixed Numbers -Improper Fractions -Distributive Property -Substitution into Variables | ▶ Combining Like Terms 2 (3:43) ▶ Combining Like Terms 3 (4:39) ▶ Combining like terms and the distributive property (4:07) ☆ Combining like terms with distribution ▶ Adding Fractions with Unlike Denominators (4:06) ▶ Adding Mixed Numbers with Unlike Denominators (5:16) ▶ Adding subtracting mixed numbers 1 (ex 2) (2:31) ☆ Adding subtracting mixed numbers 1 ▶ Multiplying Mixed Numbers (4:21) ▶ Dividing Mixed Numbers and Fractions (3:22) ☆ Multiplying mixed numbers 1 ▶ Introduction to Order of Operations (9:40) ▶ Order of Operations examples (14:23) *watch until 10:30 ☆ Order of operations |
| 2 | -Solving Linear Equations -Solving Linear Inequalities -Compound Inequalities | ▶ One Step Equations (12:30) ▶ Two-Step Equations (13:50) ▶ Two-step equation with $x/4$ term (3:04) ☆ 2-step equations ▶ Example 1: Variables on both sides (4:33) ▶ Equation Special Cases (1:55) ☆ Equations with variables on both sides ▶ Solving Equations with the Distributive Property (6:04) ▶ Solving equations with the distributive property 2 (4:50) ☆ Multistep equations with distribution ▶ Inequalities Using Addition and Subtraction (7:48) ▶ Inequalities Using Multiplication and Division (10:27) ▶ Multi-Step Inequalities (8:02) ▶ Multi-Step Inequalities 2 (3:47) ▶ Multi-Step Inequalities 3 (5:38) ☆ Multi-step linear inequalities ▶ Compound Inequalities (4:31) ▶ Compound Inequalities 2 (5:13) ▶ Compound Inequalities 3 (4:28) ▶ Compound Inequalities 4 (2:41) ☆ Compound inequalities |

| | | |
|------------------------|----------------|----------|
| Khan Academy Boot Camp | Scott Holbrook | Syllabus |
|------------------------|----------------|----------|

| | | |
|---|--|--|
| 3 | <ul style="list-style-type: none"> -Exponent Properties -Product Rule (Exponents) -Quotient Rule (Exponents) -Power Rules (Exponents) -Zero Exponent -Negative Exponents -Operations on Polynomials | <ul style="list-style-type: none"> ▶ Exponent Properties Involving Products (14:00) ▶ Exponent Properties Involving Quotients (9:22) ▶ Zero, Negative and Fractional Exponents (14:04) *watch until 5:16 ★ Negative exponents <ul style="list-style-type: none"> ▶ Exponent Properties 1 (2:36) ▶ Exponent Properties 2 (5:11) ▶ Exponent Properties 3 (2:35) ▶ Exponent Properties 4 (3:07) ▶ Exponent Properties 5 (2:50) ▶ Exponent Properties 6 (4:19) ▶ Adding and Subtracting Polynomials 1 (2:01) ▶ Adding and Subtracting Polynomials 2 (1:44) ▶ Adding and Subtracting Polynomials 3 (2:27) ★ Adding and subtracting polynomials <ul style="list-style-type: none"> ▶ Multiplying Binomials (5:47) ★ Multiplying expressions 1 <ul style="list-style-type: none"> ▶ Multiplying Monomials by Polynomials (2:43) ▶ Multiplying Polynomials (5:46) ▶ More multiplying polynomials (2:34) ★ Multiplying polynomials |
| 4 | <ul style="list-style-type: none"> -Greatest Common Factor -Factoring with GCF -Factoring Trinomials -Difference of Squares | <ul style="list-style-type: none"> ▶ Factor polynomials using the GCF (5:28) ▶ Factoring and the Distributive Property 2 (4:46) ▶ Factoring and the Distributive Property 3 (5:54) ★ Factoring linear binomials <ul style="list-style-type: none"> ▶ Factoring quadratic expressions (16:30) ▶ Examples: Factoring simple quadratics (4:20) ★ Factoring polynomials 1 <ul style="list-style-type: none"> ▶ Example 1: Factoring trinomials with a common factor (5:01) ★ Factoring polynomials 2 <ul style="list-style-type: none"> ▶ Example 4: Factoring by grouping (3:55) ▶ Example 5: Factoring by grouping (4:46) ▶ Example 6: Factoring by grouping (5:17) ★ Factoring polynomials by grouping <ul style="list-style-type: none"> ▶ Example 1: Factoring difference of squares (1:49) ★ Factoring difference of squares 1 ★ Factoring difference of squares 2 |
| | WEEK 1 OVER | CATCH UP ON ALL MISSED WORK FROM THE FIRST WEEK |

| | | |
|---|---|--|
| 5 | <p>-Simplifying Rational Expressions</p> <p>-Operations on Rational Expressions</p> | <ul style="list-style-type: none"> ▶ Simplifying Rational Expressions Introduction (15:22) ▶ Simplifying Rational Expressions 2 (6:42) ★ Simplifying rational expressions 2 ★ Simplifying rational expressions 3 ▶ Multiplying and Dividing Rational Expressions 1 (3:38) ▶ Multiplying and Dividing Rational Expressions 2 (4:52) ▶ Multiplying and Dividing Rational Expressions 3 (4:10) ★ Multiplying and dividing rational expressions 2 ▶ Adding and Subtracting Rational Expressions 2 (2:56) ▶ Adding and Subtracting Rational Expressions 3 (4:36) ▶ Subtracting Rational Expressions (5:35) ★ Adding and subtracting rational expressions 1.5 ★ Adding and subtracting rational expressions 2 |
| 6 | <p>-Graphing Linear Equations</p> <p>-x, y Intercepts</p> <p>-Slope Formula</p> <p>-Writing Equations of Lines</p> <p>-Graphing Linear Inequalities</p> <p>-Functions</p> | <ul style="list-style-type: none"> ▶ The Coordinate Plane (6:50) ★ Points on the coordinate plane ▶ Ordered pair solutions of equations (1:29) ★ Ordered pair solutions to linear equations ▶ X and Y intercepts (4:08) ★ Solving for the x-intercept ▶ Slope of a line (4:40) ▶ Slope of a Line 2 (7:12) ▶ Slope of a Line 3 (5:05) ▶ Graphing a line in slope intercept form (3:01) ▶ Converting to slope-intercept form (5:07) ★ Graphing linear equations ▶ Equation of a line 1 (3:45) ▶ Equation of a line 2 (3:57) ▶ Equation of a line 3 (6:42) ▶ Equations of Parallel and Perpendicular Lines (9:13) ▶ Parallel Line Equation (4:24) ★ Equations of parallel and perpendicular lines ▶ Graphing Inequalities (8:03) ▶ Graphing Inequalities 2 (5:20) ★ Graphing linear inequalities ▶ Relations and Functions (6:57) ▶ Function example problems (11:49) ★ Understanding function notation |

| | | |
|------------------------|----------------|----------|
| Khan Academy Boot Camp | Scott Holbrook | Syllabus |
|------------------------|----------------|----------|

| | | |
|---|--|--|
| 7 | <ul style="list-style-type: none"> -Systems of Equations -Graphing Method -Substitution Method -Elimination Method | <ul style="list-style-type: none"> ▶ Solving Systems Graphically (2:22) ★ Graphing systems of equations ▶ The Substitution Method (4:39) ▶ Substitution Method 2 (3:44) ★ Systems of equations with substitution ▶ Addition Elimination Method 1 (3:38) ▶ Addition Elimination Method 2 (4:25) ▶ Addition Elimination Method 3 (5:05) ★ Systems of equations with simple elimination ▶ Systems with Elimination Practice (5:31) ★ Systems of equations with elimination |
| 8 | <ul style="list-style-type: none"> -Additional Topics -If you're not finished, this day will be used to allow you to finish all work from Days 1 through 7 | <ul style="list-style-type: none"> ▶ Example 1: Solving a quadratic equation by factoring (6:22) ▶ Example 2: Solving a quadratic equation by factoring (3:19) ★ Solving quadratics by factoring ▶ Solving Rational Equations 1 (4:12) ▶ Solving Rational Equations 2 (4:08) ★ Systems of equations with substitution |
| Thank you for your participation! Have a great summer!! | | |

**Additional videos, exercises, worksheets and other supplemental materials may be assigned at the discretion of the instructor.

Example: Khan Academy In the Classroom (A)

Self-pacing: Mr. [redacted] teaches a specific skill each day that is aligned to Khan Academy, students work on aligned exercises, remediate, or work ahead during learning lab
Other details: Students complete work at school in a learning lab and at home.

| 2012 - 2013 | | Algebra Syllabus | 1st Semester | | | | | | | | | | | | |
|---|---------------|---|---|---------------|-----|---------------|-----|---------------|-----|---------|-----|----------------|-----|--|--|
| Contact Info for Mr. [redacted] [redacted] [redacted] | | | | | | | | | | | | | | | |
| Khan Academy.org Khan exercises will be assigned for each section of the course. These exercises will be worked on in class and at home. They are expected to be completed in the week they are assigned. If you do not have internet access at home it is your responsibility to take advantage of computer resources on campus before you go home. | | | | | | | | | | | | | | | |
| Course Pacing: Exercises are arranged according to the schedule I will use for class examples and brief explanations. Some of you may move ahead of this pace, but you will be required to complete a "stack" of these problems in class as we review each topic. If you fall behind this pace, or if you fail to maintain a 70% average, you will be assigned to an afterschool program for additional assistance. You are always welcomed to come by after school for extra help. | | | | | | | | | | | | | | | |
| Grading Policy: <table border="0"> <tr> <td>Khanwork</td> <td>30%</td> <td>Section Tests</td> <td>20%</td> <td>Being Focused</td> <td>10%</td> </tr> <tr> <td>Quizzes</td> <td>20%</td> <td>Semester Final</td> <td>20%</td> <td></td> <td></td> </tr> </table> Being focused grade reflects participation in class activities and preparation for class. | | | | Khanwork | 30% | Section Tests | 20% | Being Focused | 10% | Quizzes | 20% | Semester Final | 20% | | |
| Khanwork | 30% | Section Tests | 20% | Being Focused | 10% | | | | | | | | | | |
| Quizzes | 20% | Semester Final | 20% | | | | | | | | | | | | |
| Text Book: Flexbook Other Resource: PurpleMath.com | | | | | | | | | | | | | | | |
| Materials: Bring them every day! 3-ring binder, lined paper, pencil. Calculators will be allowed only in rare situations. | | | | | | | | | | | | | | | |
| Sections 1&2 – Math Skills & Algebra Building Blocks | | | | | | | | | | | | | | | |
| Mon | 27-Aug | Syllabus, Edmodo, Flex Books [] | Clear your reviews! | | | | | | | | | | | | |
| T/W | 28-Aug | Project – Filling the Floor [] | Area1, [] Perimeter 1 | | | | | | | | | | | | |
| Thur | 30-Aug | [] | Area of squares & rectangles, [] Perimeter of squares & rectangles | | | | | | | | | | | | |
| Fri | 31-Aug | [] | Distributive Property, [] Combining like terms, [] Combining like terms with distribution | | | | | | | | | | | | |
| Mon | 3-Sep | Labor Day | | | | | | | | | | | | | |
| T/W | 4-Sep | Project - Filling the Room [] | Divisibility intuition, [] Divisibility tests | | | | | | | | | | | | |
| Thur | 6-Sep | [] | Divisibility 0.5 [] Divisibility | | | | | | | | | | | | |
| Fri | 7-Sep | [] | Prime Numbers, [] The fundamental theorem of arithmetic | | | | | | | | | | | | |
| Mon | 10-Sep | [] | Prime factorization | | | | | | | | | | | | |
| T/W | 11-Sep | Project - Hanging Pictures [] | Greatest common divisor | | | | | | | | | | | | |
| Thur | 13-Sep | [] | Least common multiple | | | | | | | | | | | | |
| Fri | 14-Sep | [] | LCM and GCD word problems, [] Estimation with decimals | | | | | | | | | | | | |
| Mon | 17-Sep | [] | Convert 1 digit repeating decimals, [] Evaluating expressions in one variable | | | | | | | | | | | | |
| T/W | 18-Sep | Project – Big Problems [] | Writing expressions, [] Writing expressions 2 | | | | | | | | | | | | |
| Thur | 20-Sep | [] | Order of operations, [] Negative number word problems | | | | | | | | | | | | |
| Fri | 21-Sep | [] | Evaluating expressions in 2 variables, [] Fraction word problems 1 | | | | | | | | | | | | |
| Mon | 24-Sep | [] | Properties of numbers 1, [] Properties of numbers 2, [] Number properties terminology 1 | | | | | | | | | | | | |
| T/W | 25-Sep | Project – Cutting wood – "Measure twice, cut once" [] | Rounding whole numbers, [] Rounding numbers | | | | | | | | | | | | |
| Thur | 27-Sep | Review | | | | | | | | | | | | | |
| Fri | 28-Sep | Test Section 1&2 | | | | | | | | | | | | | |
| Section 3 – Solving Linear Equations | | | | | | | | | | | | | | | |
| Mon | 1-Oct | [] | One Step Equation, [] One-Step equation with mult, [] 2-step equation | | | | | | | | | | | | |
| T/W | 2-Oct | Project – Solving Word Problems that are impossible to solve, [] | Age word problems | | | | | | | | | | | | |
| Thur | 4-Oct | [] | Multi-step equations, [] Equations with variables on both sides | | | | | | | | | | | | |
| Fri | 5-Oct | Work sheet: Equations with fractions | | | | | | | | | | | | | |
| Mon | 8-Oct | More equations with fractions | | | | | | | | | | | | | |
| T/W | 9-Oct | Project – Mystery ratios [] | Expressing ratios as fractions, [] Proportions 1, [] Proportions 2 | | | | | | | | | | | | |
| Thur | 11-Oct | Teacher | | | | | | | | | | | | | |
| Fri | 12-Oct | Meetings | | | | | | | | | | | | | |
| Mon | 15-Oct | [] | Rate problems 0.5, [] Reading bar charts 1, [] Reading bar charts 2 | | | | | | | | | | | | |

Example: Khan Academy In the Classroom (B)

Self-pacing: Students work at their own pace within a week and are expected to hit target deadlines for their work on Khan Academy, projects, and activities. They can also work ahead.
Other details: Mr. [redacted] uses data to host seminars for specific groups of students each week. He intentionally integrates hands-on projects and group work alongside Khan Academy.

Checklist 2: November 21 to December 1

Name: _____

GOAL

Students will be able to work interchangeably between the different representations of linear relationships: verbal/visual description, data table, graph and algebraic rule.

- SHOULD BE COMPLETE ALREADY**
- Last Week's Khans:**
- Functions 1
 - Interpreting Linear Equations
 - Distributive Property with Variables
 - Graphing Points
 - Graphing Points 2
- Older Khans:**
- Distance Formula
 - Midpoint Formula
 - Pythagorean Theorem 1
 - Triangle Inequality Theorem
 - Geometry 1
 - Simplifying Radicals

- DUE MONDAY, NOVEMBER 28th**
- Slope Project:**
- Instructions: Find some stairs. Calculate their slope. Describe how you did it. Take a picture. I'm looking for stairs with the steepest and shallowest slope.

- DUE BY WEDNESDAY, NOVEMBER 30th**
- Linear Relationships Project 1: "Thrifty Math Teachers"**
- Paper copy of this project should be turned in to Mr. [redacted] on or before due date.

- KHAN DUE BY TUESDAY, NOVEMBER 29th**
- Slope of a Line
 - Line Graph Intuition
 - Equation of a Line
 - Solving for the y-intercept
 - Graphing Linear Equations
 - Converting Between Slope-intercept and Standard Form
 - AT LEAST 2 NEW VIDEOS

- DUE BY THURSDAY, DECEMBER 1st**
- Linear Relationships Project 2: Microsoft Excel Activity**
- This project sent via e-mail. When completed, should be returned to Mr. [redacted] via e-mail as an attachment.

- UPCOMING KHAN**
- Graphing Inequalities 1
 - Graphing Inequalities 2
 - Line Relationships
 - Graphing Systems of Equations
 - Systems of Equations

**Concept Assessments on
 Friday, December 2nd
 (and always during Office Hours
 every Wed, Thurs & Fri)**

[+Additional examples to be added from pilot sites]

Getting Started

Technology

After thinking through how Khan Academy might be used in your classroom, NEBHE recommends working through the following questions:

- *What types of technology will your students need?*
- *How and when can your students access that technology?*
 - *How often will students have access to technology during class?*
 - *What is the ratio of computers, laptops, or tablets to students?*
 - *When can students access computer labs on campus, outside of class time?*
 - *What percentage of your students have internet access and a working, accessible computer, laptop, or tablet at home?*
- *Does your college's internet bandwidth and wifi capacity allow for all students to be on Khan Academy at once? (Khan Academy recommends internet connection speeds of ~1.5 Mbps per student.)*
- *Does the college block certain websites, such as YouTube?*
- *Would you feel comfortable troubleshooting tech-related issues as they arise? (ex. What will you do and/or who will you contact if some of your students haven't set up their school email; the internet is very slow or not working; some computers won't turn on; etc)*

Logistics

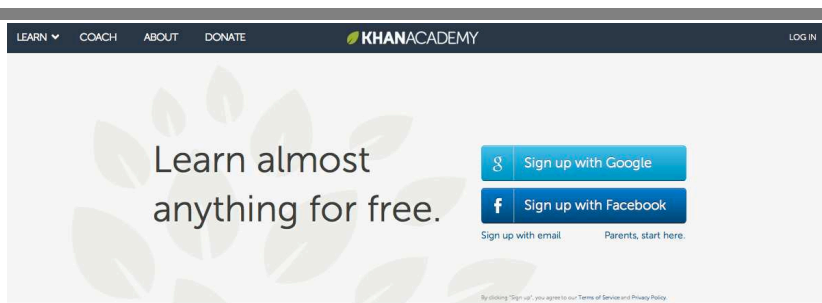
In order to use Khan Academy instructional materials and access student usage data, students and faculty members must have active Khan Academy accounts and be logged-in whenever Khan Academy materials are being used.

NEBHE recommends that faculty members create accounts, in advance, for themselves and their students (and/or require that students create an account as part of the course).

How To: Create An Account

Khan Academy user accounts require an active email address. The account set up process is outlined below.

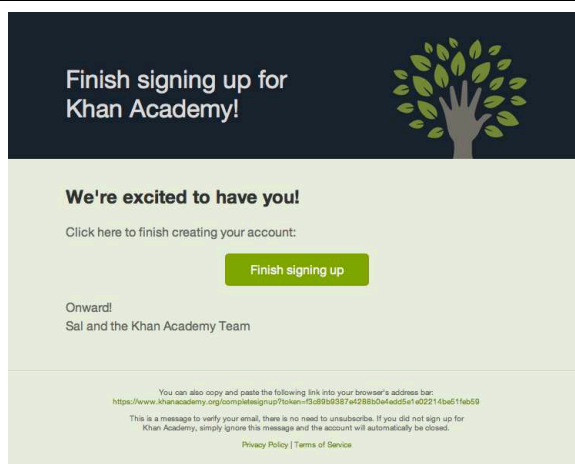
1. Go to www.khanacademy.org. If you haven't been to the site before and/or are not logged in, you'll see the image on the right.



2. If you aren't using a Google-hosted email account and/or are not signing up through facebook, click the "Sign up with email" link under the dark blue box. A form asking for your email address will appear.

A screenshot of the Khan Academy sign-up form. It includes input fields for "Last name" and "Email", and a "Birthdate" field with three dropdown menus. Below the birthdate field is a "Go back or" link and a large green "Sign up" button. At the bottom, there is a small text link: "By clicking 'Sign up', you agree to our Terms of Service and Privacy Policy."

3. Once the email information is inputted, the prospective user must confirm the account through their email. Clicking on the "Finish Signing Up" button will lead a user back to the Khan Academy website to set up their username and password.



How To: Track Student Usage

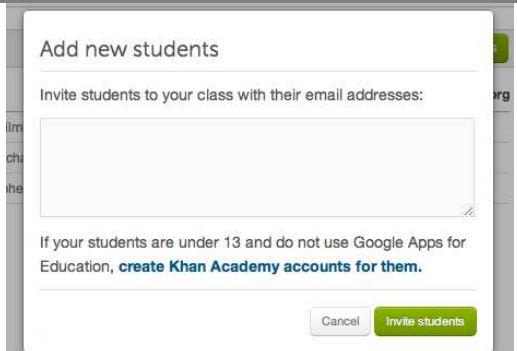
In order for you to see students' progress on Khan Academy, your students must add you as their "coach" in their account settings. Initiating the coaching process can occur in three ways:

1. The student adds you as a coach within their account settings
2. The student adds themselves to a specific class list (directions for creating class lists are below)
3. You suggest that they add you as a coach via Khan Academy

Options 1 and 3 require knowledge of the other person's email address. *Please note, a student may add more than one person as coach.*

To suggest students add you as a coach:

1. Select the "Coach Tab" at the top left (after logging in). Select "Manage Students", then "add new students". A box will appear allowing you to add in students' email addresses.



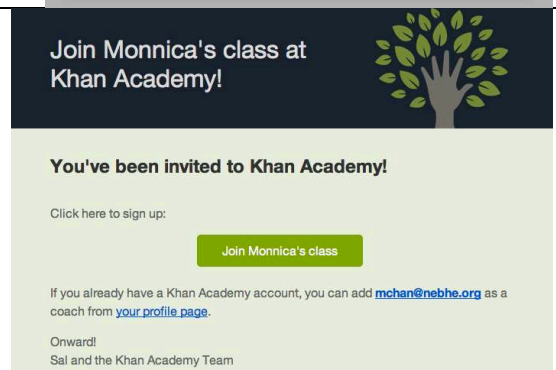
Add new students

Invite students to your class with their email addresses:

If your students are under 13 and do not use Google Apps for Education, [create Khan Academy accounts for them.](#)

Cancel Invite students

2. After suggesting that students add you as a coach, they'll receive an email asking them to confirm. Students must add you as a coach in order for you to access their usage history.



Join Monnica's class at Khan Academy!

You've been invited to Khan Academy!

Click here to sign up:

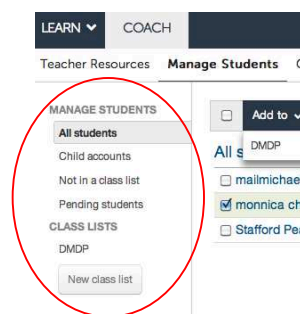
Join Monnica's class

If you already have a Khan Academy account, you can add mchan@nebhe.org as a coach from [your profile page](#).

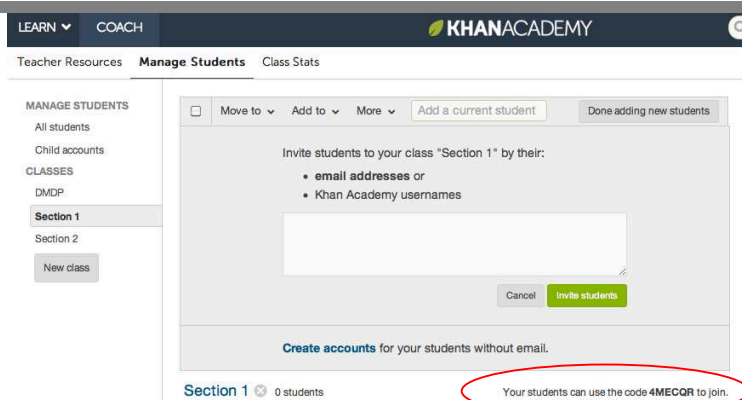
Onward!
Sal and the Khan Academy Team

To create a class list for students to add themselves to:

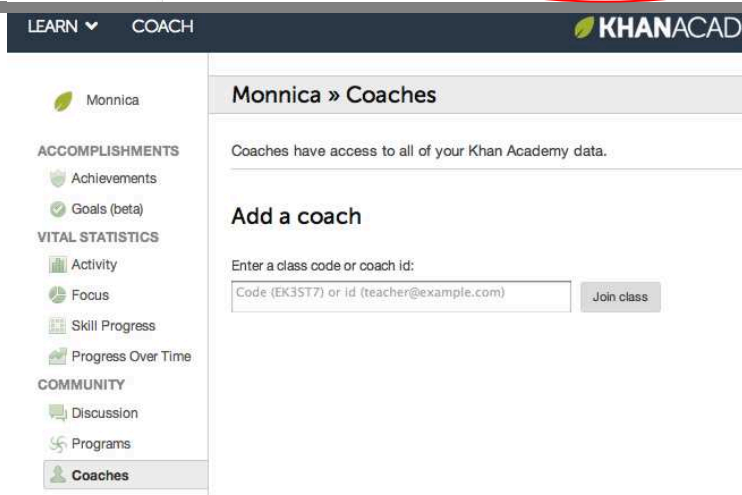
1. Class lists are one way to organize and group the students you are coaching. Under the “Manage Students” tab, click “New Class List” on the left. A box will appear allowing you to name a new class list.



2. Once a class list is added, select the class list you’d like students to join. While you may invite students to join the class (as you would invite a student to coach), students may also add themselves to the class using the class code at the bottom right.

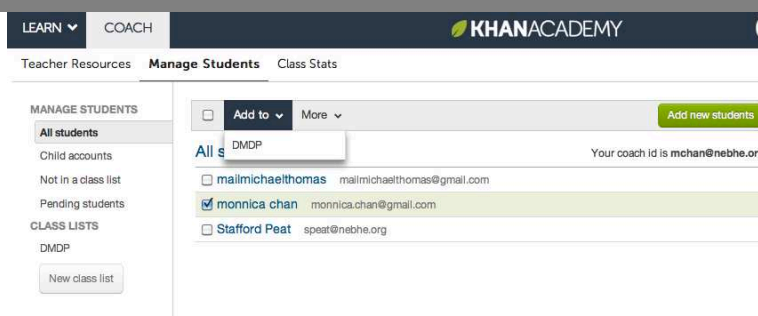


3. For a student to join your class, they must first create an account. The student would then access their user profile by clicking on their username at the upper right corner. Clicking on the coach tab at the left will allow students to add in a coach’s email or the class code. Once this is entered, a student will automatically appear under your list of students.



After a student adds you as a coach:

Student progress on Khan Academy can be organized and viewed by class (see image on right) or viewed individually by clicking on their name within the class list. You can also elect to stop coaching students under the “More” tab depicted on the right.



How To: Generate Student Reports

Khan Academy features multiple tools for understanding student usage and performance of the site’s videos and exercises. This includes options ranging from individual student progress to aggregate class summaries on specific topic areas (i.e. “addition and subtraction”; “area, perimeter, and volume”).

The screenshot shows the Khan Academy Coach interface. At the top, there are navigation tabs for 'LEARN' and 'COACH'. The 'COACH' tab is active, and the 'Class Stats' sub-tab is selected. The main content area displays a progress report for 'Addition and subtraction'. The report includes a filter for 'All Time' and a search box for 'Filter by exercises'. Below this, there are buttons for 'All students' and 'Struggling'. The report shows the skills your class has worked on and completed, with buttons for 'Started', 'Proficient', 'Review', and 'Struggling'. The report is expanded to show 'Addition and subtraction' skills. The skills are listed as follows:

| Skill | Struggling | Unstarted | Started | Proficient | Review |
|---------------------------|------------|-------------------|---------|------------|------------------|
| 1-digit addition | 1 (policy) | 1 (Stafford Peat) | 0 | 0 | 1 (monnica chan) |
| 1-digit subtraction | 0 | 2 | 1 | 0 | 0 |
| 2 and 3-digit subtraction | 0 | 3 | 0 | 0 | 0 |

Student progress is characterized as “Started”, “Proficient”, “Review” and “Struggling”. To navigate across the multiple tools, use the menu on the left side of the window, under the Coach>Class Stats tab.

Many of these tools can be useful to you in the classroom and NEBHE welcomes your feedback to their utility and accessibility. For an overview of each of these teacher tools, we would recommend viewing Khan Academy’s Coach Resources, which are available at <https://www.khanacademy.org/coach-res>.

For an overview of the data analytics available on Khan Academy, please see: <http://s3.amazonaws.com/KA-share/Toolkit-photos/Data-reference.pdf>

If there is a specific teacher resource that you’d like to see developed and/or feedback that you have on current teacher resources, please share your feedback with the project Implementation Coaches, Peter Mili (pmili@nebhe.org) and Tim O’Connor (toconnor@nebhe.org).

For NEBHE’s Developmental Math Demonstration Project, all participating pilot sites are required to submit student-level information on Khan Academy usage. NEBHE expects that a single office/staff person from the college or system will submit all data required for DMDP. The process for collecting student-level data may differ across participating sites.

If you are responsible for collecting and submitting student-level Khan Academy usage data, NEBHE recommends the following:

To download all student data:

1. Visit <http://khan-report.appspot.com/>. Click on “Class Report”.

mchan@nebhe.org | Logout | Donate

WATCH PRACTICE COACH VOLUNTEER ABOUT

Home

Khan Academy offline reports

- [Class Report](#) (coach access)
- [Goals Report](#) (coach access)
- [Suggest goals for your students](#) (coach access)
- [Student Goal Setting](#) (student access)

2. After entering in your email address (and logging in), an Excel file will be emailed to you. This file details, by student, the number of videos watched; the number of exercises a student is proficient in; the number of problems attempted; and the number of problems correct. *Note: You may need to match your students’ IDs or names with their email address and aggregate some of the data to come up with a complete student-specific snapshot. In addition, only a student’s coach has access to student-level data on Khan Academy. Please make sure that every student you plan to report on has added you as a coach.*

| | A | B | C | D | E | F | G | H |
|----|----------------|--------------------|---------------------------------------|--------|------------|---------------|------------------------------|----------------|
| 1 | Student Email | Exercise Name | Exercise Display Name | Key | Status | Is Proficient | Number of Problems Attempted | Number Correct |
| 2 | speat@nebhe.or | converting_percent | Converting percents to decimals | speat@ | working | 0 | 2 | 1 |
| 3 | speat@nebhe.or | adding_negative_nu | Adding negative numbers | speat@ | working | 0 | 2 | 1 |
| 4 | speat@nebhe.or | converting_decimal | Converting decimals to percents | speat@ | working | 0 | 3 | 0 |
| 5 | | | | | | | | |
| 6 | monnica.chan@ | adding_and_subtra | Adding and subtracting fractions | monnic | working | 0 | 1 | 1 |
| 7 | monnica.chan@ | recognizing_fra | Recognizing fractions | monnic | working | 0 | 1 | 1 |
| 8 | monnica.chan@ | subtraction_1 | 1-digit subtraction | monnic | proficient | 1 | 8 | 8 |
| 9 | monnica.chan@ | the_fundamental_th | The fundamental theorem of arithmetic | monnic | working | 0 | 1 | 1 |
| 10 | monnica.chan@ | prime_numbers | Prime numbers | monnic | working | 0 | 1 | 1 |
| 11 | monnica.chan@ | addition_1 | 1-digit addition | monnic | proficient | 1 | 8 | 8 |
| 12 | monnica.chan@ | least_common_mul | Least common multiple | monnic | working | 0 | 1 | 0 |
| 13 | monnica.chan@ | recognizing_fra | Recognizing fractions 0.5 | monnic | working | 0 | 6 | 5 |
| 14 | monnica.chan@ | number_line | Number line 1 | monnic | proficient | 1 | 8 | 8 |
| 15 | monnica.chan@ | composite_number | Composite numbers | monnic | working | 0 | 2 | 2 |
| 16 | monnica.chan@ | divisibility_intu | Divisibility intuition | monnic | proficient | 1 | 10 | 9 |
| 17 | monnica.chan@ | divisibility_0.5 | Divisibility 0.5 | monnic | working | 0 | 1 | 1 |

Example: Planning Your Data Collection and Reporting

The following worksheet is one way to begin planning your data collection and reporting strategy for DMDP. NEBHE recommends that everyone involved in DMDP at your institution is aware of the data collection and reporting process.

Name of Institution: _____

Please describe your year-one implementation model(s).

How many students do you anticipate participating in the first pilot cohort? _____

How many faculty members do you anticipate participating? _____

Please indicate the appropriate person(s) for each of the following:

| | Site Coordinator | Faculty Member | Institutional Research Staff | Other |
|--|------------------|----------------|------------------------------|-------|
| Coaching Students on Khan Academy | | | | |
| Generating Student Reports from Khan Academy: This person must also be a “coach” for all students whose data is being accessed. | | | | |
| Collecting Student Level Data from the Institution: Please see the data dictionary for data elements. | | | | |
| Merging Khan Academy and Institutional Data | | | | |
| Submitting DMDP data to NEBHE | | | | |

Example: Setting Up Data Collection at a DMDP Site

Setup Tasks for Accessing the NEBHE DMDP Khan Academy Usage Data

As participants in the NEBHE Developmental Math Demonstration Project, we are obligated to provide information to NEBHE about the students who are involved in the NEBHE DMDP courses.

There are two groups of data for which we are responsible- “Variables for pre- or post- matriculation programs using Khan Academy” and “Base-line data variables to be collected for comparative purposes”. This document focuses on the first group of data. More will be said about the other data in a separate document.

The first group of information involves the Khan Academy usage by the students who are enrolled in the DMDP courses. In preparation for your summer boot camp courses, there are a couple of tasks you need to accomplish before the courses start. The tasks are covered in the NEBHE DMDP User Guide (Ver. 1.3-May2013).

Here are the setup tasks (with some comments):

- 1) In order to access the Khan Academy usage data, you will need to create an active Khan Academy account for yourself (see User Guide, page 12).
- 2) In addition, each student will need to add you as a “coach” in their account settings. Your coach ID is your login email. The student will need this email to identify you as a “coach” (see User Guide, pages 13-14). You *cannot* access the Khan Academy usage data for the student unless you are the student’s “coach”.
- 3) NEBHE recommends that the DMDP course instructor (or site coordinator) use one of the first class meetings to introduce the students to the DMDP and to their participation in the project (see User Guide, page 17). It is at this time that your email information should be provided to the students so they can add you as a “coach”.
- 4) Students who do not want to participate in the DMDP will need to sign the Opt-Out form that should be available from the instructor. You will need to keep a list of the students who have opted-out of the DMDP so their information can be removed from the final compilation of data.
- 5) Once the course has started, you will need to login to the course and compare its list of students with the course roster in order to identify any students that have not added you as a “coach”. The instructor should be notified of these students so each student can be reminded to add you as a “coach”.

Successfully completing the above tasks will insure that you can access the Khan Academy information required by NEBHE.

Near the completion of the course, you can access a Khan Academy report link and create a “class report” (see User Guide, pages 15-16). The “class report” will produce an Excel file containing the Khan Academy usage data required by NEBHE. The file will contain, by student, the number of videos watched; the number of exercises a student is proficient in; the number of problems attempted; and the number of problems correct. This information will need to be supplemented with information about the course. In addition, the student’s college ID will need to be added to each student’s record. A document to follow will say more about these tasks.

If you have questions, please let me know- Phil Frankland, 603-882-6923 x1610 or pfrankland@ccsnh.edu

Example: First Day of Class Agenda

NEBHE recommends that instructors use one of the first few class meetings to orient students to Khan Academy. Some sample discussion points include:

- *Course Expectations & Requirements* — How do students fulfill course requirements? Will students be graded on their participation/utilization of Khan Academy? And if so, what percentage of their grade will be attributed to Khan academy usage? Whom must the students add as their coach on Khan Academy?
- *Khan Academy Website* — What is Khan Academy? How will students set up a Khan academy user account and/or login? How do students add coaches, access material, and track their own progress?
- *DMDP* — Please feel free to describe this project as well as offer the opportunity for students to provide feedback via surveys or focus groups. We are extremely interested in how Khan is perceived and used by your students.
- *Access to technology & extra help* — How and when will students be able to access Khan Academy (in class, at home)? What are the hours of operation for your college's computer lab? Are there other resources students may use for help (ex. tutoring center)?

[+ Additional examples to be added from pilot sites]

Example: Student Handout and Opt-In on DMDP

NEBHE recommends that colleges give students enrolled in a course participating in DMDP the opportunity to opt-in or opt-out of sharing their course performance data. A template is provided below as an example.

**The New England Board of Higher Education
Developmental Math Demonstration Project**

The NEBHE Developmental Math Demonstration Project (DMDP) is a collaborative made up of community colleges across Connecticut, Massachusetts, New Hampshire, Rhode Island and Vermont. These colleges will be using Khan Academy videos and exercise problems in developmental math classes and math review sessions. As part of the project, colleges will be sending data on course outcomes to the New England Board of Higher Education (the organization coordinating the project). All student data sent to NEBHE will be anonymous and it will be impossible for those outside of the college to identify your performance in the course.

Please fill out the information below.

Name: _____

Community College ID Number: _____

Select one of the following options:

____ [Institution Name] may share anonymous information on my course performance with the New England Board of Higher Education as part of the NEBHE Developmental Math Demonstration Project.

____ I do NOT want anonymous information on my course performance shared with the New England Board of Higher Education as part of the NEBHE Developmental Math Demonstration Project.

Signature: _____