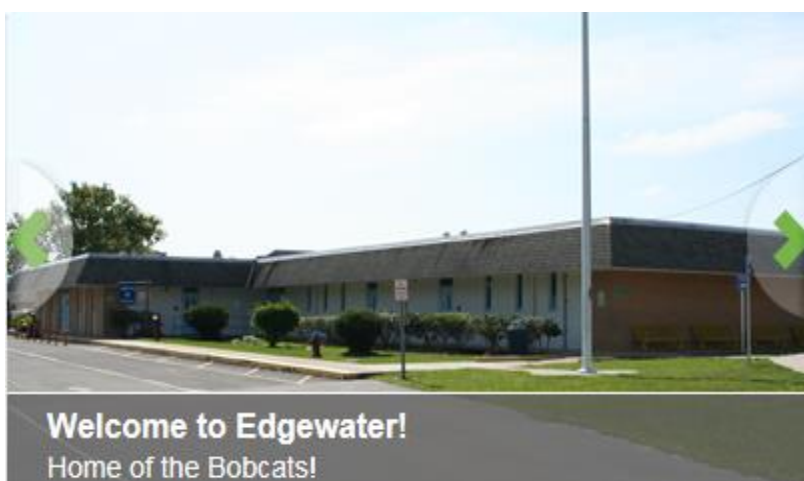


Edgewater Public School

STrEaM Implementation



STrEaM



**Science Technology Reading
Engineering Arts Math**

Table of Contents

Vision and Implementation Plan.....	3
STrEaM Educators Collaborate as an Interdisciplinary Team.....	4
Supporting All Students in STrEaM Program Areas.....	6
Preparing Students for Workforce Readiness.....	6
Continuous Program of STrEaM-Specific Professional Learning.....	8
Creating Interdisciplinary Problem-Based Curricula to Focus on Real World Applications.....	8
Technology Resources to Demonstrate Creative and Critical Thinking, Effective Communication, and Collaboration.....	9
Referenced Resources.....	11
STrEaM Planning Team.....	11

Edgewater Public School

STrEaM : The Elementary Pathway to STEM

Vision and Implementation Plan



Edgewater Public School Mission Statement –

“Through the shared responsibility of all, we will provide a safe learning environment that fosters commitment, collaboration, and creativity in a changing world.” Revised May 2014

Edgewater Public School STrEaM Vision Statement-

“Provide our students with exceptional experiences that allows them to express and demonstrate their knowledge gained through shared learning opportunities and to envision possibilities for the future.” (Presented to the School SAC Committee April 2015)

Edgewater Public School recognizes that the commitment, collaboration and creativity necessary for our changing world encompass the utilization and integration of technology in the instructional setting. We are committed to increasing student engagement and academic performance to not just close achievement gaps but to foster a learning environment that allows students to accelerate in core subject areas at an individualized pace. This will include STrEaM based project learning experiences that are designed to equip and engage students. Our vision is to collaborate with all stakeholders so as to provide our students with varied modality practices that promote real world applications through our STrEaM Advisory Committee making the connections to the community and beyond. The assimilation of technology into the classroom and beyond involves the classroom teacher collaborating with administration to create a seamless digital journey into blended learning. At the elementary school level we understand it is important to equip and instill in our students the core knowledge skills necessary to prepare them for secondary education and beyond.

Edgewater Public School’s Journey to STrEaM Implementation

Edgewater Public School began their STrEaM journey in January 2014 through one team’s quest to supplement more mathematics and science into the instructional week. With that purpose, a request to institute a *STrEaM Wednesday* evolved through a plan to maximize the shorter *Early Release Wednesday* with interactive centers targeting mathematics and science benchmarks where students performed poorly.

Gaining approval from Mr. Reaves, the principal, the fifth grade team began methodical planning and preparation for this effort utilizing Volusia Math Test (VMT) and Volusia Science Test (VST) data. Other grade level teams became aware of this innovative approach to focus supplemental core instruction and made similar requests to the principal. By the end of the 3rd quarter 2014, all grade levels were following a STrEaM Wednesday plan.

In late summer 2014, a proposal was developed to implement an authentic STrEaM initiative involving an integration of Science, Technology, and Mathematics through an Engineering Challenge. It was determined that an ideological shift of the premise needed to be developed and supported. To assist

teachers with connecting and integrating curriculum components, the acronym: **STrEaM (Science, Technology, Reading/Writing, Engineering, the Arts, and Mathematics)** was introduced as an elementary pathway. The administrative leadership committee prepared a professional development plan with instructional goals, pledging yearlong support to the implementation of the major tenants of the program.

In the fall of 2014, Florida Department of Education completed a site visit on our campus. Their objective was to assess and measure our school's "STEM" readiness. Based on their assessment and using the book "The CASE for STEM Education- Challenges and Opportunities" by Rodger W. Bybee, as their guide to determine our rating on a rubric scale of 1-4, FLDOE rated our Edgewater Public School a 4. They created a video that was distributed throughout the state of our school and its program.

STrEaM Educators Collaborate as an Interdisciplinary Team

A collaboration of administrative leaders, academic coaches, and grade-level lead teachers serve as a collaborative leadership team to develop goals that define and support the process that would merge engineering practices into ongoing curriculum pacing. These instructional leaders and teachers serve as mentors and liaisons with implementation. Leadership teams have met quarterly to discuss team goals and needs.

STrEaM process goals were created to target specific student practices that would extend into other interdisciplinary areas and increase student achievement. Targeting explicit engineering practices, these goals created the mainframe of STrEaM Wednesday and include:

- *Increased student engagement*
- *Explicit training of the engineering process*
- *Varied problem-solving techniques*
- *Collaborative teamwork among students*
- *Acceptance of failure as process*
- *Application of engineering standards*
- *Integration of literacy and arts standards*
- *Embedded grade-level mathematics/science standards*
- *Integration of technology standards*
- *Rubrics for student and teacher assessments*
- *Application and transfer of processes and skills to other subject areas*

The implementation plan included targeted, intensive teacher training and support as part of Year 1 goals through varied stages throughout the year.

2014-2015 YEAR 1 Implementation

- Model engineering process and steps
- Provide teacher resources
- Establish EPS STrEaM Steering Committee
- Utilize training videos/lessons from Engineering In Elementaries (EIE) by the Smithsonian Institute and other STEM resources such as CPALMS
- Use of varied technology to enhance the Engineering Design Challenges (EDC)
- Research grade-level appropriate and curriculum-based EDCs integrating multiple subject areas
- Provide ½ day grade-level planning for each quarter and during ERPD

- Introduction of coding technology application
- Advanc-ED STEM Certification review and self-evaluation, best practices
- Create community STEM Advisory Committee
- Engineering Curriculum Planning for 2015-2016

- Collaborate with other schools and counties (share resources, provide observation platforms)
- Incorporate STEM Sea Lab for Grade 4 students
- Technology Class with IC3 "Spark" certification
- Robotic team added

2015-2016 YEAR 2 Implementation

- Continue Year 1 Process Goals
- Create Makerspace- school and classroom platforms
- Increased technology tool use
- Blended learning curriculum
- Agriscience application
- Students design engineering applications as provided by community partners
- Collaborate with other schools and counties (share resources, provide observation platforms)
- Advanc-ED Certification process, site visit

- Integration and focus of our Title 1 plan including the Parent Involvement Plan- **S*T*R*E*A*M** Family Nights
- Budgetary commitment to funding technology needs, professional development, materials and supplies
- Establish network connections with local area secondary feeder pattern schools
- Increase community involvement
- Create and add an "Enrichment" component to students' curriculum
- A second robotic team added

2016-2017 YEAR 3 Implementation

- Improve connections with secondary schools to foster deeper ties
- Add animals to our Agriscience program
- Host Lego Robotics competition
- Expand STEM Advisory Committee to include more businesses
- Increased alignment and rigor with Common Core curriculum
- Professional Development with the Orlando Science Center and Dr. Larry Chew of University of Central Florida Engineering College
- School Improvement Plan focus with STReaM as a focus
- Assess technology needs and invest in additional purchases
- Summer teacher planning with secondary CTE teachers
- Develop cross curricular STEM challenges involving students from elementary, middle and high school
- Create STEM brochure for K-12 for Southeast Volusia County
- Parent Involvement Nights including staff from all grade levels
- Integrate and develop STEM opportunities with Multi-VE and Pre-K students with students from the high school teaching program

Supporting All Students in STReaM Program Areas

We will seek ways to reach out and serve all of our student population to include our students who are economically disadvantaged (81% Free and Reduced Lunch) as well as our ESE population. As a “hub site” for the Southeast Volusia schools for Multi-VE, ESE Pre-K classes, and self-contained classes, we make sure to incorporate the students served in these settings and provide them with educational opportunities in the field of technology and the appropriate fusion of instruction that aligns with project-based learning in STReaM.

Enrichment engagement is another avenue for students to engage in STReaM. Enrichment students are those students who demonstrate mastery of content for their grade level. Enrichment criteria was established by each grade level in collaboration with administration. Students have the opportunity each nine weeks to participate in additional *Music, Art, Intro to Computers, Agriscience, TV Production or PE classes*. Students will study music and rhythm; local ecological art project-canvas painting of Mosquito Lagoon; Coding; Agriscience research newsletter article project of studying animal habitats; create and produce news and video clips; or study and learn team sports. Students have the possibility of selecting from a list of offerings each nine weeks. This will provide students with choice and a voice in the STReaM experiences they will gain.

Preparing Students for Workforce Readiness

With our focus on math and science, we are measuring our outcomes based on state assessments for science (FCAT 2.0) and FSA Math Assessment. This ties into our School Improvement Plan and goals. Our School Improvement Goal for 2015-2016 is “If we incorporate effective, research-based assessment strategies across content areas, then student achievement will increase.”

State Math Assessment and NGSS FCAT 2.0 Science Data

FCAT Math 2.0	2013			FCAT Math 2.0	2014*			FSA Math	2015**			FSA Math	2016				
	Grades 3-5	Title 1 Avg	Volusia Pines***		EPS	Grades 3-5	Title 1 Avg		Volusia Pines	EPS	Grades 3-5		Title 1 Avg	Volusia Pines	EPS	Grades 3-5	Title 1 Avg
Proficiency	54	48	47	Proficiency	58	51	50	Proficiency	56	62	49	Proficiency					
Learning Gains	64	67	63	Learning Gains	65	59	70	Learning Gains	XX	XX	XX	Learning Gains					
Total score	110	114	110	Total score	123	110	120	Total score	56	62	49	Total score					

* Last year of state test FCAT Math

** First year of new test. FSA Math. No gains to measure

*** Demographically our mirror Title 1 school

2013				2014				2015				2016			
NGSS FCAT 2.0 Science	Title 1 Avg	Volusia Pines	EPS	NGSS FCAT 2.0 Science	Title 1 Avg	Volusia Pines	EPS	NGSS FCAT 2.0 Science	Title 1 Avg	Volusia Pines	EPS	NGSS FCAT 2.0 Science	Title 1 Avg	Volusia Pines	EPS
Grade 5 Proficiency	61	70	66	Grade 5 Proficiency	60	51	60	Grade 5 Proficiency	56	53	50	Grade 5 Proficiency			

The School Leadership Team and Digital Learning Committee believe the School Improvement Plan goal for 2015-2016 is aligned for student success with the pursuit and implementation of our STReAM plan. To assist our school with implementing our STReAM program, we have harnessed the special area scheduling. Edgewater Public started an *Introduction to Computers* course in which all students participate. In addition to utilizing the curriculum maps outlined in CPalms (link) for students Pre-K through 5th grades, in grades 3-5 students are instructed in the core alignment with IC3 Spark (Internet and Computing Core Certification- Global Standard 4). Our goal for 5th grade students earning their IC3 certification is:

IC3 Spark Certification Tracking

Year	2015					2016					2017				
	Total Students	Attempted	%	Passed	%	Total Students	Attempted	%	Passed	%	Total Students	Attempted	%	Passed	%
Students	81	20	24.69%	6	30%	84									

Edgewater Public has also added an *Agriscience* program. This is new to us for the school year 2015-2016. It is a part-time component to our program serving students in grades 3-5 through the Special Area rotation schedule. Younger grades will participate through the “Enrichment program”. The Southeast Volusia County area is very agrarian. Our 4-H program is made up of 10% of our student population with a waiting list. We determined that it would be important to integrate this into our STReAM program. A barn is currently under construction for our campus making it one of the first in the State of Florida equipped with solar panels to supply the power source and will have additional rain barrels to collect the rain for watering the plants and animals. To build capacity for the secondary school Agriscience programs (and Academy in the high school), Edgewater Public will collaborate with the middle school to align curriculum and expectations.

Staff was hired for both positions that have a background and expertise in the field. The *Introduction to Computers* course is a full time position. The *Agriscience* course is part-time.

EPS will coordinate with the local high school to monitor, measure and track student enrollment in Engineering and Agriscience Academies as a success measure of our STReAM program.

High School Academy Tracking

Year	2016	2017	2018	2019	2020	2021
# of students in Agriscience Academy	139					
# of EPS students	15					
Overall &	10.79%					

# of students in Engineering Academy	92					
# of EPS students	15					
Overall %	16.30%					

Attendance is another indicator that is monitored to measure engagement for our STReaM program. In 2013, Edgewater Public was 44 out of 47 schools in Volusia County for elementary school. We monitored student attendance as a whole and on our STReaM Wednesdays and compared it with the district average.

STReaM Attendance Tracking

Year	2015	2016	2017	2018	2019	2022
District Avg Elementary Attendance	94.16%	94.92%				
EPS Avg Daily Attendance	93.63%	94.81%				
EPS STReaM Day Attendance	94.00%	95.49%				

Middle School Science Fair Tracking

Year	2016	%	2017	%	2018	%
# of EPS students winning in 8 Science Categories	3	37.5%				
# of EPS students placing	6	18.75%				

Continuous Program of STReaM-Specific Professional Learning

Educators have participated in ongoing professional learning to deepen their understanding of the engineering design process. STReaM specific professional learning has occurred in several different formats. There have been short informative sessions and trainings provided at Early Release Professional Development Days and Faculty Meetings. A deeper focus on specific areas such as the engineer design process, technology needs, assessments, team building, curriculum integration, and planning have involved half and full day sessions. Each spring the faculty is surveyed to determine needs for professional development for the upcoming year.

EPS is exploring CTE planning with middle and high school teachers to develop design challenges for all grade levels. This will take place in 2016. Cross curricular planning will also occur with the high school teacher academy going into 2016-2017. Allowing students another avenue to explore a career and develop the skills necessary to collaborate and teach students in project-based learning.

Creating Interdisciplinary Problem-Based Curricula to Focus on Real World Applications

Teachers have collaborated quarterly plans that have integrated engineering design challenges with ongoing literacy, mathematics, science, and social studies benchmarks. The process included identifying upcoming standards and making connections in which the challenge would solicit a solution that may create a new prototype or modify a current solution. Using Year 1 as a guide to implementation, teachers continue to modify, add, and better the process as their understanding of the engineering process deepens.

As lessons are modified, they are uploaded to a virtual cloud site (MS Office 365) that allows collaboration and sharing.

Sample Lesson Implications

- ✚ Use building materials to brainstorm, create, problem-solve possible solutions; use as storyboard to create literacy platform
- ✚ Change the story with an additional problem to be solved; characters build solution prototypes
- ✚ Collaboration with different grade levels
- ✚ Development of 3-D geometrical shapes as building blocks for prototypes
- ✚ Research history, scientific properties of events and challenges to use as justification for solutions
- ✚ Purposeful use of technology applications to develop and share projects
- ✚ Evaluative tools for students to share thinking and process with other groups
- ✚ Use of rubrics as formative and summative tool to guide student success
- ✚ Students use or create rubrics; self-assess
- ✚ Collaboration with Art and Technology curriculum
- ✚ Embedded Mathematical Practices
- ✚ Incorporate local history that addresses engineering pioneers and Black History Month

Technology Resources to Demonstrate Creative and Critical Thinking, Effective Communication, and Collaboration

Edgewater Public is a Bring Your Own Technology (BYOT) to School site. Our Technology Committee developed a distribution plan that would maximize the amount of technology on campus. With 522 devices for 613 students, our ratio is 1:1.15. We continue to seek the best technology to increase our student performance. A budget was also established to address maintenance concerns with the volume of devices and the increased risk of damage. This was done to limit the down time of devices so student instruction would not be hampered.

Edgewater Public School
2015-2016 Technology Plan

	Location		Person Responsible	Device												Total Devices (minus VGA connectors and keyboards)
	Classroom	Teacher	Grade level	Ipad 30 pin	Ipad lit pin	Ipad keyboard	Chrome	Laptop	Ipod	VGA connector 30 pin	VGA connector lit pin	Doc camera	Wireless USB	Desktop	Title 1	
1	116	Duncan	K	5	0	0	0	0	0	1	0	1	0	4	3	13
2	117	C. Haynes	K	5	0	0	0	0	0	1	0	1	0	4	3	13
3	120	Moon	K	5	0	0	0	0	0	1	0	1	0	4	3	13
4	119	Wiggins	K	5	0	0	0	0	0	1	0	1	0	4	3	13
5	121	Baker	K	5	0	0	0	0	0	1	0	1	0	6	3	15
6	135	Stewart	K	5	0	0	0	0	0	1	0	1	0	4	3	13
7	136	Garrett	1	5	0	0	0	0	0	1	0	1	0	4	3	13
8	137	Crossland	1	5	0	0	0	0	0	1	0	1	0	4	3	13
9	133	Wilson	1	5	0	0	0	0	0	1	0	1	0	4	3	13
10	226	Jones	1	5	0	0	0	0	0	1	0	1	0	4	3	13
11	231	Jensen	1	5	0	0	0	0	0	1	0	1	0	4	3	13
12	234	Johnson	1	5	0	0	0	0	0	1	0	1	1	4	3	14
13	221	Deaton	2	5	0	0	0	0	0	1	0	1	0	4	3	13
14	220	Scalo	2	5	0	0	0	0	0	1	0	1	0	4	3	13
15	213	Black	2	5	0	0	0	0	0	1	0	1	0	4	3	13
16	208	Freeman	2	5	0	0	0	0	0	1	0	1	0	4	3	13
17	214	Mallory	2	0	5	0	0	0	0	0	1	1	0	4	3	13
18	202	Haynes, L	2	0	5	0	0	0	0	0	1	1	0	4	3	13
19	507	Jollie	3	0	6	6	6	0	0	0	1	1	0	0	3	16
20	505	Bradley, D	3	0	6	6	6	0	0	0	1	1	0	0	3	16
21	902	Meador	3	0	6	6	6	0	0	0	1	1	0	0	3	16
22	904	Diaz	3	0	6	6	6	0	0	0	1	1	0	0	3	16
23	612	Smith	3	0	6	6	6	0	0	0	1	1	0	0	3	16
24	144	Resheidat	4	0	7	7	0	7	0	0	1	1	0	0	3	18
25	127	Kelly	4	0	7	7	0	7	0	0	1	1	0	0	3	18
26	135	Mowrey	4	0	7	7	0	7	0	0	1	1	0	0	3	18
27	142	Marks	4	0	7	7	0	7	0	0	1	1	0	0	3	18
28	124	Stull	5	0	7	7	0	7	0	0	1	1	0	0	3	18
29	123	Cortright	5	0	7	7	0	7	0	0	1	1	0	0	3	18
30	113	Bradley, L	5	0	7	7	0	7	0	0	1	1	0	0	3	18
31	114	Flassig	5	0	7	7	0	7	0	0	1	1	0	0	3	18
32	803	Mort	Multi-VE	0	3	0	0	0	0	0	0	0	0	1	1	5
33	804	Johnston	Multi-VE	0	3	0	0	0	0	0	0	0	0	2	1	6
34	721	Zavala	Multi-VE	0	3	0	0	0	0	0	0	0	0	2	1	6
35	724	Ashley	2-5 Res	0	3	0	0	0	0	0	1	1	0	2	0	6
36	727	Boden	K-1 Res	0	3	0	0	0	0	0	1	1	0	1	1	6
37	617	Strahan	Intro to Comp	0	9	9	10	8	0	0	1	1	0	0	0	28
38	602	Lindsey	Media Center	2	0	0	0	0	18	1	0	0	0	20	0	40
	Total			82	120	95	40	64	18	17	18	34	1	102	97	523

Our school wrote a grant in 2014 for a 3-D printer and scanner to add to our Intro to Computers course. This has added an additional measure of STReaM to our campus. Our students now use Tinkercad and other software programs to build their inquiry skills. In 2015, EPS was awarded a business grant through a partnership with SunTrust Bank to purchase a Glow Forge laser printer for a student-led manufacturing green business.

REFERENCED RESOURCES:

Engineering is Elementary: <http://www.eie.org/>

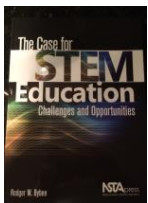
eGFI: <http://www.egfi-k12.org/>

CPALMS: <http://www.cpalms.org/Public/>

Model Elicited Activities: <http://www.cpalms.org/CPALMS/MEA.aspx>

CODE: <http://code.org/>

ERIC.ed: <https://eric.ed.gov/?q=%22%22&ff1=pubReports+-+Descriptive&ff2=eduPostsecondary+Education&ff3=eduElementary+Education&ff4=eduGrade+4&id=EJ1036487>



[FLDOE referenced book during their review](#)

**The Case for STEM Education-
Challenges and Opportunities**
by Rodger W. Bybee

EPS STReaM Planning Committee

Team Member	Position
Melanie Amato	Academic Coach
Linda Bradley	Intermediate Teacher
Michele Brown	Assistant Principal
Melissa Cleveland	Academic Math Coach
Patricia Galbreath	Academic Science Coach
Mary Jo Jones	Primary Teacher
Michele Lindsey	Media Specialist
Casey Mort	ESE Multi-VE Teacher
Jeff Reaves	Principal
Jennifer Scalo	Primary Teacher
June Weaver	Guidance Counselor
Anna Wylie	Academic Reading Coach