Core Element: The Greater New Orleans STEM Initiative
2010 Annual Report




Core Element: The Greater New Orleans STEM Initiative

2045 Lakeshore Drive, Suite 552

New Orleans, LA 70122

504.355.2865 phone

504.379.3826 fax

www.core4kids.org

core element

MISSION

Core Element: The Greater New Orleans STEM Initiative strives to educate and prepare K – 12 students in the Greater New Orleans region in Science, Technology, Engineering, and Mathematics (STEM) by offering teacher professional development, by supporting the use of inquiry-based science and math curricula, and by promoting STEM academic enrichment activities.




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About Core Element

The *Greater New Orleans STEM Initiative (GNOSI) is a non-profit organization bringing a Core Element of succes*sful Science, Technology, Engineering and Math (STEM) programs to schools in the Greater New Orleans area. *Core Element* trains and equips teachers with hands-on, inquiry-based kits to be used in classrooms.

Core Element training provides STEM lessons where students are engaged in their own learning by the acts of observing, experimenting, keeping journals and taking measurements bringing together all the skills of a well-rounded student. These help students show measurable improvements in mathematics, literacy, reasoning and analytical thinking. By establishing science as the cornerstone of education, *Core Element* provides a different kind of educational instruction with a proven record of success for our urban schools.

A *Core Element* pilot program began locally in 2006. Since its inception, the *Core Element* program has helped to increase student achievement in participating schools with clear short-term improvements building towards long-term impact. *Core Element's* goal is to help as many students as possible in the Greater New Orleans region reach their potential. This goal can only be achieved with adequate funding. Proceeds raised by *Core Element* support professional development training for teachers, provide the funds needed to buy new kits, refurbish existing kits for in-classroom experimentation and allow for limited staffing to ensure program success. Funding *Core Element* is a prudent investment in our children's future; the program's long-term impact of improving education on our workforce, economy and society is immeasurable.

"If America is to maintain our high standard of living, we must continue to innovate. We are competing with nations many times our size. We don't have a single brain to waste. Math and science are the engines of innovation. With these engines we can lead the world. We must demystify math and science so that all students feel the joy that follows understanding."

-- Dr. Michael Brown, former Nobel Prize winner for medicine and the Paul J. Thomas Professor of Molecular Genetics and Director of the for Molecular Genetics at the University of Texas Southwestern Medical School in Dallas

LEADERSHIP MESSAGE

It is our pleasure to present to you the first Annual Report for *Core Element: The Greater New Orleans STEM Initiative*. Our organization, started in 2006, achieved non-profit status in May 2009 and began doing business as Core Element.

A revolution is needed in education. Volumes of research illustrate that students who ***discover knowledge*** are better prepared than those who gain knowledge in the traditional teacher lecture method. Core Element helps teachers understand how to rework the instructional model such that students discover the core foundations of science and math content rather than asking them to memorize. This knowledge is now with the child forever establishing a base for further learning and discovery.

There is a compelling economic argument about exposing children to math and science early and consistently, but another benefit we receive as a community is an increase in their critical thinking skills. This program is about exposure, creating an interest, and developing life skills that bring value no matter where a student chooses to go in life. The program's strengths are its connection to cutting-edge techniques, access to practical learning experiences, and ability to connect with some of the best academicians, curricula and resources throughout the country.

We are privileged to assist in the leadership responsibilities for C*ore Element: The Greater New Orleans STEM Initiative*. The Board of Directors, Advisory Council and Core Element staff members are a diverse group of individuals representing education professionals, industry and community leaders. This group is committed to making a difference in how STEM education is delivered in the Greater New Orleans region and making a difference in the lives of our children, one child at a time.

We hope that as you take the time to look over our 2010 Annual Report, you will come to understand the goals and mission of Core Element. It is our intention to make a positive impact on STEM education, economic development and teacher professional development in the Greater New Orleans region.

Thank you for your interest in Core Element: The Greater New Orleans STEM Initiative.

Sincerely,

David Huete, PE
Board President

Nicholas Altiero
Board Vice-President

How You Can Get Involved?

***Donate*:** A modest investment in Core Element's program can revolutionize a classroom.

Volunteer: Volunteers are needed to assist with the events and logistics for the STEM enrichment activities.

***Participate*:** Sign up for our newsletter to learn how you and your organization can participate and become involved with Core Element.

Advocate: Improve math and science education by learning and advocating the benefits of the Core Element program to local schools.

2010 STEM Activities

Core Element's 2010 Summer Professional Development included an Elementary STEM Institute for teachers in grades 3-6 and workshops on Modeling Method of Instruction in Physics and Chemistry for grades 8 to 12. Over 60 teachers from Orleans, Jefferson, St. Bernard and St. Tammany parishes dedicated part of their summer to participate in these STEM workshops. With funding support from Baptist Community Ministries, Lockheed Martin, Northrop Grumman, Society of Petroleum Engineers-Delta Section and Shell Oil Company, the 2010 program expanded to offer training to teachers from the six parishes in the Greater New Orleans area.

"One of my favorite quotes is from Carl Sagan, who said it's suicidal to create a society that depends on science and technology in which no one knows anything about science and technology - and that's the road that we are headed down.

I think part of the issues is that it takes years, decades, to build the capability to have a society that does depend on science and technology.

You need to generate the scientists and engineers, starting in school-elementary school, middle school, you have to fund the research that those scientists go on to do-the fundamental research. You have to generate the engineers that can turn those scientific breakthroughs into products and services. And then you have to have the right environment."

--Sally Ride, President and CEO Sally Ride Science, former Astronaut, first American woman in space

Elementary STEM Summer Institute Professional Development for Teachers

Core Element has provided Greater New Orleans area elementary teachers in grades 3-6 workshop sessions on current STEM topics. These have included training in LEGO robotics, mathematics manipulatives, science note-booking, journaling, and science content with FOSS Science Modules and ARIES Modules. Teachers attended 30 hours of intense instruction held at Ben Franklin High School in New Orleans.

Nationally trained presenters provided teachers with training in both content and curriculum. Workshop presenters included local, state and national professional development trainers. Teachers attended weeklong sessions and are eligible to request module and robotics kits to use at their schools to implement the curriculum and activities covered during the intensive workshops.

Why all the fuss about FOSS?

FOSS (Full Option Science System) is a research-based science curriculum for grades K–8 developed at the Lawrence Hall of Science, University of California at Berkeley. FOSS is designed to make hands-on science engaging and fun, for teachers as well as students. Core Element supports the FOSS philosophy that hands-on science is intrinsically fun and interesting for students and that most teachers can be outstanding science teachers when they are provided with effective instructional materials.

FOSS engages students in inquiry. Students construct an understanding of science concepts through their own investigations and analyses, using laboratory equipment, student readings, and interactive technology. Students are encouraged to become a partner in the classroom educational exchange by exercising logical thinking and applying decision-making skills appropriate to their ability. FOSS helps develop basic skills within the context of learning science through student readings, science journals, student projects, and the use of mathematics to quantify and communicate results of investigations and experiments. Students exercise logical thinking and decision-making skills appropriate to their age level.

High School STEM Summer Institute Professional Development for Teachers

Modeling Method of Instruction in Physics and Chemistry
Summer Workshops

Core Element provided Greater New Orleans area chemistry and physics teachers an opportunity to experience the Modeling Instruction Program developed by Arizona State University with funding from the National Science Foundation. A talented group of nationally trained presenters provided high school teachers with 60 hours of professional development training in both content and the basics of the Modeling Instruction curriculum.

Modeling Method:
A different way to teach students

One of the main differences between the Modeling Method and the traditional lecture format is that in the Modeling Method, students learn by doing the problem solving themselves rather than watching the teacher do it. In the Modeling Method, students are not lectured to by the teacher but are guided to develop a model using diagrams, maps and mathematical formulas. The teacher acts as a facilitator who is unobtrusively in control of the agenda at all times.

In the traditional lecture method, the teacher is the focus of attention, and the student is an observer rather than a participant and memorization can become the major technique for learning the material. In the Modeling Method, the teacher gives some initial background, but it is up to the students to design and perform experiments, develop a model to represent relationships between variables in the system, and analyze and verify the model. The students have the opportunity to present their findings to the rest of the class, while the teacher checks their understanding of the conceptual and mathematical model they have developed. The use of models allows students to develop a thought-based, hands-on approach to learning.

Core Element-Supported STEM Enrichment Activities

Greater New Orleans Science and Engineering Fair (GNOSEF)

Core Element supports the GNOSEF by assisting with volunteer support, serving as members for various committees, providing competition day safety and logistics support and assisting with GNOSEF teacher training. The mission of GNOSEF is to encourage independent student research in science and engineering, to encourage youth to pursue science, math, or engineering careers, and to promote collaboration and interaction between area students and scientists and engineers. GNOSEF, one of the oldest such fairs in the nation, awards more than $25,000 in cash and prizes to students each year. Competition is open to any student attending middle school or high school in Jefferson, Orleans, Plaquemines or St. Bernard Parishes.

FIRST® LEGO League (FLL)

FIRST® LEGO League introduces younger children to the exciting world of science and technology. This program features a real-world challenge to be solved by research, critical thinking, construction, teamwork, and imagination. Guided by adult coaches, teams use LEGO® bricks and software to build a model with a motorized part and develop a coordinating poster to illustrate their journey. Core Element supports FLL by offering teacher training, providing materials to teams, enhancing team support and assisting with competition day activities.

Bayou Regional *FIRST*® Robotics Competition (FRC)

The FIRST® mission is to inspire children to be science and technology leaders, by engaging them in exciting mentor-based programs that build science, engineering and technology skills, inspire innovation, and foster well-rounded life capabilities including self-confidence, communication, and leadership. The FIRST® Robotics Competition stages short games played by robots designed and built in six weeks (from a common set of parts) by a team of high-school students and a handful of engineers-mentors. The students program and remotely control the robots in competition rounds on the field. Core Element supports *FIRST®* Robotics by providing and funding materials to teams that wish to participate in the competition, assisting with providing volunteers and competition day support.

Core Element Accomplishments

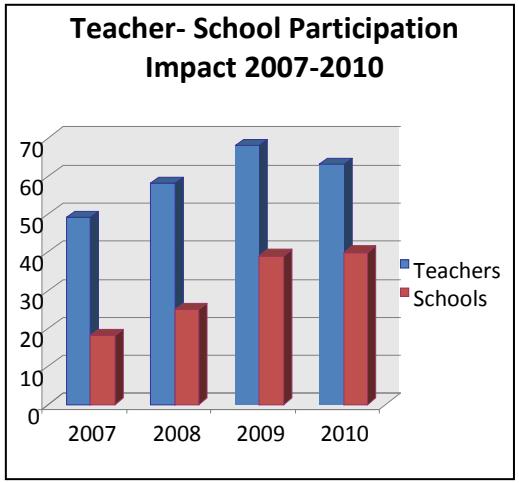
Initial results have been positive with standardized testing scores of participating schools increasing by 30%, but the program has not been in existence long enough to demonstrate long-term success. However, there is significant research done by other educators that show that this type of program has significantly improved the proficiency of math, science and literary skills in K-12 students. (See the following paper for more details: Lowery, Lawrence F. (July 2003), "Research On Hands-On Science Programs – A Bibliography" (http://www.fossworks.com/pdfs/HandsOnScienceResearch.pdf)

Since introducing these programs in 2007, Core Element has trained 238 teachers from 122 different schools impacting 27,170 students. Initial science and math test results from participating elementary schools have improved standardized test scores by more than 30%!

Estimated Student Impact* 2007 through 2010					
	Teachers	elementary 2-4	middle 5-8	high 9-12	Total
2010	63	675	1950	4140	6765
2009	68	475	3000	5220	8695
2008	58	700	3900	720	5320
2007	49	300	2850	3240	6390

* Based on normal average teacher to pupil ratios:

Schools Involved 2007 through 2010					
	Total	NOPS/ Charters	RSD/ Charters	Jefferson	Other
2010	63	7	4	20	9
2009	39	12	5	19	3
2008	25	12	0	13	0
2007	18	10	8	0	0



This new generation will have the opportunity to solve many global issues: health-care, energy security and the global food crisis to name just a few. Given this, the missing ingredient is a better knowledge of math and science and its power to provide solutions to these problems. Technology can and will change the world. For this younger generation to be the force for good they want to be, they need to understand that the new literacy of the 21st century includes math and science."

-- Tom Luce, CEO, National Math and Science Initiative

Program Success

The Core Element program success is independent of the local area School Boards and is driven by the feedback from the teachers, principals and superintendents of the schools participating in the program. Student achievement data on state exams are collected and compiled by district representatives working on the project.

2010 Summer STEM Institute Participant Pre/Post Score Analysis	
	Percent Change
Modeling Physics	18.1%
Modeling Chemistry	11.8%
FOSS Water Module	31.3%
FOSS Magnetism & Electricity	60.6%
FOSS Mixtures & Solutions	29.5%

On-site master teachers are instrumental to the long-term success of the summer training program. The master teachers offer support to program participants throughout the school year. Allowing master teachers to visit the classroom enable program participants to garner the benefit of continuing their training without having to leave the classroom during the school year.

More than half of all science and engineering degreed workers are 40 years or older and 26 percent are over 50 (National Science Foundation), yet less than 15 percent of U.S. students have the math and science prerequisites to be successful (Southern Methodist University). Eighty percent of jobs in the next decade will require some form of math and science (National Science Foundation).

Why Is STEM education important?

Nationwide, K-12 students are not obtaining proficiency in science and math that is critical to maintain a solid STEM (Science, Technology, Engineering and Math) workforce in America.

- 80% of jobs created over the next decade will call for substantial math and science skills
- Less than 30% of students are graduating with proficiency in math and science topics;
  - In New Orleans, that number drops to less than 20%
- High School graduates' proficiency in science is declining
- Over 50% of students receive instruction in science or math from a teacher without a degree that field.

In Louisiana

- Between 2008 and 2018, new jobs in Louisiana requiring postsecondary education and training will grow by 65,000 while jobs for high school graduates and dropouts will grow by 61,000.
- Between 2008 and 2018, Louisiana will create 634,000 job vacancies both from new jobs and from job openings due to retirement.
- 316,000 of these job vacancies will be for those with postsecondary credentials, 229,000 for high school graduates and 89,000 for high school dropouts.
- Louisiana ranks 45th in terms of the proportion of its 2018 jobs that will require a Bachelor's degree, and is 6th in jobs for high school dropouts.
- 51% of all jobs in Louisiana (1.1 million jobs) will require some postsecondary training beyond high school in 2018.

Source: National Assessment of Educational Progress (NAEP) Report, 2005.

"Strengthening STEM education across the Nation is critical to maintaining a high quality of life for our citizens and ensuring that Americans remain competitive in international science and technology." – National Science Board, 2007

Louisiana's STEM Report Card*

	Latest Educational Scores for Science & Math NAEP Scores (National Assessment of Educational Progress)[1]	NAEP 2009 Scores for Science & Math to be released in 2010	
45	2009 Grade 8 Mathematics Average Score	272	282
46	2009 Percentage "At or Above Proficiency" in Math	20%	31%
39	2005 Grade 8 Science Average Score	138	147
	ACT Scores 2009 [2]		
45	Louisiana's 2009 Average ACT Science Score	20	20.9
44	Louisiana's 2009 Average ACT Math Score	19.6	21.0
8	Percentage of Graduates Taking ACT in 2009	89%	45%
	SAT® Scores & Advanced Placement (AP) Percentages 2007		
17	Louisiana's Average Mean Score for SAT Mathematics 2009	558	515
34	Louisiana's Percentage of Graduates Taking SAT Mathematics 2009	7%	46%
51	AP Math Exam — Percentage of High Schoolers Taking 2007	1.5%	9.4%
51	AP Science Exam — Percentage of High Schoolers Taking 2007	1.3%	8.1%
	College Readiness Indicators: % ACT-Tested Students [2]		
47	ACT Math — % of H.S. Graduates ready for College Level 2009	30%	42%
46	ACT Science — % of H.S. Graduates ready for College Level 2009	20%	28%
	Teacher Quality Indicators (K-12) 2004 [4]		
8	Percentage of Middle Level Science Teachers Certified	78%	54%
7	Percentage of Middle Level Math Teachers Certified	76%	49%
11	% of H.S. Chemistry Teachers with Main Certification in Chemistry	65%	53%
13	% of H.S. Math Teachers with Main Certification in Math	88%	79%

The STEM Ed Coalition: Louisiana's STEM Ed Report Card 2010 http://www.usinnovation.org/state/pdf_stem/STEMEdLouisiana2010.pdf
Sources: 1. U.S. Department of Education, National Center for Education Statistics, Institute of Education Sciences, National Assessment of Educational Progress (NAEP) 2007 (*Mathematics*) and 2005 (*Science*). 2. ACT, Inc.; 3. The College Board; 4. Council of Chief State School Officers (CCSSO) and State Departments of Education, Data on Public schools, 2007-2008; and 5. U.S. Department of Education, National Center for Education Statistics (NCES).

Our Partners

Core Element Thanks Our Sponsors, Donors, Grantors and Partners

Baptist Community Ministries

BLaST

Greater New Orleans Science & Engineering Fair

Lockheed Martin

Shell Oil

Northrop Grumman

Society of Petroleum Engineers, Delta Chapter

Society of Petroleum Engineers, Young Professionals Program

Tulane University

U.S. Navy

University of New Orleans

And People Like You!!

Core Element was initiated through a generous grant from Shell Exploration & Production Company in 2006 to the University of New Orleans Foundations to found our program. Core Element continues this partnership to provide services to students in the Greater New Orleans Region. Shell joined with the New Orleans Public School System and the National Sciences Resources Center to implement significant scientific and technological improvements in the education of K-12 students in the Greater New Orleans region. As a result of Shell's philosophy of advocating enhancement and advancement of science, math and engineering curriculum to encourage students to enter these fields of study, the non-profit: Core Element, The Greater New Orleans STEM Initiative was granted 501(c)3 status in 2009.

Without the assistance of Shell and our partners, supporters and grantors, we would have been unable to gain a footing in local public schools and all of the tangible results we have seen from our efforts here would be nonexistent. Core Element thanks Shell, The National Science Resources Center and all of our partners, donors and grantors for their dedication to improving the education and welfare of the students of the Greater New Orleans region.

Role of the Board of Directors and Committees

Core Element: The Greater New Orleans STEM Initiative is governed by a Board of Directors comprised of members of the community that volunteer their time to oversee the mission of our organization. Members shall be persons of distinction in their fields and communities, and have a strong interest in serving and supporting the objective of Core Element: GNOSI. We strive to achieve membership of a diverse mix of community leaders in business, education and government. All board members are given the authority to affect change in the organization by being given the right to vote on issues and matters concerning the organization.

The Advisory Council is a means for providing an expanded base for input and support from the community, and for increasing diversity of background and thought. It also provides exposure opportunities for potential future Board members. Advisory council members are non-voting members of the organization.

EXECUTIVE COMMITTEE

The Executive Committee consists of nine members. The Executive Committee has the right to exercise the powers of the Board when the full Board is not in session and in those additional functions delegated to it by Board resolutions passed by a majority of Board members. Executive Committee members include the Board President, Vice-President, Secretary and Treasurer, two board members at large and the Core Element directors.

MEMBERSHIP COMMITTEE

The Nominating Committee is responsible for the development of a strategic and tactical plan for the recruitment of community members to serve on the Board and Advisory Council.

COMMUNICATION, MARKETING AND PUBLIC RELATIONS COMMITTEE

This committee is responsible for the development of written materials, web site design and functionality, and development of a strategic and tactical plan for disseminating the information to potential supporters and stakeholders.

FINANCE COMMITTEE

This committee is responsible to oversee the management of revenues and expenses of Core Element; develop strategic and tactical plans for funding the goals of the organization, and provide regular reports to the Board and Advisory Council regarding the organization's finances and tax-exempt status.

Executive Board

David A. Huete, PE
President
Principal Development Planner
Shell Oil Company

Nicholas Altiero, PhD
Vice President
Dean, School of Science & Engineering
Tulane University

Peggy Abadie
Executive Director
Information & Instructional Technology
Orleans Parish School Board

Cathie Brister
Science Consultant
Jefferson Parish Public School System

Jan Catalano
Petroleum Engineer
ORX Resources, Inc.

Sandra Daleo, Treasurer
Retired, Shell Oil Company

Dana Gonzalez
Science and Math Specialist
Orleans Parish School Board

Frank Hall
National Oceanic & Atmospheric Administration

Marion Lanasa
Director, Communications
Lockheed Martin Space Systems

Richard LoRusso
Retired, Shell

Norma Jean Mattei
Dean, School of Engineering
University of New Orleans

Annette Oertling
Assistant Dean of K-12 Outreach
School of Science and Engineering
Tulane University

Barbara Pailet
President
BLAST, Inc

Lisa Tomlin
Consultant
Sustainable Solutions Consulting

Advisory Council

Charles Allen
Director, Environmental Affairs
City Of New Orleans

Adam Baran
Staff Engineer
Lockheed Martin

Jan Brenan
Operations Director
Core Element

Debbie Canale
Regional Vice-President
AT&T

Richard Fillion
Senior Scientist
Earth Studies Group

Adrian Graff
Community Relations
Northrop Grumman

Maria Huete
Non-profit, Civic and Community Leader

Janet Krane
Civic and Community Leader

Kevin Krane, MD
Professor of Medicine
Vice-Dean Academic Affairs
Tulane University School of Medicine

Jerry Lenaz
Consultant
Fire Starter Consulting

Jean May-Brett
Math Science Partnership Coordinator
Louisiana Department of Education

James McNamara
President & CEO
GNO Biosciences Development District

Alexina Medley
Principal
Easton Senior High School

Woody Oge
Director, Business Affairs
Avondale Facility
Northrop Grumman

Elizabeth Rhodes
Director, Center for Educational Services
Center, Educational Services & Research
Southeastern Louisiana University

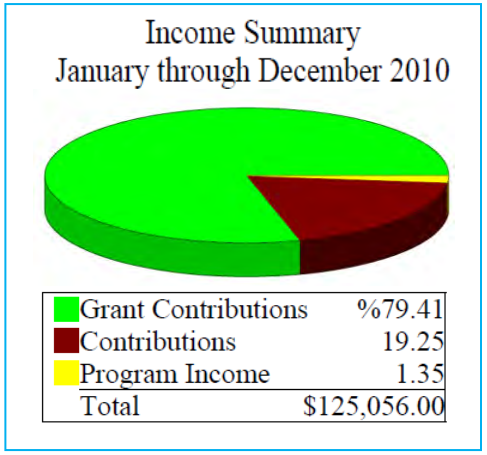
Andrea Walker
Resource Center Director
Core Element

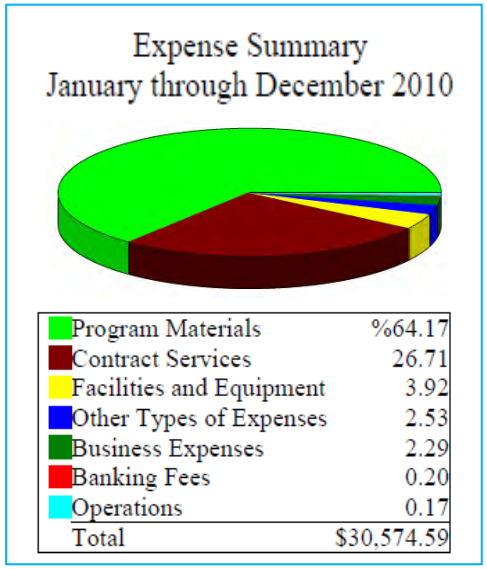
Bruce Ward
Senior Project Manager& Senior Research Associate
Harvard Smithsonian Center for Astrophysics

Program Expenses

Core Element
Profit & Loss
January through December 2010

	Jan - Dec 10
Ordinary Income/Expense	
Income	
Contributions	24,070.00
Grant Contributions	99,303.00
Program Income	1,683.00
Total Income	125,056.00
Expense	
Banking Fees	62.01
Business Expenses	00.00
Contract Services	8,166.20
Facilities and Equipment	1,200.00
Operations	52.85
Other Types of Expenses	773.00
Program Materials	19,620.53
Total Expense	30,574.59
Net Ordinary Income	94,481.41
Net Income	94,481.41**





****PLEASE NOTE:**

This Annual Report represents Greater New Orleans STEM Initiative's first fiscal year of operation.

Due to the nature of the school academic year calendar, some grants awarded in 2010 are designated to fund Teacher Professional Development Institute expenses and materials for programs offered in the summer of 2011 and the 2011 academic year.

Core Element partners with the University of New Orleans Foundations. Activities funded through this partnership include limited workshop projects, consultant fees, board meeting activities, and facility expenses.