

COVER PAGE

Connecticut State Department of Education
 Bureau of Choice Programs, Hartford, Connecticut
 GRANT APPLICATION FY 2011-2013
 INTERDISTRICT COOPERATIVE GRANT

Project Title	Accelerating Achievement in Science and Mathematics (AASM)	
Name of Applicant District/Agency	EDUCATION CONNECTION	
Town Code	242	
Check the appropriate sponsor type. (i.e. School Boards, Regional Educational Service Center or Nonsectarian Nonprofit)	ACES CES CREC EASTCONN LEARN <input checked="" type="checkbox"/> EDUCATION CONNECTION	Cooperative Arrangement between two or more Local or Regional School Boards Cooperative Arrangement between RESC and two or more Local or Regional School Boards Nonsectarian Nonprofit
Application Type	Summer Summer and Residential <input checked="" type="checkbox"/> Academic Year Summer and Academic Year Residential and Academic Year	
Total Number of Students Served	400 Total: 200 Year 1 (2011-2012); 200 Year 2 (2012-2013)	
Program Length (entire duration of program)	# Days = 180 #Hours = 65 (must be at least 45 hours)	
Average number of Contact Hours per Student	45 (must be at least 30)	
Fiscal Agent (if other than applicant)		
Contact Person's Name and Title	[REDACTED]	
Agency Name and Address	EDUCATION CONNECTION 355 Goshen Road P.O. Box 909 Litchfield, CT 06759-0909	

Phone	[REDACTED]
Fax	[REDACTED]
E-mail	[REDACTED]
Year 2011-2012 Funds Requested	[REDACTED]
Year 2012-2013 Funds Requested	[REDACTED]
Names of participating school districts. See next pages for Superintendent Sign-Off Forms. Make additional copies of form as needed.	[REDACTED]
	[REDACTED]
	[REDACTED]
	[REDACTED]
	5.
	6.
Name of Superintendent/Director	[REDACTED]

I hereby certify that the information contained in this application is true and accurate to the best of my knowledge and belief. Signature:	Date 1/18/11
Signature of superintendent of schools/director, fiscal agent or signature of authorized agent (nonprofit corporations - attach corporate resolution)	

Connecticut State Department of Education
Bureau of Choice Programs
Hartford, Connecticut

GRANT APPLICATION FY 2011-2013
INTERDISTRICT COOPERATIVE GRANT

Participating Superintendent Signature Page

Name of Applicant District/Agency	EDUCATION CONNECTION
Project Title	Accelerating Achievement in Science and Mathematics
Name of Participating School Districts	
Signature of Superintendent/Director	<i>A letter for each participating district with Signature of Superintendent is included in this proposal.</i>

Abstract and Program Description

The CSDE maintains a public catalogue on the web for all interdistrict cooperative programs. The CSDE will add the project identification number and the grant award amount and shall include the abstract below. Please ensure that all e-mail addresses are working. The CSDE will not accept **applications with incomplete abstracts or abstracts over the five hundred (500) word count.**

Title of Program	Accelerating Achievement in Science and Mathematics
Applicant or Grantee	EDUCATION CONNECTION
Town or City Where Program is Located	██ and Litchfield, CT (EDUCATION CONNECTION)
Complete Address of Program Site	355 Goshen Road, Litchfield CT 06759-0909 and various participating district, college, and industry locations.
Days of Week and Hours of Operation	8:00 AM - 6:00 PM weekdays; 9:00 AM - 4:00 PM Saturdays
Age Ranges of Students	10 th and 11 th grade (ages 14 – 17)
Participating School Districts	██
Indicate: a) Summer; b) Summer Residential; c) Academic Year; d) Summer and Academic Year; e) Residential and Academic Year	Academic Year
Total Number of Students	400 Total: 200 Year 1 (2011-2012); 200 Year 2 (2012-2013)
Contact Person	██
Telephone	████████████████████
Fax	████████████████
E-mail Address	██
Project Number	
Award Amount	

Abstract (Description of the Program) - Maximum of five hundred (500) typed words using Times New Roman Font Size = 12:

The **Accelerating Achievement in Science and Mathematics (AASM)** Program has been developed to reduce racial, ethnic, and economic isolation while at the same time promoting academic achievement in the sciences, specifically chemistry with integrated mathematics. Cultivating cultural competency and a lifelong appreciation for diversity through positive and sustained interactions with persons from different backgrounds is a critical component of AASM. Meaningful interaction is supported by the program design elements of collaborative research and project-based learning. AASM concentrates on improving high school student academic achievement in chemistry for several research-supported reasons: 1) chemistry is viewed as a 'gateway' course whereby student success is vital for continuation in further science coursework in both high school and college, and 2) mathematical skills are fully integrated in chemistry across concepts.

In total, 400 (200 each program year) 10th and 11th grade students in four districts ([REDACTED]) will participate in the program; 40-50% of student participants will be minority.

AASM builds on previous successful multi-district programs developed by EDUCATION CONNECTION's Center for 21st Century Skills. The Center has a proven record of developing and implementing innovative next generation science and mathematics curricula and programs to advance teaching and learning in high schools throughout Connecticut; 40-50% of students currently enrolled in these programs are minority. AASM will enable diverse groups of students from urban and suburban school districts to advance their science and mathematics skills in a culturally rich and supportive learning environment. A Program Manager will coordinate all program components, including student, staff, and mentor recruitment; scheduling of student meetings and events; professional development, reporting, and evaluation activities.

AASM's teaching strategies are grounded in differentiated instruction, culturally responsive teaching, and collaborative project-based learning. AASM teachers will use the dynamic Chemistry 21 curriculum that is context based and responsive to students' different learning styles. Achievement in chemistry will be supported through the significant contact time among students, teachers, industry, and college mentors during: 1) monthly project-based meetings between students in 'partner' urban/suburban districts; 2) quarterly experiential learning events involving all participating students, teachers, and mentors; 3) after school tutoring, homework assistance, and test taking skills; and 4) culminating student team project presentations at the CT Student Innovation EXPO.

Each year, students and teachers will participate in a full-day program, "Science is a Multicultural Endeavor". In the spirit of science, this will involve hands-on inquiry of multicultural issues, with guest speakers (college students/faculty and industry professionals from diverse backgrounds), student activities fostering appreciation of living in a culturally diverse society, and an exploration of how science relies on and is advanced by the contributions of persons from diverse backgrounds around the globe.

Robust formative and summative evaluation will be conducted to assess program strengths and weaknesses and attainment of goals and objectives to reduce racial, ethnic, and economic isolation and support high academic achievement in students. The proposed budget represents a cost effective approach and an excellent return on investment, and is well within the acceptable cost range.

Word Count = 497

Complete the following information outlining economic and race/ethnicity/gender data for participating districts. Certain district demographic data are contained in the Strategic School Profiles which are available on CSDE's website at: www.state.ct.us/sde. For gender data, click "CEDar," then "Student Data," then "Enrollment Data, Trends and Projections," then "Public School Enrollment, then "Public School Enrollment, Race and Gender by Grade, School and District."

Student Economic and Racial/Ethnic Data														
Participating School Districts	% of Students Receiving Free or Reduced Lunch	American Indian or Alaskan Native		Asian/Pacific Islander		Black (Not of Hispanic Origin)		Hispanic		White		Other		Total
		M	F	M	F	M	F	M	F	M	F	M	F	
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Total:		█	█	█	█	█	█	█	█	█	█	█	█	█

Anticipated Student Enrollment														
Participating School Districts	% of Students Receiving Free or Reduced Lunch	American Indian or Alaskan Native		Asian/Pacific Islander		Black (Not of Hispanic Origin)		Hispanic		White		Other		Total
		M	F	M	F	M	F	M	F	M	F	M	F	
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Total:		█	█	█	█	█	█	█	█	█	█	█	█	█

400 Total enrolled in this program (200 per year; 40-50% minority).

Anticipated Program Staff Race/Ethnicity Data

Total number of staff who work directly with students.	American Indian or Alaskan Native		Asian/Pacific Islander		Black (Not of Hispanic Origin)		Hispanic		White		Other		Total
	M	F	M	F	M	F	M	F	M	F	M	F	
	█	█	█	█	█	█	█	█	█	█	█	█	█

█ Total staff anticipated to work in this program.

█ Percentage of minority staff anticipated to work in this program.

Outline of Program Goals, Objectives, Activities and Evaluation

Program Goals	Objectives	Activities	Pre-and-Post Student Assessment and End-of-Year Program Evaluation
State Goal 1 Reduce racial, ethnic and economic isolation	1. By June 30, 2012 and June 30, 2013, 400 racially, ethnically, and economically diverse students (200 per year) from 4 CT school districts (2 urban and 2 suburban) will participate in the Accelerating Achievement in Science and Mathematics , an innovative interdistrict program designed to develop appreciation for diversity and student interest and advance achievement in science and mathematics. <i>It is projected that 40-50% of participating students will be minority.</i>	<ul style="list-style-type: none"> ❖ During the summer and beginning and end of each school year, the AASM Program Manager will conduct outreach at participating schools to promote the program with administrators, teachers, department heads, and guidance counselors with an emphasis on recruitment of minority students. ❖ Students and parents/guardians will receive culturally and language appropriate program outreach and enrollment materials through school open houses, information sessions, superintendent and principal newsletters, and school/district websites. ❖ Participating students will work collaboratively in mixed heterogeneous groups at monthly meetings, quarterly events, and at the CT Student Innovation Exposition (EXPO) each year. ❖ Students will complete diversity attitudinal survey pre-test and post-tests. 	<ul style="list-style-type: none"> ♦ Recruitment efforts will be documented. ♦ A student participant database will be maintained including enrollment, gender, and race/ethnicity by district. <p><u>Student Assessments:</u></p> <ul style="list-style-type: none"> ♦ Pre-Post Diversity Attitudinal Surveys will assess and document reduction in student perceptions of racial, ethnic, and economic isolation and improved appreciation of the value of diversity and attainment of cross-cultural skills. <p><u>End of Year Program Evaluation methods will include:</u></p> <ul style="list-style-type: none"> ♦ End of Year Student, Teacher, and Parent Surveys to assess program effectiveness, including strengths and weaknesses, and help refine/improve the program for the next year <p><i>See Attachments for Survey Templates</i></p>
	2. By June 30, 2012 and June 30, 2013, 400 10 th and 11 th	<ul style="list-style-type: none"> ❖ During spring break each year, students, teachers, staff, and mentors will participate in an 	<ul style="list-style-type: none"> ♦ “Science is a Multicultural Endeavor” workshop response forms will assess

	<p>grade chemistry students from 2 urban and 2 suburban school districts will gain a better understanding of and appreciation for the differences and similarities in beliefs, customs, and attitudes of individuals from varied socio-demographic backgrounds through participation in after school and quarterly meetings, a full-day “Science is a Multicultural Endeavor” workshop, and the CT Student Innovation Exposition (EXPO) (14 total sessions).</p>	<p>inquiry-based, day long workshop, “Science is a Multicultural Endeavor”, facilitated by guest speakers, industry leaders, college students and faculty from varied racial, ethnic, and economic backgrounds.</p> <ul style="list-style-type: none"> ❖ Students will participate in a progressive series of mixed-district group activities that help to build positive, meaningful relationships between students of diverse backgrounds. ❖ Mixed group activities will engage students in exploration of how science relies on and is advanced by the contributions of individuals from diverse backgrounds throughout the world. ❖ At after school, quarterly meetings, the full-day “Science is a Multicultural Endeavor” workshop, and at EXPO, students will have meaningful interaction with racially and ethnically diverse teachers, science professionals, and college students and faculty to better appreciate the role of diversity. 	<p>students’, teachers’, and mentors’ ratings of the workshop in meeting or exceeding their expectations and improving their cultural competency and appreciation of diversity.</p> <p><u>Student Assessments:</u></p> <ul style="list-style-type: none"> ♦ Pre-Post Diversity Attitudinal Surveys will assess and document reduction in student perceptions of racial, ethnic, and economic isolation; improved appreciation of the value of diversity; and attainment of cross-cultural skills.
	<p>3. By June 30, 2012 and June 30, 2013, 400 students (200 per year) from 4 diverse districts will meet for a minimum of 45 face-to-face contact hours and be engaged in interactive, project-based learning activities specifically designed to build competencies in working cooperatively with persons from different racial, ethnic, and socioeconomic backgrounds.</p>	<ul style="list-style-type: none"> ❖ Heterogeneous groups of students from urban and suburban schools will complete science challenge projects focused on chemistry with integrated mathematics that include a research plan, website development, product prototype, exhibit and oral presentation. Student groups will self-select topics of interest for their science challenge projects. Projects will include such chemistry topics such as nanotechnology and materials science that solve a real-world problem or need. ❖ Participating students will attend 8 monthly after school meetings with students in their ‘partner’ district - urban/suburban ‘partner districts’ will be [REDACTED] (16 hrs.). In addition, students from all 4 participating districts will convene for quarterly events held 	<p><u>Student Assessments:</u></p> <ul style="list-style-type: none"> ♦ The Program Manager and teachers will maintain records of student attendance and evaluate participation and collaboration levels at meetings and the CT Student EXPO, using standardized rubrics. ♦ Pre-Post Diversity Attitudinal Surveys will assess and document reduction in student perceptions of racial, ethnic and economic isolation; improved appreciation of the value of diversity; and attainment of cross-cultural skills. <p><u>End of Year Program Evaluation methods will include:</u></p> <ul style="list-style-type: none"> ♦ End of Year Student Surveys ♦ End of Year Parent Surveys ♦ End of Year Teacher Surveys <p><i>See Attachments for Rubric and</i></p>

		<p>off-site at college sites throughout CT, thereby exposing students to a diversity of college environments, students, and faculty. (16 hrs.)</p> <ul style="list-style-type: none"> ❖ Each year, student groups will meet at the Hartford Convention Center for 7 hours at the EXPO, to present their science and mathematics challenge project findings (May). ❖ All participants will attend a full-day program “Science is a Multicultural Endeavor” (6 hrs.). ❖ Students will interact online and via video with each other for <i>an additional 20 hours</i> each year through the AASM online learning platform Moodle and Skype, during after school tutoring and homework support sessions held in their schools. 	<p><i>Survey Templates</i></p>
<p>4. During the entire two year project period, 400 students in the 4 districts will interact with racially and ethnically diverse teachers and college and industry mentors on 14 separate occasions and deepen their understanding and appreciation of the positive role of diversity in education and work environments, and in their personal lives.</p>	<ul style="list-style-type: none"> ❖ Teachers, college faculty, college undergraduate and graduate students, and science and mathematics industry mentors will be recruited to represent racial, ethnic, cultural and gender diversity. <i>It is anticipated that 50-60% will be minority.</i> 	<ul style="list-style-type: none"> ♦ Racial, ethnic, and gender data on teachers and mentors will be collected as part of the evaluation plan. <p><u>Student Assessments:</u></p> <ul style="list-style-type: none"> ♦ Pre-Post Diversity Attitudinal Surveys will assess and document reduction in student perceptions of racial, ethnic, and economic isolation; improved appreciation of the value of diversity; and attainment of cross-cultural skills. 	
<p>5. By August 31, 2011 and August 31, 2012, 8 AASM teachers from the 4 participating districts will complete a two-day professional development training focused on differentiated instruction, culturally responsive teaching, and the AASM</p>	<ul style="list-style-type: none"> ❖ In July-August of each program year, EDUCATION CONNECTION Educational/Instructional Specialists will plan and conduct a two-day professional development (PD) intensive for teachers from all 4 districts. ❖ Professional development sessions will include modeling of evidence-based instructional practices and coaching by expert trainers. ❖ Teacher feedback from the Year 1 sessions will be used to inform and 	<ul style="list-style-type: none"> ♦ Professional development pre-post tests and surveys will assess improvements in teacher: 1) knowledge and skills to create a positive and differentiated learning environment, 2) understanding of the ways in which stereotypes, bias, and student’s cultural references affect the teaching and learning process, and 3) skills in fully integrating cultural 	

	curriculum.	refine the PD content in Year 2.	competencies in the AASM curriculum and all program activities.
State Goal 2 High Academic Achievement of All Students	1. By June 30, 2012 and June 30, 2013, 400 10 th and 11 th grade chemistry students from 2 urban and 2 suburban school districts will improve science competencies as detailed in the CT Core Science Curriculum Frameworks for Chemistry by participating in engaging and progressive educational activities guided by certified teachers and science professionals.	<ul style="list-style-type: none"> ❖ Teachers trained in culturally responsive teaching and differentiated instruction will guide students in activities and project development. ❖ A science curriculum specialist will review the AASM Chem21 curriculum and revise as indicated to incorporate best practices and newly released standards and recommendations. ❖ Students will advance their level of comprehension, depth of inquiry, decision making, social participation, collaboration, data analysis and presentation skills through their collaborative research. ❖ Students will demonstrate grade appropriate, standards-based science and mathematics competencies aligned with <i>CSDE's Core Science and Mathematics Curriculum Frameworks for grades 9-12 and the Next Generation National Science Education Standards</i>. ❖ Students will complete formative and summative assessments embedded in the AASM Program curriculum. ❖ AASM Program Manager will attend monthly and quarterly meetings to monitor the quality of the program implementation. ❖ The program evaluator will review all evaluation instruments (pre-post tests, surveys, etc.) and assure fidelity in the implementation of evaluation activities. 	<u>Student Assessments:</u> <ul style="list-style-type: none"> ♦ Pre-Post CAPT-like science assessments. ♦ Analysis of CAPT science scores for AASM participating students compared to district/school average. ♦ CAPT score improvement for students not meeting goal in 10th grade. ♦ AASM teachers will maintain records of student attendance, grades on formative and summative classroom assessments, and participation and collaboration levels at meetings and EXPO. ♦ Student pre and post assessments will be administered to assess understanding of core science concepts and competencies. Pre-post assessments will be analyzed to document individual student gains. ♦ Successful completion of AASM curriculum including lab experiments, and project-based assessments. <i>See Attachments for Templates</i>
	2. By June 30, 2012 and June 30, 2013, 400 10 th and 11 th grade chemistry students from 2 urban and 2 suburban school districts will refine scientific and mathematics skills as they complete quality	<ul style="list-style-type: none"> ❖ Students will attend <i>monthly</i> project development meetings with their partner district and <i>quarterly</i> all district meetings. ❖ Between face-to-face meetings, students will interact with peers, teachers, and mentors via the online learning platform Moodle in the refinement and completion of their projects. 	<u>Student Assessments:</u> <ul style="list-style-type: none"> ♦ Student team science challenge projects are panel-reviewed in two ways at the CT Student Innovation EXPO using standardized rubrics: 1) the rigor and depth of the solution to the research/challenge question, and 2) the quality of the

	<p>challenged-based projects related to chemistry with integrated mathematics.</p>	<ul style="list-style-type: none"> ❖ Students will complete group challenge projects that include a research plan, website, product prototype, exhibit and oral presentation. ❖ Student project teams will attend the CT Student Innovation EXPO and present their project findings. 	<p>project presentations in both written and oral formats.</p> <p><u>End of Year Program Evaluation:</u></p> <ul style="list-style-type: none"> ♦ Student, Parent, and Teacher Surveys to assess program effectiveness, including strengths and areas for improvement. <p><i>See Attachments for Templates</i></p>
	<p>3. By June 30, 2012 and June 30, 2013, 400 10th and 11th grade chemistry students from 2 urban and 2 suburban school districts will receive supportive services to promote individual student academic achievement in weekly after school extra help sessions.</p>	<ul style="list-style-type: none"> ❖ Students will attend weekly after-school extra help sessions with their regular science teachers. Students will receive individualized homework assistance, tutoring and test-preparation activities that help promote academic achievement in the science. ❖ Teachers will provide culturally responsive differentiated instruction to students in order to promote academic achievement. ❖ Collaboration with teachers and students from 'partner districts' will be supported during support sessions via the AASM program's online Moodle site. 	<ul style="list-style-type: none"> ♦ All students will be assessed for special needs, including ELL learners, and accommodations will be made for them. Teachers will keep records of assessments and interventions.
	<p>4. By the end of the program, 400 students will design and conduct appropriate types of scientific investigations and communicate about science in different formats, using relevant science vocabulary, supporting evidence, and clear logic.</p>	<ul style="list-style-type: none"> ❖ Students will complete program activities with an emphasis on the mastery and application of core science, mathematics, and research concepts, including designing and conducting valid experiments, data analysis, and presentation. ❖ Formative and summative assessments will be used to measure what students know, understand, and can apply as a result of their investigations; assessment results will be used to improve subsequent learning. 	<p><u>Student Assessments:</u></p> <ul style="list-style-type: none"> ♦ Teachers will evaluate student individual and collaborative work using standardized rubrics. <p><i>See Attachments for Problem Solving and Cooperative Learning Rubric Templates.</i></p>

Required Information linked to the Scoring Rubric on page 38 (Appendix C)

1. Reducing Racial, Ethnic and Economic Isolation

Student Recruitment and Composition - Describe how the project brings urban, suburban and rural or economically isolated students together voluntarily for the purpose of reducing racial isolation and enhancing student achievement. The program should have significant diversity among its student participants. The program should describe an effective plan to recruit and retain students from various diverse racial and ethnic groups. What is the anticipated percentage of diverse students?

The Accelerating Achievement in Science and Mathematics (AASM) Program provides a full academic year opportunity for *voluntary* collaboration among 400 (200 annually) 10th and 11th grade students from four diverse districts in Connecticut. **A projected 40-50% of participating students will be minority.** The AASM program will serve students enrolled in standard level college-preparatory chemistry classes in two predominately minority, low-income urban districts ([REDACTED]) and two less diverse suburban districts ([REDACTED]). Students from urban districts will partner with students from suburban districts in collaborative project-based and experiential learning activities focused on science and mathematics.

Through participation in the proposed AASM Interdistrict Cooperative Grant Program, students will develop an appreciation for diversity through a coordinated series of academic-year learning experiences including meetings, workshops, field trips, a collaborative team research project presented at the annual Connecticut Student Innovation Exposition, and a full-day "Science is a Multicultural Endeavor" program.

In the participating districts of [REDACTED], a projected 400 racially, ethnically, and economically diverse students will join together voluntarily to work cooperatively, cultivate positive relationships, and develop cultural competency skills necessary for school, college, and the workplace, while advancing their interest and achievement in science and mathematics.

As minorities are significantly underrepresented both in science and mathematics postsecondary majors and careers, it is vital to provide underrepresented youth with opportunities to encourage and support interest and preparation in these academic areas. Barriers to access and success in science and mathematics by minority students that have been identified in the literature include lack of academic preparation (i.e., completion of four years of science and mathematics and higher level coursework in high school) necessary to pursue science or mathematics postsecondary degrees, and a lack of information about postsecondary degree options and career pathways. As stated in [REDACTED]

[REDACTED], 2009)

AASM provides an innovative approach to overcoming these barriers and strives to achieve equity in math and science achievement in student participants aligned with [REDACTED] call to action:

"The United States [REDACTED]

[REDACTED], 2009)

The critical need for AASM is further supported by examination of district student performance levels on CAPT science and mathematics assessments. In 2010, there were considerable disparities in student CAPT science and mathematics scores among the participating schools. The percentage of students [REDACTED]

It is noteworthy that all of the participating districts have considerable progress to make in student achievement in math and science.

Statewide disparities in student achievement based on socioeconomic status are further evidenced in the most recent *"The Nation's Report Card"* data from the National Assessment of Educational Progress. *CT has the highest achievement gap in the nation among poor and non-poor public school 8th grade students in mathematics, science, reading, and writing. Differences in average scale scores between minority and non-minority students in CT rank consistently among the largest in the U.S.*

The AASM program will enable diverse groups of students from urban and suburban school districts to advance their science and mathematics skills in a culturally rich and supportive learning environment. The program consists of the following components:

- ♦ Pre-program, all AASM teachers participate in high quality professional development workshops related to culturally responsive teaching and differentiated instruction, and the AASM curriculum.
- ♦ AASM students from all four participating districts will meet for a full-day program, entitled "Science is a Multicultural Endeavor" during the spring break of each program year (6 hrs.). In the spirit of science, this will involve a hands-on inquiry of multicultural issues, with guest speakers (including science professionals and college faculty and students from diverse backgrounds), student activities fostering appreciation of living in a culturally diverse society, and an exploration of how science relies on and is advanced by the contributions of persons from diverse backgrounds around the globe (with connections to the book, [REDACTED]).
- ♦ AASM students will collaborate on academic year challenge projects in monthly, face-to-face interdistrict meetings facilitated by certified science teachers. To maximize student interaction, urban and suburban students will meet with their 'partner' district monthly i.e., [REDACTED] and [REDACTED]. These 'partner' district meetings will occur 8 times a year for two hours immediately after school (16 hrs. total). The relatively close geographic proximity of 'partner' districts will maximize student time interacting collaboratively vs. time spent in traveling. Bus transportation will include student transportation home.
- ♦ In addition, students from all four participating districts will collaborate in quarterly events (including meetings and field trips) held at various science and mathematics-focused industry and college venues throughout CT (16 hrs.). These quarterly events will include a variety of science and mathematics-based learning experiences, including seminars, guest speakers, and actual laboratory experiments/demonstrations to help further students' projects as well as their interest in science and mathematics as career pathways.

- ♦ All participating students will meet for a final time in May of each year to present solutions to their science and math-focused challenge projects at the full-day CT Student Innovation Exposition (7 hrs.).
- ♦ In addition, students and teachers will interact with each other through Moodle, a web-based, secure open source online learning platform, at after school academic tutoring, homework assistance, and test preparation sessions held three times per month at their individual schools. Students and teachers will use Moodle to interact in discussion forums with their partner district, to further develop their projects.
- ♦ Project-based learning and culturally responsive differentiated instruction are the primary teaching strategies used to maximize student engagement, involvement, retention, and advancement of science and mathematics skills.
- ♦ Rigorous formative and summative evaluation is conducted to measure improvements in racial, ethnic, and economic isolation and in academic achievement in science and mathematics.

In total, face-to-face contact time among students from diverse racial, ethnic, and economic backgrounds will equal no less than 45 hours. Online interactive Moodle time and videoconferencing via Skype will contribute an additional 20 hours for a total of 65 hours per year.

Accelerating Achievement in Science and Mathematics (AASM) builds on previous successful multi-district programs developed by EDUCATION CONNECTION's Center for 21st Century Skills. The Center for 21st Century Skills at EDUCATION CONNECTION has a proven record of developing and implementing innovative next generation science, mathematics, literacy, and digital media curricula and programs to advance teaching and learning for middle and high school teachers and students. Since 2002, the Center has developed coursework for and managed the highly successful Connecticut Career Choices (CCC) Program. The CCC Program has engaged hundreds of CT urban, suburban, and rural educators and thousands of students in progressive academic experiences in core subject areas enhanced with technology and experiential learning. Cultural diversity is a hallmark of Center programs, 40-50% of enrolled students are minority. Center courses are designed to meet the challenges of rising secondary and postsecondary academic expectations, and develop students' cultural competencies and appreciation of today's diverse global workforce. The four participating districts in this application have enthusiastically committed to the proposed AASM program due to their prior positive experiences in implementing Center-developed coursework.

Teachers participating in the AASM Program will use the Chemistry 21 'Chem21' blended learning curriculum. Use of this nationally recognized in-class and online integrated instructional model will ensure that all students participating in the interdistrict program have access to the same high-quality curriculum and resource materials. Development of the Chem21 blended learning model has been supported in part by the National Science Foundation. The Chem21 online curriculum is hosted by EDUCATION CONNECTION and is housed in the free open-source Moodle platform. Participating teachers will receive supportive technologies (laptop computers and digital projectors) to enhance instruction and to ensure that all students have use of these technologies during AASM meetings and presentations. Additionally, as student inquiry-based projects require materials for hands-on laboratory investigations, project scientific supplies will be provided to each participating school.

Due to the prior work with the districts involved in this application in implementing CCC courses, effective strategies for student recruitment and retention are in place. Student recruitment will occur in the following ways: 1) at the end and beginning of each school year, the Program Manager will meet with participating district teachers, building administrators, department heads, school-to-career coordinators, and guidance counselors to discuss and promote the program, with special emphasis on recruitment of minority students; 2) over the summer and at the beginning of school, print and online program description

and enrollment materials will be made available at all participating schools, and youth community center and agencies in the areas served by the district; 3) the Program Manager will offer informational meetings for all potentially-interested students and their parents/guardians and provide information at fall school open houses; 4) program information will be continually available on district, school, and EDUCATION CONNECTION's websites; 5) program posters will be displayed in prominent areas in participating schools and community sites; 6) program information will be shared with participating district leadership via RESC Alliance and Curriculum Council meetings; and 7) program information will be included in all EXPO communications, including postcards sent to student home addresses.

To retain students in the program, students will be supported in the following ways: 1) no-cost transportation to all meetings and events; 2) the Program Manager will communicate with all students and their families at least monthly (print and email); and 3) teachers and mentors will monitor and support student work in meetings, workshops, and online. All participating students and teachers will have access to a supplemental secure password-protected online learning environment through Moodle. This interactive web-based site is designed to support AASM participants and facilitate the completion of collaborative student team projects. Moodle is a safe forum that allows students, teachers, and mentors to work together toward completing projects, and for ongoing information exchange, homework support, and problem-solving. Moodle hosting and technical support will be supported by other funding sources.

In addition to significant needs in the area of academic improvement in science and mathematics, high school students in the participating districts also experience considerable racial, ethnic, and economic isolation. The 4 participating districts student populations range from [REDACTED] minority with [REDACTED] eligible for free or reduced price school lunch. The participating urban districts have from [REDACTED] minority students compared with [REDACTED] in the suburban districts. Accessible public transportation is limited in the more homogeneous suburban communities where students reside, severely hampering students' ability to interact in school, work, and community settings with persons of varied races, ethnicities, and income levels. This can foster a lack of understanding of and appreciation for persons from backgrounds different than their own. In contrast, schools in the urban districts are predominately minority, and students have limited experience working with non-minority students. Economic disparities are considerable among the districts participating in the program, which will permit students from different socioeconomic groups to gain an appreciation of the importance of equity in access to quality education and employment opportunities. AASM is designed to be barrier-free, and therefore will be provided at no cost to participating students.

Urban, suburban, and rural students rarely have the opportunity to interact and learn from each other and develop solid and supportive relationships. AASM brings diverse groups of interested students together voluntarily, to work cooperatively and passionately towards common goals. All of the activities offered in the program focus on the importance of teamwork and collaborative learning. Students will truly get to know one another as individuals, discover their common interests, and appreciate how their differences inform and add value to their education and their personal lives.

Staff Recruitment and Composition – Describe in detail how the program will recruit and retain a diverse staff from various racial and ethnic groups. What is the anticipated percentage of diverse staff?

A part-time Program Manager ([REDACTED]) at EDUCATION CONNECTION's Center for 21st Century Skills will coordinate the AASM Program. The Center has experience bringing together students, teachers, and higher education and industry professionals to work collaboratively and enhance academic achievement. The AASM Program Manager will coordinate teacher and mentor recruitment, all meetings, field trips, and other program activities and serve as the point of contact with district program leads (teachers and

administrators). An Administrative Assistant ([REDACTED]) will assist the Program Manager in clerical, scheduling, data entry, and reporting duties related to the grant. Teachers recruited to participate in the program will come from diverse ethnic, racial, and economic backgrounds. The teachers will be assigned the responsibility for project teams made up of students from different schools, and for supervising and engaging students in the interdistrict collaboration and communication portion of the project throughout the school year. Each interdistrict team of students will be partnered with a project mentor. Center staff has considerable experience and success in recruiting project mentors from academic institutions throughout the state. Project mentors will be undergraduate and graduate students representing a variety of backgrounds and disciplines in science and mathematics.

Overall it is projected that **50-60% of the program staff composition will represent racially, ethnically, and economically diverse backgrounds.** This includes the AASM Program Manager, teachers, community and higher education partners such as project mentors, and volunteers and guest speakers at meetings and events. Recruiting diverse teachers is a priority and participation in the program by minority teachers will be promoted through partner school and AASM Program staff presentations.

Recruitment of project partners will also be facilitated through cooperation with the [REDACTED]

[REDACTED] (See Attachments for Letter of Support)

The Program Manager will schedule meetings at times and locations convenient to undergraduate and graduate students', science professionals' and college faculty's busy schedules. The Program Manager will act as a liaison among mentors and school staff to address any scheduling issues that arise, ensuring maximum retention of recruited volunteers and staff throughout the Program. As an incentive, undergraduate and graduate student mentors will be offered mileage reimbursement for program-related travel.

Parental Involvement - Describe how the program will involve parents from diverse ethnic and cultural groups in program activities and planning.

Parents from each participating school will be informed of the opportunity for students to enroll in the program. EDUCATION CONNECTION has established an Academy of Digital Arts and Sciences in the districts participating in the AASM program, thus many parents are already familiar with our programs. **The AASM program will be targeted to students and parents from culturally and economically diverse backgrounds in the participating districts.** Parents from each participating school will be informed of the opportunity for enrollment in the AASM program at the end and beginning of each school year by each school's Academy Coordinator and AASM teachers.

The AASM program will hold a pre-program meeting with parents of participants, enlisting the support and assistance of this diverse parent group. It will be important to utilize the skills of this diverse group of community members, as the year-long projects may involve transportation, skills, and equipment beyond the capabilities of school personnel. Parents will be invited to be involved in their students' learning as project facilitators at meetings and in the after school sessions.

Communication with parents will take place throughout each school year via teachers, guidance counselors,

AASM staff presentations, and direct parent communication (email and mail). The Program Manager and teachers will provide informational presentations for parents at organized meetings and school open house nights in each district. A program information packet will be prepared and distributed that contains:

██████████ Packets will be distributed to students and parents and made available on the district and school web sites. All presentations and materials will be literacy and language-appropriate. As school personnel have established channels of communication with students and parents, this will ensure an effective recruitment effort.

Parents will be invited to participate in the coordination of the full-day diversity and cultural appreciation program, entitled “Science is a Multicultural Endeavor”, by facilitating and leading student activities which explore the benefits of living in a culturally diverse society. Parents will be contacted prior to the program each year to identify the ways in which they would like to participate, i.e., planning committee, publicity, workshop facilitator/presenter. E-newsletters will be emailed to parents throughout the year to encourage parent involvement, update them on students’ progress, and receive continued feedback. Hard copies will be mailed to parents without home Internet access. Finally, parents will receive a postcard invitation and encouraged to attend the culminating event, the CT Student Innovation EXPO, in order to experience the results of students’ work first-hand.

Parents/guardians will also complete end-of-year program evaluation surveys to evaluate the program’s effectiveness, strengths, and areas for improvement.

2. High Academic Achievement of All Students in Reading, Writing, Mathematics or Science

Curriculum Design – Describe how the program and activities support, in meaningful ways, efforts to: a) reduce racial, ethnic and economic isolation; and b) increase student achievement.

a) **Reduce Racial, Ethnic, and Economic Isolation:** Building cultural competency and a lifelong appreciation for diversity through positive and sustained interactions with persons from different backgrounds is a critical component of the **Accelerating Achievement in Science and Mathematics Program**. By working together in heterogeneous groups with students from other districts, participants will have the opportunity to learn and grow personally with a diverse group of peers. Meaningful interaction is supported by the program design elements of collaborative research and project-based learning. Not only are new science and mathematics skills achieved, but participants actively work with, learn from, and cultivate respect for other student’s unique perspectives, talents, and contributions throughout their team research and project development. **As students from diverse backgrounds work collaboratively to complete their projects, interpersonal relationships develop which, in turn, reduce racial, ethnic, and economic isolation.** *This project-based learning program will increase student engagement in science and mathematics, support students’ decision-making and communication skills, and provide a direct connection between the field of chemistry and the real world. As diverse student teams collaborate on their projects, they learn the skills necessary to succeed in a multicultural and diverse society.* During participation in the full-day program, “Science is a Multicultural Endeavor”, students will work towards developing an acceptance and respect for cultural differences in small-group projects. In addition, by working collaboratively to complete a year-long project to be presented at the EXPO, students will develop a better appreciation for the perspectives and contributions of individuals from different backgrounds.

Students also need culturally responsive teaching in order to be successful. Culturally responsive teaching recognizes the importance of fully integrating students’ cultural references in the learning process. Through participation in summer professional development sessions, AASM teachers will

learn about culturally responsive teaching strategies, the influence of culture on learning styles, and how to create an atmosphere in the classroom that reflects an acceptance and respect for ethnic and cultural differences. Summer professional development sessions include expert guidance and coaching in the delivery of culturally responsive and differentiated instruction. **The AASM curriculum will also address how scientific research and progress relies on the work of many individuals throughout the world who have different ethnic, social, and economic backgrounds.**

Increase Student Achievement: The AASM program is specifically designed to increase student achievement in science and mathematics, by: 1) engaging students in a dynamic blended learning environment with integrated experiential learning, 2) incorporating after school support services for tutoring, homework assistance, and test skills preparation, and 3) creating substantive opportunities for diverse groups of students design, develop, and collaborate on a science and mathematics-focused research project. **While working on their year-long challenge projects, students will refine decision-making skills, cultivate interpersonal relationships with students from diverse backgrounds, and develop valuable social participation skills.** The real-world, problem-based design of the challenge project will encourage students to take on leadership roles and to identify individual strengths while working collaboratively in a team setting. These projects truly belong to, and are directed by the students; teams quickly realize that the success of their projects depends on their ability to make decisions, delegate responsibilities and work collaboratively with all team members. AASM's project design and its curriculum are highly responsive to the recommendations of the Institute

Chemistry was intentionally selected as the content focus of this program for several reasons. Proficiency in chemistry is vital for success in higher level sciences in both high school and college, as it connects physical, life, and applied sciences such as engineering and health disciplines. Chemistry is often the roadblock to continued study in science by high school students, in part due to the mathematics skills integrated into its content, and a lack of appreciation as to its relevance in our lives.

“Chemistry is

For students to successfully study science or mathematics disciplines in college, achievement in chemistry in high school is critical. ***The Accelerating Achievement in Science and Mathematics Program will help to ensure this success by extending learning time outside the classroom, increasing student achievement and engagement, and providing the academic support and encouragement for students to take more advanced level science courses, and/or complete four years of science in high***

school, and increase student interest in pursuing science and mathematics related fields.

The AASM Program will accelerate individual student achievement in science and mathematics through project-based learning and by providing support services including tutoring, homework assistance, and test taking skills. Many students in college-preparatory chemistry courses need extra help with the mathematical principles that are heavily relied on in the course. Chemistry courses provide a unique opportunity to reinforce and develop critical mathematics skills. Chemistry requires a working knowledge and practice of mathematic operations and topics such as ratios, proportions, unit conversions, percentages, and statistics. Scientific data must be manipulated and presented in a logical manner to make conclusions and communicate findings. In AASM, students will practice and master essential math skills and see the real-world applications of these skills.

The AASM curriculum supports student achievement by closely aligning with state and national science and mathematics standards for high school students, including the *CT Core Science and Mathematics Curriculum Frameworks*. The curriculum is well-aligned with the conceptual framework for the *Next Generation National Science Education Standards*, which are currently under development. CMSA focuses on evidenced-based teaching for understanding through inquiry and collaborative project-based learning. The AASM curriculum is grounded in the *CT Science Frameworks core content standards in scientific inquiry, literacy, and numeracy*, specifically:

SCIENTIFIC INQUIRY

- ◆ Scientific inquiry is a thoughtful and coordinated attempt to search out, describe, explain and predict natural phenomena.
- ◆ Scientific inquiry progresses through a continuous process of questioning, data collection, analysis and interpretation.
- ◆ Scientific inquiry requires the sharing of findings and ideas for critical review by colleagues and other scientists.

SCIENTIFIC LITERACY

- ◆ Scientific literacy includes the ability to read, write, discuss and present coherent ideas about science.
- ◆ Scientific literacy also includes the ability to search for and assess the relevance and credibility of scientific information found in various print and electronic media.

SCIENTIFIC NUMERACY

- ◆ Scientific numeracy includes the ability to use mathematical operations and procedures to calculate, analyze and present scientific data and ideas.

As stated in the CT Core Science Curriculum Frameworks, "Science literacy, in the view of Connecticut science educators, is a combination of understanding major science concepts and theories, using scientific reasoning, and recognizing the complex interactions between science, technology and society." Furthermore, "A scientifically literate person is able to transfer knowledge of the academic theories and principles of science to practical applications in the real world. To support this concept, Connecticut's Core Science Curriculum Framework is structured around these key real-world issues and technologies, rather than around the subdisciplines of the life, physical and earth sciences."

At the core of the AASM Program, students are asked to create a nanotechnology or materials science product or technology that solves a real-world problem or need. Students will research their topic, interact with a scientific mentor, create a website, and develop a written project plan. Topics for challenge projects may include such areas as water/soil purification and environmental remediation, medicine, and biochemical research. For example, students may design a unique water filtration system,

develop an improved package for a product, design a high performance piece of apparel, or investigate ways to improve human health. Progress on student team projects will be shared throughout the year at interdistrict quarterly meetings, with final project presentations (student designed exhibits and oral presentations) to be held at the Connecticut Student Innovation EXPO each May.

At EXPO, students showcase their solutions to the project-based challenge that integrates their learning in chemistry and mathematics. *Students interact with peers from all over the state in a variety of formats (e.g., oral presentations, question and answer sessions) that support cultural competence.* In addition, the challenge project and participation in the CT Student Exposition provide students with what Harvard educator [REDACTED] calls a [REDACTED] that exposes them to new content and skills in a way that cements life-long interest in science and mathematics-related careers.

Teaching Strategies and Learning Styles - Describe how the program utilizes culturally responsive teaching strategies in order to support student achievement.

Every student learns **differently**. As such, the program's teaching strategies are grounded in *differentiated instruction, culturally responsive teaching, and collaborative project-based learning*. The program's staff will be trained to utilize a variety of culturally responsive teaching strategies to ensure that each and every student is fully engaged, accepted and valued, and empowered. The focus on challenged-based research allows for student teams to select and investigate topics that truly interest them. Students continually collaborate and share their unique perspectives and ideas, and practice techniques to provide useful and constructive feedback as an active and contributing member of a team.

Culturally responsive teaching is a pedagogy that recognizes the importance of including students' cultural references in all aspects of learning. *Participation in the program will provide multiple opportunities for teachers to develop and refine culturally responsive teaching strategies.* Teachers will take part in a two-day summer professional development (PD) program that focuses on important pedagogical skills required for successful implementation of the program. The design of summer PD sessions will rely upon the integration of suggestions made in [REDACTED]

During the summer professional development program, teachers will attend workshops on differentiated instructional strategies that are connected to different learning styles, with a focus on respecting the cultures and experiences of various groups and using these as resources for teaching and learning. Teachers will explore culturally responsive instruction by reading, discussing, and reflecting upon selective chapters of [REDACTED]. Reflection questions are included in each chapter, providing deeper individual and group understanding of culture and effective instructional practices. Topics covered in this book include: Who needs culturally proficient instruction, What is culturally proficient instruction, Valuing diversity, and Gaining cultural knowledge.

In addition, teachers will explore thirteen specific teaching strategies for diverse learners. These thirteen strategies will be acquired through reading and applying [REDACTED]. This is a research-based book [REDACTED] intended to improve achievement among all students with a focus on diverse populations. Strategies discussed in the book include collaboration, interdisciplinary teaching, modeling strategies, critical thinking, and the multicultural teaching approach. Additionally, the book includes a chapter focused specifically on strategies for increasing achievement in science.

Through their participation in AASM PD Programs, teachers will develop a better understanding of how including students' cultural references in learning increases students' achievement. The student-centered instruction model that is supported by the Chem21 curriculum helps to meet this objective. Providing instruction within the context of students' personal experiences is a second way to meet this objective. The

Chem21 curriculum explores chemistry in the context of students' real-life experiences such as the chemistry of food, the chemistry of plastics, and the chemistry of energy.

The instructional methods used by AASM teachers are research-based and consistent with state and national science and mathematics standards for high school students, including the *CT Core Science and Mathematics Curriculum Frameworks*. The curriculum is well-aligned with the conceptual framework for the *Next Generation National Science Education Standards*, which are currently under development. CMSA focuses on evidenced-based teaching for understanding through inquiry and collaborative project-based learning.

Supportive Services – Describe the program's strong academic component and academic support.

Academic Tutoring and Homework Assistance

The AASM program will support achievement of students in science by providing weekly after school programs for test preparation and homework assistance. High school chemistry students often struggle with both the science and mathematics components of chemistry, and thus the after school help sessions will help ensure that all students receive the support needed to be successful in their current and future studies.

Students will attend a weekly after school academic tutoring and homework assistance sessions with their certified classroom teacher on those weeks when there is not a partner district meeting. This weekly after school program will extend the learning environment by providing individualized tutoring, homework assistance, and/or test preparation (e.g. CAPT) in order to retain students in the program and to ensure that all students progress in their learning. Many students in college-preparatory chemistry courses need extra help with the scientific and mathematical principles that are heavily relied on in the course. Participating teachers will also use this extra contact time to assess student needs for differentiation and implement special accommodations. During these sessions, teachers provide instruction on effective study and test-taking skills. Teachers will also be able to provide students with practice questions for in-class exams and CAPT-like review questions to promote student achievement.

Special Needs

EDUCATION CONNECTION is committed to providing quality programs and support services to students. All facilities are ADA-compliant. All participating students will be assessed for *special needs, including English Language Learners*, and appropriate accommodations made to assure their full program participation (i.e., bilingual presentations and educational materials, low literacy level materials). English Language Learners comprise █████ of the participating districts' student populations. An interpreter for the deaf, ESL instructor and/or an instructional aide will be employed on an as needed basis. Students will receive support for *accessing ESL, special education, etc.* via differentiated instruction by skilled educators during meetings.

The web-based, online Moodle (learning management system) format offers various avenues for providing student accommodations. For example, a Google translator has been embedded in the Chem21 curriculum, meaning that *all curriculum documents and web pages can be instantly translated into students' native languages*. Additionally, the online learning management system provides substantial support for student learning, as students have more opportunities to communicate with each other and with the teacher through online discussion forums, chats, and blogs. *AASM students will interact via Moodle in the weekly after school programs, including posing questions and solving problems with their partner districts related to their specific challenge project.* Virtual discussions allow students additional time to formulate their comments without the pressure of public speaking often felt during in-class discussions. Students also become more intensively engaged with the course material in a blended learning environment, as it more accurately reflects how they locate and process information in the real world. In addition, having all course

and project materials available online provides built-in accommodation as students can complete assignments at their own pace.

Individual and Group Counseling Services are available through participating district's school guidance, student assistance, and social work services programs. The Program Manager will make appropriate referrals based on AASM teacher recommendations. In addition, community-based resources, [REDACTED] will be made available as needed.

College and Career Readiness

At quarterly meetings and at EXPO, all students receive information on vocational, two-year and four-year colleges. Project-related career information is presented by an ethnically diverse group of industry mentors and guest speakers. Students will also have access to EDUCATION CONNECTION's [REDACTED] online learning module, which will include guidance related to the college application process and ACT/SAT test preparation guidance.

Student Assessment – How will the grantee measure student academic achievement?

Student progress, including attitudes about the importance of diversity and gains academic achievement, will be assessed in a variety of ways. First, all students participating in the program will be given *pre- and post-tests at the beginning and end of the program year* to determine gains in understanding of *core scientific concepts*. In addition, students will take *beginning and end of year pre- and post- surveys that focus on diversity and multicultural issues* (see Attachments) in order to assess whether their attitudes about race, ethnicity, and economic isolation have improved/changed through participation in the program. Students will also be asked to complete *an end-of-year program evaluation to assess attitudes about the program, gains in content knowledge and competencies, identify program strengths and weaknesses, and help refine/improve the program for the next year*.

Another major assessment will be an evaluation of the quality of student team research challenge projects. Teachers, industry mentors, and student peers will participate in project grading and feedback. Student team projects are evaluated in two ways at the CT Student Innovation EXPO: 1) the rigor and depth of the solution to the science challenge question, and 2) the quality of the project presentations in both written and oral formats. Template rubrics for project-based learning and group collaboration that will be adapted for use by AASM teachers in the student assessment process are provided in the Attachments.

Advancement in *individual* student academic attainment will be measured through performance on CAPT-like science assessments, progression of student grades in Chem21 classroom formative and summative assessments, as well as CAPT science section performance.

Formative assessments include the quality of individual student participation in meetings and discussions, and project planning and development. The variety of formats used for assessment enable students from diverse backgrounds to express their knowledge beyond the traditional quiz/exam format. Taken together, formative assessments, along with cumulative/ summative assessments, provide teachers with a better picture of the "whole" student. Student assessment results will be used to inform needed modifications in teaching practices to advance individual student progress and in continuous program improvement.

Program Evaluation

The AASM program evaluation plan will be overseen by [REDACTED], Ph.D., Director of the [REDACTED]. Dr. [REDACTED] has over 15 years of experience conducting evaluations of educational programs in diverse content areas. She has successfully evaluated programs funded by the National Science Foundation, the U.S. Department of

Education, the U.S. Department of Health and Human Services, the National Centers for Disease Control and Prevention (CDC), the Connecticut State Department of Education, the and Connecticut Department of Public Health, among others. She has particular strengths in the integration of qualitative and quantitative research, survey design, sampling, analyzing, summarizing and reporting results, and the use of evaluation results in continuous program improvement. Dr. [REDACTED] will review and align all AASM evaluation tools and practices to assure their fidelity and timely implementation. She will collaborate with the Program Manager in coordination of all evaluation activities to assess project outcomes through the selected methodologies: e.g., parent/student/teacher surveys; student science content and competency pre-post tests, analysis of student enrollment, demographic, and academic performance data.

Systematic qualitative and quantitative evaluation of the AASM Program goals and objectives, methods and materials will occur via several methods:

Student and Teacher Assessments: (See Attachments for Sample Evaluation Surveys and Rubrics)

- To assess the program goal of reducing racial, ethnic, and economic isolation, and the methods there involved, the following evaluation measures will be used:
 - Teacher pre- and-post surveys and daily Professional Development workshop surveys will be administered to assess teacher attitudes and knowledge of culturally responsive teaching strategies. Pre-surveys and daily workshop surveys will be reviewed by Program staff to identify and address additional teacher needs. Post surveys will be used to inform staff of program strengths and weakness and to suggest modifications for year two of the AASM Program.
 - Student pre-and-post surveys including cultural awareness and attitudes will be administered and analyzed to assess the impact of the program on the reduction of racial, ethnic, and economic isolation. Student responses will help to directly inform ongoing additions and modifications to the program.
 - Teachers and program staff will monitor and evaluate student inquiries and work submitted in the Moodle environment to ensure that all participating students, including ELL students, are successfully submitting assignments and are engaged in the program.
- The year-long challenge project is designed such that group collaboration is required for success. Thus, the monitoring and evaluation of these projects will be used as an indicator of the formation of positive, collaborative relationships amongst students from diverse backgrounds. Student progress on these group projects will be monitored by teachers and program staff, and assessed at after school and quarterly meetings.
- To assess the instructional methods and curriculum materials used in the AASM Program, and to ensure that program materials support high academic achievement in science and mathematics, the following measures will be implemented:
 - Proposed AASM course materials will be reviewed and revised by the Science Curriculum Specialist at EDUCATION CONNECTION. All curricula and program materials will be aligned to state and national science standards, and embedded with student formative and summative assessments, as well as teacher curriculum feedback surveys. These assessments and surveys will be reviewed on a regular basis and used to inform further curriculum revisions.
 - The Program Manager will attend monthly student project meetings and quarterly events to assess the quality of program implementation, instructional methods, and use of curricular

materials.

- To assess the goal of increasing achievement in science and mathematics, the following program evaluation measures will be implemented:
 - Student pre-and post-assessments will be administered to assess student gains in understanding of core scientific concepts and competencies. Likert scale data will be analyzed to provide a quantitative measure of results and to indicate progress toward academic goals.
 - Final project assessment will occur via a diverse judging panel at the CT Student Innovation Exposition, using standardized rubrics for the exhibit and oral presentations.
 - Achievement in science and math will also be measured via classroom grades, participation, and attendance measures. Attendance, grades, and participation data will be collected twice a year from participating schools.
 - Analysis of CAPT science scores for AASM participating students compared to district/school average.
 - CAPT score improvement for students not meeting goal in 10th grade.

End of Year Program Evaluation methods will include:

- Student, Parent/Guardian and Teacher Surveys to assess program strengths and weaknesses, and recommendations to refine/improve the program for the next year.

3. IDCG Goals – Overall Program Design – How will the program measure its strengths and weaknesses?

As detailed in the Outline of Program Goals, Objectives, Activities, and Evaluation on pp. 11-15, the **Accelerating Achievement in Science and Mathematics Program** has been developed to reduce racial, ethnic, and economic isolation while at the same time promoting academic achievement in the sciences, specifically chemistry, with integrated mathematics. Participation in the program will foster students' development of essential skills and attitudes that will enable successful integration into diverse colleges and workplaces and build positive, meaningful relationships among students from varied backgrounds. The program includes during school, after school, and school vacation evidence-based academic activities and programs to promote and sustain student achievement.

All participants will be 10th and 11th grade students who elect to enroll in the Chem21 college-preparatory level high school chemistry course. In total, it is projected that 400 students in four districts (2 urban, 2 suburban) will participate in the program. Students in two districts with diverse student populations will be partnered to collaborate on a year-long research project focused around chemistry and their projects will be presented at the Connecticut Student Innovation EXPO. Students from partner districts will meet face-to-face once a month after school to make connections and develop their projects. Students from all 4 districts will also meet face-to-face at quarterly AASM events that will incorporate guest speakers, seminars, lab explorations, and interactive experiences related to the sciences and at the CT Student Innovation EXPO. Through their interactions and collaborations, students will develop a greater appreciation for diversity in our society and prepare them for future endeavors in postsecondary and the workplace.

Students, teachers, and mentors will participate in a full-day, program, entitled "*Science is a Multicultural Endeavor*", with students from all four districts to focus on multicultural awareness, with guest speakers (including university staff and undergraduate and graduate students from diverse backgrounds), student activities to explore living in a culturally diverse society, and an exploration of how science relies on and is advanced by the contributions of individuals from diverse backgrounds.

AASM teachers will use the dynamic Chem21 curriculum that is context based and responsive to students' different learning styles. Achievement in chemistry will be supported through the significant contact time among students, teacher, and industry mentors during: 1) monthly project-based meetings between urban/suburban 'partner districts', 2) quarterly experiential learning events involving all participating students and teachers and industry and postsecondary student and faculty mentors, 3) after school tutoring, homework assistance, and test taking skills, 4) student team presentations of their challenge projects at the CT Student Innovation EXPO.

The program has incorporated strategies for recruiting a diverse population of students in the program that have been previously successful in The Center for 21st Century Skills Programs. Recruitment and communication with students will take place during the summer and each school year through teachers, guidance counselors, AASM staff presentations, and direct parent communication. In addition, AASM Program staff and teachers will provide informational presentations for parents at organized meetings and back to school nights in each district.

The program will be expanded to and involve other stakeholders in the participating districts through ongoing outreach and communication with school administrators, teachers, support staff, parents, PTO/PTAs, and science and mathematics-related industries in the communities served by the Program. The Program Manager will work with the Communications Coordinator and Digital Media Specialists at EDUCATION CONNECTION to develop professional quality publications in both print and web-based formats for use in program outreach and publicity. District superintendents and school principals will be provided with descriptive program articles for inclusion in newsletters available through district/school websites and in communications mailed to parents.

As stated previously, minorities are significantly underrepresented in science and mathematics disciplines. The AASM program will address the barriers to entry in these disciplines for minorities (e.g., being unprepared academically, unfamiliarity with educational opportunities and careers, and the lack of relevant role models) by providing a culturally responsive science and mathematics enrichment program in an engaging, supportive learning environment.

The AASM Program aims to provide exceptional learning experiences and opportunities for a diverse population of students in the sciences and mathematics with a goal of developing innovative, scientifically literate individuals prepared for living and working in a diverse society.

As previously described in the evaluation section, systemic and robust formative and summative evaluation of objectives, methods, and instructional materials will be conducted to assess program strengths and weaknesses and attainment of goals and objectives to reduce racial, ethnic, and economic isolation and support high academic achievement in all participating students. Assessment findings will be used continuously to inform the program design and activities, and modifications will be made by the Program Manager in collaboration with participating teachers as indicated. All assessment procedures used will be responsive to the ethnic and cultural practices of students.

As indicators of program success, expected student outcomes include:

[REDACTED]