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Merge Cube:
The Future of Education is Now!
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Disseminator: Zeny Ulloa
zulloa@dadeschools.net
Kendale Lakes Elementary
Mail Code: 2651

For information concerning Ideas with IMPACT opportunities including Adapter and Disseminator grants, please contact:
Audrey Onyeike, Program Director
Ideas with IMPACT
The Education Fund
305-558-4544, Ext. 113
Email: audrey@educationfund.org
www.educationfund.org
# Table of Contents

- **Goals and Objectives** ........................................................................................................... 3
- **Common Core Science Standards** ....................................................................................... 4
- **Introduction** ........................................................................................................................ 6
- **Course Outline and Overview** .............................................................................................. 7
- **Sample Lesson Plan** ............................................................................................................. 10
- **Sample Student Work** .......................................................................................................... 12
- **Resource List and Internet Sites** .......................................................................................... 13
- **References** ........................................................................................................................... 17

*Image Credit: Merge VR*
Goals and Objectives

My objective was to help my students (especially my ESOL students) advance academically by implementing a STEM-based Augmented Reality (AR) experience using the Merge Cube within the classroom. Students would be able to learn by taking part in an interactive experience with the Merge Cube that reaches all types of learners (tactile, kinesthetic, visual, and auditory). As a STEAM (Science, Technology, Engineering, Arts, and Math) Designation School, we are driven to motivate and engage our students to think strategically and problem solve. Using the Merge Cube has not only accomplished my objective but has also helped my ESOL (English Speakers of Other Languages) students acquire necessary vocabulary in an interactive way.

As an educator, I’m always looking for new and innovative ways to engage my students and get them excited about learning. As a parent, I also know how frustrating it is to get kids interested in learning something new which they believe is not necessary for them in life - especially if it is not going to help them in what they already do with most of their free time, such as Fortnite, Roblox, or Minecraft. That is why using the Merge Cube is so captivating and engaging for students. It is one of the most easily accessible devices to use when teaching hands-on science with augmented reality.

Image Credit: Merge VR
Common Core Science Standards

According to the Florida Department of Education, the NGSSS (Next Generation Sunshine State Standards) for science are organized by grade level for grades K–8. Although 18 Big Ideas are present throughout all grade levels and build in rigor and depth as students advance, not all grades have benchmarks for each Big Idea. The benchmarks for grades K–2 serve as a foundation for grades 3–5 benchmarks. For that reason, science teachers in K–2 must ensure a good, solid foundation so that students can succeed later on in school and when they take the Science FSA in 5th grade.

These are some of those foundational standards in the elementary grades which can be mastered using Merge Cube applications:

**SC.2.E.6.1** Recognize that Earth is made up of rocks. Rocks come in many sizes and shapes.

**SC.2.E.7.2** Investigate by observing and measuring, that the Sun's energy directly and indirectly warms the water, land, and air.

**SC.2.L.17.2** Recognize and explain that living things are found all over Earth, but each is only able to live in habitats that meet its basic needs.

**SC.2.L.14.1** Distinguish human body parts (brain, heart, lungs, stomach, muscles, and skeleton) and their basic functions.

**HE.2.C.1.6** Recognize the locations and functions of major human organs.

**SC.3.E.5.3** Recognize that the Sun appears large and bright because it is the closest star to Earth.

**Middle School Standards:**

**SC.6.E.6.2** Recognize that there are a variety of different landforms on Earth's surface such as coastlines, dunes, rivers, mountains, glaciers, deltas, and lakes and relate these landforms as they apply to Florida.
SC.7.E.6.2 Identify the patterns within the rock cycle and relate them to surface events (weathering and erosion) and sub-surface events (plate tectonics and mountain building).

SC.7.E.6.5 Explore the scientific theory of plate tectonics by describing how the movement of Earth's crustal plates causes both slow and rapid changes in Earth's surface, including volcanic eruptions, earthquakes, and mountain building.

SC.8.E.5.8 Compare various historical models of the Solar System, including geocentric and heliocentric.

Image Credit: Merge VR
Introduction

It may be hard to believe but by 2025, two billion of the world’s population is going to be made up by the youngest generation: Generation Alpha. Generation Alpha is made up of children born between 2010 and 2025 (Vargason, 2017). This generation of students is considered to be the most technologically infused generation to date. They have no problem using technology, smartphones, tablets, and computers. These students have never known a world without Internet, or video games.

Infusing the classroom with modern technology is essential in addressing today’s student needs (Wichlinski, 2017). Wichlinski (2017) goes on to say that “by integrating these methods into our current system (of instruction), we can better prepare students for the real world.” Therefore, today’s educator must captivate the student’s attention with game-based learning, virtual reality and augmented reality devices in order to engage the Generation Alpha students to learn. Being an educator in this technological era means staying up to date with engaging programs that will help students not only understand complex and abstract concepts but allow them to see how those concepts are useful in preparing them for their possible future careers all while keeping in mind that many of these careers do not even exist at the present moment.
Being a parent of a child that constantly needs motivation to succeed in school has given me a different perspective and approach to engage students within my own classroom. Every student wants to succeed but getting them motivated in education is key to achieving that academic success. Ask a student to study for a science test and I’m sure her or his motivation to pick up a book or an outline defining scientific concepts and vocabulary is less than positively taken into consideration. Yet, ask a student to take out a cell phone or tablet and use a hand-held cube to learn about the human body with a 3D holographic image and their curiosity, engagement, and motivation has suddenly reached new heights. This type of learning is the future of education.

Through the use of digital technology, virtual realities can create experiences for students which would otherwise be very difficult or even impossible for them. Since today’s students are very tech savvy, why not take advantage of their technological skills and infuse their education with 21st century learning?

As an educator, I not only want my students to succeed academically, but also to positively impact their future success, college plans and careers. The future of education is technology. According to April Chamberlain (2014) the District Technology Integration Specialist at Trussville City Schools, “Education is evolving due to the impact of the Internet. We cannot teach our students in the same manner in which we were taught. Change is necessary to engage students not in the curriculum we are responsible for teaching, but in school. Period.” If we are to truly prepare our students for their future, we must grasp the idea that technology is and will surround every aspect of our lives.

Given what we know from this new generation of student learners, as educators we can’t teach them the way we were taught; no more “old school” techniques and strategies. We must find new means of engagement with our Generation Alpha students; yet at the same time, as teachers, our means of funding new technological devices must be
cost effective. Let’s face it, although we are a technological society, schools can’t afford to provide teachers with new digital devices for each student; it’s just not possible. We must be creative, tech savvy, and resourceful in order to provide our students with that high level of digital technology engagement given our monetary constraints. This is where the Merge Cube comes to save the day.

The Merge Cube costs only $20, yet its capabilities and applications are immeasurable in terms of student engagement and cost effectiveness. You will also need a smartphone or tablet and to download the free applications called Mr. Body and Galactic Explorer from your App Store. The Merge Cube acts like a QR code, giving the apps the ability to appear holographic and in 3D. If you don’t feel safe handing over your smartphone to your students to use with the Merge Cube, you can buy the Merge AR/VR Headset - Augmented and Virtual Reality Goggles ($30) and securely put your phone in the protected goggles.

My entire 2nd grade class of 19 students participated in using the Merge Cube during Science. We met a total of 150 minutes every week (two days for one hour and one day for half an hour). The beauty of the Merge Cube is that this one product can be used from K-12th grade, yet
in my opinion, given the apps I utilized, it would be better suited for elementary and middle school students serving as a solid foundation in Science skills for high school students.

I began using the Merge Cube with my Science class for the second half the 2018-2019 school year and witnessed how it helped not only my struggling students succeed academically, but my ESOL (English to Speakers of Other Languages) students, who lack the vocabulary and English language, as well. Since some of my students are ESOL Level 1, I found that when they brought their own devices (configured in their language) to use with the Merge Cube, all the text for the desired information was in their home language. Students got to see what each piece of information said in their language, while learning the vocabulary terms and meaning in English. This was an even greater feature I didn’t even know was available until I started using it with my ESOL students.

ESOL student viewing text information in his own language.
Sample Lesson
The Human Body Part: Brain

Standard
SC.2.L.14.1 Distinguish human body parts (brain, heart, lungs, stomach, muscles, and skeleton) and their basic functions.

Body of Knowledge: Life Science

Big Idea: Organization and Development of Living Organisms

Learning Objective: Understand how structures and systems of organisms in the human body perform functions necessary for life. In this lesson students will gain the skills to identify and explain the characteristics and functions of the brain and the different sections of the brain.

Vocabulary:
Frontal Lobe          Occipital Lobe          Cerebellum
Temporal Lobe          Parietal Lobe

Materials Needed
- 1 Merge Cube for every 3 or 4 students
• Science Journal
• 1 Student tablet, iPad, or smartphone for every 3 or 4 students
• Mr. Body App downloaded from App Store on student devices
• Brain Game Worksheet from: https://thecraftyclassroom.com/crafts/anatomy-crafts-for-kids/brain-crafts-activities/

Prior Knowledge
Students should know that the human body has different body parts and they all have distinct functions. Students should know that each body part has a similar function (example: skeleton - supports the body, muscles - movement of the body, etc.)

Activities
1. Students will go to https://safeshare.tv/x/qZUaQqyJsa to view an introductory video on the brain.
2. Students will then be placed in groups of 3 or 4 and be given a Merge Cube to use with their own devices with the Mr. Body App.
3. Students will be given 5 minutes with the Merge Cube to explore the major human parts inside the body.
4. Distribute Brain Game Handout depicting the brain so that they can label each part of the brain with their Merge Cube
5. Students will then take out their Science Journals and write the informational text within each of the lobes of the brain from the Merge Cube.
6. Students will glue the Brain Game worksheet in their Science Journals along with each piece of information text from the 5 sections of the brain (see Sample Student Work below),

Evaluation
Brain Worksheet and Student Science Journal
Sample Student Work

Resource List and Internet Sites

The resources needed to use the Merge Cube are easily accessible through Apple App Store or Microsoft Store depending on your device and operating system. Here is a list from www.MINIVERSE.io giving a brief description of the app, QR code, available languages, operating system, and cost.
## MERGE Cube Apps for Edu

<table>
<thead>
<tr>
<th>APP NAME</th>
<th>GRADE LEVEL</th>
<th>SUBJECT</th>
<th>CURRICULUM AREA</th>
<th>ISTE STANDARD</th>
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<tbody>
<tr>
<td>SUPER Sugar Crash: MERGE Cube</td>
<td>1st - 3rd</td>
<td>Math</td>
<td>Space Earth’s Place in the Universe, Particles in Matter, Gravity, Life beyond Earth, Motion and Stability, Forces and Interactions</td>
<td>1 Empowered Learner Indicators 1a</td>
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<td>Galactic Explorer</td>
<td>1st - 6th</td>
<td>Science, Earth, Science, Astronomy</td>
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<td>3 Knowledge Constructor Indicators 3c</td>
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<td>THINGS</td>
<td>1st - 12th</td>
<td>Math, Science, Art</td>
<td>Problem Solving</td>
<td>1 Empowered Learner Indicators 1d</td>
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<td></td>
<td>Technology, Engineering</td>
<td></td>
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<td>Titball</td>
<td>1st - 4th</td>
<td>Math</td>
<td>Spacial Awareness, Problem-Solving, Time, Time Management</td>
<td>1 Empowered Learner Indicators 1e</td>
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<td>CubePaintAR</td>
<td>1st - 4th</td>
<td>Art, Technology</td>
<td>Color, Design</td>
<td>4 Innovative Designer Indicators 4b</td>
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<tr>
<td>Party Games for MERGE Cube</td>
<td>1st - 12th</td>
<td>Technology, Math</td>
<td>Problem-solving, Time Management, Group Collaboration</td>
<td>7 Global Collaborator Indicators 7c</td>
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<td>Snake Attack for MERGE Cube</td>
<td>2nd - 4th</td>
<td>Science</td>
<td>Problem-Solving, Energy</td>
<td>1 Empowered Learner Indicators 1d</td>
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<td>CyberCube</td>
<td>2nd - 3rd</td>
<td>Math</td>
<td>Patterns, Sequencing, Coding</td>
<td>5 Computational Thinker Indicators 5c</td>
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<td>Ask Kronky</td>
<td>3rd - 9th</td>
<td>Emerging Technology</td>
<td>N/A</td>
<td>1 Empowered Learner Indicators 1d</td>
</tr>
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<td>DinoDigger</td>
<td>3rd - 6th</td>
<td>Science, Natural History, EIA, Geology Paleontology</td>
<td>Biological Unity and Diversity, Inheritance and Variation of Traits, Fossils, Natural Selection, Fluency, Listening and Responding, Multimodal Literacy, Digital</td>
<td>3 Knowledge Constructor Indicators 3c</td>
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**edu.MERGEVR.com**

Find these apps at MINIVERSE.io/Cube
Here are more useful sites where you can obtain more information on how to utilize the Merge Cube in your classroom:

https://www.teacherspayteachers.com/ Teachers Pay Teachers TpT
https://mergevr.com/cube
https://mergevr.com/edu-resources/activity-plans
https://drive.google.com/file/d/1y6a3NzcBoOSky1zrsnHZP-cuwIBodAY/view
http://www.janusgroup.us/merge/
References

