Creating a STEM Pathway to Increase Hispanic Student STEM Degrees and Transfer

Crafton Hills College (CHC) proposes to more fully support the success of Hispanic and other low-income students through the creation of clear pathways through which Hispanic students attain degrees in the fields of science, technology, engineering, and mathematics. This project will strengthen articulation by developing model STEM articulation agreements between CHC, a two-year HSI, and four-year institutions. A STEM Transfer Services Coordinator will be hired through this project and become permanent at CHC by the end of the project, connecting students with existing articulated courses and assisting the CHC Articulation Officer in developing additional agreements. A STEM Research Analyst will be integral to the project to enable data-based decision making. Finally, updated courses, programs, equipment and professional development will transform CHC from lagging to leading STEM efforts among two-year HSIs in the Inland Empire.

CHC is in a unique position to increase the number of Hispanic students attaining STEM degrees. A local bond approved by voters and support by the college's administration, faculty and staff has begun to address the gap between the 29% of CHC students identifying themselves as Hispanic and the 47% of pre-collegiate Hispanic students in San Bernardino County. A newly-restructured Office of Research and Planning (ORP) has made great strides in providing data necessary to guide the college in decision-making; however, there is still a great need to attract and prepare STEM students, especially among Hispanic students. Reaching into secondary and elementary schools in the CHC service area to increase STEM awareness and preparation will help address the need. This project will also attract and retain more college students by modernizing CHC course offerings, programs, equipment, and teaching strategies in STEM. Up-to-date technology, opportunities for student research, and solid articulation with four-year institutions will prepare CHC students for the next step - transfer to a STEM major at a four-year institution.

Project goals are to significantly increase the number of Hispanic students receiving degrees in STEM and transferring to four-year colleges and universities; increasing the capacity of CHC STEM faculty to remain current in their respective fields; and increasing data-based decision-making in STEM fields of study. CHC expects to achieve these goals by increasing the number of Hispanic students entering CHC with the intention and ability to complete a STEM major; modernizing equipment; adding and updating STEM programs and courses; providing professional development to STEM faculty to ensure their teaching is addressing the needs of low-income and Hispanic students; reaching back into the K-12 system to increase STEM enrollment; and reaching forward to four-year institutions by utilizing existing articulation agreements and creating additional agreements in STEM areas. Policy and practices at CHC continue to be influenced by data; this project has its origin in research and represents the most effective strategies to address the need to increase the number of Hispanic students pursuing STEM careers. It is by combining efforts in these areas that CHC expects to make the greatest contribution.

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CREATING A STEM PATHWAY TO INCREASE HISPANIC STUDENT STEM DEGREES AND TRANSFER

Crafton Hills College (CHC) proposes to more fully support the success of Hispanic and other low-income students through the creation of clear pathways through which Hispanic students are exposed to STEM fields and careers. CHC will expose K-12 students to STEM fields and strengthen the relationships with our feeder high schools and four-year colleges by **aligning the mathematics and science curriculum**. In addition, the **science curriculum will be restructured for better articulation and transfer**, **science labs will be updated,** and **several best practices strategies to improve success of STEM transfer students will be implemented**. CHC, located in Yucaipa, California is a comprehensive, public two-year institution founded in 1972 and the smaller of the two colleges in the San Bernardino Community College District (SBCCD). CHC serves the economically and ethnically diverse communities of eastern San Bernardino Valley with a comprehensive range of academic programs and support services. CHC enrolled 8,711 credit students in 2009-10, 29% (2,490) of whom were Hispanic. In Fall 2010, 32% of CHC students were Hispanic, a 3% increase from Fall 2009. In addition, of those students receiving financial aid, **41%** were Hispanic students. Data from the CHC Office of Research and Planning (ORP) show CHC students receiving financial aid are less likely to successfully complete courses with a "C" or better, less likely to improve in English, less likely to earn a degree or certificate, and less likely to transfer to a four-year institution. Moreover, **12% of the students at CHC acknowledge a primary language other than English,** with 16% reporting they were taught in a language other than English at some point in their life. Spanish is the most common language cited other than English.

1. NEED FOR THE PROJECT

Education Needs of the Local Community California has experienced tremendous population growth over the past 40 years.[1] This growth has been accelerated through the immigration of ethnic populations. Since 1990, the increases in the Hispanic, Asian, and Pacific Islander population account for 91% of California's population increase. **More than one-third of all Californians are now Hispanic.**[2]

Race/Ethnicity of San Bernardino County Population and CHC – Fall 2009			
Racial/Ethnic Group	**CHC Students**	**SBCCD Service Area[3]**	**San Bernardino County[4]**
Hispanic	32%	29%	47%
African/American	5%	4%	8%
Asian/Pacific	6%	5%	6%
Other Non-White	4%	2%	3%
White	53%	60%	36%

A Growing Low-Income Hispanic Population: San Bernardino County is 47% Hispanic[5] with per capita income among Hispanics in the county 54% less than that of Caucasians**.** Over 16% of families are below poverty level and 61% of children enrolled in San Bernardino County Unified Schools qualify for nutritional assistance.[6] Overall, educational levels in San Bernardino County are low (23% of people 25 years old or older do not have a high school diploma, compared to 15% nationwide), but they are particularly low for its **Hispanic residents, of whom 40% did not graduate from high school**. Moreover, the Inland Empire region, including San Bernardino and Riverside Counties, has the highest level of unemployment of the nation's 49 metropolitan areas with populations over one million.[7]

[1] State of CA Dept of Finance, Race/Ethnic Pop. Est.: 4 /1990 to 4/2000, Sacramento, CA, 8/05
[2] http://quickfacts.census.gov/qfd/states/06000.html
[3] US Census 2005-2009 American Community Survey Table B03002
[4] US Census 2006-2008 American Community Survey Table B03002
[5] US Census Bureau American Fact Finder http://factfinder.census.gov/
[6] Ibid
[7] Inland Empire Region Leading in Unemployment Numbers" by DiMarinto (San Bernardino Sun, September 29, 2010

Median Income – 2005-2009 ACS			
Racial/Ethnic Group	**Crafton Service Area**	**California**	**U.S.**
Hispanic	$45,186	$46,535	$40,946
White	$62,031	$69,828	$55,896

CHC faculty, staff and students and our community partners have identified five deficits currently hindering the success of Hispanic students in attaining STEM degrees and transferring to four year institutions in STEM fields.

DEFICIT 1: Too few CHC students, especially Hispanic students, are entering STEM fields of study and completing associate degrees in STEM fields.
There is an achievement gap between the proportion of Hispanic students at CHC and the proportion of Hispanic students earning a degree in a STEM field. Specifically, 32% of CHC students are Hispanic students, yet only 21% of the students who earned a STEM degree in the last five years were Hispanic students.

Students do not have adequate K-12 exposure to STEM content and tools. There is a lack of knowledge of, exposure to and interest in Science, Technology, Engineering and Mathematics among K-12 students and the Hispanic community. The research is clear--to attract students into sciences and engineering, we need to pay close attention to children's early exposure to science at the middle and even younger grades.[8] "There is good evidence that children make career choices early in their lives, influenced by family expectation and educational experiences, current events, and, increasingly, by the media."[9] A recent longitudinal study explored the impact of student career expectations on college majors. The authors found a strong correlation between 8th grade mathematics skills and achievement of college degrees in physical sciences. Students have a general idea of what they want to "be when they grow up" by the time they enter 7th grade but have had limited exposure to careers involving mathematics and sciences.[10] It is clear that comprehensive outreach, in the form of mentoring, engaging, and connecting with students

[8] Where are the Future Rocket Scientists?" by Edna DeVore, Director of Education and Public Outreach December 7, 2006 Retrieved April 17, 2011 from http://www.space.com/searchforlive/061207_set_thursday.html
[9] Plan Early for Careers in Science by Tai, Liu, Maltese and Fan (Science, May 2006)
[10] ibid

through a variety of programs and hands-on experiences is essential to ensure that students stay engaged throughout their K-12 years. By doing so, incoming college students should improve their performance in mathematics and science courses. This need is particularly acute at CHC as **only 6% of students entering CHC assess into transfer level mathematics.** As a result, comprehensive outreach must be made to students, K-12 faculty at feeder school districts and the community which should include mentoring, engaging, and connecting with students through a variety of programs and hands-on experiences.

High Paying STEM Careers in the Local Area Require Degree Programs not Provided at CHC. Riverside and San Bernardino counties comprise what is commonly known as the Inland Empire, one of the fastest growing metropolitan areas in the nation[11]. STEM related occupations in the Inland Empire are projected to have substantial job opportunities for workers with an education level at or above an associate's degree. Over the next 10 years, estimated projections for 6 of the top 25 fastest growing fields require a STEM education and have projected increases of employment that range between 18% and 42%.

Inland Empire STEM Related Occupations with Fastest Job Growth (% change)				
Occupational Title	**Total Estimated Jobs 2008**	**Total Projected Jobs 2018**	**Projected Growth**	**Median Annual Salary**
Medical Scientists	850	1,210	42.4	$72,914
Network Systems & Data Com.	1,250	1,750	40.0	$69,405
Computer Software Engineers, Soft.	1,350	1,720	27.4	$101,604
Computer Software Engineers, Appl.	1,460	1,830	25.3	$80,941
Mathematics/Science Teachers, Post	550	650	18.2	$102,252
Environmental Scientists and Specialists	730	860	17.8	$67,450

[11] Source: Labor Market Information Division, Employment Development Department, *Occupation Profile*, on the Internet at**:** **http://www.labormarketinfo.edd.ca.gov/** (visited *October 27, 2010*).

Employers in our local service area, including ESRI, Ingen Technologies and Sorenson Engineering require levels of scientific and technological sophistication and skills that our students do not currently possess. ESRI, a technology company in the neighboring City of Redlands, is renowned worldwide for their work in geographic information systems (GIS). ESRI needs employees who are able to integrate hardware, software, and data for capturing, managing, analyzing, and displaying all forms of geographically referenced information. CHC has been unable to provide the laboratory experience necessary to produce the technologically literate graduates needed for this rapidly growing business and field. Ingen Technologies, headquartered in Yucaipa, is the world's largest manufacturer of pneumatic oxygen flow meters and requires a growing number of biomedical researchers to meet growing market demand. Sorenson Engineering, also headquartered in Yucaipa, whose customers include the aerospace and defense sectors, is moving forward with a 70,000 square foot expansion which will increase the need for engineers and other highly trained technicians.

Unfortunately, "while the nation's need for more … STEM graduates grows, the number of Hispanics in those fields far lags the national average. Unless more Hispanics -- now more than half of California's pre-college pupils -- enter STEM fields, the shortage will worsen, experts warn." [12] Research by Lindsey Malcom, an assistant professor of education nearby UC Riverside has demonstrated that programs geared toward Hispanic students like this project reduce hurdles many Hispanics face and ultimately will contribute to increasing the number of Hispanics graduating with STEM degrees. Students graduating with STEM degrees are needed throughout California and more specifically in our local service area.[13]

[12] "Tackling the Shortage of Latinos in Math, Science" by David Olson Riverside Press-Enterprise January 1, 2011
[13] ibid

DEFICIT 2: Too few Hispanic students are transferring to four-year colleges and universities in science, technology, engineering and mathematics.
"CHC Hispanic students are less likely to become transfer directed, transfer prepared, and transfer to a four-year institution." *Keith Wurtz, Director of Research & Planning, CHC*

Overall, the rate of CHC students who transfer to a California public four year institution has declined 11% over the past 3 years. In addition, **the number of Hispanic students transferring to public four-year institutions has dropped from 50 students in fall 2007 to only 33 in 2009**. Although there has been a slight percentage increase of CHC students transferring as declared STEM majors during the same time period, the actual number of STEM transfers and more specifically Hispanic STEM transfers is woefully low.

	CHC- Transfer Students to CA Public Four-Year Institutions (CPEC)								
		Fall 2007			Fall 2008			Fall 2009	
		STEM	ALL	%	STEM	ALL	%	STEM	ALL	%
UC	Total	6	35	17%	7	21	33%	10	26	38%
	Hispanic	0	7	0%	0	5	0%	1	4	25%
CSU	Total	24	153	16%	24	150	16%	31	142	22%
	Hispanic	4	43	9%	5	29	17%	8	29	28%
TOT. Transf.		30	188	16%	31	171	18%	41	168	24%
TOT. Hispanic Transfers		4	50	8%	5	34	15%	9	33	27%

Making matters worse, transfer general education patterns such as California State University General Education (CSUGE) and Intersegmental General Education Transfer Curriculum (IGETC), which is accepted at UC and CSU, are designed for liberal arts, not STEM. Because STEM transfer often require upwards of forty units of lower division science courses, four-year STEM programs actually dissuade potential students from following prescribed general

education patterns. Many students fail to receive adequate advising, thus lengthening the time they spend at the community college and creating another barrier to transfer.

Add to all of this the challenge faced by CHC in its efforts to serve Hispanic students in light of the ongoing California state budget crisis. CHC relies more on state appropriations than do four-year California State colleges and universities. In California, almost one of every two dollars spent by the community-college system comes from the state, compared with about one of every four dollars at the University of California. Due to budget cuts, course offerings at CHC have been reduced by 11% and 16% respectively in the past two years. Staffing for crucial student services including counseling and tutoring services has been severely reduced at CHC making it even more difficult for students to receive the necessary assistance to move from developmental education (in most cases) to an AA degree and ultimately to transfer. **For instance, only five of 1000 CHC students (0.5%) who start in Intermediate Algebra successfully complete Calculus within three years.**

Articulation Agreements are Barriers Instead of Bridges: "More than 80% of African American and Latino college students in California's public institutions enroll in community colleges. Therefore, any effort to diversify the teaching workforce must consider students who begin in the community colleges."[14] **Disjointed, incomplete and over-specified articulation agreements between CHC and local four-year institutions need review.** Articulation between CHC and four-year institutions varies widely and tends to be difficult because of historical differences in practices, policies and curricula. **At CHC students must decide by the time they enter a General Education/Transfer program not only what major they want but to which college they will transfer, since course articulation and requirements for admission differ**

[14] Shulock, Moore and Solomon, 2003: Improving Outcomes for California's Minority Students: Can an Increased Role in Community Colleges in Teacher Preparation be Part of the Answer?]

considerably between institutions. After completing their associate degree/transfer requirements, if a student is not accepted to the four-year institution of their choice they either must stop at the AS level or take up to a year's worth of additional and/or similar classes still hoping to be accepted to their second or even third choice of four-year institution. Most students feel forced to end their education with their AA/AS.

DEFICIT 3: Students entering CHC have insufficient mathematics, technological and conceptual science skills.

Four year colleges and universities in California no longer offer remediation in mathematics, expecting students to enter prepared to take college-level mathematics. Unfortunately, most students leaving high school are not prepared for college-level mathematics. Therefore it is up to the community colleges to provide developmental courses to raise students' mathematics skills. Nearly all responsibility for basic skills assessment and remediation has been shifted to the two-year colleges without funds to strengthen programs. Because of the disconnect between K-12 and community colleges and community colleges and four-year institutions, it is up to CHC to provide the coordination of curriculum between the 3 entities.

In assessment testing in 2009-2010, **a staggering 94% of all incoming students at CHC tested below acceptable levels for college-level mathematics courses**. Even more troubling is the fact that the majority of students who enroll in developmental mathematics are unable to get past this remediation stage. **Specifically, of those students who start in elementary algebra or lower, only 8% reach transfer level mathematics**. In addition, **success rates in developmental mathematics classes at CHC are very low (59.5%) with success rates of Hispanic Students even lower at 54.2%.** Given that these courses are prerequisites for both higher level mathematics and many science classes, students are unable to take, much less succeed in STEM courses and will never realize their goals to transfer.

2009 – 2010 CHC Student Success Rates in Developmental Mathematics Courses					
Course	# Enrolled	% Successful	Course	# Enrolled	% Successful
Arithmetic	503	59.8	Elem. Alg.	939	53.1
Pre-algebra	428	58.9	Inter. Algebra	1,486	63.7

Further hampering this goal is the fact that the majority of today's youth only have superficial skills when it comes to technology. They can text message but cannot write a computer program; they can update their Facebook page but cannot create a website. In *Technology Counts 2008,* the Education Research Center awarded grades for technology leadership to the 50 states. California's overall grade was D+ due to lower scores in student access to technology, use of technology, and the capacity to use technology.[15] Even as the cost of supplies and state-of-the-art equipment has risen, the State of California has not appropriated any funds to community colleges for instructional equipment since 2006. In 2010-2011, only $14,340 was budgeted for instructional equipment purchases in the general fund. Even if all these funds were devoted to STEM programs, it would not begin to meet the needs of students at CHC.

Finally, American students, even those preparing for degrees in STEM fields lack comprehension of basic science facts as well as conceptual science and reasoning skills. A report published in the Journal of Science in 2009 reported that college freshman majoring in STEM-related fields scored only 50% on a test of basic scientific facts and 75% on critical reasoning skills.[16] **These statistics are supported by qualitative research conducted at CHC** which provided a deeper understanding of some of the challenges faced by CHC students taking STEM courses that a survey or quantitative research would not have provided in this case. Accordingly, **informal surveys of faculty reveal that Crafton students in introductory**

[15] Technology counts 2008: STEM—The push to improve STEM. *Education Week, 27.*
[16] "College Freshmen In US And China: Chinese Students Know More Science Facts But Neither Group Especially Skilled In Reasoning" February 1, 2009 Retrieved April 17, 2011 from http://www.sciencedaily.com/releases/2009/01/090129140840.htm.

science courses including conceptual physics, physical geography and biology demonstrate an inability to solve basic problems, interpret quantitative data, analyze charts and graphs, and apply scientific concepts to everyday life.

The result of all these deficiencies are poor success rates in many STEM courses at CHC. As seen in the table below, success rates in STEM courses are well below average. The success rates of students in 41% of the STEM courses offered at CHC during the 2009-2010 academic year were below 70%. Specifically, less than half of the students enrolled in CIS 104 successfully completed the course. In both GEOL 101 and GEOL 150 the student success rate was only 52%.

Success Rates in STEM Courses[17]
2009-2010 Academic Year

Course	#	N	%	Course	#	N	%
ANAT-101	284	443	64.1%	**GEOL-150**	**19**	**36**	**52.8%**
ANAT-150	165	247	66.8%	MATH-095	828	1,353	61.2%
ASTRON-150	**90**	**176**	**51.1%**	MATH-102	333	534	62.4%
BIOL-130	30	44	68.2%	MATH-103	109	179	60.9%
BIOL-131	21	34	61.8%	MATH-251	48	73	65.8%
CIS-104	**11**	**25**	**44.0%**	MICRO-102	64	94	68.1%
CIS-114	37	60	61.7%	OCEAN-101	188	311	60.5%
GEOG-110	47	77	61.0%	PHYSIC-100	159	229	69.4%
GEOL-101	**42**	**81**	**51.9%**	PHYSIC-110	4	10	40.0%

DEFICIT 4: Labs are aging and are not equipped to prepare students for experiences at four-year universities or meet current workplace standards.

CHC offers coursework in anatomy and physiology, biology, microbiology, chemistry, physics, astronomy and the geosciences with additional courses planned for GIS and pre-engineering. All science labs were built in 1972-1978 and have had minimal upgrades in the past 30 years. Instructional equipment funds provided by the state have been insufficient to keep up with technology and laboratory instrumentation changes. CHC cannot claim to offer quality STEM

[17] Excludes courses with <10 students enrolled.

programs with transfer articulated laboratory experiences if the college does not have equipment / instrumentation and lab experiences that parallel those in first and second year science and technology lab courses at four-year universities.

Furthermore because of outdated safety equipment, only a limited number of CHC STEM courses include laboratory experiences. The aging equipment of the CHC labs restricts the classes which can be taught/articulated for transfer, putting students at a disadvantage because they have not even seen pieces of equipment on which other have gained mastery. Additionally, low-income students are choosing to go to other colleges, often for-profit-colleges, with better, up-to-date labs that are much more expensive per semester than CHC. Resources are not available to bring labs up to acceptable standards. This project offers a one-time opportunity to overcome these deficits.

Lack of up-to-date equipment and instrumentation has forced many STEM faculty to replace appropriate laboratory experiences with "kitchen" experiments utilizing household items rather than scientifically-appropriate equipment and supplies.

DEFICIT 5: Professional development has been severely curtailed by state budget cuts, and STEM faculty have not been provided adequate opportunities to remain current in their respective fields.

According to a report published by the National Staff Development Council, professional development efforts which are sustained, intensive and specific to a instructor's subject matter have a direct and positive impact on student learning and success.[18] While STEM faculty at CHC are dedicated, resourceful educators, they have not been afforded opportunities to remain current in their respective disciplines. Original research, the hallmark of scholarship in STEM fields, is neither required nor supported in California community colleges, including CHC. STEM faculty have also had to forgo attendance at professional conferences, membership in

[18] "Better Teacher Development is the Key to Student Success" Retrieved April 25, 2011 from http://www.nea.org/home/30424.htm

professional organizations and even subscriptions to professional journals. Moreover, funding devoted to professional development has been severely curtailed in recent years because of statewide budget cuts. CHC has not received funding from the state earmarked for professional development for over four years. As the state budget crisis has deepened, professional development funding has been cut in an effort to maintain basic college services. During the past two years, the college has allocated an average of $3,000 in general funds to its entire professional development program. As a result, professional development at the college has been limited to short-term workshops of general interest rather than extended learning opportunities specific to each faculty's field of study.

2. PROJECT DESIGN

The goals, objectives and outcomes of this project support the project goals of HSI-STEM program, institutional goals and mission of Crafton Hills College and directly relate to the Needs and Project Services. All decisions, institutionalization, and any programmatic changes will be based on data collected on an ongoing basis throughout the life of this project.

Measurability of Goals, Objectives, and Outcomes: In keeping with the purpose of the HSI - STEM, CHC's two over-arching goals for this project are:

1) To increase the number of Hispanic and other low income students attaining degrees in the fields of science, technology, engineering or mathematics at CHC
2) Develop Model Transfer and Articulation Agreements Between Two-Year Hispanic-Serving Institutions and Four-Year Institutions in STEM Fields.

In addition, this project includes a 0.5 FTE STEM Research Analyst position to help guide data based decision making in the project.

HSI-STEM Goals	Five Year Measurable Objectives

Goal (1) CHC must increase the number of Hispanic students receiving degrees in STEM programs	Objective 1.1: CHC will increase by 25% (5% per year) the numbers of Hispanic students graduating with an AA, AS or Transfer Certificate from the 2009-2010 baseline of 18 degrees/certificates to 54 by 2016, a 200% increase.
Goal (2) CHC must increase capacity to transfer more Hispanic students to four-year STEM programs	Objective 1.2: By Fall 2016, CHC will increase the number of Hispanic students transferring to UC or CSU systems declaring majors in STEM from nine students in 2009-2010 to 27 students in 2016, a 200% increase.
Goal (3) Increase the use of evidence-based decision making.	Objective 1.3: By 2016, CHC will increase the number of STEM programs that utilize data to inform decision-making from one program (CHEM) in the 2009-2010 academic year to eight programs (CHEM, ANAT, BIOL, MICRO, PHYSIC, GEOL, CS, GIS), an overall increase of 700%.

The outcomes, defined as process-related results, will be achieved as the college works toward the objectives. The following table outlines the annual goals, objectives, and outcomes.

<table>
<tr><th>Annual Goals</th><th colspan="6">Annual Measurable Objectives</th></tr>
<tr><td>Increase the number of Hispanic students entering STEM programs at CHC</td><td colspan="6">Objective 1.4: By 2016, 15% of incoming CHC students who participated in a STEM related activity while in high school will register for at least one STEM course the Fall semester following their high school graduation.</td></tr>
<tr><td colspan="7">Outcomes Greater numbers of Hispanic students entering CHC, greater numbers of Hispanic students entering STEM programs.</td></tr>
<tr><td rowspan="5">To increase the number of students successfully completing coursework and obtaining a STEM degree and transfer readiness</td><td colspan="6">Objective 1.5: By 2016, CHC will increase the number of all students successfully improving from Intermediate Algebra (MATH-095) to Calculus (MATH-250) from 5 to 50, a 900% increase (180% per year).</td></tr>
<tr><td>Baseline 2010</td><td>Year 1</td><td>Year 2</td><td>Year 3</td><td>Year 4</td><td>Year 5</td></tr>
<tr><td>5</td><td>14</td><td>23</td><td>32</td><td>41</td><td>50</td></tr>
<tr><td colspan="6">Objective 1.6: By 2016, CHC will increase the percent of all students successfully completing STEM courses with a “C” grade or better from 61.9% to 70%, an increase of 8.1% (1.6% increase in the rate each year).</td></tr>
<tr><td>Baseline 2010</td><td>Year 1</td><td>Year 2</td><td>Year 3</td><td>Year 4</td><td>Year 5</td></tr>
<tr><td>61.9</td><td>63.5</td><td>65.1</td><td>66.7</td><td>68.3</td><td>70.0</td></tr>
<tr><td colspan="7">Outcomes Greater number of Hispanic students successfully completing math and science courses and persisting to STEM degrees.</td></tr>
<tr><td>To increase the number of articulated STEM</td><td colspan="6">Objective 1.7: By 2016, ten (10) new STEM courses, two new STEM programs and 30 revised courses will have completed approval processes, curriculum development, and articulation.</td></tr>
</table>

<table>
<tr><td rowspan="2">courses between CHC and local four year institutions.</td><td>Baseline 2010</td><td>Year 1</td><td>Year 2</td><td>Year 3</td><td>Year 4</td><td>Year 5</td></tr>
<tr><td>0/0/0</td><td>4/1/10</td><td>8/2/15</td><td>10/2/20</td><td>10/2/30</td><td>10/2/30</td></tr>
<tr><td colspan="7">Outcomes Open transfer pathways, increase the numbers of students transferring to four-year colleges and universities, open communication and coordination between CHC staff/faculty and those at four-year colleges and universities.</td></tr>
<tr><td colspan="2">To improve the currency of laboratory equipment and experiences.</td><td colspan="5">Objective 1.8: By 2016, 100% of CHC STEM courses will have technologically current equipment and instrumentation.</td></tr>
<tr><td colspan="7">Outcomes Increase number of articulation agreements, Increase the number of students who get experience with equipment used at four-year institutions and the work force, more diverse laboratory experiences</td></tr>
<tr><td rowspan="3">To provide fac. develop. to meet the needs of Hispanic learners in STEM courses</td><td colspan="6">Objective 1.9: By 2016, 75% of STEM faculty will have taken part in faculty development/training AND 50% will include at least one new classroom technique proven to work with Hispanic learners.</td></tr>
<tr><td>Baseline</td><td>Year 1</td><td>Year 2</td><td>Year 3</td><td>Year 4</td><td>Year 5</td></tr>
<tr><td>0%/0%</td><td>50%/10%</td><td>60%/20%</td><td>65%/30%</td><td>70%/40%</td><td>75%/50%</td></tr>
<tr><td colspan="7">Outcomes Increased level of engagement, retention, persistence and success in STEM courses</td></tr>
</table>

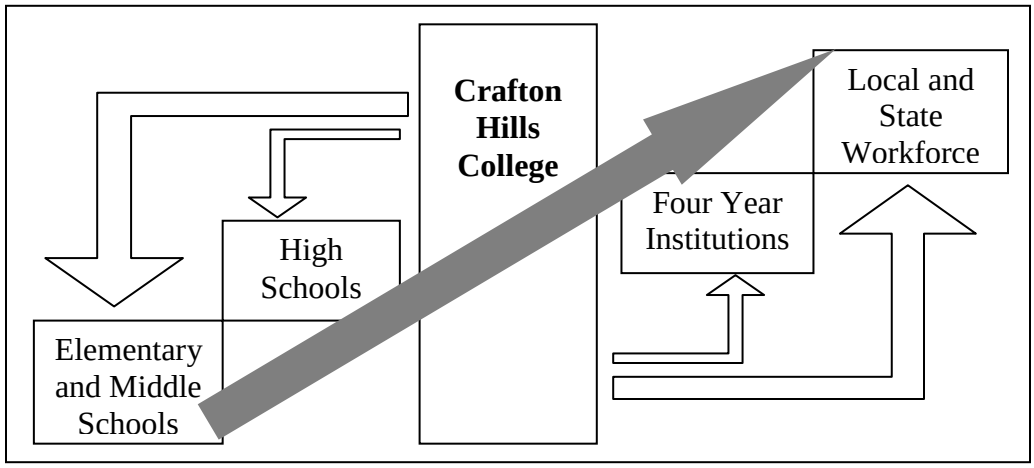
All of the goals and objectives included in this proposal directly address the needs of students and the community by increasing the probability of Hispanic students receiving four-year STEM degrees and employment opportunities in science careers.

The fulfillment of the Project Design will increase the number of Hispanic students prepared to graduate and transfer with a long term goal of entering STEM professions. This will be done by: increasing the numbers of student receiving STEM degrees and transferring to a four-year institution as well as bringing community awareness to the need for science, technology, engineering and mathematics education.

The sustained impact for the college is to be better prepared and technologically equipped to address the needs of Hispanic students entering STEM fields. Labs will be equipped, faculty will be up-to date in their discipline knowledge and instructional technology; CHC will enjoy a better relationship with the community, especially the Hispanic community.

According to the California State Employment Development Department, science and technology fields comprise seven of the top 10 growth jobs in the Inland Empire. It is imperative that CHC graduate and transfer students in these fields.

3. PROJECT SERVICES



During this five year project, CHC will strengthen systems and services to better support the success of Hispanic and other low-income students. This will be accomplished through the creation of clear pathways by which Hispanic students are exposed to STEM fields and careers in elementary and high school, receive adequate preparation in mathematics and science in high school, receive their first two years of an academically rigorous STEM education at CHC in an environment which provides an integrated network of social and academic support, transfer into STEM programs at highly regarded four-year institutions, and ultimately enter the workforce.

Each of the specific activities identified in the project is intended to respond to one or more of the previously identified needs.

Deficit 1: Too Few CHC students, especially Hispanic students, are entering STEM fields of study and completing associate degrees in STEM fields.
Response: Develop programs and projects to expose students and faculty at all levels, and the community to STEM careers.

Early Exploration of STEM is Key: As described earlier, to increase the number of Hispanic and other low-income students entering STEM fields, we must reach out to students as early as

elementary school in an effort to expose them to science, technology and mathematics. The college will develop a comprehensive outreach effort with our K-12 partners to introduce STEM careers to students early and often in their educational careers.

Expose students to careers in science, engineering and technology CHC will develop a STEM program which includes an Annual Math, Science and Technology Fair. This fair will be open to the public and target all students. This fair, to be held on the CHC campus will include all STEM fields represented at the college and have a wide target: from kindergarteners to post-graduates. Students at elementary, middle, and high school levels as well as CHC students and students from CHC's transfer partner institutions will take part in a variety of competitions. Included in the fair will be *Fun with Math and Science* exhibit and the opportunity to take part in career exploration events for children and adults.

The Math, Science and Technology Fair will be a community celebration of the learning that takes place in the science classroom.

For the past two years, the College, in cooperation with Colton-Redlands-Yucaipa Regional Occupational Program (ROP) has hosted, with great success, a two-day science summer day camp for middle school students. With involvement from faculty in the microbiology and earth science programs, 7th grade students spent one day in the laboratory, conducing a variety of experiments including microbial analysis and blood typing and a second day in the field, examining the geologic environment of a local dry river bed. CHC will expand and institutionalize this program with the goal of serving students from schools throughout the college's service area. Included in these efforts will be the development of a bilingual camp for Hispanic students who are non-native speakers of English.

The college will hold a science experience for underprepared and at-risk high school seniors with an interest in math and science who plan to enroll at CHC. Based on ArtsDay, a

fine arts program developed and instituted as a part of a previous Title V grant, *Sci Fri* (Science Friday) will invite 100 students to campus to participate in a series of workshops in chemistry, earth science, anatomy and microbiology. The uniting theme will be crime scene investigation. At the end of the day, students will use the result of experiments from each of the workshops to solve a hypothetical crime. The ArtsDay model has demonstrated considerable success. In 2010, approximately 25% of students attending ArtsDay subsequently enrolled in the college, with nearly all of those participating in one or more of the fine arts programs. As a result, these at-risk students were more likely to succeed and persist toward their educational goal.

Facilitate opportunities for student research in STEM fields. According to an article written by editor Jan Tobochnik in the *American Journal of Physics*, among STEM educators, there is a widely held belief that student research at undergraduate institutions is the most important factor in the education of future scientists[19].Upon graduating from high school and beginning course work at CHC, students enrolled in STEM courses at Crafton Hills College will engage in original undergraduate research with their faculty. Students will work cooperatively with faculty to develop a research question, conduct research, and share that research at student conferences. Faculty stipends will be awarded for supervision of research projects of sufficient scope and quantity as determined by the Project Director. Participation in original research will also provide CHC students an advantage as they apply to transfer into rigorous STEM programs at various four-year institutions.

Deficit 2 – Too few Hispanic students are transferring to four-year colleges and universities in science, technology, engineering and mathematics.
Response – Curriculum alignment, review, revisions and new programs in STEM fields; transfer and support services to STEM students.

[19] The Importance of Undergraduate Research by Jan Tobochnik, American Journal of Physics, Vol 69, page 9, September 2001.

Alignment of K-12 and post-secondary STEM curriculum. According to Stanford University's Bridge Project, one significant step educational institutions can take to ease the transition of students from K-12 to post-secondary education is to align the curriculum of similar courses and programs.[20] **This project will bring together STEM faculty from K-12, the community college and surrounding four-year institutions to examine existing STEM curriculum with the goal of sequencing courses so that high school courses in chemistry, physics, biology and the earth sciences prepare students for lower-division STEM coursework at CHC and in turn prepare students for the rigors of upper-division coursework upon transfer to the four-year institution.** In California, a structure for this dialogue already exists in the form of the California Partnership for Achieving Student Success (Cal-PASS). Cal-PASS sponsors Professional Learning Councils which have demonstrated success in alignment of mathematics and English curriculum. Although a science PLC exists, it has not been utilized. This project will utilize the existing structure of the science PLC to bring together faculty toward this goal.

Review of STEM courses, majors and programs to promote engagement and strengthen student success. Based on the aforementioned curriculum alignment project, CHC faculty will conduct a thorough review of all STEM courses and programs at the college. The redesign model CHC has chosen for similar projects is based on the National Center of Academic Transformation best practices which recommends redesigning whole courses, not sections, fostering active learning, personal assistance to students, immediate assessment and feedback to students and giving adequate student time on task and monitoring progress. Results at other

[20] Venezia, A. et al "Betraying the college dream: How disconnected K-12 and post-secondary systems undermine student aspirations." Stanford University's Bridge Project Retrieved April 17, 2011 from http://standford.edu/group

colleges including nearby Riverside Community College demonstrate that such redesign has positive impacts on Hispanic students, adult learners and low-income students.[21]

Develop Curriculum and Add Two New Degree Programs in Computer Science (CS) and Geographic Information Systems (GIS) CHC operates a comprehensive Computer Information Systems program offering coursework in programming, networking, graphic media and web design but offers no courses for students interested in pursuing a degree in Computer Science. By drawing on the expertise of a new faculty member with CS degrees from the University of California, Berkeley and UC San Diego, the college will develop a program including courses in discrete mathematics, assembly language programming, data structures and other classes to prepare students to major in Computer Science and Computer Engineering at nearby UC Riverside, CSU San Bernardino and other four-year institutions.

Geographic Information Systems are becoming important tools, not only for the sciences, but also the social sciences. The leading developer of GIS software in the world, Redlands' ESRI, is headquartered in the college's service area. In addition, the University of Redlands has a graduate level Geographical Information Systems Program. CHC has a unique ability to draw of the expertise of both ESRI staff and University of Redlands faculty to teach classes and advise the college on the development of a comprehensive GIS program. CHC proposes to increase GIS courses to include courses that will enable students in the earth, environmental, biological and social sciences to use GIS as a tool in research. GIS is rapidly becoming an expected tool for market researchers (20% employment growth between 2004 and 2014, California EDD[22]), urban

[21] Guder, Myran (ed). "Reinventing the Open Door." Community College Press, American Association o Community Colleges, Washington DC, 2009. pg 92-93

[22] California Economic Development Department Web Site: http://www.labormarketinfo.edd.ca.gov/cgi/databrowsing/occExplorerSelection.asp?menuChoice=occExplorer&currCat=110000#level015

planners (17% growth) social scientists (15% growth), environmental technicians (15% growth) and environmental scientists (16% growth) among others. By providing our graduates with access to the knowledge and skills necessary to operate GIS software and interpret GIS data, we will better meet the needs of both our local and the global workforce.

Increase the number and scope of STEM articulation agreements with four-year institutions, especially the University of California. The responsibilities of the college's articulation officer are numerous. She is responsible for maintaining and updating Transferrable Course Agreements (TCAS) with the UC system, maintaining baccalaureate list agreement with the CSU system, and CSU GE and IGETC general education requirements as well as establishing course-to-course articulation agreements with public and private institutions. The redesign of STEM curriculum, development of GIS and CS programs, and updates of STEM labs will position the college to complete and strengthen articulation agreements with these institutions, especially University of California campuses offering renowned programs in STEM fields. CHC will provide additional support to articulation as well as adopt best practices in training STEM faculty on articulation issues and establishing a close working relationship between them and the Articulation Officer.

Begin counseling and advising specific to STEM. CHC also proposes to change the model through which it provided counseling services to students enrolled in STEM programs. STEM faculty currently "advise" students regarding appropriate courses, differences in degree programs, and career pathways. However, students must still see a general academic counselor in order to develop an educational plan and register for course. Unfortunately, general counselors are not familiar with the unique challenges STEM students face in their efforts to complete degree requirements and transfer to the four-year institution of their choice. Most four-year

STEM programs require an extraordinarily high number of units in science for transfer and as a result, too often a student is advised to NOT take the general education sequence prescribed for other majors. Crafton Hills College will create the position of a dedicated Transfer Services Coordinator. This counselor will work closely with STEM faculty in their efforts to counsel students toward reaching their desired educational goal. The Transfer Services Coordinator will also develop and offer a variety of career development workshops for students interested in STEM careers as well as work collaboratively with faculty in math-science LCs and SI tutors to identify at risk students requiring more specific interventions and support.

Deficit 3 – Students entering CHC have insufficient math, techn. & conceptual science skills
Response – CHC will provide a strong foundation in mathematics, curricular interventions and alternative learning strategies aimed at Hispanic students

Coordination of mathematics curriculum. Success in science courses depends on a strong foundation in mathematics. Mathematics curriculum will be reviewed and revised as needed. Developmental education course content and core competencies, specifically in MATH 095, the prerequisite for all transfer-level mathematics courses, will be linked to transfer-level requirements. Curriculum in upper-level mathematics courses including calculus, linear algebra and differential equations will be evaluated to ensure it is in line with the curriculum offered at four-year institutions. Additionally, alternative learning strategies shown to help Hispanic and low-income students success will be built into curricular changes.

Interventions in mathematics and science curriculum to increase success in all STEM coursework. CHC students who ultimately enroll in upper-level mathematics courses including calculus, linear algebra, and differential equations, generally demonstrate high levels of retention and success. However, the college still faces difficulty in transitioning students from developmental mathematics courses into and through introductory transfer-level mathematics

courses including MATH 102, College Algebra, MATH 103, Plane Trigonometry and MATH 160, Pre-calculus. Students who are unable to successfully navigate through this sequence of mathematics courses will not persist through science and technology programs. To address this need, CHC will hire a STEM Alternative Learning Strategies Coordinator (ALSC), expand its use of alternative learning strategies including Supplemental Instruction (SI) and Learning Communities (LCs) in both mathematics and science courses.

Research examining the effectiveness of Supplemental Instruction (SI) has strongly indicated that SI is an effective strategy among community college students.[23] For instance, SI students are more likely to persist from one semester to the next and have a higher course GPA than similar students who do not utilize SI.

The strategy of SI teaches collaborative learning techniques to SI leaders who then use those techniques to help students learn course material.[24] Equally important, SI Leaders also teach students attending the SI sessions how to learn at the same time they are covering the material that they are teaching SI students. A major component of the SI sessions is to create a safe environment where students can explore course information without being worried about being ostracized. SI Leaders also attend each class session so that they are familiar with the material currently being covered in the class and so that they can model student behavior.

In addition, at a local community college (Chaffey College) adjacent to CHC with similar students, students who utilized SI were also more likely to have a higher course success rate (69%) than students who do not utilize SI (47%). Equally important, SI had the largest impact on student success for Hispanic students. Namely, Hispanic students who utilized SI were

[23] Bowles, T. J., McCoy, A. C., Bates, S. (2008). The effect of supplemental instruction on timely graduation. *College Student Journal*, *42*, 853-859.
[24] Barkley, E., Cross, P., & Major, C. H. (2005). *Collaborative learning techniques: A handbook for college faculty*. San Francisco, CA: Jossey-Bass.

statistically significantly more likely to successfully complete their mathematics course (76%) than Hispanic students who do not utilize SI (42%).[25] Accordingly, SI is a best practices strategy that needs to be implemented in the STEM courses to strongly increase the likelihood that students will succeed. The college will expand current SI efforts in mathematics to create a comprehensive SI program which will provide support to students in all STEM courses.

CHC has also had large success with learning communities, a form of contextualized learning. For instance, students participating in mathematics learning communities were statistically significantly and substantially more likely to successfully complete the course, persist to the following semester, and persist to the next highest level mathematics course. Moreover, learning communities (LC) are often thought of as effective strategies for increasing the opportunities for students to feel included and connected to other students and faculty at an institution[26;27]. Past research on the relationship between LCs has consistently indicated that LCs positively impact student interaction with other students, student interaction with faculty, student satisfaction, and student success.[28] CHC will expand its learning community efforts geared toward students interested in STEM by pairing developmental and introductory transfer-level mathematics courses with appropriate introductory science courses with the goal of substantially improving the likelihood that students will successfully complete their courses and persist through the mathematics and science curriculum at CHC.

[25] http://www.chaffey.edu/research/IR_PDF_Files/Research_Briefs/Academic_Success/0708-F05toSU07-SI-Ethnicity.pdf -- Supplemental Instruction by Ethnicity: 2005-2007.
[26] Dunlap, L., & Pettitt, M. (2008). Assessing student outcomes in learning communities: Two decades of studies at a community college. *Journal of Applied Research in the Community College*, *15*, 140-149.
[27] Killacky, J., Thomas, C., & Accomando, A. (2002). Learning communities and community colleges: A case study. *Community College Journal of Research and Practice*, *26*, 763-775.
[28] Andrade, M. S. (2007). Learning communities: Examining positive outcomes. *Journal of College Student Retention*, *9*, 1-20.

Proposed Learning Communities	
Mathematics Course	**Science Course**
MATH 090 Elementary Algebra	GEOL 100, Physical Geology
MATH 095 Intermediate Algebra	CHEM 101, Introduction to Chemistry
MATH 103 Plane Trigonometry	PHYSIC 100, Introduction to Physics.
MATH 250 Single Variable Calculus I	PHYSIC 200 General Physics II

According to Hyman Bass from the University of Michigan School of Education, "mathematics instruction should be contextualized and avoid the abstraction associated with the traditional curriculum."[29] Research is replete with studies demonstrating the benefit of contextualized and problem-based learning, both in general and more specifically in mathematics. The college will institute the use of STEM-oriented contextualized and problem-based learning in specifically identified sections of MATH 095 and introductory transfer-level mathematics courses. The college will offer professional development workshops for faculty on the use of these strategies and mathematics faculty will work with science faculty to develop scenarios and projects through which students can apply their knowledge of mathematics to real problems in science, engineering and technology.

Deficit 4 – Labs are aging and are not equipped to prepare students for experiences at four-year universities or meet current workplace standards.
Response – CHC must update labs to provide exposure to the equipment and technology currently used in four-year institutions and STEM careers.

Laboratory equipment and technology will be brought up to appropriate standards. The National Science Teachers Association (NSTA) states in position statement on the Integral Role of Laboratory Investigations in Science Instruction that "at the college level, all students should have opportunities to experience (rigorous) inquiry-based science laboratory investigations… Laboratory experiences should help students learn to work independently and collaboratively,

[29] Bass, H. "What we have learned…and have yet to learn?" Retrieved April 17, 2011 from http://www.maa.org/ql/pgs247_249.pdf

incorporate and critique the published work of others in their communications, use scientific reasoning and appropriate laboratory techniques to define and solve problems, and draw and evaluate conclusions based on quantitative evidence." Updating the currency of laboratories at CHC is essential to increasing the quantity and quality of students receiving STEM degrees and/or transferring into four-year STEM programs. Resources from this project will be dedicated to addressing currently identified deficiencies as well as incorporating new and emerging technologies identified through the curriculum alignment and redesign project. In addition to the course specific instrumentation and equipment needed for chemistry, physics, earth science, and the biological sciences, as a part of this project the college will be instituting new GIS and CS programs. Safety equipment upgrades will be instituted in all labs to assure the health and well-being of our students, staff and faculty. Faculty development activities related to this proposal will include training in the use of new equipment and technologies.

Deficit 5: Professional development has been severely curtailed by state budget cuts, and STEM faculty have not been provided adequate opportunities to remain current in their respective fields.
Response: STEM faculty will receive extensive opportunities for professional development.

Provide opportunities for STEM faculty to remain current in their field. As a result of significant budget cuts for professional development, CHC STEM faculty have not been provided adequate opportunities to maintain currency in their respective disciplines. This project will provide a consistent, intensive program of professional development specific to teaching and learning in STEM disciplines. The college will dedicate resources to allow CHC faculty to attend conferences of their respective professional organizations as well as educational conferences including STEMtech, sponsored by the League for Innovation in the Community College. The college will also invite to campus professional experts, including authorities on best practices of

teaching and learning in STEM disciplines as well as researchers in a variety of STEM fields to campus for a series of colloquia involving STEM faculty and students.

To answer the need for professional development, release time will be given to CHC STEM faculty to improve their body of knowledge and become more informed about local STEM needs through "job shadowing" opportunities in local STEM-oriented employers, including ESRI, Ingen, Sorenson Engineering and others. Personal experience in STEM industries will give faculty the most current knowledge to bring to students in the classroom and as supervisors of student research.

STEM faculty development with full access for K-12 faculty. Workshops engaging STEM full- and part-time STEM faculty, laboratory technicians, administrators, counselors will be scheduled and implemented almost immediately upon award of the grant. These workshops and other development activities will be held primarily for CHC faculty and staff, and focus on the development needs of the college, but faculty from the surrounding school districts will be invited and welcomed to attend. Initial workshops will establish a community of practitioners, while subsequent workshops will continue developing curriculum and instruction in light of student learning outcomes. Based on research which has investigated promising instructional practices specific to increasing the skills of faculty teaching STEM courses, similar workshops have produced "exemplary course outlines, student learning activities, capstone projects, and organizational structures used by faculty and administrators as they adapt academic courses to the career goals of students."[30]

30 "Innovation in Professional Development: The Community College Cooperative" Retrieved April 17, 2011 from http://ncrve.berkeley.edu/CW10.2/CW102-INNOVAT.html.

Faculty and Staff Development for Data-Based Decision Making The new 0.5 FTE Research Analyst will be responsible for developing and implementing training designed to help faculty, staff, and managers use data for decision-making. For instance, research strongly indicates that people are much more likely to be motivated by a compelling story than other approaches. The training will focus on how to get people to act on information in era of information overload. In addition, presentations and trainings will also be developed on the following topic areas: "How to Ask Research Questions," "Gleaning Insight from Tables," "Using Institution-Level Data to Inform Classroom/Service-Level Decisions," and "What to Do When Your Data Don't Reveal a Clear Solution." The training will outline use of these tools to build a culture of evidence. As an illustration, the Office of Research and Planning will focus on facilitating discussions among STEM faculty about data because "data do not speak for themselves. What is…needed are occasions that *bring educators together* to examine evidence about student learning, reflect on its meaning and identify approaches that yield better results."[31] This will result in faculty continuously using data to inform discussion and identifying strategies to improve student outcomes.

4. KEY PERSONNEL

Given the need to institutionalize this project at the end of five years, whenever possible, CHC will use personnel currently working at the institution with adjunct faculty as replacements. Within the parameters of legalities all efforts were made to include persons from under-represented groups.

Key Management Personnel: The CHC application team, at the request of CHC President Gloria Macías Harrison, separated the operational functions related to Grants Management from

[31] Carnegie Foundation (2009)

the role of Project Director. The Project Director (PD) will be responsible for achievement of all project objectives, but the day-to-day record and fiscal bookkeeping functions will be handled by the Director of Grant Development and Management (DGDM). The DGDM will allow the Project Director to focus his significant academic talents on leadership for the project.

Project Management Team	
Project Director **Richard Hogrefe** **1.0 FTE** **(0.5 FTE funded by CHC/0.5 FTE funded by grant)**	
Duties	Serve as chief spokesperson for the goals and objectives of the project to internal and external constituencies; authorize all expenditures, assume responsibility for appropriate use of funds, and establish a procedure for timely process and approval of expenditures; assure adherence to project timelines and achievement of project goals and objectives; supervise grant employees for the percentage of time they are assigned to the project; regularly communicate with faculty and administration at collaborating institutions; ensure the development and implementation of an effective and objective system of evaluation of all components of the project and their impact on the college.
Education	M.A. Eastern Michigan University – Communication B.S. Texas Christian University – Communication
Professional Experience	Dean, Arts and Sciences (2 years); President, CHC Academic Senate (3 years); Faculty (11 years)
Qualifications	• Five years experience managing campus-wide efforts, budgets, and components of federal and other large grant projects (Title V); • Two years leading science programs including comprehensive reviews of programs, budgets, equipment needs and safety and operational procedures. • CHC Chemical Hygiene Officer and member of Environmental Health and Safety Committee • Excellent communications skills; • Expert in curriculum and articulation issues; Chair, Professional Development (4 years); • Administrative Chair, Educational Technology Committee (2 years); Leading member of Curriculum, Educational Master Planning and Enrollment Management Committees.
Director of Grant Development and Management **Karen Childers** **0.15 FTE** **0.15 position paid by CHC**	
Duties	Compliance and logistical hub of STEM project; works with Project Director to assure appropriate use of funds, including development of procedures for timely processing and approval of expenditures; processes all purchasing requests, bids, consultant and construction contracts within institutional, state, and federal rules. Maintains records as required in EDGAR, including inventory, time and effort documentation, and monthly reports. Oversees preparation of required

	fiscal reports for ED; with PD assures that the grant operates in compliance with EDGAR throughout the period of federal support
Education	M.S., California State University, San Bernardino (CSUSB) – Educational Counseling & Guidance Certificate in Grant Development and Management, CSUSB B.A., CSUSB – Psychology
Professional Experience	CTE Grant Coordinator (2 years) Associate Director, GEAR UP Inland Empire (2 years) Program Specialist / Staff Analyst, County of San Bernardino (6 years)
Qualifications	• 4 years experience with state and federal grants management including grant writing, reporting, budgeting, and management of personnel and resources. • 6 years experience writing County policies, procedures, and reports. Wrote grant applications to federal agencies, assisted with County Requests for Proposals, evaluated grant applications, monitored County contracts, wrote reports. • Experienced manager, supervisor, and trainer.
STEM Research Analyst - To be determined	**0.5 FTE term of grant**
Duties	Plans, designs, conducts, and interprets research projects for the evaluation of operational and program performance including articulation activities, student outcome measures and institutional effectiveness; performs a variety of duties related to the design, writing, and presentation of institutional research and evaluation; assists in data collection, data review, data search, and other research as identified by the director; develops queries or programs to process data; and analyzes data using software such as SPSS or other programs.
Qualifications	A bachelor's degree in research, statistics, mathematics, economics, social/educational science, or education. Masters preferred; Two years of professional level research experience in or similar to institutional research and five years experience with relevant computer hardware and software.
Administrative Assistant - To be determined	**1.0 FTE term of grant**
Duties	Compose correspondence independently; take and transcribe minutes from committee meetings; order office supplies and equipment; Compose, edit, assemble, coordinate, and word process various documents and agenda materials; research, collect, and compile statistical, financial, and other diverse information into special college and federal reports; make arrangements for meetings and notify participants; monitor program budgets.
Qualifications	Advanced knowledge of office computers including word processing, database management, and spreadsheets; Experience with purchasing and payroll records; Strong written and oral communication skills. Three years experience implementing requirements of Federal programs; Three years experience working with Federal budgeting systems and requirements.
Key Project Personnel	
STEM Pathway Coordinator – To be determined	**1.0 FTE Institutionalized at the end of grant term**
Duties	Serve as the liaison coordinating the CHC's grant activities with local high

	schools and universities to ensure integration is consistent, measureable, and effective; regular interface and ongoing communications with faculty and administration at cooperating institutions to create sustainable STEM student pathways; working with STEM faculty to coordinate curriculum redesign and upgrades of laboratory facilities; oversee articulation efforts and schedules as they relate to the coordination efforts of the grant; oversee development of Math, Science and Technology Day and Sci Fri; perform continuous monitoring and evaluation of activities associated with grant activities; facilitate/monitor communications and development to maximize the potential for successful post-grant continuation of new practices, strategies, and partnerships.
Qualifications	MA/MS in a STEM discipline. Experience coordinating, leading large work groups and projects that impact a significant portion of an organization. Post-secondary teaching and research experience; Experience with adherence to federal, state, or other governmental program requirements.
STEM Transfer Services Coordinator – To be determined 1.0 FTE Institutionalized at the end of the grant term	
Duties	Plan, organize, develop, and coordinate support services for STEM students; Assists students in planning a program in STEM fields to be ready to transfer; assists students in the transfer process; coordinates with existing support staff at transfer colleges and universities (for example the Medical Scholars Program at UCR) to ensure success of students upon transfer; assists faculty with coordination of courses across disciplines to ensure transfer readiness and transfer success; assists College's articulation officer in securing articulation agreements for STEM courses and programs.
Qualifications	A master's degree in counseling or related field; One year experience in higher education setting; Experience working with students entering STEM fields.
Alternative Learning Strategies Coordinator – To be determined 1.0 FTE Institutionalized at the end of the grant term	
Duties	Develop, coordinate, implement, and evaluate supplemental instruction program and learning communities efforts; develop, coordinate, implement, archive and evaluate faculty, staff, and management skills training related to alternative learning strategies directly related to grant activities; develop, coordinate, implement, and evaluate pilot programs related to successful completion of grant activities; develop, coordinate, implement, and evaluate professional development training related to STEM for feeder schools and university partners.
Qualifications	A master's degree in education or related field; Two years post-secondary teaching experience; Extensive knowledge of learning theory and alternative learning strategies including supplemental instruction (SI), contextualized and problem-based learning and learning communities.
Other Personnel	
Articulation Officer	Work with faculty and articulation officers at four-year colleges/universities to create articulation agreements. Articulation Officer will review course outlines, programs of study, comparable courses and programs, and participate in presentation to the Curriculum Committee.

Faculty Release	STEM faculty at CHC will receive release time to take part in the alignment of curriculum, curriculum redesign, GIS/CS curriculum and program development; job shadowing, overseeing student research; professional development and participation special projects related to grant activities.
Standing Committees	Curriculum Committee, Educational Technology Committee, Professional Development Committee; Chairs Council; Instructional Management Team
Consultative Experience	External experts will be brought in to assist with GIS curriculum and program development; professional development; participation in special projects related to grant activities; external evaluation and institutional development specialist

5. ADEQUACY OF RESOURCES

Appropriateness and Reasonableness of Budget The faculty, staff and administration of Crafton Hills College has researched the costs and determined that it makes most financial and organizational sense for the proposed project activities to utilize programmatic models targeting the Hispanic population such in the provision of new courses, training opportunities and student support services. To increase the post-grant institutionalization and contain costs, CHC has developed this proposal to build on the infrastructure and involve staff of existing programs. The expertise of the Articulation Officer will help transform the STEM articulation agreements and student Transfer Admission Guarantee Program institutions in the UC and CSU systems in addition to local, private colleges.

The costs associated with the proposed activity will be readily absorbed by the college as the proposed activities are woven into the existing structure and budget of CHC strengthening and/or replacing the old. The table below identifies the relationships between the proposed activities and the current infrastructure.

Relationship of Proposed Activities and Current Infrastructure		
Project Activity	**Project Goal**	**Current Action**
Alignment of K-12 and post-secondary STEM curriculum	HSI Goals 1,2 CHC goal 1, 2, 3, 5	Current relationships with feeder high schools and local four-year university partners; participation in Cal-PASS.

Review of STEM courses, majors and programs to promote engagement and strengthen success.	STEM Goals 1,2 CHC Goals 1,2,3, 4,5,	Clearly defined review process requiring regular and periodic review of all courses and programs.
Mathematics-Science Learning Communities		Well-executed LC plan focusing on building success in developmental mathematics and English courses.
Supplemental Instruction		Tutoring Center coordinating existing tutoring, SI and structured learning assistance programs.
Laboratory Equipment will be brought up to appropriate standards.		Current construction of Math-Science Annex and planned construction of new Science building in 2016.
Increase the number and scope of articulation agreements.		Full-time college Articulation Officer
Increase levels of academic and support services for transfer student enrolled in STEM courses.	STEM Goals 1,2 CHC Goals 1,2,3,7	Transfer Center to be opened Fall 2011.
Provide opportunities for STEM faculty to remain current in their field.	STEM Goals 1,2 CHC Goals 1,2,3,4,5,6,7,8	Professional Development Committee overseeing workshop offerings for entire campus.
Research to inform data-based decision making	STEM Goals 1,2 CHC Goals 1,2,3,4,5,6,7	Fully-functioning Office of Research and Planning

The extent to which the costs are reasonable in relation to the objectives, design and potential significance of the proposed project. Funding is requested at a level that supports the implementation of activities as outlined in the proposal. The funding is reasonable and cost-effective to accomplish the activities designed to meet the stated objectives and the high quality services described in the proposal. All costs are directly related to the proposed activities, have been researched and preliminary bids have been drawn up (for immediate start-up) whenever possible. All equipment prices have been thoroughly researched and confirmed via preliminary bid research and communications with vendors as itemized and described in the budget narrative.

Discussions among senior level staff, division chairs, STEM faculty, student services staff and coordinators of other projects have helped identify essential cost items. CHC's President is committed to **institutionalizing the proposal activities and personnel**

- Articulation Agreements and Transfer Pathways developed will remain post-grant.
- New lab facilities will remain and be fully operational post-grant.
- New lab equipment will remain post-grant. The CHC Administration is committed to institutionalizing the cost for all new equipment supplies and maintenance needs. In addition, the State's economic recovery is expected to strengthen in 2014[32] which will allow the college to support the cost of STEM equipment and supplies.

Key items in preparation of the budget and proposal are: **post-grant sustainability** of project services; the ease in **replicating the project; cost per participant**; and, costs associated with data collection, dissemination, and use in **data-based decision making.**

<table>
<tr><th colspan="5">Reasonableness of Project Costs</th></tr>
<tr><td>Post-Grant Sustainability</td><td colspan="4">Revised science curriculum, learning communities, outreach to K12 students, and SI will continue; laboratory equipment will be maintained.</td></tr>
<tr><td>Replicability of Project</td><td colspan="4">Replication of project services and activities will allow other colleges and universities to learn from or replicate CHC's HSI-STEM initiatives. Documentation of the CHC project will be collected in an end-of-grant report. This report, with project findings, lessons learned and recommendations for duplication, will be disseminated throughout regional, state and national community college networks.</td></tr>
<tr><td rowspan="7">Cost Per Participant</td><td colspan="4">Projected number of unduplicated students over the five-year project period who will positively benefit from project services are calculated based on numbers of students who: 1) K-12 students who attend outreach events; 2) CHC students who participate in STEM events; and 3) CHC students who enroll in new or revised STEM courses or programs;. By the end of the grant period, this project will have affected 1,000 K-12 students, 7,670 College students, 50 staff and faculty.</td></tr>
<tr><td>Budget year</td><td>Unique Participants</td><td>Budget</td><td>Cost per participant</td></tr>
<tr><td>Year 1</td><td>400</td><td>$870,000</td><td>$2,175</td></tr>
<tr><td>Year 2</td><td>800</td><td>$870,000</td><td>$1,088</td></tr>
<tr><td>Year 3</td><td>1,200</td><td>$870,000</td><td>$725</td></tr>
<tr><td>Year 4</td><td>2,400</td><td>$870,000</td><td>$363</td></tr>
<tr><td>Year 5</td><td>4,000</td><td>$870,000</td><td>$218</td></tr>
</table>

[32] California Legislative Analyst's Office. (2010). http://www.lao.ca.gov/reports/2010/bud/fiscal_outlook/fiscal_outlook_2010.pdf

Task	Responsibility	Milestones or Measurable Indicator	Dates

6. MANAGEMENT PLAN

Responsibilities, Timelines and Milestones

PD = Project Director; DGDM = Director of Grant Development and Management; SPC = STEM Pathway Coordinator; TSC = STEM Transfer Services Coordinator; ALSC=Alternative Learning Strategies Coordinator; CompLeads = SPC/TSC/ALSC; ArtOff = Articulation Officer; AA=Administrative Assistant; ORP=Office of Research and Planning; Fac = STEM Faculty; StrCom = Steering Committee; EE=External Evaluator; SPLC = Cal-PASS Science Professional Learning Council; USD = Unified School District/Feeder Schools;			
Annual Tasks (2011-2016) (Tasks recur each year but are presented only once on this chart.)			
Integration of HSI STEM into CHC governance structure	President, Deans, PD, ORP	Communication lines established to improve effectiveness and promote institutionalization	On-going
Purchasing, contracts for consultants, travel	PD, Business office	All CHC, SBVCCD, CA, and federal policies followed with appropriate documentation filed	On-going
Record-keeping and submission of reports	PD, Component leads STEM staff	Monthly Time and Effort Reports, Interim Report and Annual Progress Reports compliant with EDGAR and Circular A-21	On-going
Identify, bid, purchase and install equipment	PD, AA, Business office	Equipment installed and ready for use by personnel and students	As needed
Select and release faculty and staff working on project activities following established CHC release time and part-time hiring procedures	PD, Comp Leads, Deans, Division Chairs, BusAff	Faculty and staff selected; course coverage planned in preceding term; teaching loads and staff assignments made clear to college at large	Each semester
Steering Committee meets bi-monthly first six months and then quarterly or more often as necessary; Sept meeting entails annual review of data, goals, timelines and strategies	PD, ORP, StrCom	StrCom meets quarterly; fall (Sept) meeting used to assess the overall annual progress toward project goals and objectives	Quarterly
Summative and formative evaluation of impact activities have on achieving CDP goals and objectives; recommendations for institutionalization made to President and BOD	PD, ORP, StrCom, ExtEval	Progress toward fulfillment of annual objectives and five-year benchmarks noted and documented; plan for following year refined in light of data received and evaluation reports	September
Management Tasks - Year 1 (2011 – 2012)			
Communication of award and start-up	President, PD	Announcements made via internal governance structures and external media releases	After notification

Task	Responsibility	Milestones or Measurable Indicator	Dates
Identify and track cohorts for all strategies and identify relationship between strategies and student outcomes	ORP, PD, Faculty	Outcomes tracked and evaluated with continual modifications and changes for improvement of project	Annual as needed
Convene Cal-PASS Science Professional Learning Council to initiate dialogue on alignment of STEM curriculum.	PD, Faculty, USD, transfer college and univ.	Begin dialog among all entities on curriculum, student engagement and student success.	Jan 2012 to become permanent
Management Tasks - Years 2-5 (2011 – 2015)			
On-going evaluation by Project Director, Office of Institutional Research and Planning, External Evaluator, and Steering Committee	PD, ORP, EE, StrCom	Feedback for improvement; progress toward annual objectives and five-year benchmarks noted and provided to stakeholders	Annual as needed
Assessments and reports completed consistent with cycle for evaluation/ institutionalization	PD, ORP, StrCom	See Project Evaluation Plan for details	Annual as needed
Management Tasks - Year Five (2015)			
Final evaluation of project (includes quantitative and qualitative evaluation with constituent input)	PD, ORP, EE, STEM Staff	Recommendations for institutionalization made to President's Cabinet and Board of Directors	Sept-Dec 2016
Year One 2011-2012			
Review curriculum and entrance/exit requirements in existing physical sciences courses (CHEM, PHYSIC, GEOL, GEOG) and revise as necessary.	Curriculum Spec., Fac. (SPLC).	Beginning with science courses offered at CHC curriculum will be revised as needed so exit requirements are aligned with entrance requirements for the next sequential course. Curriculum will also include contextualized and problem-based learning and set the stage for learning communities.	1/12 – end of grant
Identify specific courses needed for transfer and AS degree and develop required lower-division major courses in computer science	Fac., Consultants, local businesses, Curriculum Spec.	Courses required for STEM transfer and AS degree will be identified and reviewed/revised as needed for curriculum alignment. Curriculum for new CS program to be developed and presented to Curriculum Comm. for approval	10/11 – 9/12
Develop plan for STEM professional development in best practices in teaching and learning, curriculum development, student research, data-based decision making, classroom assessment, etc	PD, Prof Dev.Comm, ALSC, Fac, Consultants	Plan to be completed and implemented beginning in March 2012, annual calendar set, Training materials prepared, feeder school districts invited and notified of dates; 75% participation among STEM faculty. Plan to be updated annually as needed.	Planning <u>10/11-1/12</u> Implement <u>2/12</u> ongoing
Begin review of existing articulation agreements in STEM disciplines for gaps.	Fac, SPLC, Art Off, Curr. Spec	Over the period of the grant, ten new STEM courses, two new STEM programs and 30 revised courses will have completed curriculum development,approval processes, and articulation.	1/12 – 7/16 ongoing

Task	Responsibility	Milestones or Measurable Indicator	Dates
Working with community entities, develop plans for SciFri event.	CompLeads, PD, Fac, ORP, USD, business	Focus and sub-events planned, dates set, invitations to community, USD and TI prepared and sent, facilities notified, supplies ordered	11/11-6/12
Develop, pilot and evaluate summer science day camp based on existing ROP model.	SPC, ALSC	Coursework and curriculum set, pilot conducted, data collected on satisfaction, increased skills and needs. Decisions based on pre/ post data collection	11/11–8/12
Examine alignment of MATH 095 and introductory college-level mathematics courses and revise as needed.	Fac, Curr. Spec, USD Fac	Courses revised, curriculum changes submitted for review and approval; increase in course success rates	1/12 6/12
Develop initial math-science learning communities.	ALSC, Fac	Developmental and transfer-level mathematics paired with appropriate introductory science courses to substantially improve successful completion and persistence through math and science	2/12 – 6/12
Develop a plan for in-lab supplemental instruction tutoring in STEM courses.	ALSC, Fac	Tutor training manual complete, faculty to work with tutors, instruction parameters set,	11/11-5/12
Year Two 2012 - 2013			
Review existing courses in biological sciences (ANAT, BIOL, MICRO) and revise as necessary. Sent for review and approval	SPC, Fac, Curr. Consultant	Curriculum revised as needed; exit requirements aligned with entrance requirements for next sequential course. Curriculum includes contextualized and problem-based learning	10/12 – 7/13
Identify and develop courses/program required for Geographic Information Systems (GIS), expertise of both ESRI staff and University of Redlands faculty to advise the college	Fac, business Curr.Spec	Courses required for STEM transfer and AS degree will be identified and reviewed/revised as needed for curriculum alignment. Curriculum for new GIS program to be developed and presented for approval then accreditation	10/12 – 7/13
Secure articulation agreements for CS courses and increase the number of articulation agreements for existing courses in the physical sciences.	Fac Artic. Officer	Articulation approved for courses in discrete mathematics, assembly language programming, data structures and other classes to prepare students to major in Computer Science	1/13 – 6/13
Pilot and evaluate SciFri; offer expanded summer science day camp program.	SPC, ALSC, Fac ORP,USD	SciFri evaluated for success and student participation, increased skills and awareness of STEM, initial program expanded and dates set for on-going SciFri events	3/13-9/13
Develop plans for bilingual summer science day camp.	SPC, Fac, Students, SPLC,USD	Coursework and curriculum set and translated to Spanish, community informed, dates set.	3/13 – 7/13
Attend Cal-PASS mathematics Professional Learning Council meetings to dialogue on alignment of mathematics curriculum.	Fac, CompLeads, PD	Increase working relationship with STEM faculty from TI and USD, plans made for ongoing work on curriculum issues, raising the level of math and science in the HS and CHC	1/13 on-going
Pilot math-science learning communities.	ALSC, Fac,	Pilot projects evaluated for success, student participation,	1/13

Task	Responsibility	Milestones or Measurable Indicator	Dates
Pilot in-lab supplemental instruction tutoring.	CSTEM	increased success rates, retention, persistence. Data used for decisions regarding revision and institutionalization	1/13
Develop capacity and strategies for STEM specific counseling including STEM transfer tracks.	CSTEM, PD, TSC	Develop/ offer career development workshops for students interested in STEM careers; work collaboratively with faculty in math-science LCs and SI tutors to identify at risk students requiring specific interventions and support	10/12 – 7/13
Year Three 2013 - 2014			
Review existing courses in computer programming and revise as necessary.	AD, F	Curriculum revised as needed; exit requirements aligned with entrance requirements for next sequential course. Curriculum to include contextualized and problem-based learning	10/13 – 6/14
Identify and develop new courses in existing STEM programs.	SPC, Fac, TSC, SPLC	New courses required for STEM transfer and AS degree will be identified and developed to strengthen STEM programs	11/13 - 5/14
Offer newly developed CS courses.	PD, Fac	One (1) course offered Fall and Spring semester	Fall
Identify space and create GIS laboratory	PD, SPC, Fac, facilities	Space prepared and equipped for GIS lab, lab time open	10/13-3/13
Secure articulation agreements for GIS courses and increase the number of articulation agreements for existing courses in the physical and biological sciences.	Fac, TSC,ArtOfficer	Articulation agreements in place, TSC and CSTEM to provide up to date information, increase in transfers to four year institutions.	10/13 – 7/14
Host and evaluate SciFri and summer science day camps, including bilingual campus.	SPC, PD, Fac, ORP	Pilot projects evaluated for success, student participation, increased success rates, retention, persistence. Data used for decisions regarding revision/institutionalization	4/14 Summer 2014
Develop plan for Math, Science and Technology Fair.	SPC, Fac, Students, PD	Focus and sub-events planned, dates set, invitations to community, USD and TI prepared and sent, facilities notified, supplies ordered	3/14 – 6/14
Expand scope of math-science learning communities.	ALSC, Fac, CSTEM	Increased number learning communities offered; student evaluations of LCs and retention, success and persistence data; SLO data	2/14 – 9/14
Develop plans for integration of project-based learning in mathematics and science courses.	ALSC, Fac	Project-based learning integrated throughout the STEM curriculum, increase in course success, retention, persistence	1/14 – 5/14
Expand in-lab supplemental instruction to include all high risk science courses.	ALSC, Fac	Increase in number of student served; student evaluations of SI and success data; SLO data	10/13 – 4/14
Expand counseling and student support efforts directed specifically at STEM students.	CSTEM	Increase in transfer awareness, information readily available to students, Number of students served; student POS surveys	1/14 – 5/14
Year Four 2014-2015			
Expand CS offerings and offer newly developed GIS courses.	PD, Fac	Two (2) CS courses offered each semester; one (1) GIS course offered each semester	Fall 2014

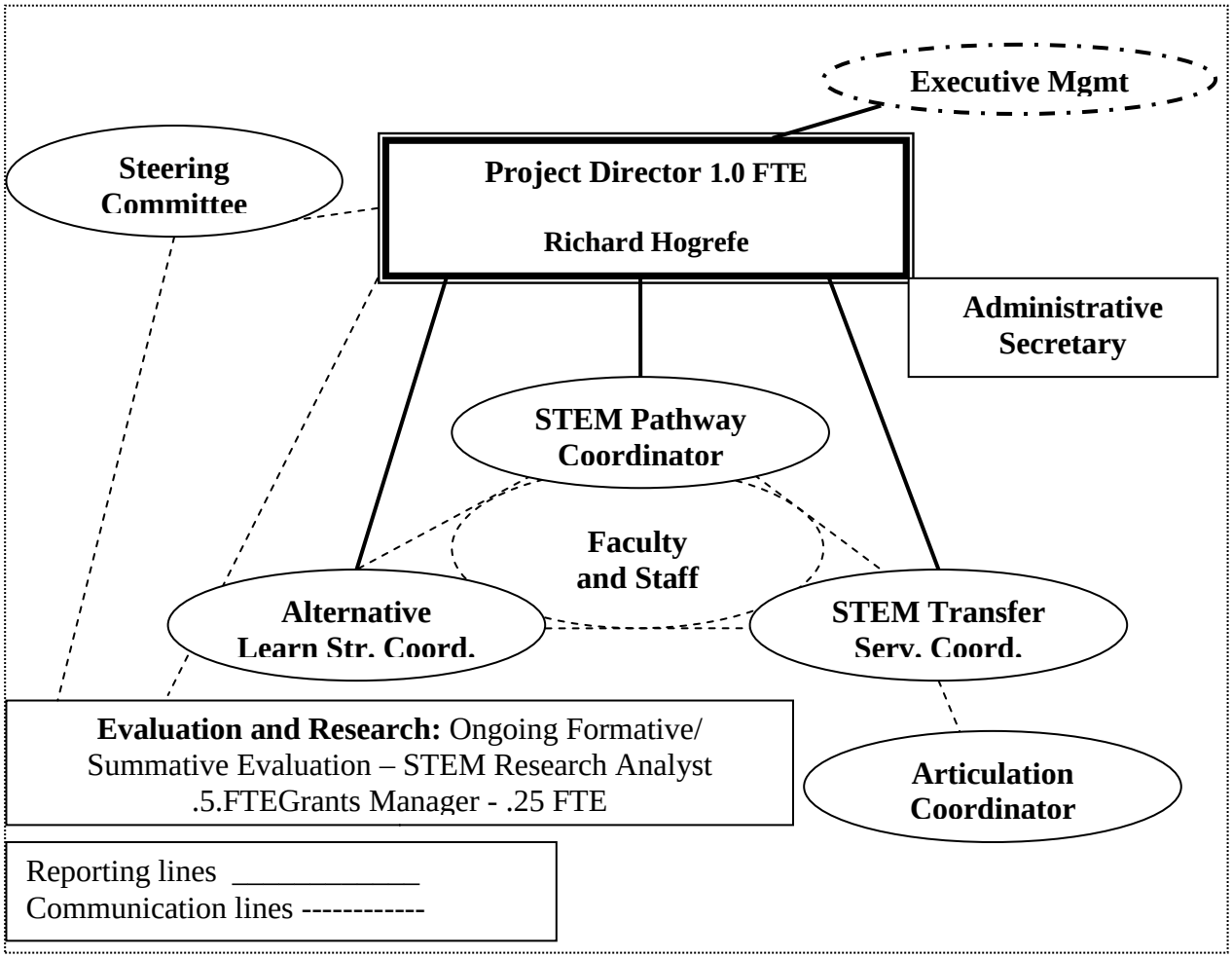
Task	Responsibility	Milestones or Measurable Indicator	Dates
Pilot program for faculty-directed student research.	Comp leads, fac	Pilot projects evaluated for success, student participation, increased success rates, retention, persistence. Data used for decisions regarding revision/ institutionalization	Fall 2014
Host SciFri and summer science day camps, including bilingual camps.	SPC, Fac, Students, USD	Programs evaluated for success, student participation, increased knowledge of STEM and STEM careers. Data used for decisions regarding revision and institutionalization	Quarterly
Pilot and evaluate Math, Science and Technology Fair.	AD, Fac, CSTEM, ORP		March 2015
Expand scope of math-science learning communities.	ALSC, Fac, CSTEM	Number of learning communities offered; student evaluations of LCs and retention, success and persistence data; SLO data	Spring 2015
Pilot use of project-based learning in mathematics and science courses.	ALSC, Fac	Pilot conducted and assessed using pre-post survey/tests, student outcomes, achievement, satisfaction	2/15 – 6/15
Expand in-lab supplemental instruction to include all science and technology courses.	ALSC, F	Number of student served; student evaluations of SI and success data; SLO data	1/15 – 7/15
Institutionalize counseling and student support efforts for STEM students	CSTEM	Access to Transfer Services Coordinator and STEM transfer information, Number of students served; student POS surveys	Spring 2015
Year Five 2015-2016			
Offer CS courses and expand GIS course offerings.	PD, Fac	Two (2) CS and GIS courses offered each semester.	Fall 2015
Provide professional development to STEM and social science faculty in the use and integration of GIS into existing courses.	PD, Fac, Consultant	Curriculum revisions made and approved, faculty trained, GIS use in place in humanities and social science in addition to STEM	11/15-4/16
Expand program for faculty-directed student research.	Comp leads, fac	Increase scope, extent and number of student research projects; research reports	1/16 – 6/16
Host SciFri, summer science day camps, including bilingual camps and Math, Science and Technology Fair.	SPC,Fac ORP	Programs scheduled, data on success compiled and evaluated. All programs institutionalized	ongoing
Offer full complement of math-science learning communities.	ALSC, Fac, CSTEM	Increased number and scope of LC offered; student evaluations of LCs, retention, success and persistence data; SLO data	beginning Fall 2015
Expand use of project-based learning in mathematics and science courses.	ALSC, Fac	Program completed and evaluated; SLO data used for institutionalization	beginning Fall 2015
Offer full complement of in-lab supplemental instruction in STEM courses.	ALSC, Fac	Number of student served; student evaluations of SI and success data; SLO data	beginning Spr 2016

As clearly delineated in the *Key Personnel* section, the CHC application development team has separated the day-to-day record and fiscal bookkeeping functions related to grants management away from the role of Project Director, allowing the Project Director to focus on fulfilling the goals and objectives of this project. The roles of consultants for **External Evaluation** and **Institutional Development Specialist** strengthen the overall impact and institutionalization of project initiatives. The HSI-STEM **Steering Committee** will meet every two weeks for the first three months to make sure that this project gets a quick and well-based start, monthly thereafter to review progress. The members of the Steering Committee will communicate with campus constituencies about grant and progress of activities; recommend and assist the planning, as appropriate, for joint activities – specifically faculty development and intern/mentor relationships. Members of the Steering Committee have been chosen, in part, for their expertise and ability to serve as resources for the project director and will make recommendations regarding personnel, expenditures, and hiring of consultants as appropriate. The Steering Committee will receive extensive training in data-based decision making, have access to all data, internal and external evaluation reports as a basis for making recommendations for needed modifications to project and will assist with institutionalization issues.

Steering Committee Membership	
Gloria Macias Harrison, President	Bob Crise, Faculty, Mathematics
Cheryl Marshall, VP Instruction	Rich Hughes, Faculty, Earth Sciences
Rebeccah Warren-Marlatt, VP Student Services	Sam Han Truong, Faculty, Anatomy and Physiology
Mike Strong, Interim VP Administrative Services	Margaret Yau, Faculty, CIS
Kirsten Colvey, Dean, Counseling and Matriculation	Judi Harrington, Articulation Officer
Raju Hegde, Dean, Mathematics, English, Reading and Instructional Support	Fran Farrell, Lab Technician, Chemistry
Keith Wurtz, Director, Research and Planning	Renee Sanford, Lab Technician, Microbiology
Karen Childers, Director of Grant Development and Management	Sherri Wilson, Faculty Chair, Mathematics
Kelly Boebinger, Faculty Chair, Physical and Biological Sciences	Dr. Dave Polcyn, Biology, CSUSB
	Dr. Cindy Lerive, Chemistry, UC Riverside
	Doug Hammer, Sorenson Engineering

	Two high school STEM teachers to be determined

PROJECT ORGANIZATION AND STAFFING CHART



Operating Within Compliance. The Project Director and Director of Grant Development and Management will ensure that **fiscal policies** and procedures are in full adherence with CHC regulations, as well all Federal and State and District requirements. The Director of Grant Development and Management will develop and maintain a comprehensive ***Project Manual*** which will be available to project staff. The manual will outline staff responsibilities, timelines, internal and external progress reporting procedures, time and effort forms, purchasing and inventory processes, templates for documentation of articulation activities and other information integral to the HSI-STEM project success.

Mechanisms for Assuring High Quality Products and Services A four-tiered review system will be implemented to assure a high quality of products and services that warrant institutionalization and/or replication at other institutions: 1) existing systems at CHC (e.g. curriculum approval committee), 2) CHC Institutional Research Office, 3) HSI-STEM Project Steering Committee and 4) an external evaluator and institutional development specialist. Each project activity will be assessed based on relevant and data-based criteria (not all may apply to each activity): 1) statistically significant and substantial evidence of positive impact, 2) cost relative to benefit, 3) ease of expansion beyond pilot cohorts or activities, 4) perceptions of benefit to persons served, 5) acceptance within culture of the institution and 6) systemic impact. Specifically, data will be provided to the faculty, the meaning of the data will be discussed among faculty, and strategies will be developed to improve the effectiveness of the alternative learning strategies based on the collaborative discussion about the meaning of the data.

Communication: Communication is essential to both the success of this project and the achievement of data-driven decision making. In order to effectively communicate the progress of the grant to the College all means available will be used for communication, including the STEM project website. A direct link on CHC's website will serve as the primary mode of information dispersal and provide an overview of the project, and data-based updates of grant activities. STEM updates will be a permanent agenda item for the President's Cabinet. It will be included as a permanent agenda item on all meetings of the departments effected by the proposal.

Evaluation of Project Personnel will be fully consistent with CHC policies and procedures, including all negotiated agreements with faculty, administration and classified staff.

Link to Institutional Effectiveness to Maximize HSI-STEM Impact and Institutionalization: Executives at CHC have agreed to link this HSI-STEM Project to on-going

institutional effectiveness efforts to increase success of Hispanic students and address accreditation standards related to equity and outcomes. An Institutional Development Specialist will be hired to assist with this process:

Institutional Development Specialist (Consultative Expertise)
Job Description: This new part-time consultative position (for the term of the grant only) will work with Project Director, Component Leads and STEM Steering Committee, as appropriate, to maximize the effectiveness program initiatives developed. In addition, this individual will communicate as appropriate the independent evaluation expert. *This position will be filled on a contract for consultative expertise to allow CHC to access the specialist.*
Responsibilities: Assist college leadership to: tie improved practices to college-wide assessment and program review processes; keep HSI-STEM activities tied to internal planning and budgeting processes to maximize potential for institutionalization at grant's end; to connect HSI STEM initiatives to recommendations for institutional effectiveness and outcomes by accrediting agency; retain focus on improving effectiveness as Hispanic-Serving Institution.

7. PROJECT EVALUATION

Data-Based Decision Making At Crafton Hills College Crafton Hills College has a **strong commitment to instilling research into the campus climate** as well as an experienced researcher who has worked in the community college system for over a decade, who is an expert in data management, statistical analysis, research design, and evaluation. CHC's Office of Research and Planning (ORP) continuously and successfully supports CHC's culture of data-based decision making. The mission of the CHC ORP is "to collaborate with faculty, administration, staff, and students to provide high quality educational programs and services by integrating institutional research, planning, analysis, and systematic assessment to **inform evidenced-based decision making and learning**."

In a recent Campus Climate Survey of Crafton Hills College faculty, staff, and managers, 88% of respondents agreed or strongly agreed that data and information were used routinely to inform institutional decisions[33]. Moreover, 83% agreed or strongly agreed that CHC uses both

[33] CHC Employee Campus Climate Survey, Fall 2010

qualitative and quantitative data to identify student learning needs. The visiting team from CHC's accrediting body recently stated that "In addition to providing access to data, the [ORP] has provided training on how the data can be interpreted and used, including using the new standard planning and program review performance reports and improving data entry accuracy. According to faculty and managers, the [ORP] has also worked collaboratively with them to communicate research results in understandable terms, as well as to address ad hoc research requests. Thus, data and information are more readily available and understandable for assessment, planning, and decision making purposes."[34] The STEM Research Analyst will work closely with ORP to create, administer and analyze surveys and other instruments to guide data-based decision making throughout the life of this project. Combining the expertise and strong relationships already established with the ORP, the Research Analyst specifically assigned to this project will maximize the ability of the project to base its decisions on relevant data. HSI-STEM research will focus on improving post secondary student outcomes relating to enrollment, persistence and completion and leading to career success.

Project Evaluation Design: Three key features characterize the HSI-STEM Project evaluation design: **Formative Evaluation** will assure the quality of program management by tracking the effectiveness of project development and implementation during the two-year project. **Summative Evaluation** that carefully documents impact on learners and CHC Hills College. Controlled comparisons between program participant and non-participants will clarify the impact of particular innovations, when possible, and their potential for benefiting other campuses. As detailed on pages 49-50, each objective will be measured both on an ongoing (formative) basis, to provide for continuous improvement and feedback over the five-year period of the project, as

[34] Accreditation Follow-Up Visit Report, CHC, November 2010

well as on a summative basis, to ensure that the project meets its interim and final objectives and goals of increasing Hispanic graduation and transfer in STEM areas.

Planned use of Evaluation Data: Use of assessment data to improve process and practices and implement organizational change, is a regular part of the institutional effectiveness processes at CHC. Analyses of outcomes data will include both **scientific measurement analysis** to determine statistical significance of data collected, **as well as qualitative analysis** where appropriate to augment quantifiable data. Formative data will provide feedback to inform leadership regarding needed modifications, possible barriers to success and approaches to rectify those situations, continually increasing the likelihood of project success and post-grant institutionalization of key activity components. Data gathered will provide evidence of impact of project and increase likelihood of institutionalization.

Scientifically Valid Education Evaluation The Institute of Education Science[35]states that valid evaluation: Adheres to the highest possible standards with respect to research design and statistical analysis; Provides an adequate description of the programs evaluated and, to the extent possible, examines the relationship between program implementation and program impacts; Both quantitative and qualitative measures are used to broaden credibility of process; Employs experimental designs using random assignment; when feasible, and other research methodologies that allow for the strongest possible causal inferences when random assignment is not feasible. Multiple measures are used with combinations of scientifically valid and reliable methods.

How this evaluation plan addresses each aspect of a scientifically valid education evaluation: There will be a third party evaluation, designed and conducted by an independent professional. Comprehensive analysis of both output and outcome data will be made, rather than

[35] http://www.ed.gov/about/offices/list/ies/index.html May 2007

simply publishing and distributing data. Appropriate decision-makers and stakeholders will be involved in making action plans based upon the results of the evaluation analysis. Control groups will be used for comparison (sections of courses not using new methods; success of students in parallel courses of study whose faculty are not involved in development activities; historical longitudinal studies). Surveys, focus groups, and questionnaires will also be used to track/analyze outcomes. Built into the regular daily/weekly process of implementing the project will be **on-going processes for evaluation outlined below.** As discussed above, student performance data will be used to inform decision-making and improve the effectiveness of the alternative learning strategies that are made available to Hispanic students.

<table>
<tr><th colspan="2">CHC Hills College Project Evaluation Design</th></tr>
<tr><td colspan="2">Evaluation Plan: who, when, and how the data will be collected, analyzed, reported and used.</td></tr>
<tr><td colspan="2">CHC will systematically collect data and information to determine the extent which Project objectives are met, use quantitative and qualitative measures and review outputs & outcomes.</td></tr>
<tr><td colspan="2">Project is limited to a few clear and specific measurable objectives.</td></tr>
<tr><td colspan="2">Offices of Institutional Research and college evaluation standards were involved in the design</td></tr>
<tr><td colspan="2">An Independent Evaluator will work with Key Personnel, Steering Committee and Institutional Researcher.</td></tr>
<tr><td>Data for GPRA indicators</td><td>In addition to the data pertaining to CHC’s project objectives evaluation processes will also include collection of data for GPRA indicators for Annual Reporting: (Academic Quality, Student Service and Student Outcomes, and Institutional Management and Fiscal Stability, established by the Secretary of the Dept. of Educations to assess the effectiveness of the HSI STEM Program.
Measure 1: Percentage of full-time degree-seeking under-graduates enrolled.
Measure 2: Percentage of first-time, full-time degree-seeking undergraduate students who were in their first year of postsecondary enrollment in the previous year and are enrolled in current year at same institution.
Measure 3: % of first-time, full-time degree-seeking undergraduate students enrolled at four-year institutions graduating within six years of enrollment.
Measure 4: % of first-time, full-time degree-seeking undergraduate students enrolled at two-year institutions graduating within 3 years of enrollment.
Measure 5: The (federal) cost for undergraduate and graduate degrees at CHC.</td></tr>
<tr><td colspan="2">Evaluation Schedule: ‘On-going Evaluation’ indicates Evaluation/Assessment/ Feedback for improvement will be on the agenda for every staff and subcommittee meeting.</td></tr>
<tr><td>Tracking of progress toward achievement of objectives</td><td>On-going: Will ensure timely reporting to CHC strategic and budget planning groups.</td></tr>
</table>

Distribution of current enrollment and MIS reports	**Weekly** updates at beginning of each term (until census) Monthly at regular meetings of CHC Steering Committee
Formative evaluation Feedback for adjustments/improvements	**On-going**: Activity Leads will report to PD and Steering Committee and modifications will be made as needed.
External Evaluation	**See detailed schedule below.**
Interim Report	Data collected during 1st six months
Annual Report & Final Report	**December and 90 days after close of grant year.**

EVALUATION RESPONSIBILITIES	
Project Director will have overall responsibility for Evaluation	
Research Analyst and ORP will be responsible for gathering required data and records	
Steering Committee	resource and sounding board for formative evaluation issues (suggesting modifications) and summative evaluation decisions (institutionalization issues).
Evaluation Experts	CHC Office of Research and Planning (ORP) will help construct final data collection plans, monitor effectiveness, suggest changes as needed
Independent External Evaluators will make multiple visits to work with project leadership and to construct and implement research agenda.	

External Evaluation Consultant: In support of this complex project, and the importance of institutional research to its successful implementation, we are hiring an independent evaluator with expertise in both Title V and Outcomes Evaluation to consult with annually.

Required Qualifications for External Evaluation Consultants: An independent external evaluation will be conducted by Dr. Inge Peltzer who will make annual site visits to Crafton Hills College and document her findings and recommendations in written reports. The evaluation will include the following deliverables: 1) Assessment of progress toward **objectives**. 2) Assessment of the **sustainability** of the project after federal funding ceases. 3) Assessment of overall **institutional impact** that the project is having upon the college, 4) Assessment of the **impact** of the individual project activities based on data collection and statistical analysis. 5) Assessment of compliance with federal **regulations**. 6) **Recommendations** for improvement.

EXTERNAL EVALUATOR – DR. INGE PELTZER	
Relevant Experience:	Developed, wrote and administered grants in excess of $3-4 million annually including federal Hispanic Serving Institutions grants, Title III, NEH, NSF, workforce development and HSI-STEM grants Built community base grants writing and evaluation with school districts, served as external evaluator of numerous projects Administered the Institutional Research Office since its inception with hands-on involvement Extensive expertise in institutional research, federal, state and local grant development and management Excellent skills in strategic planning, budget development, and extensive experience facilitating cooperative teamwork Comprehensive experience developing and implementing outcomes based program evaluation Solid background in leading institutional teams through WASC accreditation from training to self study writing and follow up reporting. Strong program and curriculum development background

The Project Director and the STEM project Steering Committee will contract with Dr. Inge Pelzer who will work from project start through final summative evaluation to provide formative evaluation and guidance, assessing all aspects of project development.

Projected Timelines for Involvement of Evaluation		
October 2011	**March 2012**	**September 2012**
Start-up visit and baselines confirmation	Interim First Year Visitation; Input for *Interim Progress Report;* Recommendation for Modifications	End of 1st Year/Beginning of 2nd. Recommendation for Modifications
Annual Visits – 2013-2016		
December: Consultation on *Annual Report*	**Summer/early fall**: Midterm visit	**September 2016**: Final Summative Visit

The project's achievements will be documented in an end of grant report. This report, with project findings, lessons learned and recommendations for duplication, will be widely disseminated throughout regional, state and national networks. The STEM Transfer Pathway will serve as a model for community colleges to improve STEM programs and transfer pathways.

Methods: <u>Use of Multiple Measures:</u> If student outcomes are not being reached, and even when the targets are being met, data, including multiple measures, will be used to inform

the development and improvement of strategies being provided to students. Evaluation of the Services Components will include, but not be limited to:

Evaluation Instruments - Multiple Measures Examples	
Staff records, committee minutes, student and/or faculty logs, observations of programs, classrooms and labs, and analysis of other program documents to measure program outputs	Measure program activities and benchmarks; including participation in Engineering program, new and revised courses and articulation of courses and major programs.
Analysis of data for totals of students served by identified cohorts and when possible, between participants in Engineering pilot programs and other comparable students as a control group. Comparisons made with the baseline measures.	To measure Successful Retention, Completion, Progression and Transfer rates, and other related benchmarks for Total students served and for identified cohorts; including ethnicity and gender.
Questionnaires, Surveys, and Focus groups. Feedback and satisfaction gathered via evaluation tools. Collected from a cross section of randomly selected students and participating faculty	

Objectives	**Source of Information and Data Elements**	**Responsibility and Timelines**
Objective 1.1: CHC will increase by 25% (5% per year) the numbers of Hispanic students graduating with an AA, AS or Transfer Certificate from the 2009-2010 baseline of 18 degrees/certificates to 54 by 2016, a 200% increase.	Colleague is used to identify student ID, ethnicity, major, and degrees and certificates earned.	Degree data accessed by the Office of Research and Planning (ORP) and distributed to the campus community each year.
Objective 1.2: By Fall 2016, CHC will increase the number of Hispanic students transferring to UC or CSU systems declaring majors in STEM from 9 students in 2009-2010 to 27 students in 2016, a 200% increase.	A combination of sources is used to identify the number of Hispanic students who are transferring. Colleague is used to identify student ID, ethnicity, and major. CPEC as well as the National Student Clearinghouse (NSC) are used to identify transfers.	Transfer data accessed by the ORP and distributed to the campus community each year.
Objective 1.3: By 2016, CHC will increase the number of STEM programs that utilize data to inform decision-making from 1 program (CHEM) in the 2009-2010 academic year to 8 programs (CHEM, ANAT, BIOL, MICRO, PHYSIC, GEOL, CS, GIS), an overall increase of 700%.	Tracking and evaluation of training on how to access, interpret, and utilize data, pre and post training surveys, self reporting, and identification of when evidence was used to inform decision-making.	Training provided by the ORP and the Dean of Arts & Sciences six times each year
Objective 1.4: By 2016, 25% of incoming CHC students who participated in a STEM related activity while in high school will register for at least one STEM course the Fall	A method to track students participating in STEM related activities will be developed by ORP. SIDs from the tracking method are used to match records in Colleague	ORP and the Dean of Arts and Sciences

semester following their high school graduation.	which is used to identify STEM enrollments and degree information.	
Objective 1.5: By 2016, CHC will increase the number of all students successfully improving from Intermediate Algebra (MATH-095) to Calculus (MATH-250) from 5 to 50, a 900% increase (180% per year).	Colleague (i.e. CHC's Administrative database system) is used to identify student ID, ethnicity, course, course level, and grade.	Mathematics improvement data is accessed by the ORP and distributed to the campus community each year.
Objective 1.6: By 2016, CHC will increase the percent of all students successfully completing STEM courses with a "C" grade or better from 61.9% to 70%, an increase of 8.1% (1.6% increase in the rate each year).		Grade data is accessed by the ORP and distributed to the campus community each year.
Objective 1.7: By 2016, ten (10) new STEM courses, two new STEM programs and 30 revised courses will have completed approval processes, curriculum development, and artic..	CurricuNet used to track the progress of curriculum development and approval. In addition, articulation progress with 4-year universities will also be tracked by the Articulation Officer.	Dean of Arts & Sciences, Articulation Office, and ORP
Objective 1.8: By 2016, 100% of CHC STEM courses will have technologically current equipment and instrumentation.	Colleague is used to identify student ID, ethnicity, and students using the laboratory equipment.	Data accessed by the ORP and distributed to the STEM faculty each year.
Objective 1.9: By 2016, 75% of STEM faculty will have taken part in faculty development/training AND 50% will include at least one new classroom technique proven to work with Hispanic learners.	Office of Arts & Sciences; Tracking and evaluation of training on how to access, interpret, and utilize data, pre and post training surveys, self reporting, student satisfaction surveys, and the use of the outcomes assessment tracking form to track evidence-based decision making in courses.	Training is provided by the ORP and the Office of Arts & Sciences. The Web-based outcomes assessment tracking is provided and managed by the ORP.

Hispanic-Serving Institutions STEM & Articulation Program Activity Budget Detail Form

INSTRUCTIONS: ALL applicants must complete and submit this form. You may copy or recreate this form, but do not amend or modify the required information or format. *Upon completion, attach this document as a .pdf into the "Other Attachments Form" in the Grants.gov application system.*

Activity Budget (To be completed for every activity for which funding is requested)											
1. Name of Institution: Crafton Hills College					**2. Activity Title:** Creating a STEM Pathway to Increase Hispanic Student STEM Degrees and Transfer						
3. Budget Categories By Year	**First Year**		**Second Year**		**Third Year**		**Fourth Year**		**Fifth Year**		**Total Funds Requested**
Object Class	% 0f Time	Funds Requested	% Of Time	Funds Requested	% Of Time	Funds Requested	% Of Time	Funds Requested	% Of Time	Funds Requested	
a. Personnel (Position Title)											
Project Director	0.50	$56,000	0.50	$58,000	0.50	$60,000	0.50	$62,000	0.50	$64,000	$300,000
Administrative Secretary	1.00	$43,000	1.00	$45,000	1.00	$47,000	1.00	$48,000	1.00	$50,000	$233,000
STEM Pathways Coordinator (Faculty)	1.00	$80,000	1.00	$82,400	1.00	$84,872	0.50	$42,436	0.25	$21,854	$311,562
STEM Transfer Services Coordinator (Faculty)	0.00	$0	1.00	$70,000	0.75	$54,075	0.50	$36,650	0.25	$18,875	$179,600
Alt Learning Strategies Coordinator (Faculty)	1.00	$70,000	1.00	$72,100	1.00	$74,263	0.50	$38,245	0.25	$19,696	$274,304
STEM Research Analyst	0.50	$30,000	0.50	$31,000	0.50	$32,000	0.50	$33,000	0.50	$34,000	$160,000
Supplemental Faculty Contracts and Release	hrly	$20,000	hrly	$20,000	hrly	$20,000	hrly	$20,000	hrly	$20,000	$100,000
Faculty Development Stipends	hrly	$10,000	hrly	$10,000	hrly	$10,000	hrly	$10,000	hrly	$10,000	$50,000
Supplemental Instruction	hrly	$0	hrly	$10,000	hrly	$20,000	hrly	$30,000	hrly	$40,000	$100,000
SUB-TOTAL		$309,000		$398,500		$402,210		$320,331		$278,425	$1,708,466
b. Fringe Benefits % varies		$66,492		$83,450		$83,561		$66,468		$57,785	$357,756
c. Travel		$19,000		$24,000		$22,000		$19,500		$11,500	$96,000
d. Equipment		$375,358		$287,873		$285,400		$309,006		$392,753	$1,650,390
e. Supplies		$52,150		$28,177		$10,829		$90,695		$87,537	$269,388
f. Contractual		$0		$0		$0		$0		$0	$0
g. Construction		$0		$0		$20,000		$20,000		$0	$40,000
h. Other (endowment)		$48,000		$48,000		$46,000		$44,000		$42,000	$228,000
i. TOTAL DIRECT CHARGES		$870,000		$870,000		$870,000		$870,000		$870,000	$4,350,000

1.	**Explain in detail how you arrived at the total amount requested in each object class in each year of the activity. If you fail to provide sufficient details, we may disallow costs**. Budget narrative follows on next page.

Crafton Hills College – Budget Narrative

a. PERSONNEL COSTS	
Program Director 1.0 FTE Richard Hogrefe	Mr. Hogrefe's salary will be split between CHC and Title V CHC = .5 FTE Title V = .5 FTE
Administrative Secretary 1.0 FTE To be determined	**Primary Roles and Responsibilities** Compose correspondence independently; take and transcribe minutes from committee meetings; order office supplies and equipment; Compose, edit, assemble, coordinate, and word process various documents and agenda materials; research, collect, and compile statistical, financial, and other diverse information into special college and federal reports; make arrangements for meetings and notify participants; monitor program budgets. **Minimum Qualifications** Advanced knowledge of office computers including word processing, database management, and spreadsheets; Experience with purchasing and payroll records; Strong written and oral communication skills. Three years experience implementing requirements of Federal programs; Three years experience working with Federal budgeting systems and requirements
STEM Pathway Coordinator 1.0 FTE To be determined	**Primary Roles and Responsibilities** Serve as the liaison coordinating the CHC's grant activities with local high schools and universities to ensure integration is consistent, measureable, and effective; regular interface and ongoing communications with faculty and administration at cooperating institutions to create sustainable STEM student pathways; working with STEM faculty to coordinate curriculum redesign and upgrades of laboratory facilities; oversee articulation efforts and schedules as they relate to the coordination efforts of the grant; oversee development of Math, Science and Technology Day and Sci Fri; perform continuous monitoring and evaluation of activities associated with grant activities; facilitate/monitor communications and development to maximize the potential for successful post-grant continuation of new practices, strategies, and partnerships. **Minimum Qualifications** MA/MS in a STEM discipline. Experience coordinating, leading large work groups and projects that impact a significant portion of an organization. Post-secondary teaching and research experience; Experience with adherence to federal, state, or other governmental program requirements.
Alternative Learning Strategies Coordinator	**Primary Roles and Responsibilities** Develop, coordinate, implement, and evaluate supplemental instruction program and learning

1.0 FTE To be determined	communities efforts; develop, coordinate, implement, archive and evaluate faculty, staff, and management skills training related to alternative learning strategies directly related to grant activities; develop, coordinate, implement, and evaluate pilot programs related to successful completion of grant activities; develop, coordinate, implement, and evaluate professional development training related to STEM for feeder schools and university partners. **Qualifications** A master's degree in education or related field; Two years post-secondary teaching experience; Extensive knowledge of learning theory and alternative learning strategies including supplemental instruction (SI), contextualized and problem-based learning and learning communities.
STEM Transfer Services Coordinator 1.0 FTE beginning in Year 2 To be determined	**Primary Roles and Responsibilities** Plan, organize, develop, and coordinate support services for STEM students; Assists students in planning a program in STEM fields to be ready to transfer; assists students in the transfer process; coordinates with existing support staff at transfer colleges and universities (for example the Medical Scholars Program at UCR) to ensure success of students upon transfer; assists faculty with coordination of courses across disciplines to ensure transfer readiness and transfer success; assists College's articulation officer in securing articulation agreements for STEM courses and programs. **Qualifications** A master's degree in counseling or related field; One year experience in higher education setting; Experience working with students entering STEM fields
STEM Research Analyst 0.5 FTE To be determined	**Primary Roles and Responsibilities** Plans, designs, conducts, and interprets research projects for the evaluation of operational and program performance including articulation activities, student outcome measures and institutional effectiveness; performs a variety of duties related to the design, writing, and presentation of institutional research and evaluation; assists in data collection, data review, data search, and other research as identified by the director; develops queries or programs to process data; and analyzes data using software such as SPSS or other programs. **Qualifications** A bachelor's degree in research, statistics, mathematics, economics, social/educational science, or higher education. Masters preferred; Two years of professional level research experience in or similar to institutional research and five years experience with relevant computer hardware and software.
Supplemental Faculty Contracts	Supplemental Faculty Contracts: Up to 475 hours of faculty time per year for curriculum alignment and development, participation in outreach events, facilitating student research projects, learning communities, supplemental instruction and project-based learning implementation.

Faculty Development Stipends	Professional Development Activities: This funding will be used to support the STEM faculty professional development activities and implementation of faculty/staff development projects pertaining to the development of a learning college.
Supplemental Instruction (Tutor II)	Utilizing peer-assisted (Tutor II) (2 @ $10/hr in Year II; 5 @ $10/hr in Year III; 10 @ $10/hr in Year IV; 12 @ $10/hr in Year V;) study sessions. SI's will meet and lead regularly scheduled study sessions with STEM students. Year 1 = 0 SI tutors Year 2 = 2 SI tutors Year 3 = 5 SI tutors Year 4 = 8 SI tutors Year 5 = 10 SI tutors

a. PERSONNEL COSTS	**2011-2012**	**2012-2013**	**2013-2014**	**2014-2015**	**2015-2016**
Project Director – Richard Hogrefe	56,000	58,000	60,000	62,000	64,000
Administrative Secretary – to be determined	43,000	45,000	47,000	48,000	50,000
STEM Pathway Coordinator – to be determined	80,000	82,400	84,872	42,436	21,854
Alternative Learning Strategies Coordinator – to be determ	70,000	72,100	74,263	38,245	19,696
STEM Transfer Services Coordinator – to be determined	0	70,000	54,075	36,650	18,875
STEM Research Analyst – to be determined	30,000	31,000	32,000	33,000	34,000
Supplemental Faculty Contracts and Release	20,000	20,000	20,000	20,000	20,000
Faculty Development Stipends	10,000	10,000	10,000	10,000	10,000
Supplemental Instruction (Tutor II)	0	10,000	20,000	30,000	40,000
TOTAL PERSONNEL	**309,000**	**398,500**	**402,210**	**320,331**	**278,425**

b. FRINGE BENEFITS			
The Fringe benefits for faculty are	STRS 8.25% Medical $8,940/YR	Medicare 1.45% SUI 0.72%,	Work Comp $1,200/YR
The Fringe benefits for classified staff are	PERS 9.709%, SUI 0.72%,	FICA 6.20%, Medical $9,300/YR	Medicare 1.45%, Work Comp $1,200/YR

Faculty Advisors, Supplemental Faculty Contracts	The District provides fringe benefits for full-time faculty on supplemental contract and release time.				
TOTAL FRINGE BENEFITS	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
	66,492	**83,450**	**83,561**	**66,468**	**57,785**

c. TRAVEL	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Project Director, STEM Pathway Coordinator and three faculty to attend the Annual STEMtech Conference in Indianapolis, IN. Years 1-3 - 5 @ $1500 = $7500; registration, airfare, lodging, per diem, ground transportation, airport parking	7,500	7,500	7,500	0	0
Three faculty members to attend the Annual National Association of Biology Teachers Conference in Anaheim, CA Years 1-5 @ $1500 = $4500; registration, airfare, lodging, per diem, ground transportation, airport parking	4,500	4,500	4,500	4,500	4,500
Two faculty members to attend the Annual Geologic Society of America Conference in Minneapolis, MN. Years 1, 3 and 5 @ $1500 = $3000; registration, airfare, lodging, per diem, ground transportation, airport parking	3,000	3,000	3,000	3,000	3,000
Two faculty members to attend the Annual ACM Technical Symposium on Computer Science Education in Raleigh, NC. Years 3 and 4 @ $1500 = $3000; registration, airfare, lodging, per diem, ground transportation, airport parking	0	0	3,000	3,000	0
Two faculty members to attend the Annual American Chemical Society Conference in Denver, CO. Years 1-5 @ $1500 = $3000; registration, airfare, lodging, per diem, ground transportation, airport parking	3,000	3,000	3,000	3,000	3,000
Two faculty members to attend the Annual Association of Anatomists Conference in San Diego, CA. Years 2 and 4 @ $1500 = $3000; registration, airfare, lodging, per diem, ground transportation, airport parking	0	3,000	0	3,000	0

Two faculty members to attend the Annual Center of Astronomy Education Regional Teaching Exchange in Oceanside, CA. Years 1, 3 and 5 @ $500 = $1000; registration, airfare, lodging, per diem, ground transportation, airport parking	1,000	0	1,000	0	1,000
Two faculty members to attend the Annual American Association of Physics Teachers Conference in Omaha, NE. Years 2 and 4 @ $1500 = $3000; registration, airfare, lodging, per diem, ground transportation, airport parking	0	3,000	0	3,000	0
TOTAL TRAVEL	**19,000**	**24,000**	**22,000**	**19,500**	**11,500**

d. EQUIPMENT

Laboratory equipment and computer technology with a per unit cost greater than $1000. Institutional policies require that all equipment purchases exceeding a per unit cost of $1000 be purchased as capital outlay and be inventoried as such. Laboratory equipment included in this proposal is based on existing departmental needs identified in planning, program review and other departmental documents. All laboratory equipment purchases have been evaluated by a committee of full-time STEM faculty and reviewed by the project Steering Committee. All prices include applicable taxes and shipping.

	YEAR ONE			
ANAT	Veriner Lab Quest Mini Physiology Deluxe Package	6	1029.00	6174.00
BIOL	Nikon E200 SET 120V Microscope	32	1475.00	47200.00
BIOL	DNA Electrophoresis Kits	4	1500.00	6000.00
BIOL	Black Spider Monkey Skeleton, Articulated	1	2250.00	2250.00
BIOL	PCR	1	10000.00	10000.00
CHEM	Vernier Vis-Spectrophotometer	25	1732.00	43300.00
CHEM	Vernier Mini Gas Chromatograph	6	1749.00	10494.00
CHEM	SRS Digital Melting Point Apparatus	15	1786.00	26790.00
CHEM	Buck Gas Chromatograph	1	4995.00	4995.00
CHEM	Buck IR Spectrophotometer with Accessories	1	6550.00	6550.00
GEOL	GPS Units	8	1000.00	8000.00
GEOL	Stereomicroscopes	10	1100.00	11000.00
GEOL	Thin Section Set, Rocks	1	1924.00	1924.00

GEOL	Microvideo System with Polarizing Microscope	1	6000.00	6000.00
MICRO	Nikon E200 SET 120V Microscope	32	1475.00	47200.00
MICRO	Konus Opal 20x Stereoscopic Dissecting Microscope	32	2000.00	64000.00
MICRO	Desktop Computers	6	2000.00	12000.00
MICRO	Isotemp Trable Top Incubator	1	2982.00	2982.00
MICRO	Nikon DMX 1200C High Definition Cooled Color Digital Camera	1	3000.00	3000.00
MICRO	Nikon Microscope Accessories	1	3500.00	3500.00
MICRO	Nikon Eclipse 551 Microscope with Tilting Telescopic hed	1	5000.00	5000.00
MICRO	Thermo Scientific Large Capacity Incubator	1	10000.00	10000.00
OTHER	Projector/Laptop	1	4999.00	4999.00
OTHER	Software Packages for Activites	4	5000.00	20000.00
STAFF	Ergonomic Workstations	4	3000.00	12000.00
	TOTAL YEAR ONE			**375,358.00**
	YEAR TWO			
CS	SMART Classroom Suite - Classroom License	1	1499.00	1499.00
BIOL	DNA Electrophoresis Kits	4	1500.00	6000.00
BIOL	Microcentrifuge	2	3000.00	6000.00
BIOL	Thermal Cycler	1	6000.00	6000.00
BIOL	PCR	1	10000.00	10000.00
CS	Computer Workstations	33	2000.00	66000.00
CS	MATLAB Lab License	1	2999.00	2999.00
CS	Server	1	6000.00	6000.00
MICRO	Isotemp Trable Top Incubator	1	2982.00	2982.00
OTHER	Data switches	7	7199.00	50393.00
OTHER	4000 series core switches	2	39000.00	78000.00
OTHER	Communication cabling upgrades	1	48000.00	48000.00
STAFF	Projector/Laptop	1	4000.00	4000.00
	TOTAL YEAR TWO			**287,873.00**
	YEAR THREE			
GIS	Printer	3	1900.00	5700.00
GIS	Smart Lecturn	1	2500.00	2500.00

GIS	ArcGIS 10.0 Software Suite	36	2500.00	90000.00
GIS	Plotters	4	3500.00	14000.00
GIS	LCD Projector with mounting and interface	1	4000.00	4000.00
GIS	Computer Workstations	36	4700.00	169200.00
	TOTAL YEAR THREE			**285,400.00**
	YEAR FOUR			
ANAT	Denoyer-Geppert Premier Muscled Skull	2	1000.00	2000.00
ANAT	Somso Human and Shoulder Girdle Model	3	1775.00	5325.00
ANAT	Somso Human Leg and Portion of Pelvis Model	2	1965.00	3930.00
ANAT	Denoyer-Geppert UltraFlex Quadra™ Skeleton w/ UltraFlex ligaments	2	2800.00	5600.00
BIOL	Environomental Chamber Stand	1	1235.00	1235.00
BIOL	Human Male Asian Arculated Skeleton	1	1999.00	1999.00
BIOL	Black Spider Monkey Skeleton, Articulated	1	2250.00	2250.00
BIOL	Biotronette Environmental Chamber	1	4165.00	4165.00
CHEM	Vernier Vis-Spectrophotometer	20	1732.00	34640.00
CHEM	SRS Digital Melting Point Apparatus	15	1786.00	26790.00
CHEM	Diagger Spectrophotometers	4	1955.00	7820.00
CHEM	Laptop Computers	24	2000.00	48000.00
CHEM	Vernier UV Vis-Spectrophotometer	25	2887.00	72175.00
CS	SMART Board 885ix interactive whiteboard system	1	6500.00	6500.00
GEOL	Stereomicroscopes	10	1000.00	10000.00
GEOL	GPS Units	8	1000.00	8000.00
GEOL	World Relief Floor Globe	1	3799.00	3799.00
GEOL	Portlog Weather Logger	1	4000.00	4000.00
MICRO	Unispense Automatic Dispenser 110V	1	1924.00	1924.00
PHYSIC	Stress/Strain Experimental Apparatus	2	1000.00	2000.00
PHYSIC	Photoelectric Effect Apparatus	2	1300.00	2600.00
PHYSIC	Geiger Counter	2	1479.00	2958.00
PHYSIC	Driven Damped Harmonic Oscillator	2	1650.00	3300.00
PHYSIC	Osciloscopes	4	1699.00	6796.00
PHYSIC	Millikan Apparatus	2	1700.00	3400.00
PHYSIC	ESR/NMR Basic Set	2	1900.00	3800.00

PHYSIC	DiVA Digital Spectrometer	1	2100.00	2100.00
PHYSIC	Electron Diffraction Apparatus	1	2500.00	2500.00
PHYSIC	Optical Pyrometer	2	3000.00	6000.00
PHYSIC	Interferometry System	2	3200.00	6400.00
OTHER	Smart Lab Computers	2	2000.00	4000.00
OTHER	Smart Lab Lecturns	2	2500.00	5000.00
OTHER	Smart Lab Projectors	2	4000.00	8000.00
	TOTAL YEAR FOUR			**309,006.00**
	YEAR FIVE			
ANAT	ANAT Replacement Computers	6	2000.00	12000.00
BIOL	Laboratory Freezer	1	1050.00	1050.00
BIOL	Thermal Cycler	2	6000.00	12000.00
BIOL	BIOL Replacement Computers	6	2000.00	12000.00
BIOL	PCR	1	10000.00	10000.00
CHEM	Pipette Packs	5	1900.00	9500.00
CHEM	Diagger Spectrophotometers	4	1955.00	7820.00
CHEM	Laptop Computers	24	2000.00	48000.00
CHEM	CHEM Replacement Computers	6	2000.00	12000.00
CHEM	Vernier UV Vis-Spectrophotometer	20	2887.00	57740.00
GEOL	GEOL Computers	6	2000.00	12000.00
GEOL	Portlog Weather Logger	1	4100.00	4100.00
MICRO	Eppendorf* Model 5424/5424R Microcentrifuges	2	2800.00	5600.00
MICRO	Thermo Scientific Large Capacity Incubator	1	10000.00	10000.00
MICRO	Automatic Plate Pourer	1	16500.00	16500.00
MICRO	Slide Drying Bench	1	1100.00	1100.00
PHYSIC	Stress/Strain Experimental Apparatus	2	1000.00	2000.00
PHYSIC	Photoelectric Effect Apparatus	2	1300.00	2600.00
PHYSIC	Geiger Counter	2	1479.00	2958.00
PHYSIC	e/m apparatus	2	1600.00	3200.00
PHYSIC	Driven Damped Harmonic Oscillator	2	1650.00	3300.00
PHYSIC	Millikan Apparatus	2	1700.00	3400.00
PHYSIC	ESR/NMR Basic Set	2	1900.00	3800.00

PHYSIC	Planck's Constant apparatus	1	2000.00	2000.00
PHYSIC	PHYSIC Replacement Computers	5	2000.00	10000.00
PHYSIC	ASTRON Replacement Computers	7	2000.00	14000.00
PHYSIC	DiVA Digital Spectrometer	2	2100.00	4200.00
PHYSIC	Optical Pyrometer	2	3000.00	6000.00
PHYSIC	Interferometry System	2	3200.00	6400.00
PHYSIC	Superconductivity Experiment	1	4500.00	4500.00
PHYSIC	Muon Physics Apparatus	1	4500.00	4500.00
PHYSIC	X-Ray Apparatus	1	18000.00	18000.00
PHYSIC	Two Slit Interference Single Photon Apparatus	2	5245.00	10490.00
PHYSIC	CGE Pro 925 HD Computerized Telescope	5	6899.00	34495.00
OTHER	Smart Lab Computers	3	2000.00	6000.00
OTHER	Smart Lab Lecturns	3	2500.00	7500.00
OTHER	Smart Lab Projectors	3	4000.00	12000.00
	TOTAL YEAR FIVE			**392,753.00**

TOTAL EQUIPMENT	**375,358**	**287,873**	**285,400**	**309,006**	**392,753**

e. SUPPLIES	**2011-2012**	**2012-2013**	**2013-2014**	**2014-2015**	**2015-2016**
Laboratory supplies with a per unit cost less than $1000. Laboratory supplies included in this proposal are based on existing departmental needs identified in planning, program review and other departmental documents. All laboratory equipment purchases have been evaluated by a committee of full-time STEM faculty and reviewed by the project Steering Committee. All prices include applicable taxes and shipping.					

DEPT	**YEAR ONE**			
ANAT	Human Physiology with Veriner Lab Book	1	48.00	48.00
ANAT	25g - Accelerometer	6	92.00	552.00
ANAT	Logger Pro Software	1	189.00	189.00
ANAT	Ken-A-Vision Video Flex Microvideo Camera	1	995.00	995.00
ANAT	CO2 Gas Sensor	6	249.00	1494.00
CHEM	Vernier Melt Station	25	399.00	9975.00
CHEM	Magnetic Stirrer/Hot Plate	25	653.00	16325.00
GEOL	Student Polarizing Microscopes	3	725.00	2175.00

GEOL	Thin Section Set, Minerals	1	780.00	780.00
GEOL	Brunton Compasses	5	800.00	4000.00
MICRO	WARD'S Micropipette, 0.5–10 µL	5	130.00	650.00
MICRO	WARD'S Micropipette, 10–100 µL	10	130.00	1300.00
MICRO	Pipetter 100 to 1000µL	10	130.00	1300.00
PHYSIC	750 Interface	3	789.00	2367.00
General Supplies	For Activity management including, but not limited to computer software, paper, toner, flash drives, notebooks, photocopying, etc		5000.00	5000.00
Laboratory Supplies	Supplies required for installation of and training on new laboratory equipment as well supplies required for science activities during outreach events including summer science day camps, Sci Fri, and Math, Science and Technology Fair		5000.00	5000.00
	TOTAL YEAR ONE			**52150.00**
	YEAR TWO			
BIOL	Vrotex Mixers	3	278.00	834.00
BIOL	Eppendorf Pipets	3	360.00	1080.00
BIOL	Platform Rockers	3	425.00	1275.00
BIOL	Digital Hot Plate/Stirrer	3	435.00	1305.00
BIOL	Incubators	1	695.00	695.00
BIOL	Triple Water Bath	1	900.00	900.00
CS	VMware Workstation 7.1	33	108.00	3564.00
CS	LEGO Mindstorms Education NXT 2.0	10	279.00	2790.00
PHYSIC	Photogate Breaks	9	19.00	171.00
PHYSIC	Photogate Heads	10	44.00	440.00
PHYSIC	B&K Precision Digital Multimeters	15	105.00	1575.00
PHYSIC	AE Digital Scale 1500g	3	131.00	393.00
PHYSIC	Digital Power Supply	6	157.00	942.00
PHYSIC	AE Digital Scale 3000g	2	184.00	368.00
PHYSIC	LRC Meters	3	199.00	597.00
PHYSIC	PAStrack Dymamics System	2	235.00	470.00
PHYSIC	Steam Generator	2	389.00	778.00
General Supplies	For Activity management including, but not limited to computer software, paper, toner, flash drives, notebooks, photocopying, etc		5000.00	5000.00

Laboratory Supplies	Supplies required for installation of and training on new laboratory equipment as well supplies required for science activities during outreach events including summer science day camps, Sci Fri, and Math, Science and Technology Fair		5000.00	5000.00
	TOTAL YEAR TWO			**28177.00**
	YEAR THREE			
GIS	Opaque Projector	1	829.00	829.00
General Supplies	For Activity management including, but not limited to computer software, paper, toner, flash drives, notebooks, photocopying, etc		5000.00	5000.00
Laboratory Supplies	Supplies required for installation of and training on new laboratory equipment as well supplies required for science activities during outreach events including summer science day camps, Sci Fri, and Math, Science and Technology Fair		5000.00	5000.00
	TOTAL YEAR THREE			**10829.00**
	YEAR FOUR			
ANAT	Altay Human Heart Model	4	54.00	216.00
ANAT	Altay Human Ovary Model	3	85.00	255.00
ANAT	Altay Human Female Reproductive System Model	3	105.00	315.00
ANAT	Altay Liver and Gall Bladder with Pancreas and Duodenum Model	3	115.00	345.00
ANAT	Altay Human Male Reproductive System Model Set	3	125.00	375.00
ANAT	Altay Human Vertabrae Spinal Cord Dissection Model	3	125.00	375.00
ANAT	Denoyer-Geppert Premier™ Lumbar Vertebrae Set	4	125.00	500.00
ANAT	Altay Human Blood Cell Types Model	4	154.00	616.00
ANAT	Altay Human Respiratory System Model	4	155.00	620.00
ANAT	Altay Human Endocrine Organs Model	3	173.00	519.00
ANAT	Somso Nephron Model	3	180.00	540.00
ANAT	Altay Skeletal Muscle Fiber Model	3	200.00	600.00
ANAT	Somso Human Kidney and Adrenal Gland Model	3	215.00	645.00
ANAT	Cyber-Anatomy Human CD-ROM	1	235.00	235.00
ANAT	Denoyer-Geppert Pre Flex Spine w/ Female Pelvis	3	250.00	750.00
ANAT	Denoyer-Geppert UltraFlex™ Full-Function Knee	4	250.00	1000.00
ANAT	Altay Microsctructure of Artery and Vein Model	2	260.00	520.00
ANAT	Somso Human Spleen, Duodenum and Pancreas Model	3	296.00	888.00

ANAT	Altay Human Kidney, Nephron and Renal Corpuscle Model	3	300.00	900.00
ANAT	Somso Oversized Kidney Model	3	339.00	1017.00
ANAT	Somso Human Skin Section Model	4	350.00	1400.00
ANAT	Somso Human Spinal Cord Section Model	4	350.00	1400.00
ANAT	Denoyer-Geppert Classic Eye in Orbit, 3 times life-size, 7 part	4	350.00	1400.00
ANAT	Denoyer-Geppert Intestinal Villi	4	400.00	1600.00
ANAT	Denoyer-Geppart Heart of America Model	3	407.00	1221.00
ANAT	Somso Larynx, Trachea and Bronchi Model	4	700.00	2800.00
ANAT	Somso Human Eye in Orbit Model	3	755.00	2265.00
ANAT	Denoyer-Geppert Delux Bisected Skull	2	800.00	1600.00
ANAT	Somso 4-Part Human Heart Model	3	830.00	2490.00
BIOL	Common House Cat Skull	1	80.00	80.00
BIOL	Fruit Bat Skull	1	80.00	80.00
BIOL	Chinese Giant Salamander Skull	1	98.00	98.00
BIOL	Tuarta Skull	1	120.00	120.00
BIOL	Whitetail Deer Doe Skull	1	145.00	145.00
BIOL	Giant Armadillo Sjull	1	145.00	145.00
BIOL	Chinese Water Deer Skull	1	150.00	150.00
BIOL	Koala Skull	1	154.00	154.00
BIOL	Vrotex Mixers	3	278.00	834.00
BIOL	Eppendorf Pipets	3	360.00	1080.00
BIOL	Platform Rockers	3	425.00	1275.00
BIOL	Digital Hot Plate/Stirrer	3	435.00	1305.00
BIOL	Incubators	1	695.00	695.00
BIOL	Triple Water Bath	1	900.00	900.00
BIOL	Ken-A-Vision Video Flex Microvideo Camera	1	995.00	995.00
CHEM	Organic Chemistry Micro Kit	24	229.00	5496.00
CHEM	Vernier Melt Station	20	399.00	7980.00
CHEM	Organic Chemistry Macro Kit	24	603.00	14472.00
GEOL	Pangea Globe	1	250.00	250.00
GEOL	Student Polarizing Microscopes	3	725.00	2175.00
GEOL	Brunton Compasses	5	800.00	4000.00
GEOL	Seasonal Display Globe	1	999.00	999.00

MICRO	Elisa Simulation Kit (with Perishables)	1	99.00	99.00
MICRO	Elisa Simulation Refill Kit (with Perishables)	4	49.00	196.00
MICRO	Analog Vortex Mixers	2	241.00	482.00
MICRO	Digital Gel Imaging System, White Light/UV Dual Light	1	999.00	999.00
PHYSIC	Thermal Expansion Apparatus	6	264.00	1584.00
PHYSIC	Coulomb Balance	2	700.00	1400.00
PHYSIC	Adiabatic Gas Law Apparatus	4	850.00	3400.00
PHYSIC	Hall Effect	2	850.00	1700.00
General Supplies	For Activity management including, but not limited to computer software, paper, toner, flash drives, notebooks, photocopying, etc		5000.00	5000.00
Laboratory Supplies	Supplies required for installation of and training on new laboratory equipment as well supplies required for science activities during outreach events including summer science day camps, Sci Fri, and Math, Science and Technology Fair		5000.00	5000.00
	TOTAL YEAR FOUR			**90695.00**
	YEAR FIVE			
ANAT	Anatomy and Physiology, Revealed CD-ROM Series, Vol. 1	2	50.00	100.00
ANAT	Anatomy and Physiology, Revealed CD-ROM Series, Vol. 2	2	50.00	100.00
ANAT	Human Heart Model	3	70.00	210.00
ANAT	Human Small Intestine Biosmount	1	108.00	108.00
ANAT	3B Fucntion Larynx Model	3	175.00	525.00
ANAT	Cyber-Anatomy Human CD-ROM	2	200.00	400.00
ANAT	3B Liver Microanatomy Model	3	300.00	900.00
BIOL	Saint Bernard Skull	1	160.00	160.00
BIOL	Pit Bull Skull	1	180.00	180.00
BIOL	American Black Bear Skull and Stand	1	222.00	222.00
BIOL	Sumatra Orangtan Skull and Stand	1	280.00	280.00
BIOL	Horse Skull	1	325.00	325.00
BIOL	African Lion Skull and Stand	1	335.00	335.00
BIOL	Incubators	1	695.00	695.00
BIOL	Triple Water Bath	1	800.00	800.00
CHEM	Support Stands	36	26.00	936.00
CHEM	Digital Thermometers	36	28.00	1008.00

CHEM	Timer-Stop Watch	90	33.00	2970.00
CHEM	Lab Jack	75	79.00	5925.00
CHEM	LabQuest Mini	45	149.00	6705.00
CHEM	Organic Distallation Kit	24	231.00	5544.00
CHEM	Heating Mantle	30	278.00	8340.00
CHEM	Diagger Adjustable Volume Dispenser	10	403.00	4030.00
CHEM	Ohaus Scot Pro Balance	36	479.00	17244.00
CHEM	Magnetic Stirrer/Hot Plate	25	653.00	16325.00
MICRO	Portable White Light Illuminator	1	70.00	70.00
PHYSIC	Coulomb Balance	2	700.00	1400.00
PHYSIC	Hall Effect	2	850.00	1700.00
General Supplies	For Activity management including, but not limited to computer software, paper, toner, flash drives, notebooks, photocopying, etc		5000.00	5000.00
Laboratory Supplies	Supplies required for installation of and training on new laboratory equipment as well supplies required for science activities during outreach events including summer science day camps, Sci Fri, and Math, Science and Technology Fair		5000.00	5000.00
	YEAR FIVE TOTAL			**87,537**

TOTAL SUPPLIES	**52,150**	**28,177**	**10,829**	**90,695**	**87,537**

e. CONTRACTUAL – None	**0**	**0**	**0**	**0**	**0**

f. CONSTRUCTION	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
Renovation including relocation and addition of electrical sockets, and adding network and data cabling in existing laboratories.	0	0	20,000	20,000	0
TOTAL CONSTRUCTION	**0**	**0**	**20,000**	**20,000**	**0**

f. OTHER	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**2015-16**
External Expertise for Faculty/Staff Development: Staff Development Training Experts and general expertise ($10,000) These experts are needed to work with the faculty and staff to provide guidance and training in STEM related disciplines as well as best practices in teaching and learning	10,000	10,000	10,000	10,000	10,000

External Evaluator-Dr. Inge Peltzer requested yearly per evaluation plan. $8,000 per year. 1 day prep, 2 day visit, 1 day analysis/report writing. 4 days at $1500/day + 4 days lodging and per diem at $250/day + car rental. $500 per year for copying and duplication costs for reports and materials for Steering Committee.	8,000	8,000	8,000	8,000	8,000
Institutional Development Specialist – Part-time consultative position (for the term of the grant only) will work with the Project Director, Director of Grant Development and Management and other staff as appropriate to maximize the effectiveness of the new program initiatives developed.	30,000	30,000	28,000	26,000	24,000
TOTAL OTHER	**48,000**	**48,000**	**46,000**	**44,000**	**42,000**

TOTAL BUDGET	**2011-2012**	**2012-2013**	**2013-2014**	**2014-2015**	**2015-2016**
	870,000	**870,000**	**870,000**	**870,000**	**870,000**