



## Company Overview

Playpower Labs is powering the future of learning by blending award-winning game design and cutting-edge learning science. Our first commercial product, *Fraction Planet*, is a game-based supplemental curriculum for fractions instruction that provides comprehensive coverage of the new nationwide Common Core State Standards. Our products are cross-platform: from tablets to interactive whiteboards to old-school PCs, we're supporting traditional classroom education as well as out-of-school learning experiences.

## Core Problem

Fractions are formally taught in 3<sup>rd</sup>-6<sup>th</sup> grade. However, a national survey found that 50% of 8th graders were unable to place 3 fractions in order from smallest to largest (NAEP, 2004). Citing this, the National Mathematics Advisory Council said, "Difficulty with fractions is pervasive and is a major obstacle to further progress in mathematics." Without an adequate foundation for mathematics learning, the Council believes that these students will continue to struggle—and will be unable to pursue high-demand careers in STEM (Science Technology Engineering and Math). Fractions instruction is now a national priority.

Yet, fractions are far from the only challenge that students will face. Each year, teachers spend countless hours struggling with students who lack mathematics knowledge that they supposedly learned in earlier grades. On top of all this, teachers everywhere are faced with shifting their teaching practices to align with the rigorous demands of the new Common Core State Standards that have just been rolled out in 47 states. The standards are complex and comprehensive—and often require that teachers introduce challenging topics to children in younger grades than ever before. In short, teachers really need an easy way to provide efficient and engaging instruction to struggling students.

## Our Solution

In response, Playpower Labs is introducing a set of highly engaging, self-paced supplemental curricula to assist struggling students and their teachers. Our value proposition to schools is that teachers will be able to provide Common Core Aligned Instruction to more students in less time with lower training costs. Our products empower teachers to provide individualized instruction to struggling students with minimal changes in teaching practices – where achieving effective supplemental instruction can be as simple as handing out iPads.

Our first product is *Fraction Planet*, a supplemental curriculum for teaching & assessing 70+ of the 108 Common Core State Standards for fractions instruction (figure 1). This curriculum links together 10 different learning games, each of which addresses dozens of standards (figure 2). Students can work at their own

pace through the adaptive learning environment, while teachers (and parents) can follow student progress through a powerful real-time-reporting system. This Common Core aligned reporting empowers teachers to provide efficient “over-the-shoulder” support for students who get stuck on a particular concept. In the near future, we will provide interactive whiteboard activities and lesson plans so that teachers can support class discussion and mathematical inquiry. By supporting the teacher’s natural role in the classroom, our software accomplishes more than what a purely computer-based curricula can do alone.

All of our products are developed using a new framework that allows for cross-platform access. This allows for in-school and out-of-school learning, so students can play on many devices in many contexts: from a school computer lab or classroom tablet to a parent's smart phone.



Figure 1: Planet menu screen, session menu screen, & a view of all splash screens in *Fraction Planet*.



Figure 2: Some of the 10 games present in *Fraction Planet*.

*Fraction Planet* uses cutting-edge (and possibly proprietary) technology developed at CMU. Our prestigious research publications have established us as leaders in the use of "big data" and machine learning techniques for optimizing player learning and engagement. Preliminary results from ongoing studies



suggest that we can accurately predict student scores on standardized tests based on student gameplay. This adaptive assessment technology will enable teachers to be more efficient by integrating assessment with instruction.

Beyond *Fraction Planet*, we plan to release our second product in Spring, 2013. *Numbaland* is a supplemental curriculum targeting number sense and math facts for students in 1st-5th grade. Future products may include supplemental curricula in algebra (grades 5-8), measurement & geometry (grade 3-8) and statistics (grades 6-12). Beyond math, there is also a significant need for supplemental curricula in the language arts and other areas.

<b>Problem Chain</b>	<b>Solution Response</b>
Tens of thousands of high-skill STEM jobs are unfilled, despite high unemployment	Increase the number of students pursuing high-value STEM careers by increasing basic STEM education
Students disengage from STEM education after failing to sufficiently master core topics like fractions & algebra.	Provide supplemental curricula to address these topics. Use game design to increase and maintain student engagement.
Teachers don't have much time to adopt new practices and curricula	Make implementing a supplemental curriculum as easy as handing students an iPad
Technology rolls out unevenly: schools may have some iPads, but also old laptops, etc. Also, increasingly schools are allowing BYOD strategies (bring your own device)	Provide software that works on ALL platforms: old PCs, iPads, Android tablets & smart phones
There are a patchwork of state standards that make it difficult to create a scalable, nationwide market	In 2012, 47 states started implementing the new nationwide Common Core State Standards (CCSS).
With the new CCSS, schools are struggling to find aligned instructional materials and train their teachers to use them.	Provide common core alignment within software that requires minimal supervision (and therefore minimizes changes to existing teaching practices).
Schools need CCSS assessments that can evaluate whether students are mastering CCSS: however, testing time reduces instruction time.	Use student performance during learning activities to predict student standardized test performance
Even with a high-quality educational application, public school procurement processes are challenging and time-consuming for startups	Provide lower pricing for faster sales channels (consumers, private schools & charter schools) while accommodating slower growing but far larger state and district sales



## Market Analysis and Marketing Plan

We are designing our products to meet the needs of our primary users, the 38 million K-8 students and 1.7 million teachers, and the needs of our primary customers, the 130,000 K-12 public schools. For instance, we have rigorously aligned the games to the Common Core State Standards and have provided rich reporting tools to track student learning. The school market is attractive because there is an opportunity to disrupt existing publishing giants to capture a portion of the \$5 billion market for educational media (\$500 million for math instruction).

Unfortunately, selling to large school districts can take years and benefits from existing relationships—two characteristics that do not favor startups. For this reason, we are targeting two other customer segments that can support the word-of-mouth marketing that we require for rapidly scaling the use of our products. The first segment, parents and teachers, are primarily interested in low-cost yet effective educational apps for devices like the iPad. Because we have already developed nearly 10 mobile games, we plan to polish these games and release 2-3 year over the next few years to build a consumer market on the iOS app store and Google Play. Teachers often have access to a set of iPads or other tablets in the classroom and have small discretionary funds (or pay out of pocket) for high-quality apps. This customer segment will be reached primarily through word-of-mouth marketing and app promotion campaigns.

The other key customer segment is “early-adopter schools,” which include innovative charter schools and private schools. Selling to large school districts, with their complicated procurement policies, requires patience and a significant investment in face-to-face sales and marketing. In contrast, early-adopter schools have smaller bureaucracies and more flexible discretionary budgets than large school districts. This means that low-cost social media marketing can be applied to trigger a relatively rapid growth in early-adopter sales.

Our social media and word-of-mouth marketing can leverage the >80,000 students that we already reach each month via our successful free online games. We will seek to convert the parents and teachers associated with this user-base into customers of our free and \$1.99 iOS/Android apps. The success of our individual apps can then serve as a foot-in-the-door to promote the higher priced sales of our supplemental curricula products, like *Fraction Planet*, to early adopter schools.

Our marketing will first focus on early-adopter schools, including technologically proficient charter schools, private schools and top-performing public schools. After recruiting an experienced sales and marketing manager, we will seek to close a sale with one the 100 largest school districts (a single top-100 district sale can generate over \$1 million in revenue).



There are also international opportunities that can be explored with minimal cost. The consumer market for supplemental education is very strong in BRIC countries. While the markets are distant, they are made highly accessible via the Apple/Android app stores.

## Sales & Distribution

We've already established significant product contact with our core customers. Over two hundred students in 4th, 5th and 6th grade participated in two separate (and successful!) randomized controlled trials of our games. And we are proud that our web-games are played more than 80,000 times each month. Now, we are starting beta-testing with 12 classrooms in 3 school districts in March, 2013, starting with Propel Charter Schools. This can rise to as many as 42 school districts by May, through our partnership with the Allegheny Intermediate Unit (AIU), an organization that represents 42 school districts in Allegheny County.

### Reaching Our Three Customer Segments:

1. Parents and teachers will be targeted through consumer-facing releases of individual games for fractions, number sense, and math facts. We will release 3 mobile games per year mobile games at strategic times during the year to gain iOS market awareness. Games will be priced for free and for \$1.99, which will be paid via app store accounts or credit cards. We anticipate revenues ranging from \$50k-\$150k per app per year.
2. Early-adopter schools, (e.g., the over >25,000 private and charter schools) have more immediate discretionary funds available to spend on the higher priced *Fraction Planet* and *Numbaland* (\$10/student/year). We will target these schools through a word-of-mouth campaign. In this market segment the actual buyer is typically a principal, technology director, curriculum coach or teacher using a credit card or purchase order.
3. Large public school districts are our largest but slowest growing customer segment, which will require a highly experienced sales manager and lots of patience. These customers will require integrating our supplemental curricula with existing student information systems and fully developed teacher training. The actual buyer ranges from district technology directors to state government procurement offices, though sales often occur through a bid process. While complicated, this sales segment comprises the bulk of the \$5 billion market for educational software.

Selling to schools typically requires significant face-to-face contact and approval from multiple leaders in district administration. We aim to reduce the cost of sales using our free/paid apps to build a teacher user-base; these teachers can then help advocate for adoption of the subscription-based product.



## Competitive Review

Name	Advantage	Disadvantage	Cost
<b>Splash Math</b>	The only "comprehensive" math curriculum for iOS, but rather like worksheets	Not very engaging. Not available on PCs. Each student must play on a particular device (no global login).	\$9.99/app
<b>Math Bingo</b>	The most popular tablet educational math game. Fun and educational.	Only teaches math facts, and doesn't provide any teacher analytics.	\$1.99/app
<b>Rocket Math</b>	Engaging educational math apps.	Not aligned to common core.	\$1.99/app
<b>Duck Duck Moose</b>	Engaging educational math apps	Focused only on kindergarten.	\$1.99/app
<b>Fraction Nation</b>	A very comprehensive fraction curriculum aligned to common core standards	Not very engaging and not available for mobile devices.	\$7000/school
<b>Study Island</b>	Tight alignment to the common core. Easy to use.	Essentially a series of worksheets. Games are provided, but these are only for entertainment.	\$3-\$12/student/year
<b>Carnegie Learning</b>	Intelligent tutoring system with recently released learning games that are available for tablet and web.	Their games have relatively low production values. Major change req. to teaching practices	\$69/student/year
<b>Think Through Math</b>	Combines tutors and online instruction.	No games.	\$15/student/year
<b>Dream Box</b>	An engaging web-based learning environment that provides customized learning.	Not on tablets.	\$25/student/year
<b>STMath</b>	Provides game-based math learning that aligns to common core standards.	They do not introduce math symbols for a long time -- this is a strength but also a weakness.	\$100/student/year
<b>Manga High</b>	Sophisticated math games that align to the common core, but not in a comprehensive manner.	Not for mobile devices. Most of their common core alignment comes from a non-game activity.	\$1000/school

### Key Selling Points:

1. **Common Core Standard-Aligned Games:** Game-based curriculum that fully aligned to Common Core State Standards.
2. **Unique IP:** Game characters, branding, design, and test items



3. **Cross-Platform:** Available on the web, tablets, smart phones (iOS and Android), and interactive whiteboard. Progress can be saved on any device, so students can play at home or at school.
4. **Patentable Optimization Technology:** supports continuous improvement based on unique experimental algorithms
5. **Carnegie Mellon Research Brand:** brings legitimacy and trust
6. **Competitive Pricing:** *Fraction Planet* is priced in the middle of typical prices for supplemental educational software. For instance, both *Fraction Nation* and *Conceptua Fractions* are priced at \$7,000 /school.
7. **Learning Reports:** We support on-going relationships with customers through rich, well-designed data dashboards that demonstrate student learning within our product.

## Financials

### Consumer Product Pricing: Free and \$1.99 app

App Market Revenue Projection	Year 1	Year 2	Year 3
Total Apps by end of the year	2 apps (in May and June)	5 apps (in March, July, November)	8 apps (in March, July, November)
Estimate of revenues per app per year – iOS & Android (in thousands)	\$100	\$150	\$200
Total Revenue	\$130	\$575	\$1360

Assumptions based on \$1.99/app pricing for Duck Duck Moose apps: ~\$90k/year as avg. revenue per iOS app and \$45k/year for Android.

### School Product Pricing: \$10/student/year

School Market Revenue Projection	Year 1	Year 2	Year 3
Number students reached– Private and Charter	5000	15,000	50,000
Number of students reached– Public school Districts	0	30,000	15,0000
Revenue from Private/Charter schools (in thousands)	\$50	\$150	\$500
Revenue from Public school districts	\$0	\$500	\$1500
Total Revenue (in thousands)	\$50	\$650	\$2000

Median of Number of students in the top 500 districts in K-8 ~15000.

Median Number of students in Private/Charter schools in K-8 ~500.

Expense Plan	Year 1	Year 2	Year 3
Software Developers	\$170	\$200	\$300
Designers	\$150	\$190	\$180
Curriculum Experts	\$80	\$160	\$160
Office Space + Hardware + Misc	\$50	\$150	\$250
Senior Sales Officer	\$150	\$150	\$300
Sales Officer	\$0	\$250	\$600
Total (in thousands)	\$600	\$1,100	\$1,500



Consolidated Income Statement	Year 1	Year 2	Year 3
Revenues (in thousands)	\$180	\$1,225	\$3,360
Expense (in thousands)	\$600	\$1,100	\$1,500
Net Income (in thousands)	(\$420)	\$125	\$1,860

## Core Team

**Derek Lomas:** Background in Cognitive Science from Yale University, Master of Fine Arts from UC San Diego, and a PhD in Human Computer Interaction from Carnegie Mellon University. I've always been passionate about computer-aided learning and have a unique skill set that makes me very a very effective designer of interactive educational experiences. I've also previously been involved with one successful and one failed startup -- and have subsequently developed a great ability to manage a diverse design/development team.

**Kishan Patel:** Computer Science and Electrical Engineering background from a top 10 engineering school in India (The Dhurimbi Ambani Institute of Information and Commmunication Technology, or DAIICT). I've been working with Derek Lomas for the past 2 years and have built up our amazing development team. We now employ 9 developers and designers (5 full time, 4 part time) whom I have recruited from my university. Because we are based in Ahmedabad, India, we are able to access both incredible technical talent and world-class designers (India's greatest design school, the National Institute of Design, is based in Ahmedabad). I'm very effective at translating between high-level design needs for the software and its most efficient implementation. Additionally, I've recently participated in a 12 week business accelerator program with a global top-10 business school, the Indian Institute of Management (IIM).

### Team Goals:

- We are seeking a world-class sales and marketing manager with significant experience closing district-wide sales of educational software
- We are seeking individuals with experience in social media marketing, to promote our consumer-facing app sales
- We wish to attract a partner with significant management experience

### Strategic Partners

- Allegheny Intermediate Unit (represents 42 school districts)
- Brainpop (distribution channel to 25% of all schools in the USA)

### Advisory Board:

- Jeremy Resnick, CEO Propel Schools
- Michael Levine, Director of Sesame Workshop's Joan Ganz-Cooney Center





## Previous Accomplishments

- \$50K prize from National STEM Game Competition (announced by President Obama and awarded by White House CTO, Aneesh Chopra)
- \$50K prize from Marvell Educational App Challenge
- \$65K grant from Grable Foundation to support R&D
- Completed school product, *Fraction Planet*, for iOS/Android/Mac/PC/Web
- Letter of intent from “Allegheny Intermediate Unit,” representing the willingness of 42 local Pittsburgh school districts to use beta product
- Developed 10 games (beta) for iOS/Android/Mac/PC/Web
- 80,000 monthly users of web games
- Academic Publications:
  - 1. Randomized controlled trial with 122 students showing nearly a grade-level of improvement in fraction estimation accuracy
  - 2. Study involving over 70,000 online players demonstrates optimization of game design to continuously improve player engagement and learning.
  - 3. Study demonstrating adaptive technology in our games

## Year 1 Timeline:

March, 2013	• Release <i>Fraction Planet</i> to 12 beta-testing classrooms, grades 4-8
April, 2013	• Iterate the software and extend the beta tests to 80% of the 42 participating school districts. • Begin beta-testing <i>Numbaland</i> in 1-5 grade classrooms
Late Spring, 2013	• Release <i>Fraction Planet</i> on the iOS and Android app store • Release first stand-alone app • Begin social media marketing • Raise capital to support sales and marketing hire and product dev
Summer, 2013	• Continue testing and iterating products within summer schools • Complete core optimization technology
Early Fall, 2013	• First charter/private school sale • Release second stand-alone app • Accelerate social media marketing
Winter, 2014	• First public school district sale

## Obstacles & Challenges

- One of the biggest technical challenges we will face is maintaining continued engagement by students and teachers. To this end, we have recently published a paper in a prestigious venue describing how data-driven design can be applied to educational games to support continuous improvement of player engagement and learning.
- Presently, our primary business challenge is acquiring the talent necessary to successfully close large district contracts with schools.