

Get Your Classroom Rolling With Sphero

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Emerging Technology

What is Sphero?

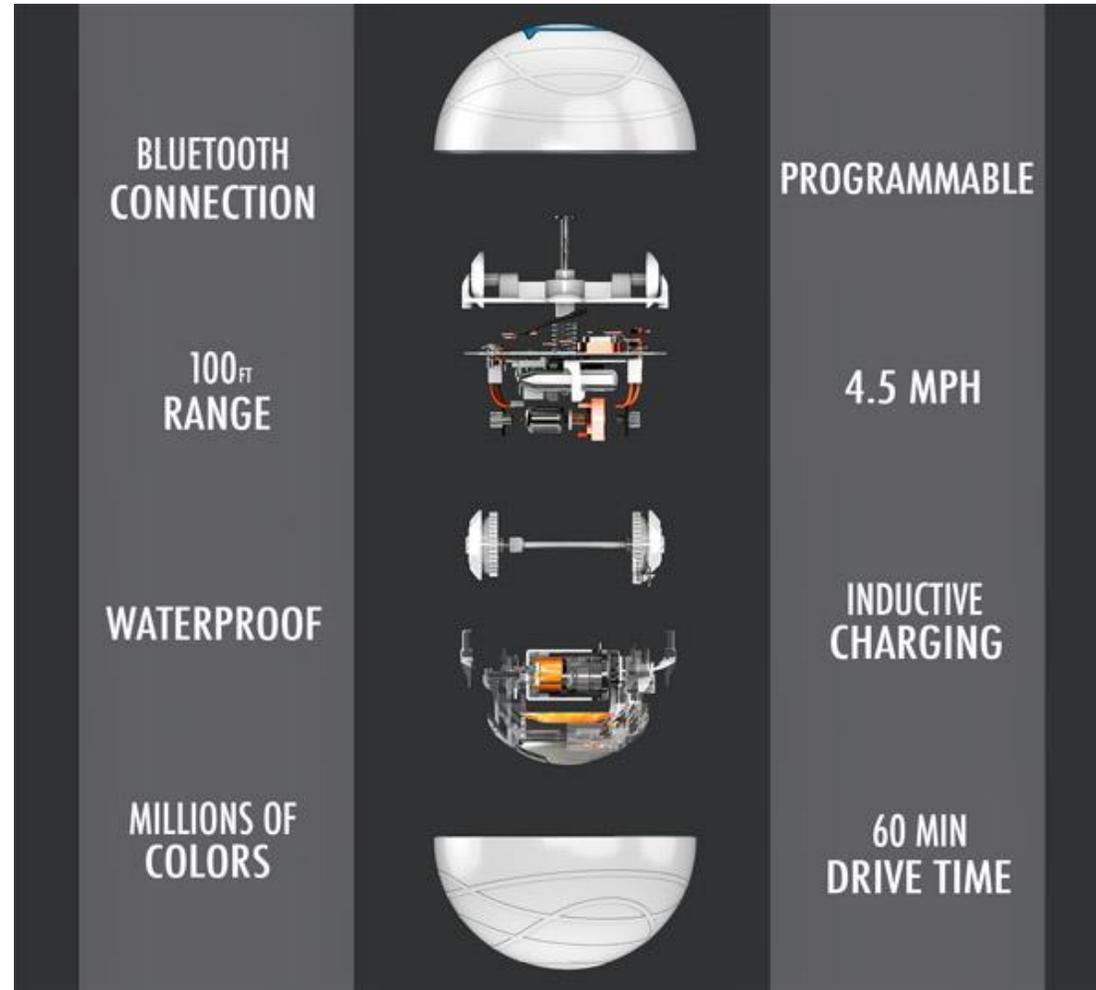
- ▶ Sphero is a robot wrapped in a polycarbonate plastic shell.
- ▶ Controlled and programmed through Bluetooth.
- ▶ The robot is programmable and compatible with various apps and devices.
- ▶ Sphero is tough and able to handle abuse that would destroy other robots.



[Sphero Ball]. (n.d.). Retrieved June 15, 2016, from <https://www.amazon.com/Sphero-Robotic-Ball-Android-Controlled/dp/B005ONTD42>

How Does It Work?

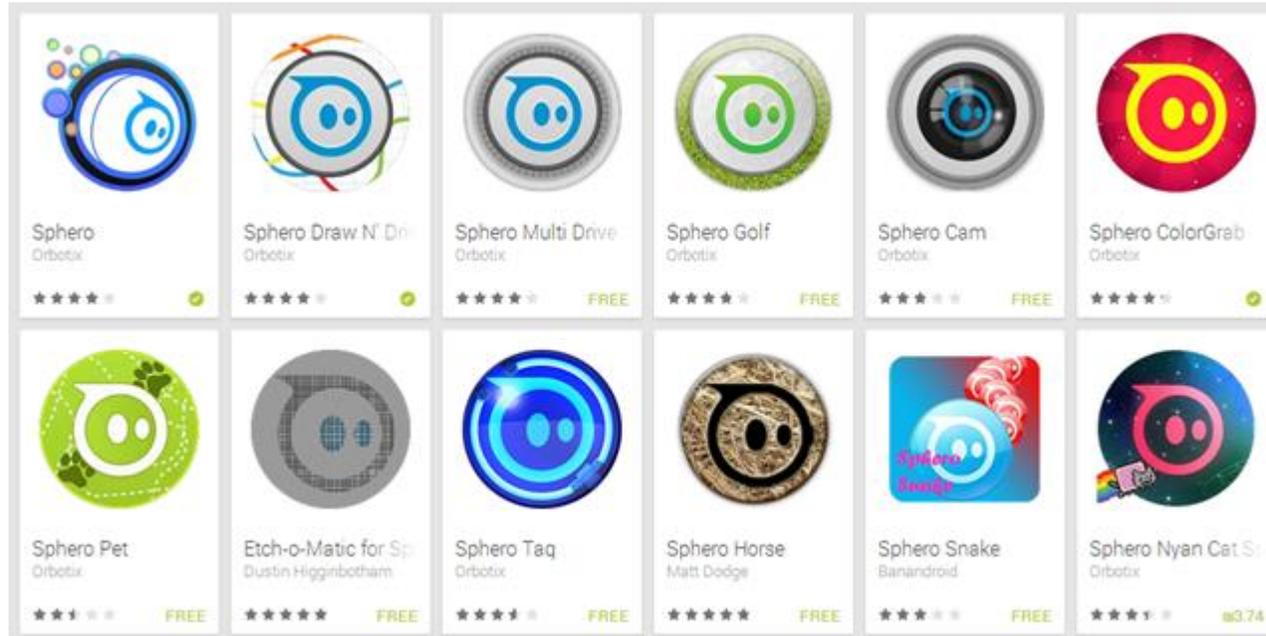
- ▶ Sphero's tough shell make it extremely durable
- ▶ The robot uses an induction charger, it has no connectors or wires
- ▶ The entire unit is sealed with its shell
- ▶ The unit is waterproof and can even float



[Sphero Breakdown]. (n.d.). Retrieved June 15, 2016, from <https://www.vat19.com/item/sphero-2-app-controlled-robotic-orb>

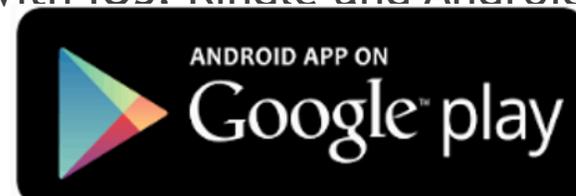
Sphero Apps

- ▶ Sphero comes complete with an assortment of free apps that support STEM and collaborative learning.



[Sphero Apps]. (n.d.). Retrieved June 15, 2016, from <http://www.makeuseof.com/tag/orbotrix-sphero-2-0-review-and-giveaway/>

- ▶ Sphero is compatible with IOS, Kindle and Android OS.



More Common and Useful than you think

- ▶ Sphero has become more and more common today.
- ▶ Sphero was even used in the hit movie Star Wars: The Force Awakens as the droid BB-8. The robot was not special effects but full-size Sphero and according to K.M. Macfarland from Wired.com, “the only gasp-inducing moment of the entire presentation.”
- ▶ <http://www.wired.com/2015/09/bb8-the-inside-story/>



[Bb8]. (n.d.). Retrieved June 15, 2016, from <http://store.sphero.com/products/bb-8-by-sphero>

Sphero is everywhere!

- ▶ According to Sphero website the robot is currently in;
 - ▶ 2,000 schools,
 - ▶ With 12,000 teachers and
 - ▶ With 300,000 kids.

- ▶ <http://www.sphero.com/education>



[School House]. (n.d.). Retrieved June 15, 2016, from Clip art image by Cliparts.co

What Can It Do?

- ▶ Sphero can be programmed to perform operations using a simple set of codes or it can do more complex multiple operations.
- ▶ Students can learn about coding, program Sphero and immediately execute.
- ▶ Students do not need to code and then compile a program, the Sphero will immediately execute the program once it is entered.



Manison, J. (2015, March 24). [Sphero in the Classroom]. Retrieved June 15, 2016, from <https://braemarcollege.wordpress.com/2015/03/24/staff-spotlight-jac-manison/>

Cobb County Mission



- ▶ Sphero fulfills the Mission of the Technology Plan
- ▶ Mission:

“Technology, as an integral part of curriculum, instruction, assessment and learning, prepares students to succeed in a global community. Our students will be equipped with twenty-first century technology skills to demonstrate, apply and communicate their learning. College and career ready graduates must have these skills.”

http://www.cobbk12.org/centraloffice/instructionaltechnology/techplan/2012_2015_ccsd_district_technology_plan.pdf

Sphero addresses the Cobb County Vision of technology education

- ✓ Technology serves as a tool to engage students in quality learning experiences requiring higher-order thinking skills to solve authentic problems.
- ✓ Students will use next generation technology tools to access, analyze and apply increasingly complex information to draw conclusion and make informed decisions.
- ✓ Student learning will be enhanced through open access and equitable distribution of online communication tools and information resources.
- ✓ Students and teachers will be technologically literate and will model responsible digital citizenship through the ethical use of information.
- ✓ Students and teachers will use technology to extend learning beyond the classroom and the school day.
- ✓ Students will use technology to connect and collaborate with classmates, educators, and experts around the world.
- ✓ Students, teachers, and educational leaders will use technology to assess, monitor, analyze, and report student performance data immediately to inform instructional planning and provide timely targeted feedback to students and teachers.
- ✓ Students will use rigorous online and blended learning opportunities including Cobb Virtual Academy and Georgia Virtual School to succeed academically.
- ✓ Technology will improve communication between district stakeholders, ensuring that students, parents, teachers, administrators, support personnel, board members, and community members receive relevant information.
- ✓ All district personnel will use technology to maximize and personalize their professional learning.
- ✓ Federal, state, and local funding sources will be maximized to support professional learning in the effective integration of technology into curriculum, instruction, and assessment.

http://www.cobbk12.org/centraloffice/instructionaltechnology/techplan/2012_2015_ccsd_district_technology_plan.pdf

How does Sphero support the Cobb County School District Technology Plan?

- ▶ Sphero allows for students to work collaborative in a problem based learning lessons.
- ▶ Sphero includes collaborative software that allows students to create programs online.
- ▶ Flipped classrooms have become popular and the SPRK software that comes with the Sphero includes the ability to create lessons at home and execute in school.
- ▶ The learning process incorporates authentic learning by giving the students real-world problems to solve.
- ▶ Apps can be downloaded to a BYOD device and programmed at home for a Flipped Classroom environment.

Who is Sphero for?

- ▶ Sphero is compatible with all grades ranging from K-12 and virtually all subject areas.
- ▶ Sphero has been used to teach all aspects of STEM and beyond.
- ▶ Lessons have been designed to teach;

Astronomy	Physical Education	Digital Citizenship
Geography	Computer Science	etc.
Physics	Art	
Geometry	Social Studies	
Shapes	History	
Colors	Collaboration Skills	

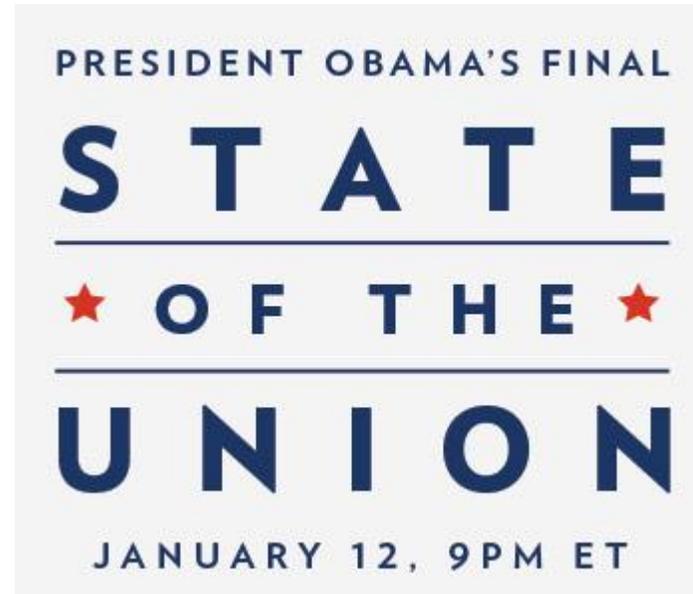
Obama and Coding

In [President Obama's final State of the Union address](#), he expressed the importance of "helping students learn to write computer code." In his most [recent YouTube video for Code.org](#), President Obama urged students to, "master the tools and technology that will change just about everything."

Coding is the future and a major emphasis of STEM initiatives around the country.

<https://www.whitehouse.gov/the-press-office/2016/01/12/remarks-president-barack-obama-%E2%80%93-prepared-delivery-state-union-address>

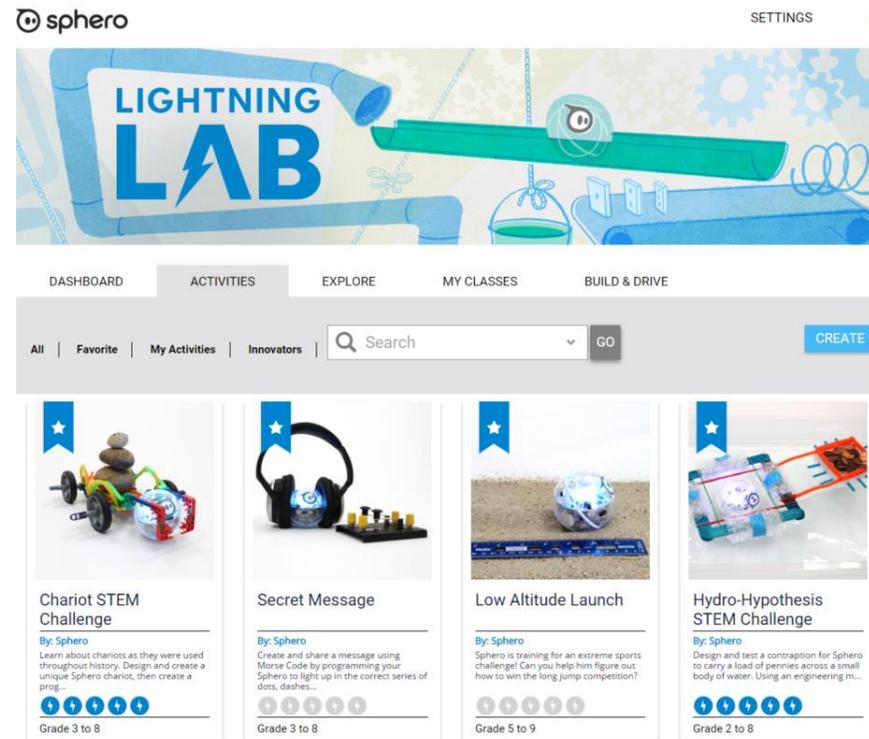
<https://www.youtube.com/watch?v=6XvmhE1J9PY>



Stone, A. (2016). Meet the Guests in the First Lady's 2016 State of the Union Box. Retrieved June 15, 2016, from <https://www.whitehouse.gov/blog/2016/01/10/meet-guests-first-ladys-2016-state-union-box>

Sphero can work with students at different coding levels.

- ▶ Coding begins at elementary and should be followed throughout the grade and content areas
- ▶ Sphero offers basic coding, intermediate and advanced coding that grows with students.
- ▶ Sphero software supports differentiated instruction by allowing teachers to select different coding challenges. Students have the ability to choose different projects and choose the one that best serves their learning level.



Sphero | Connected Entertainment Robots. (n.d.). Retrieved June 15, 2016, from <http://www.sphero.com/education>

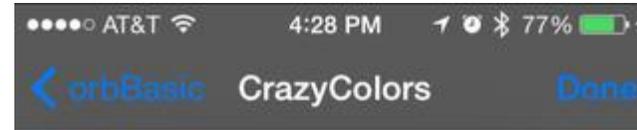
Advanced Coding

Advanced

- ▶ orbBASIC app allows for advanced coding in basic language



[OrbBasic]. (n.d.). Retrieved June 15, 2016, from <http://iphone.informer.com/Apps/orbBasic-for-Sphero/>



```
1 'This program demonstrates rapidly  
2 'changing the color of Sphero randomly  
3 'creating a cool visual effect.  
10 timerA = 5000  
20 LEDC X  
30 X = (X+1) & 7  
40 delay X*10  
50 if timerA > 0 then goto 20
```



[OrbBasic]. (n.d.). Retrieved June 15, 2016, from <http://iphone.informer.com/Apps/orbBasic-for-Sphero/>

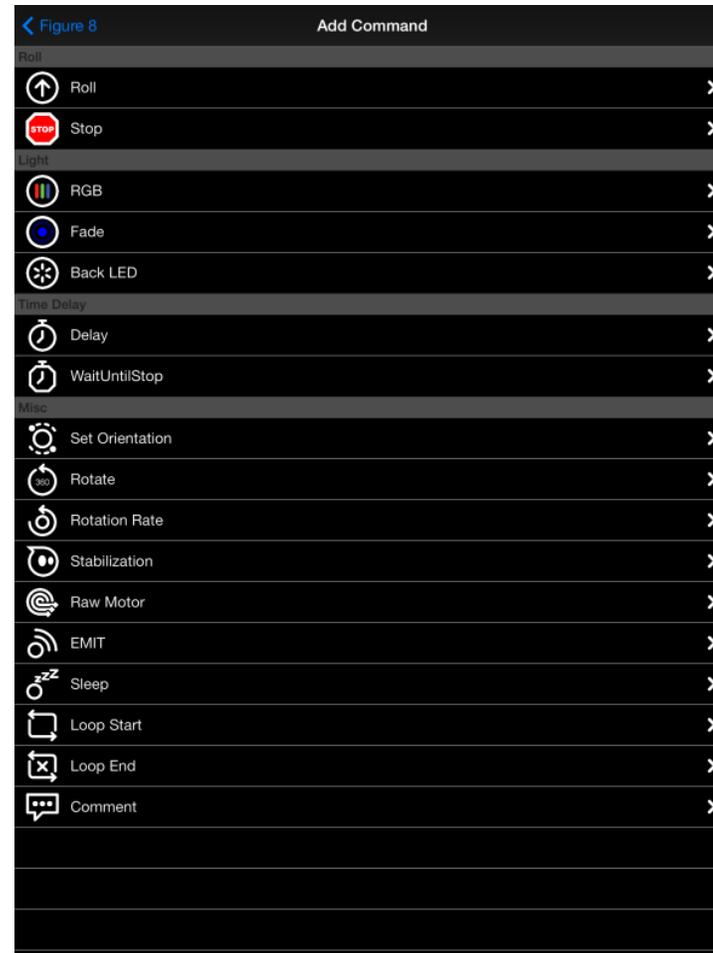
Intermediate Coding

Intermediate

- ▶ Macrolabs allow students to program using elements of command and visual



[Macrolab]. (n.d.). Retrieved June 15, 2016, from <https://play.google.com/store/apps/details?id=com.orbotix.macrolab>

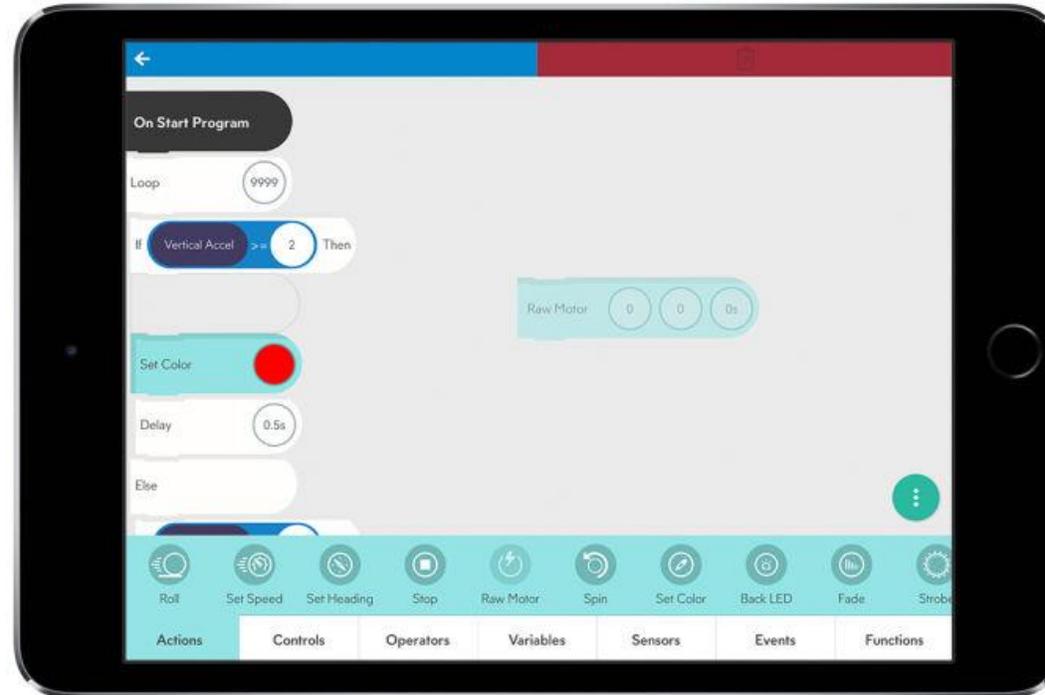


[Macrolab]. (n.d.). Retrieved June 15, 2016, from <https://itunes.apple.com/us/app/sphero-macrolab/id519917219?mt=8>

Beginner Coding

Beginner

- ▶ SPRK Lab allows students to code using a visual language

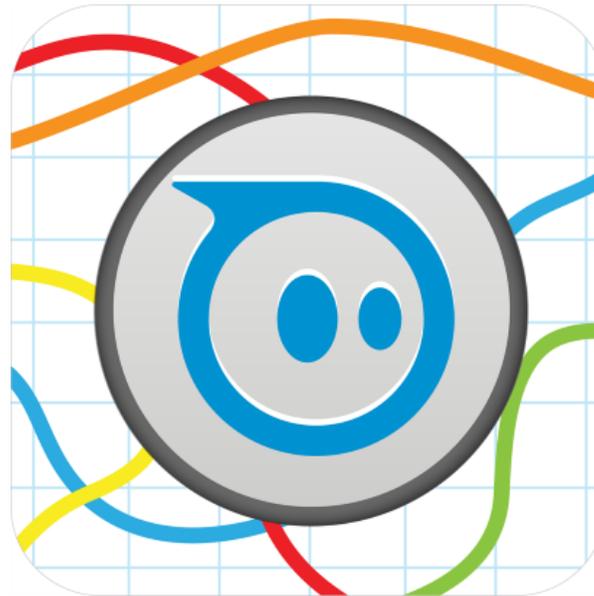


[Sprk Lab]. (n.d.). Retrieved June 15, 2016, from <http://toyland.gizmodo.com/bored-with-bb-8-sphero-s-sprk-app-lets-you-reprogram-y-1761829648>

SPRK Lightning Lab - Programming for Sphero Robots on the App Store. (n.d.). Retrieved June 15, 2016, from <https://itunes.apple.com/app/id1017847674?mt=8>

What about Special Needs?

- ▶ Sphero Draw N' Drive can help students with special needs.
- ▶ Sphero is capable of helping with shape recognition
 - ▶ Students can draw shapes and the Sphero will drive the shapes drawn by the students.
- ▶ Sphero is also able to help with color recognition by allowing students to pick the colors that sphero can turn into that color.



[Sphero Draw N' Drive]. (n.d.). Retrieved June 15, 2016, from <https://itunes.apple.com/us/app/sphero-draw-n-drive/id481029316?mt=8>

Sphero and equitable access

- ▶ Sphero can be used with the BYOD class
- ▶ Students with varying levels of computer access can work together to create programs for Sphero to run using their own and school devices.
- ▶ Current Ipad carts are compatible with Sphero as well.
- ▶ The Sphero can be programmed from home using Lightning SPRK Labs and executed in the class creating a flipped classroom model.

The cost of Sphero

- ▶ The Sphero 2.0 is currently available for \$129
- ▶ Title I funds, STEM grants and other forms of funding can help to offset the cost
- ▶ The most useful apps are available for free for tablets and smartphones.
- ▶ Sphero's tough shell allows for years of use with no Maintenance required
- ▶ Existing iPad carts, and BYOD devices can be used to help save money.

Support for the hardware

- ▶ Sphero comes with a 1 year warranty.
- ▶ Its hard outer shell makes it difficult to break and its water tight design means it can take all kinds of abuse.
- ▶ Sphero comes with a phone support staff that can answer questions if needed along with an online community to answer any questions.
- ▶ The Sphero community is available for students to work and explore within the SPRK Lightning Lab.
- ▶ Sphero can work with administration and technical departments by offering large classroom edition kits.
- ▶ The company will work with both large and small purchase orders.



Teacher Support

- ▶ Sphero and SPRK Lightning Labs offer teachers support.
- ▶ SPRK Lightning Labs offer teacher designed online classes with premade educator submitted lessons.
- ▶ The free classroom support allows teachers to create a class, enter students and design a lesson all online using collaborative software.
- ▶ The students can login and begin the lesson using their innovative online classroom. The lessons are step-by-step and at varying skill levels depending on the level of instruction.

Limitations of Sphero

- ▶ Sphero does require an investments and class kits can run over \$1,000.
- ▶ The use of the SPRK Lightning Lab puts children into an online community that although setup by the teacher outside of the school network.
 - ▶ If that is a concern students could work collaboratively using the following;
 - ▶ Blogs, (Edmodo)
 - ▶ Online Notebooks, (OneNote Notebook)
 - ▶ Email
 - ▶ Etc.

Many other teachers on board



DonorsChoose.org

Support a classroom. Build a future.

- ▶ Teachers all around the country have gotten onboard with Sphero.
- ▶ Funding can be difficult at times. Mr. Foyer from Oklahoma loved Sphero so much and wanted to have his students to have them for his afterschool Maker Club that he started a donorschoose.org page to find funding.
- ▶ <https://www.donorschoose.org/project/applying-stem-skills-with-robotic-sphero/1367833/>

Research about the importance of Coding and Robotics

- ▶ "CS (Computer Science) will play a key role in nearly all future innovation, including advancements across all STEM fields, but the United States has entered a significant national decline in the number of college graduates with basic and advanced CS-STEM degrees. This downward trend is particularly pronounced in CS"
- ▶ Liu, A., Newsom, J., Schunn, C., & Shoop, R. (2013, March). Students Learn Programming Faster Through Robotic Simulation. Retrieved June 15, 2016, from [http://education.rec.ri.cmu.edu/content/educators/research/files/p16-19Shoop et al.pdf](http://education.rec.ri.cmu.edu/content/educators/research/files/p16-19Shoop%20et%20al.pdf)

The Research

- ▶ Sphero 2.0 was launched in 2013 and SPRK education launched a year later.
- ▶ Sphero is a relatively new product in the educational community and as such there is little research however, there is a wealth of trade articles to support it.
- ▶ According to Education World, Sphero "is a prime example of how technology and educators can come together for some pretty cool, fun and educational experiences."

http://www.educationworld.com/a_news/sphero-robot-making-impact-schools-1692440428

Coding and Robotics

- ▶ Students work together in true problem based learning (PBL). According to Ralph Morelli, a professor of computer science at Trinity University, “programming is part of a complex, team-oriented, creative process.”

<http://cacm.acm.org/magazines/2009/8/34497-revitalizing-computing-education-through-free-and-open-source-software-for-humanity/abstract>

More than just one coding language

- ▶ According to Tim Slavin from kidscodec.com a kids, code, and computer science magazine, “Kids can learn to program the robot with blocks then evolve to coding with OVAL which, in turn, can help familiarize them with how C, C++, Python, Ruby, and other languages work.
- ▶ This shows how Sphero is more than just basic coding skills in the classroom. The knowledge gained from Sphero is authentic with real-world applications.
- ▶ <https://www.kidscodecs.com/about-kids-code-computer-science-magazine/>

Professional Learning

- ▶ The Instructional Technology Department will support the implementation of Sphero in classroom.
- ▶ A local Technology Training/Integration Specialist (TTIS) will work with the administrative team to offer school, department or individual training/professional learning (PL) classes on Sphero.
- ▶ Along with PL classes TTISs will also offer in class support as well.
- ▶ STEM camps over summer will also offer trainings.
- ▶ The local TTIS will also offer trainings in the use of SPRK Lightning Labs and other collaborative tools.

Reflection

- ▶ I found it extremely interesting that “40 percent of bachelor's degrees earned by men and 29 percent earned by women are now in STEM fields. At the doctoral level, more than half of the degrees earned by men (58 percent) and one-third earned by women (33 percent) are in STEM fields.”
- ▶ At the beginning I thought that Sphero would be great for teaching STEM but after I researched Sphero I found it can be used for so much more. Sphero can be used areas outside of traditional STEM classes as a way to create a true multi-disciplinary activities.
- ▶ I also learned that the software that accompanies Sphero can be used to offer a differentiated, collaborative and authentic learning environment. Students can work together to create lessons together online and then watch their lessons come to life on the Sphero.
- ▶ <http://www.usnews.com/news/articles/2015/01/27/more-students-earning-degrees-in-stem-fields-report-shows>

Reflection: Professional Practice

- ▶ Starting the next school year I plan on offering professional development classes based for Sphero. I would like to offer the classes as part of my trainings in my Cohort 3 schools and to any other school that is interested.
- ▶ Along with supporting Sphero in my district I would also like incorporate Sphero lessons at local Edcamps.
- ▶ I also plan on contacting the vendor and making arrangements to see if I could get them to appear at an Edcamp in the area.

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