



A View from the White House - Games Beyond Entertainment

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GAME DEVELOPERS CONFERENCE®

MOSCONE CENTER · SAN FRANCISCO, CA

MARCH 2-6, 2015 · EXPO: MARCH 4-6, 2015



Games Beyond Entertainment





GameDeveloper





What was it like?



What was it like?





What was it like?

- Brilliant people.
- Crazy hours.
- Government salary.



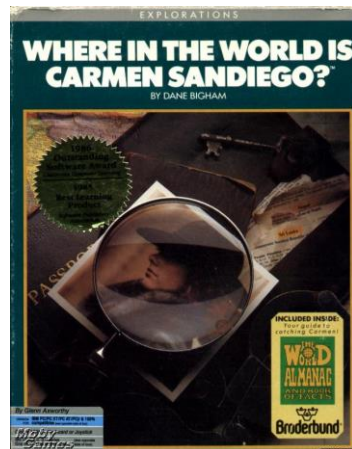
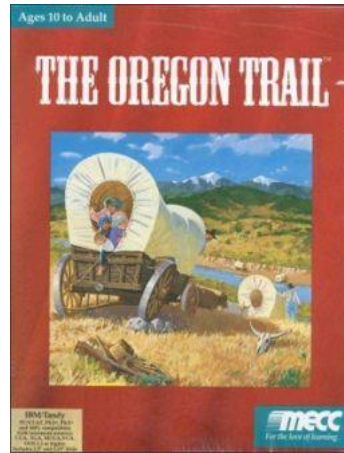
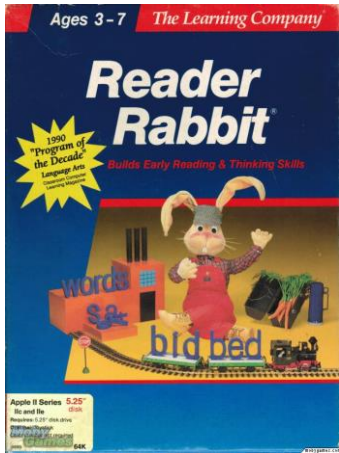


Why?





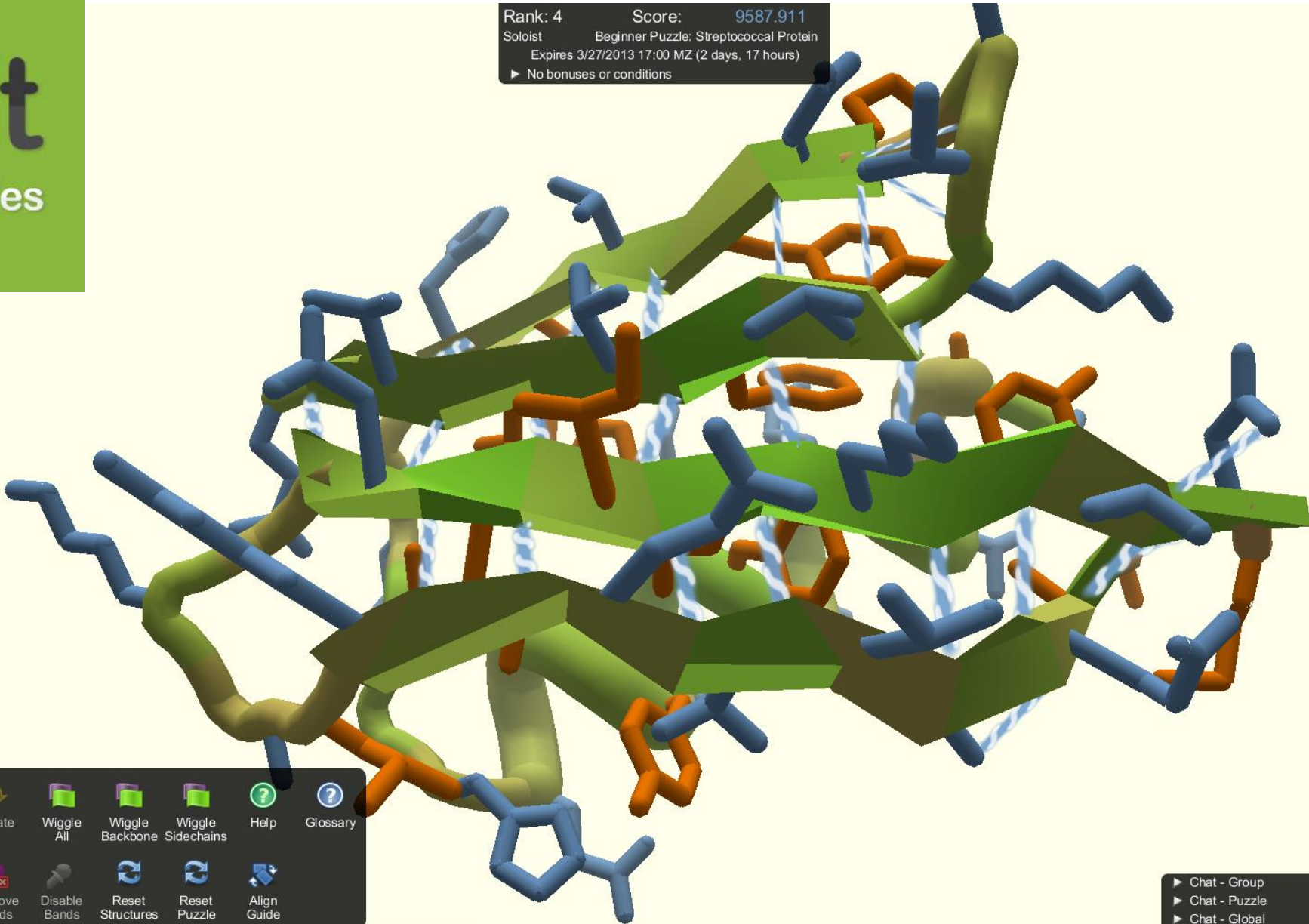
The promise of games





Rank: 4 Score: 9587.911
Soloist Beginner Puzzle: Streptococcal Protein
Expires 3/27/2013 17:00 MZ (2 days, 17 hours)
▶ No bonuses or conditions

▼ Cookbook



Shake

Mutate

Wiggle All

Wiggle Backbone

Wiggle Sidechains

Help

Glossary

Freeze Protein

Remove Bands

Disable Bands

Reset Structures

Reset Puzzle

Align Guide

▲ Actions ▶ Undo ▶ Social ▶ Modes ▶ Behavior ▶ View ▶ Menu

Chat - Group

Chat - Puzzle

Chat - Global

Notifications

X auto show

X auto show

X auto show

X auto show



Foldit

nature
structural &
molecular biology

Crystal structure of a monomeric retroviral protease solved by protein folding game players

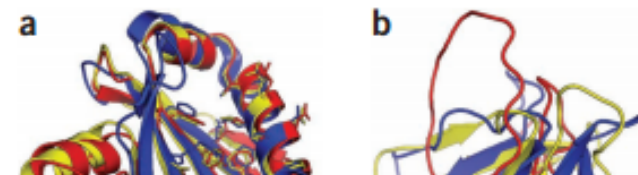
Firas Khatib¹, Frank DiMaio¹, Foldit Contenders Group, Foldit Void Crushers Group, Seth Cooper², Maciej Kazmierczyk³, Mirosław Gilski^{3,4}, Szymon Krzywda³, Helena Zabranska⁵, Iva Pichova⁵, James Thompson¹, Zoran Popović², Mariusz Jaskolski^{3,4} & David Baker^{1,6}

Following the failure of a wide range of attempts to solve the crystal structure of M-PMV retroviral protease by molecular replacement, we challenged players of the protein folding game Foldit to produce accurate models of the protein. Remarkably, Foldit players were able to generate models of sufficient quality for successful molecular replacement and subsequent structure determination. The refined structure provides new insights for the design of antiretroviral drugs.

Foldit is a multiplayer online game that enlists players worldwide to solve difficult protein-structure prediction problems. Foldit players leverage human three-dimensional problem-solving skills to interact with protein structures using direct manipulation tools and algorithms from the Rosetta structure prediction methodology¹. Players collaborate with teammates while competing with other players to obtain the highest-scoring (lowest-energy) models. In proof-of-concept tests, Foldit players—most of whom have little or no background in biochemistry—were able to solve protein structure refinement problems in which backbone rearrangement was necessary to correctly bury hydrophobic residues². Here we report Foldit player successes in real-world modeling problems with more complex deviations from native structures, leading to the solution of a long-standing

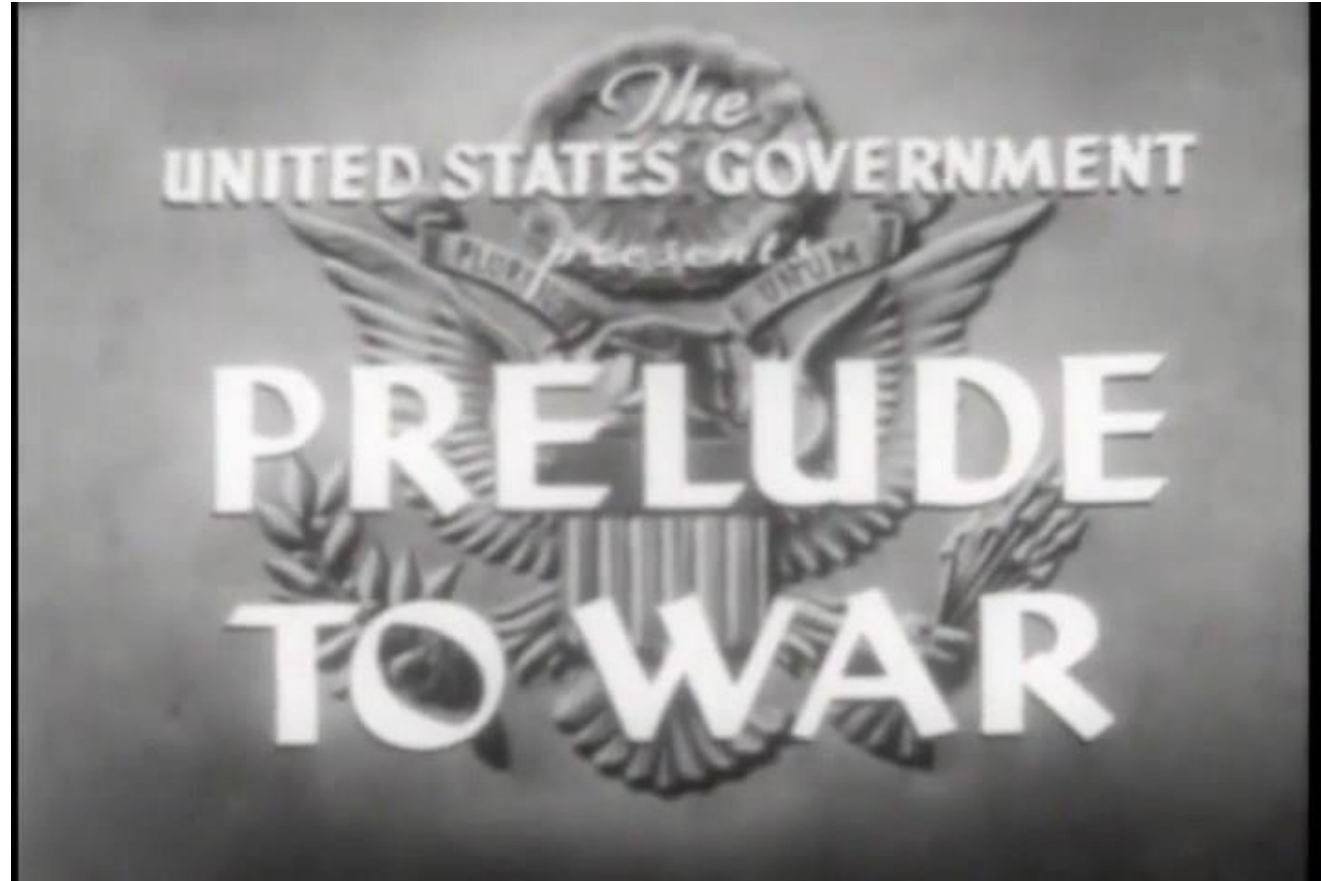
Structure Prediction (CASP) experiment was an ideal venue in which to test this. CASP is a biennial experiment in protein structure prediction methods in which the amino acid sequences of structures that are close to being experimentally determined—referred to as CASP targets—are posted to allow groups from around the world to predict the native structure (<http://predictioncenter.org/casp9/>). Each group taking part in CASP is allowed to submit five different predictions for each sequence. Foldit participated as an independent group during CASP9 and made predictions for the targets with fewer than 165 residues that the CASP organizers did not indicate as oligomeric. For targets with homologs of known structure—the Template-Based Modeling category—Foldit players were given different alignments to templates predicted by the HHpred server³ via the new Alignment Tool. Despite these new additions to the game, the performance of Foldit players over all CASP9 Template-Based Modeling targets was not as good as those of the best-performing methods, which made better use of information from homologous structures; extensive energy minimization used by Foldit players tended to perturb peripheral portions of the chain away from the conformations present in homologs.

For prediction problems for which there were no identifiable homologous protein structures—the CASP9 Free Modeling category—Foldit players were given the five Rosetta Server CASP9 submissions (which were publicly available to other prediction groups) as starting points, along with the Alignment Tool. Here all five starting models were available, allowing players to use partial threading to combine different features of the Rosetta models. In this Free Modeling





Historical gov't use of media





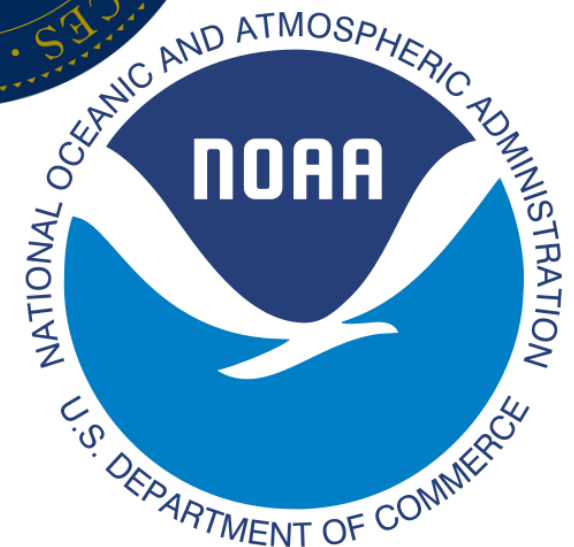
The Federal Games Guild



Woodrow Wilson
International Center
for Scholars



Smithsonian





Agency games







Investment

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Just Launched: Playlist Showcases 36 SBIR-funded “Games for Learning”

By **Javier Saade**, SBA Official

Published: October 8, 2014

Note: This blog is co-authored by Javier Saade, Ed Metz, Betty Royster, and Lindsay D'Ambrosio

The Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programs are the largest source of early-stage capital for innovative small companies in the United States. Via these programs, the federal government invests over 2 billion dollars in American entrepreneurial firms to develop and commercialize technologies that strengthen our nation's defense, improve the health of our citizens, and enhance education.

Javier Saade, Associate Administrator of SBA's Office of Investment and Innovation, which oversees both programs across the federal government describes it simply as “America's seed fund.”

“The programs essentially help ‘de-risk’ technology ideation, conception, and development so that eventually private capital and industry help these small businesses take the ball further and commercialize the wide array of technologies funded,” he added.

The programs reduce barriers to high-growth technology-based entrepreneurship and commercially viable inventions and products. Combining technological research and development with a commercial purpose helps grantees become the next Qualcomm, Genentech, Symantec, Z-Corporation, or iRobot – all recipients of SBIR/STTR capital, and leads to technological breakthroughs like 3-D printing, LASIK technology, and the Sonicare toothbrush. For more information on how SBIR works, please visit www.SBIR.gov or see [this recent post](#).

Announcing Two New SBIR/STTR Social Media Initiatives

As representatives of SBIR, we are blogging today to announce two initiatives that highlight areas of technological innovation where the program is making an impact.

First, we are leveraging the Twitter handle [@SBAgov](#) as well as the hashtag [#SBIR](#) to post

More Posts in this category

SBIR Pulse – Improving Confidence with a Spoon? Meet SBIR entrepreneur Anupam Pathak

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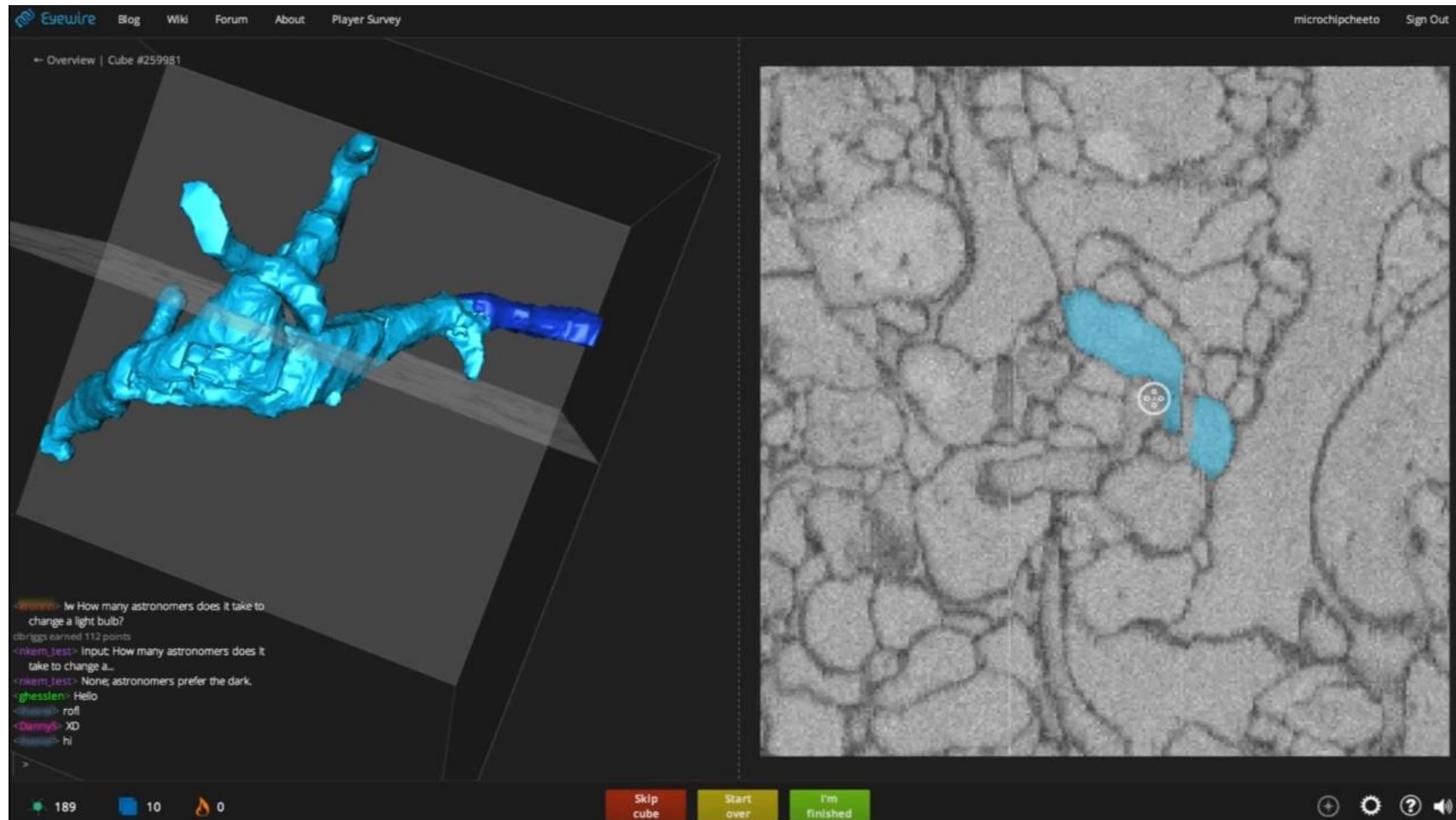
Maria Contreras

Learn more: <http://bit.ly/sbir-games>

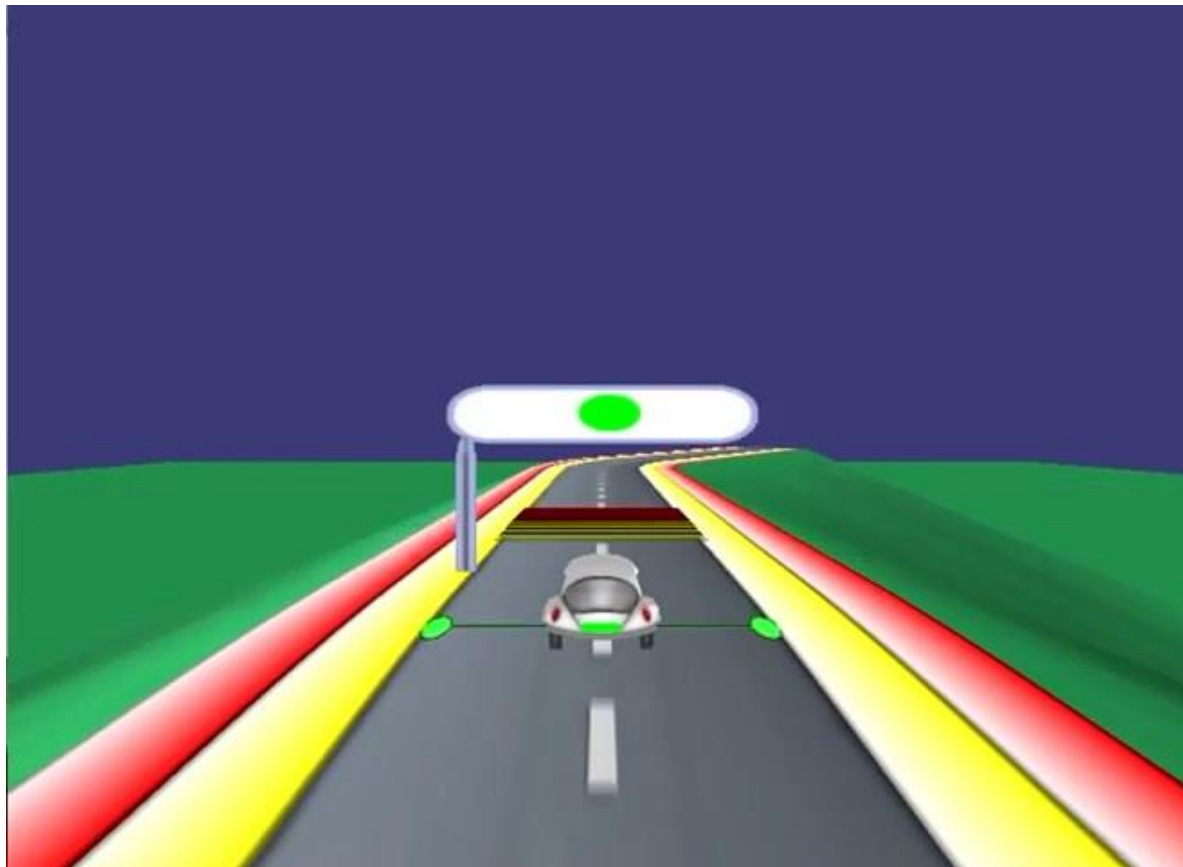


Three modern examples



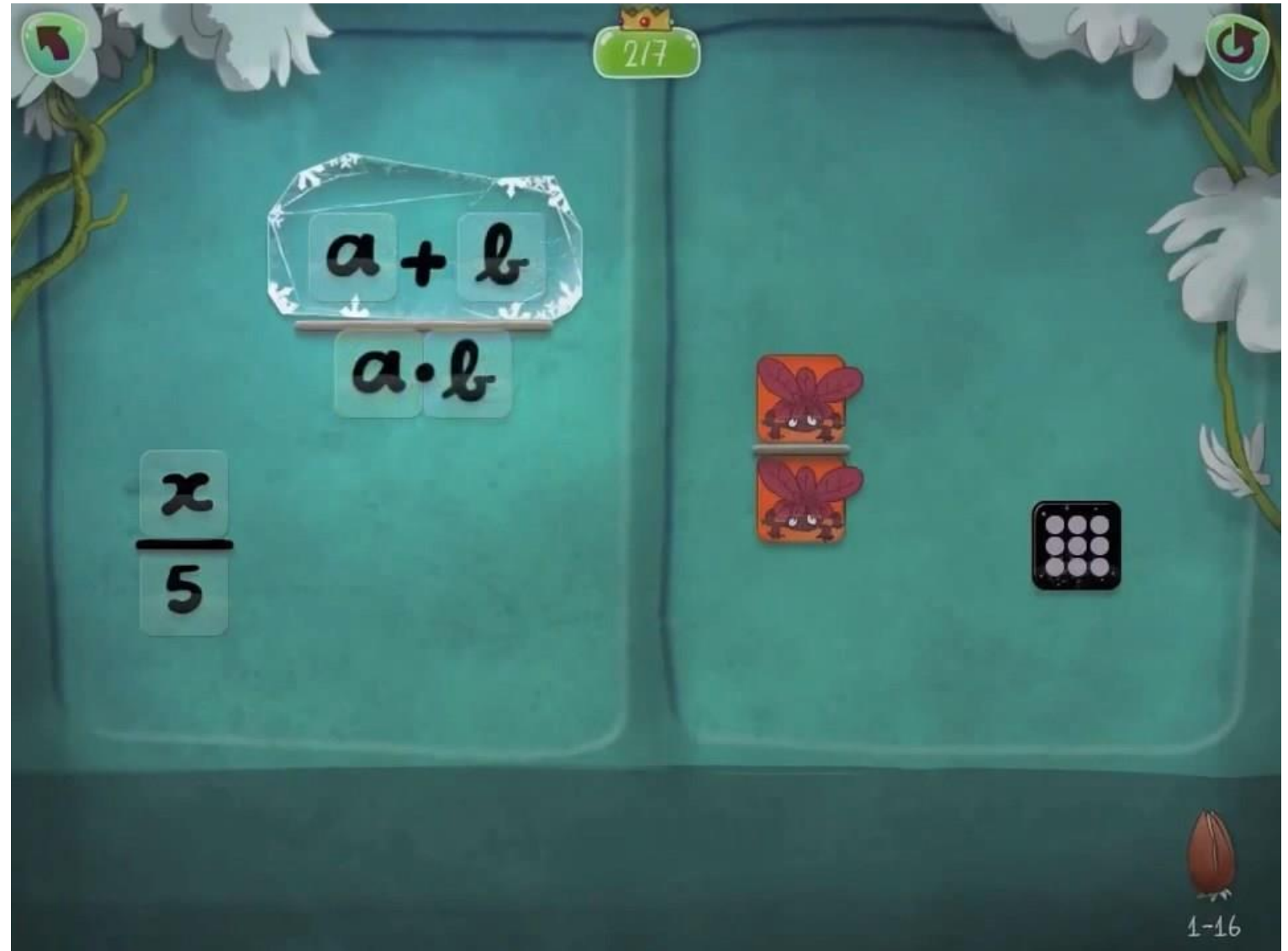
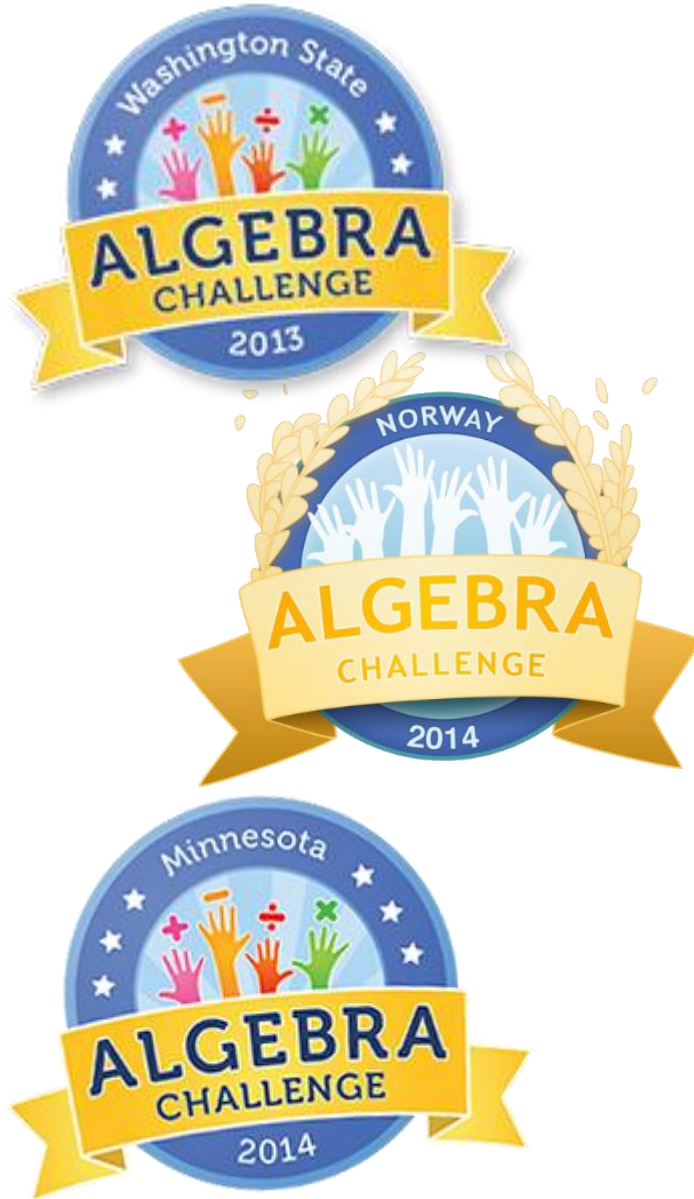


Learn more: <http://www.eyewire.org>



Learn more: <http://www.brain.akiliinteractive.org>





Learn more: <http://www.algebrachallenge.org>



Games for education

“I’m calling for investments in educational technology that will help create digital tutors that are as effective as personal tutors, and educational software that’s as compelling as the best video game.”

President Obama, 2011





PISA ranking

Snapshot of performance in mathematics, reading and science

- Countries/economies with a mean performance/share of top performers above the OECD average
- Countries/economies with a share of low achievers below the OECD average
- Countries/economies with a mean performance/share of low achievers/share of top performers not statistically significantly different from the OECD average
- Countries/economies with a mean performance/share of top performers below the OECD average
- Countries/economies with a share of low achievers above the OECD average

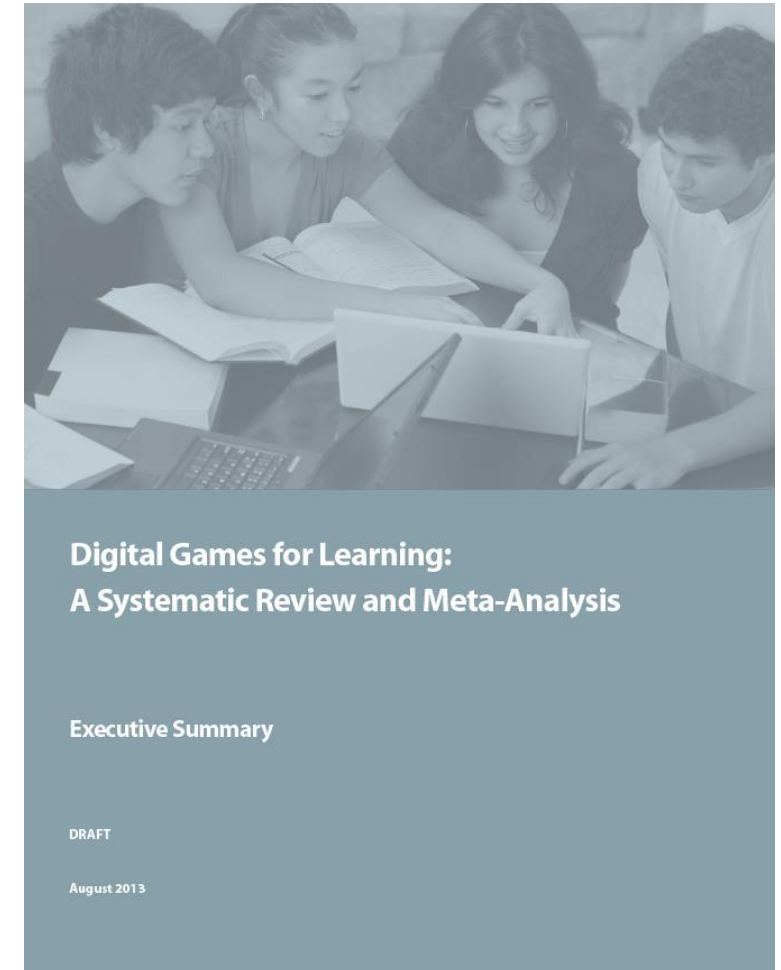
	Mathematics				Reading		Science	
	Mean score in PISA 2012	Share of low achievers in mathematics (Below Level 2)	Share of top performers in mathematics (Level 5 or 6)	Annualised change in score points	Mean score in PISA 2012	Annualised change in score points	Mean score in PISA 2012	Annualised change in score points
OECD average	494	23.0	12.6	-0.3	496	0.3	501	0.5
Shanghai-China	613	3.8	55.4	4.2	570	4.6	580	1.8
Singapore	573	8.3	40.0	3.8	542	5.4	551	3.3
Hong Kong-China	561	8.5	33.7	1.3	545	2.3	555	2.1
Chinese Taipei	560	12.8	37.2	1.7	523	4.5	523	-1.5
Korea	554	9.1	30.9	1.1	536	0.9	538	2.6
Macao-China	538	10.8	24.3	1.0	509	0.8	521	1.6
Japan	536	11.1	23.7	0.4	538	1.5	547	2.6
Liechtenstein	535	14.1	24.8	0.3	516	1.3	525	0.4
Switzerland	531	12.4	21.4	0.6	509	1.0	515	0.6
Netherlands	523	14.8	19.3	-1.6	511	-0.1	522	-0.5
Estonia	521	10.5	14.6	0.9	516	2.4	541	1.5
Finland	519	12.3	15.3	-2.8	524	-1.7	545	-3.0
Canada	518	13.8	16.4	-1.4	523	-0.9	525	-1.5
Poland	518	14.4	16.7	2.6	518	2.8	526	4.6
Belgium	515	19.0	19.5	-1.6	509	0.1	505	-0.9
Germany	514	12.7	17.5	1.4	508	1.8	524	1.4
Viet Nam	511	14.2	13.3	m	508	m	528	m
Austria	506	18.7	14.3	0.0	490	-0.2	506	-0.8
Australia	504	19.7	14.8	-2.2	512	-1.4	521	-0.9
Ireland	501	16.9	10.7	-0.6	523	-0.9	522	2.3
Slovenia	501	20.1	13.7	-0.6	481	-2.2	514	-0.8
Denmark	500	16.8	10.0	-1.8	496	0.1	498	0.4
New Zealand	500	22.6	15.0	-2.5	512	-1.1	516	-2.5
Czech Republic	499	21.0	12.9	-2.5	493	-0.5	508	-1.0
France	495	22.4	12.9	-1.5	505	0.0	499	0.6
United Kingdom	494	21.8	11.8	-0.3	499	0.7	514	-0.1
Iceland	493	21.5	11.2	-2.2	483	-1.3	478	-2.0
Latvia	491	19.9	8.0	0.5	489	1.9	502	2.0
Luxembourg	490	24.3	11.2	-0.3	488	0.7	491	0.9
Norway	489	22.3	9.4	-0.3	504	0.1	495	1.3
Portugal	487	24.9	10.6	2.8	488	1.6	489	2.5
Italy	485	24.7	9.9	2.7	490	0.5	494	3.0
Spain	484	23.6	8.0	0.1	488	-0.3	496	1.3
Russian Federation	482	24.0	7.8	1.1	475	1.1	486	1.0
Slovak Republic	482	27.5	11.0	-1.4	463	-0.1	471	-2.7
United States	481	25.8	8.8	0.3	498	-0.3	497	1.4
Lithuania	479	26.0	8.1	-1.4	477	1.1	496	1.3
Sweden	478	27.1	8.0	-3.3	483	-2.8	485	-3.1
Hungary	477	28.1	9.3	-1.3	488	1.0	494	-1.6
Croatia	471	29.9	7.0	0.6	485	1.2	491	-0.3
Israel	466	33.5	9.4	4.2	486	3.7	470	2.8
Greece	453	35.7	3.9	1.1	477	0.5	467	-1.1
Serbia	449	38.9	4.6	2.2	446	7.6	445	1.5

Learn more: <http://www.oecd.org/pisa/>



Research

- SRI International, 2013
 - Digital Games for Learning meta-analysis
 - 12% improvement in cognitive outcomes with addition of a learning game





2nd STAGE

2 PLAYER2



PERFECT
7 combo



Left, right, left, right

048944626
BASIC



Swag & Stats

Unlocks

Upgrades

Managers

Investors

Store

\$1.781

OCTOVIGINTILLION

Buy
x100



2,911

\$29.254 septenvigintillion /sec

Buy \$1.431
NOVENVIGINTILLION

00:00:00



1,850

\$9.436 sexvigintillion /sec

Buy \$38.821
OCTOVIGINTILLION

00:00:00



1,700

\$11.881 sexvigintillion /sec

Buy \$914.517
OCTOVIGINTILLION

00:00:00



1,830

\$28.003 sexvigintillion /sec

Buy \$10.378
OCTOVIGINTILLION

00:00:00



1,770

\$4.103 sexvigintillion /sec

Buy \$390.635
OCTOVIGINTILLION

00:00:00



2,000

\$918.156 sexvigintillion /sec

Buy \$7.060
OCTOVIGINTILLION

00:00:00



1,750

\$16.230 sexvigintillion /sec

Buy \$148.434
OCTOVIGINTILLION

00:00:00



2,210

\$3.043 septenvigintillion /sec

Buy \$3.910
OCTOVIGINTILLION

00:00:00



1,850

\$205.889 sexvigintillion /sec

Buy \$117.276

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2,500

\$7.039 septenvigintillion /sec

Buy \$8.280

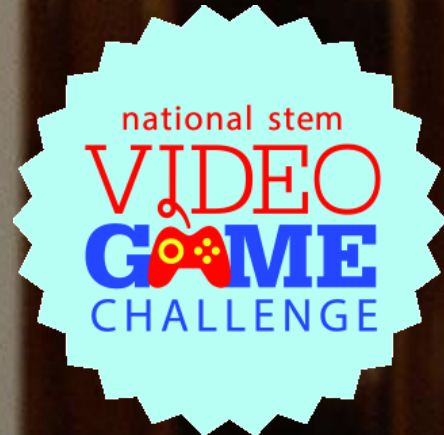
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Getting work done















Games for education - Challenges

- Subject areas
- Standards
- Audience
- Platform
- Marketplace
- Research
- Ratings



Classcraft



Learn more: <http://www.classcraft.com>



Minecraft Edu



Learn more: <http://www.minecraftedu.com>



Zombies



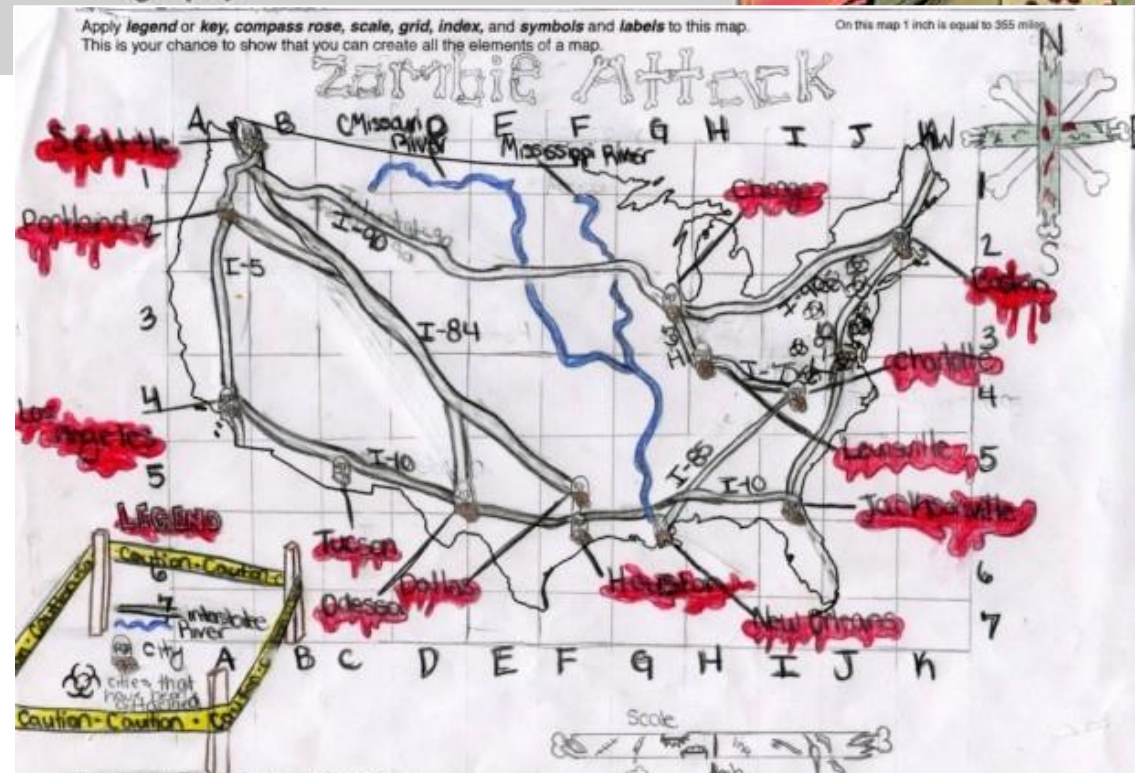
Learn more: <http://www.zombiebased.com>

ZOMBIE-BASED LEARNING

Standards-based Geography curriculum...with zombies!



By David
Hunter



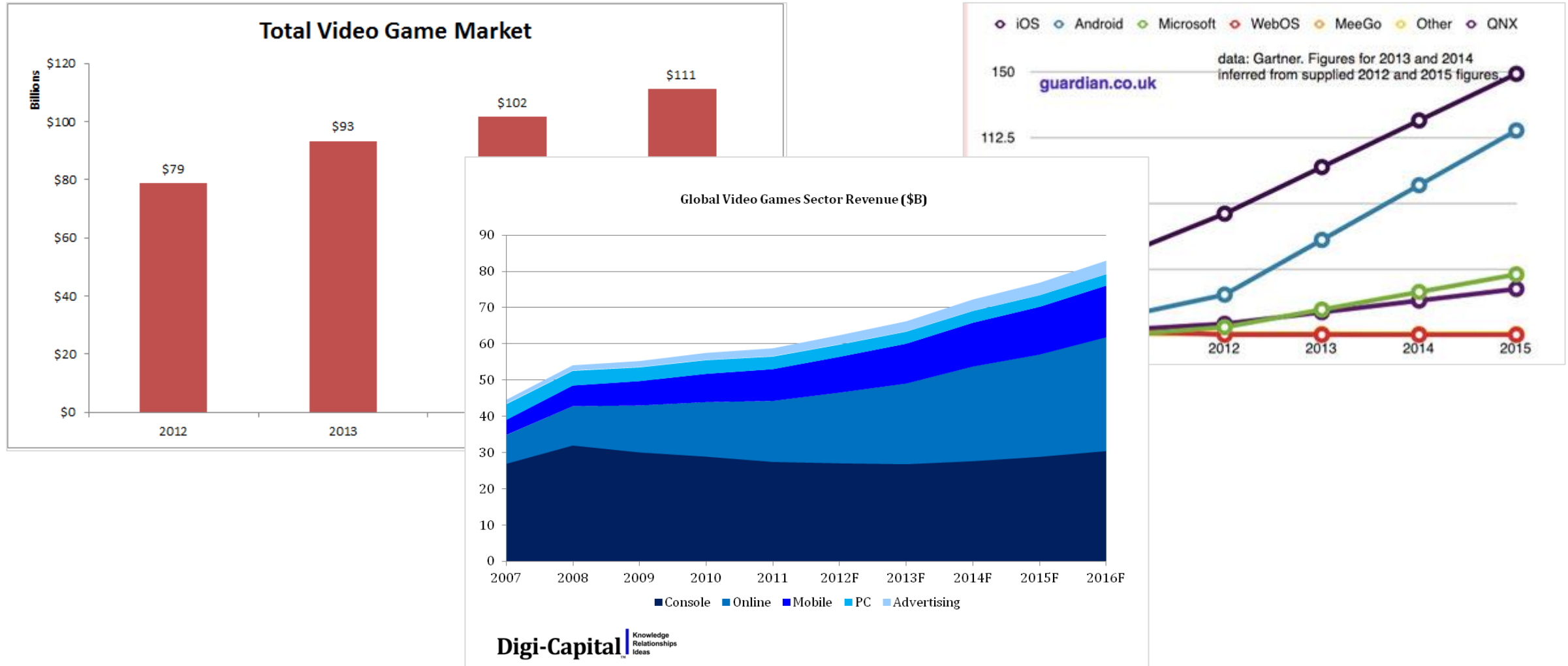


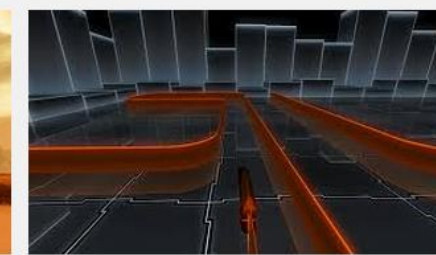
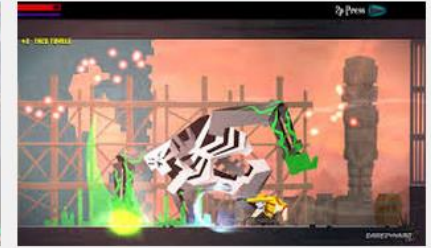
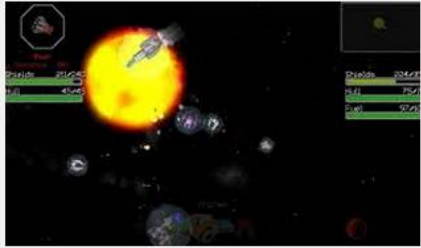
We've come a long way

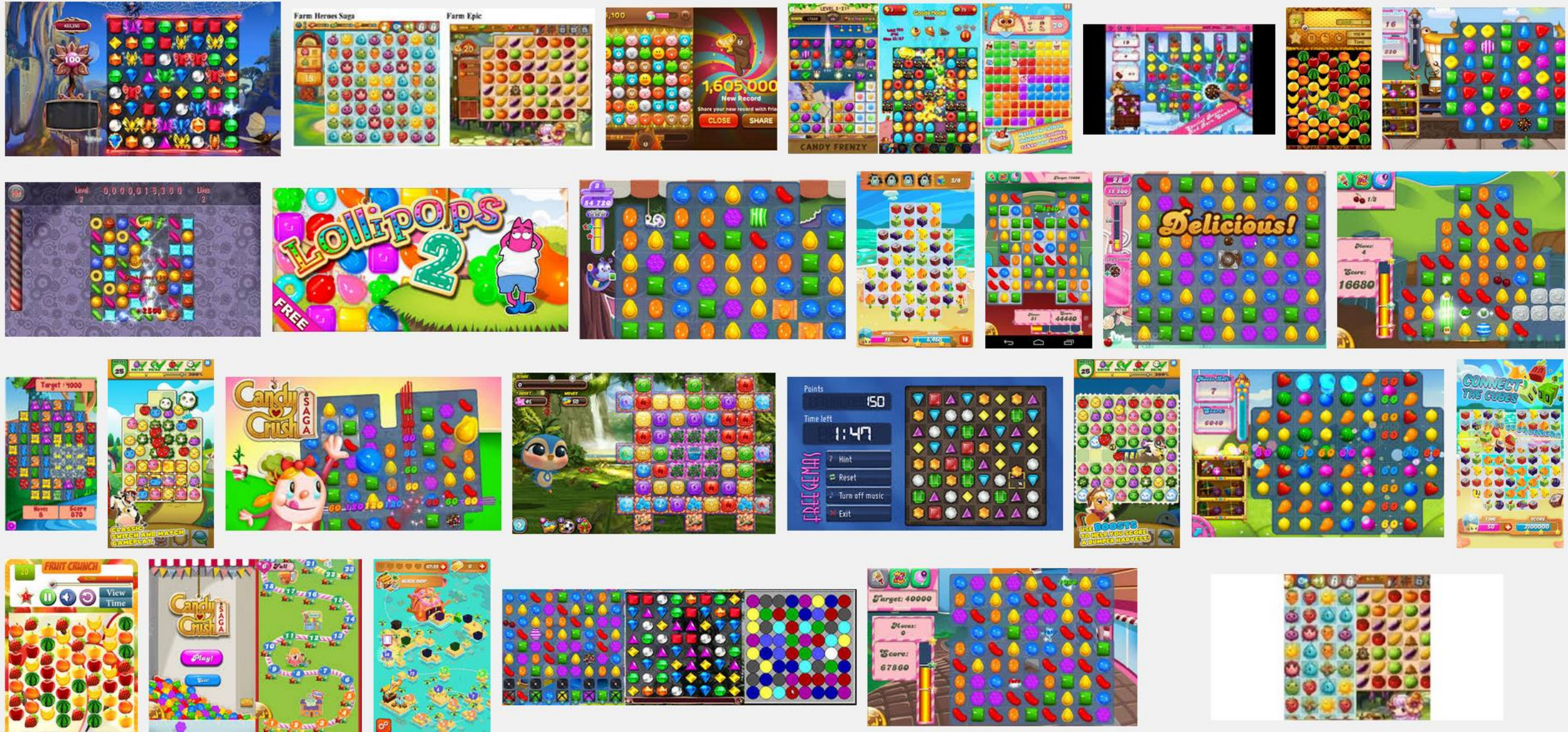




Expanding what games are



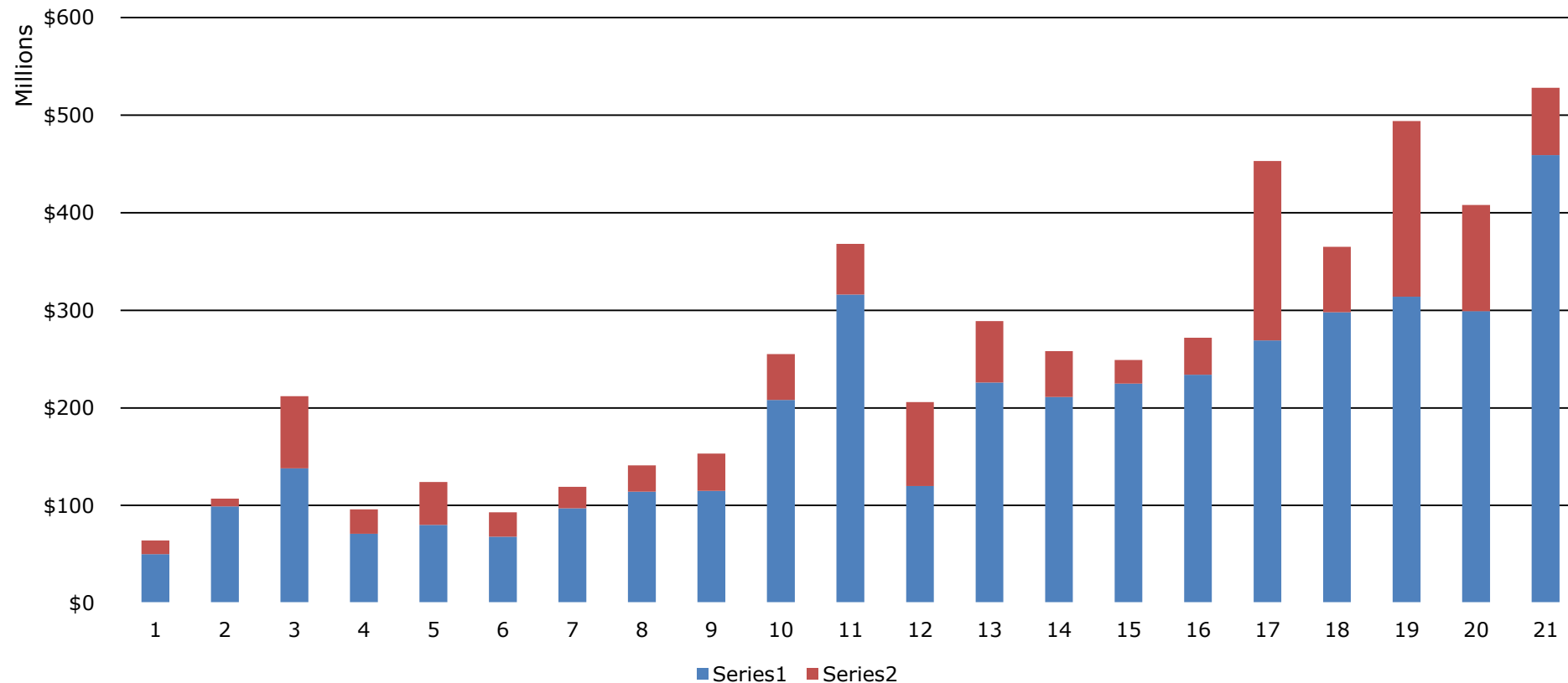






A growing sector

Venture Investment in EdTech 2010 - 2015 YTD







The White House Education Game Jam

- Building and testing education game prototypes to develop new tools for teachers in the classroom
- U.S. Department of Education, Smithsonian, and NASA
- 105 game developers
- 35 educators, students, learning researchers, and staff
- 23 education game prototypes
- Based on standards
- ... and way too much fun!





mozilla



Disney
Consumer Products



Deloitte.



Amplify.



AMERICAN
UNIVERSITY
WASHINGTON, D.C.

GLASSLAB

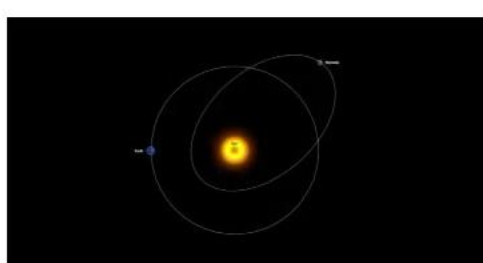
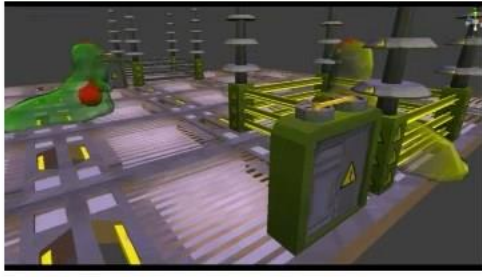
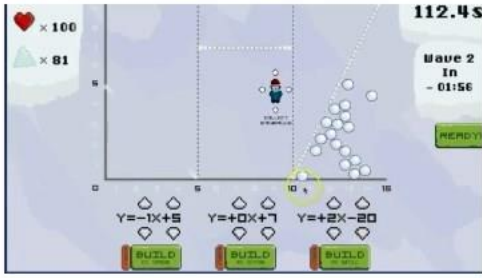
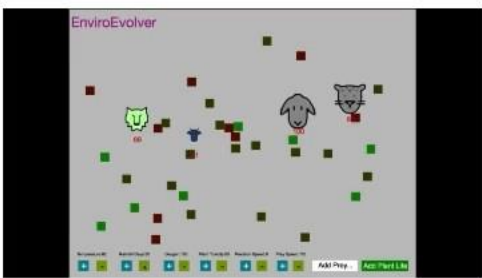
magic leap



UMBC
AN HONORS
UNIVERSITY
IN MARYLAND









Team Wolfshark



Herbivore: 181 (+10)
Children: 79 (+5), Adults: 59 (+7), Seniors: 43 (+3)
Carnivore: 2 (+0)
Children: 2 (+0), Adults: 0, Seniors: 0

RedStorm
100%
#WHGameJam



Press C to Create a Creature

Healthy Senior

Press T to Advance Time



Team Mouse Jam







Let's go exploring!





Models



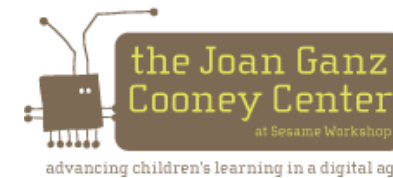


Partner up!

- ED IES SBIR
- NIH Grant
- NEA, NEH Grants
- NSF
- DARPA



LEARNING **games** NETWORK





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@markdeloura

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- Games for Change conference
- Games+Learning+Society conference
- Serious Play conference

