MathLeap

Self-grading assignments for STEM classes

The Team

Gareth Aye, CEO

- Middlebury College BA in Computer Science & Math, cum laude with high departmental honors
- Built Luvocracy bookmarking tool (acq by WalMart Labs)
- Engineering lead at Mozilla Firefox, 2013-2016
- Mozilla representative on CalConnect calendar standards committee
- Graduate of inaugural KEC CodeWorks accelerator
- Also at Google, Airtime

Will Lifferth, Product & Curriculum

- UT Computer Science
- Freelance web designer, 2014-2016
- Web development, marketing at KEC

Irun Siregar, UI/UX

- 6 years experience designing for web, mobile, and VR
- Platinum designer status on 99Designs
- Designed http://moodmeterapp.com/ by HopeLab

MathLeap won the demo competition at PDX Startup Week 2016!

The Problem

Demand for highly skilled labor in STEM outpacing supply

- STEM job creation currently outpacing *all other combined job creation*

Students need more and better feedback

- Math students can’t understand or learn from mistakes w/o feedback
- Teachers are responsible for 80+ students at a time
- Avg teacher spends <5 hours grading / week (<4min / student / week)

MathLeap

Self-grading assignments that give personalized, granular feedback

- Teachers can create assignments easily by choosing question topics
- Students solve problems online using interactive math editor
- Smart math engine instantly grades work line-by-line

Current offerings for pre-algebra and algebra 1 classes

- Growing question content includes arithmetic, fractions, equations, inequalities, and polynomials
- Will expand to cover all common core standards for pre-algebra and algebra 1 in 2016

Launched in beta in Knox County schools

- **2000+ users** joined MathLeap in first 6 weeks live

Huge differentiators

- Interactive math editor helps students show their work
- Smart grading engine gives targeted feedback

Why now?

STEM is crucial to global innovation

Americans are among the worst mathematicians in the developed world

- Nearly two-thirds of US 4th graders and 8th graders are not proficient in math
- 2012 study comparing 20 developed countries found Americans rank in bottom five in numeracy

Businesses are struggling to find qualified STEM employees

- Highly sought after in virtually all fields

75% of fastest growing jobs require significant math and science preparation

Business Model

Get in front of millions of students through a free classroom product and then upsell parents on a premium tutoring product with offerings like

- Analytics to help diagnose student strengths and weaknesses
- Recommendations and exercises for improvement
- Score prediction for important standardized tests

Product Walkthrough

Generate assignments

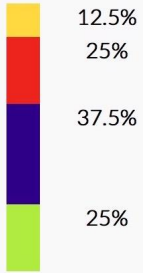
- One Variable Linear Equations
- Two variable manipulation
- Polynomials
- Inequalities in one variable
- Decimals

Solving equations in two steps	$2x + 1 = 4$
Equations with variables on both sides	$5x = x + 4$
Simple distribution	$3 \cdot (x - 2) = 4$
Clever distribution	$\frac{x}{2} + 1 = \frac{x}{4} + 6$

Topic	Question Type	Number
Expressions with variables	Evaluating expressions with one variable	1
Two variable manipulation	Solving for one variable in terms of another variable	2
One Variable Linear Equations	Equations with variables on both sides	3
One Variable Linear Equations	Simple distribution	2

Assignment Summary

Topic ratio



Questions 8

Deadline 03/10/16

Preview Assign

Students show their work in the browser

Assignment 4

Log out

< Algebra I

Solve for v.

Questions	History	Results (select and edit here)
1 $3t - 9$	7v=-4v-40-4	$7v = -4 \cdot v - 44$
2 $-3 \cdot q + p + 3 = 4p$	7v+4v=-4v-44+4v	$7v + 4v = -4 \cdot v - 44 + 4v$
3 $6x - y = x + 10 + 4y$	7v+4v=-4v-44+4v	$7v + 4v = -44$
4 $25b - 17 = 18b + 32$	7v+4v=-44	$11v = -44$
5 $-1 \cdot c - 3 = -5 \cdot c + 85$	11v/11=-44/11	$\frac{(11v)}{11} = \frac{(-44)}{11}$
6 $7v + 4 = -4 \cdot v - 40$	(11v)/11=(-44)/11	$v = \frac{(-44)}{11}$
7 $7 \cdot (v - 23) = 7$	v=(-44)/11	$v = -4$
8 $-4 \cdot (b - 13) = 20$	v=-4	v=-4

Submit

Previous

Next

The problem editor allows three primary operations: both sides, replace, and cancel.

Instant smart grading

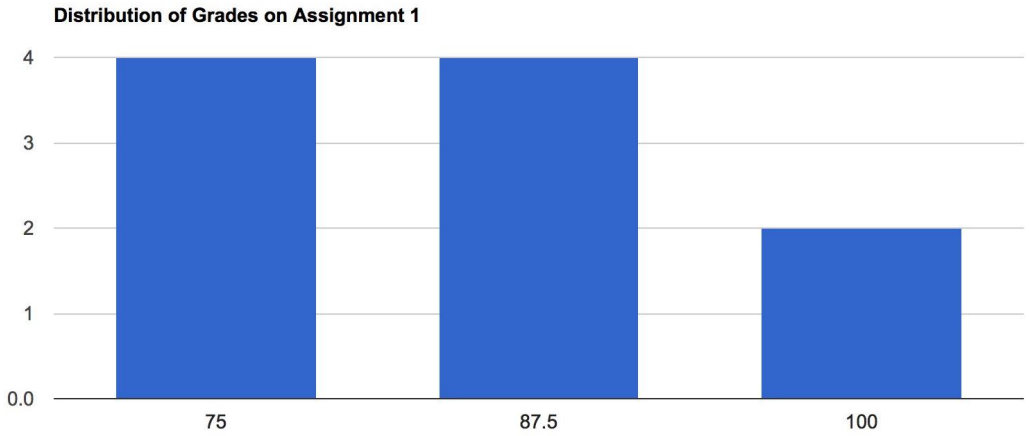
Mighty Moose, Assignment 1, 6 / 8

Log out

< Assignment 1

	Question	Response	Answer Key	Error	
1.	$-17 \cdot w = 221$	$w = -13$	$w = -13$		✔
2.	$-2 \cdot q - 19 = -63$	$q = 22$	$q = 22$		✔
3.	$-16 \cdot q - 11 = -299$	$q = 18$	$q = 18$		✔
4.	$7 \cdot (v - 23) = 7$	$v = 24$	$v = 24$		✔
5.	$12 \cdot (z + 12) = 264$	$z = 10$	$z = 10$		✔
6.	$-4 \cdot (b - 13) = 120$	$b = -30 + 13$	$b = -17$	Incomplete: Answer can be simplified	✗
7.	$\left(\frac{3}{4}\right) + \left(\frac{1}{8}\right)$	$\frac{5}{8}$	$\frac{7}{8}$	$\left(\frac{6}{8}\right) + \left(\frac{1}{8}\right) \rightarrow \frac{5}{8}$	✗
8.	$\left(\frac{3}{14}\right) + \left(\frac{4}{7}\right)$	$\frac{11}{14}$	$\frac{11}{14}$		✔

Understand class performance



Question		Percentage Correct
1	$4 \cdot (-7 + 2)$	100%
2	$5q + 12 = 72$	80%
3	$5q - 15 = 55$	30%
4	$\frac{k}{-2} > 4$	80%
5	$-2 \cdot q - 19 = -63$	90%
6	$18y + 15 = -57$	100%
7	$-9 \cdot t = -99$	90%

Competition

- Textbooks
- MathXL, IXL, WebAssign, MyOpenMath, Wolfram Problem Generator

None of our competition helps students show their work; their software doesn't *understand* math which precludes personalized feedback that helps students learn. Many teachers interviewed during customer development complained about limitations of automated grading for math and science classes.

Customer Acquisition

- Distribution through the popular Edmodo education apps marketplace
- Presenting at regional teachers' conferences
  - Already invited to present at a number of events catering to early edtech adopters including Startup Weekend EDU and TechfestNW
- Rewarding teachers with more content for referring other teachers
- Mode for students to practice and learn outside of a class context
- Explore textbook partnerships

CC = Common Core

Milestone Roadmap

	2017	2019	2021
Content	- 100% CC pre-algebra, algebra 1 - Beta alg 2, trig, precalc	- 100% CC alg 2, trig, precalc - Beta geometry, calculus, mechanics, e&m, general chem	- 100% CC geometry, calc, mechanics, e&m, general chem - Beta linear algebra, multivariable calc, differential equations
Localization	- Translated to top 10 langs - Address common core	- Individual US state standards	- Address top 10 countries standards
Mobile	- Initial iOS and Android tablet releases for teachers and students	- Smartphone releases	
Smart grading	- Common pre-algebra and algebra 1 errors recognized and mapped to explanations	- Ability to notice statistical trends in students' problem solving for personalized hints	- Ability to optimally guide students through learning from mistakes

Revenue Projections

2017. 150k free tier monthly students

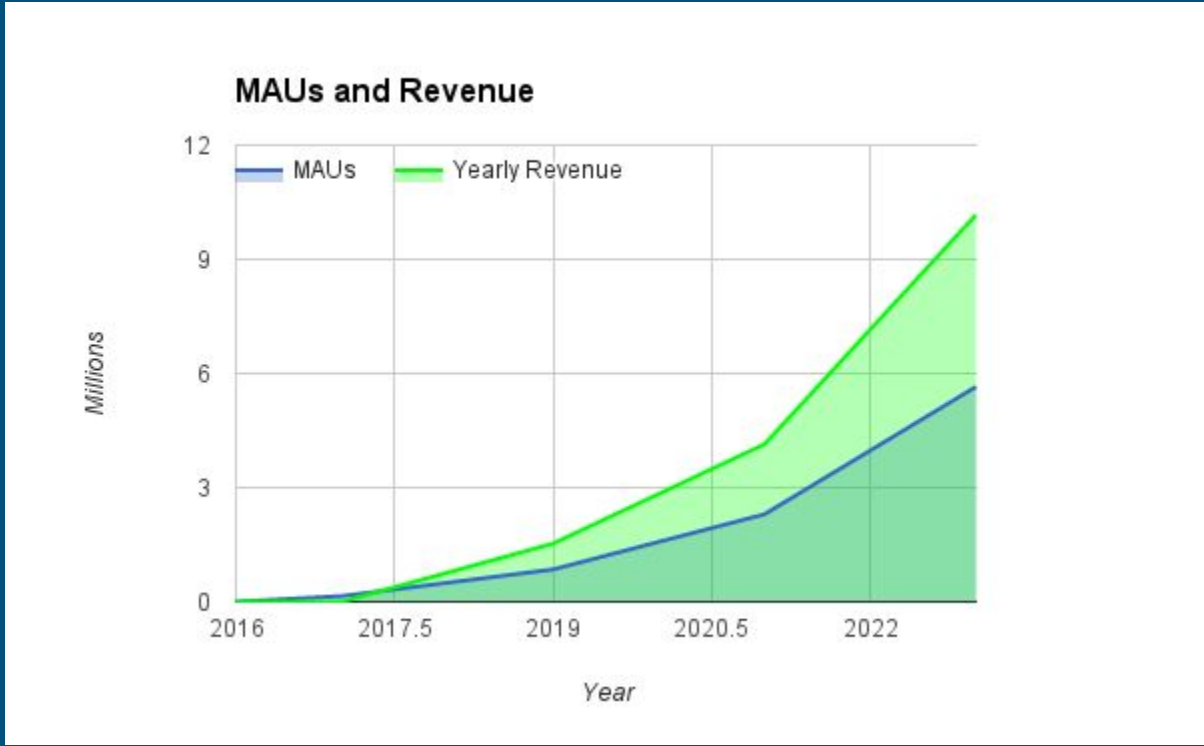
2019. 850k monthly students, 1.53M revenue

2021. 2.3M monthly students, 4.14M revenue

2023. 5.65M monthly students, 10.17M revenue

Assumptions.

- 5% freemium conversion
- $3 / student / mo



Financials

Before seed funding

- 100% self-funded from October ‘15 through March ‘16
- Spent $10k thus far
  - **67%** payroll
  - **18%** legal fees & taxes
  - **5%** equipment
  - **10%** cloud services, marketing
- 6 months of runway to September ‘16

18 mo following 600k seed round

- **75%** payroll
  - CEO
  - 2 Full-stack engineers
  - Head of Product, Curriculum
  - UI/UX Designer
- **10%** cloud services
  - estimated assuming 2017 milestone scale
- **15%** equipment, legal, marketing, misc

MathLeap is in beta!

Interested? Send us an email

hello@mathleap.org