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Evaluation Report

Will Snyder

University of Massachusetts Amherst, wsnyder@umext.umass.edu

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STEM Connections Project 2004-2005 Evaluation Summary

Will Snyder, project evaluator
June 17, 2005

GOALS. The evaluation of the third year of the STEM Connections project set out to measure the project's success in attaining the three major goals stated in the project proposal. These project goals are:

1. To provide science teachers in the middle schools in the Springfield school district with training in inquiry-based teaching and learning, including the opportunity to conduct research as part of a team of GK-12 fellows, teachers, and UMass faculty.
2. To provide UMass graduate students and faculty with an opportunity to understand the needs and culture of the schools, laying the foundations for future collaborations.
3. To provide a diverse population of middle school students with role models and mentors.

MEASURES. The 2004-2005 evaluation used several sources of data:

A **pre/post survey for teachers and fellows** was administered on paper at the beginning and end of the seminar, in September and May. The survey listed a range of project objectives and asked participants how important each one was to them individually, and also (in the spring) how well the project had achieved each objective. Both fellows and teachers were also asked to rate the project's success in achieving several objectives for the middle school student experience. Responses were anonymous but pre/post surveys were coded so they could be matched. Twelve of thirteen teachers and four of ten fellows completed both pre and post components. This allowed tracking of individual and group change.

An **email questionnaire for fellows** was administered in November and May. It asked fellows to rate their experiences on a scale and to describe them in text form. Nine of ten fellows responded in the fall and seven of ten responded in the spring, permitting some basis for measuring change.

An **email questionnaire for faculty** was administered once at the midpoint of the year, in January. It asked faculty to rate their experiences on a scale and to describe them in text form. Five of six faculty responded to the questionnaire.

Classroom observations and follow-up interviews with three of ten fellows in April and May were used to provide a fuller picture of the project as background for the evaluation.

A "**Diversity Check**" form was completed by all thirteen teachers, permitting a complete and fairly accurate estimate of the demographic makeup of the student population reached by the project this year.

Notes from informal conversations with teachers and fellows were also used to round out the picture

FINDINGS. A summary of findings is presented here as a response to questions:

Did the project provide adequate training in inquiry-based teaching?

The project provided training that was felt to be successful by a large majority of participating teachers and fellows, the majority of whom started ranked this benefit as very important.

All twelve participating teachers ranked "improved skill in inquiry-based teaching" as an important project benefit in both the pre and post surveys. Two thirds or more ranked it "very important to me". Eleven of the

twelve counted the project as successful in providing this benefit, with four counting it "very successful". Only one teacher counted the project as "fairly unsuccessful" in providing this benefit.

The four fellows who responded to both pre and post surveys agreed by the end of the year that "improved skill in inquiry-based teaching" was an important benefit. One fellow moved his/her rating from "not applicable to me" in the fall to "very important to me" in the spring. Three of the four respondents rated the project "fairly successful in this regard. One of these wrote "Basically I learned by myself and with the help of the teacher instead of through the project itself." One fellow who rated this benefit as "very important to me" rated the project as "not at all successful."

Did the project provide teachers, fellows, & faculty with a good team research experience?

The success of the project in providing a team research experience is not clear. Faculty, fellows, and teachers had different assessments of success, possibly because they brought different expectations and standards to the experience. However, most responses were positive and constructive, there were few strongly negative comments.

A point of confusion may have been that the question combines two project elements: the functioning of the faculty/teacher/fellow team, and the opportunity for scientific research.

A large majority of teachers rated a science research experience as important to them, and they felt the project gave them this experience. Ten of the participating teachers rated "a chance to engage in scientific research" as "fairly important" or "very important" to them at the opening of the year. The following May, eleven rated the project as "fairly successful" or "very successful" in this regard.

Fellows varied much more widely in their interest in and assessment of the research experience provided by the project. One of the four respondents said that this aspect of the project was "not at all successful" Two others rated this project element "fairly successful" and "very successful". A fourth, who seemed more focused on the educational elements of the project, cited "not enough information".

Faculty gave the team experience a more positive rating, but noted that the project afforded little opportunity for teachers to engage in ongoing research. Three of the faculty agreed on the importance of engaging teachers in research in more depth:

"Pay the teachers during the summer to do research in the labs of the faculty advisors."

"Incorporate [teachers] into the core experience of UMass graduate students."

"There needs to be a better mechanism so that teachers can more actively participate in ongoing research, rather than inventing projects for them to do."

One faculty response suggested an approach to do this:

"Recruit fellows who work or will work in the labs of the faculty advisors. This could be the basis of also paying the middle school teachers to work for a summer in the faculty advisor's lab. It is important to get the teachers doing "real" research instead of the grade school research they often pick to do. This will create a more collegial relationship and increase the science communication which might increase the science communicated to the middle school teachers and ultimately to the students. If everyone starts talking the same science vocabulary then the K-12 students will eventually start talking and behaving like scientists."

Fellows' responses about the functioning of the teams focused on planning curriculum and lessons, and their responses indicated a varied experience. In the spring, four out of seven reported success at least to "a moderate extent". In interviews and informal conversations, several (though not all) noted a lack of faculty involvement

in the team. The following comments represent the mixed experience:

"We work well as a team and we use our time together very efficiently."

"The diverse backgrounds and experiences have combined to make for strong planning when we have gathered."

[One challenge our team has experienced is] "Finding time to meet each week to plan lessons, to discuss how previous lessons went, etc."

"One success that my teacher and I have experienced is that we have developed a strong relation that allowed us to work more efficiently during the class periods, spending more time helping students. As with the whole team, I didn't see any success."

". . . The professor working on this project did not participate or help out very much."

Responding faculty rated the team teaching aspect of the project higher than other aspects, with three of the five responding that the fellow/teacher/faculty team had experienced success "to a great extent" and two responding that the success had been "to a moderate extent." In their comments, two noted with satisfaction where fellows and teachers seemed to have established good working relationships.

Did UMass graduate students gain an understanding of the needs and culture of schools that they can apply in the future?

The four fellows responding to both the pre and post surveys gave this aspect of the project their highest priority in both September and May. All four said that this understanding was "very important to me". In the spring, three of the four rated the project "very successful" in this regard and one rated it "fairly successful".

The email survey in November and May yielded similar positive and consistent results. Nine of ten fellows responding in the fall and seven of seven responding in the spring reported that they were "gaining new understanding of the culture and needs of urban schools" either to a "moderate extent" or "to a great extent".

Informal comments from teachers about how well their fellows were working out this year seem to corroborate this success.

Fellows took the time in response to both fall and spring email questionnaires to comment on their experience, providing more evidence of the success of this aspect of the project. Even where the experience was not wholly positive, there was clearly a strong learning experience:

"I do not know how to talk about racial and class inequality. If I say to a student that they will be able to go to college if they study, then I may be lying, I may be overlooking their financial and social situation. Luckily for me, this school has high expectations for the student's future. It is run by blacks for blacks for the most part, and as a response to what was happening in the public schools to black children. There is a real activist spirit there." (fall)

"Some of the kids have a really tough time at home and you feel bad making them focus on the parts of a cell when there is a lot of other much more immediate problems in their lives. I think it is of extreme importance to make every lesson count with these kids, whether it is just building self esteem or a more science related lesson that they can relate to and catch their interest with. For some of these kids this class room is the safest place they will be all day." (fall)

"I think that classroom management was one of the biggest challenges for me. I was not ready for the vocal volume and excitement of the kids I encountered, especially in the [town] classroom. The frequent chatting was hard to talk over but both [teacher] and [teacher] did a fantastic job of bringing the kids back on topic. The challenges of poverty often played a role in the classroom. I had one student who witnessed the death of a

teenage cousin and another student was evicted from her home because her parents could not make the mortgage payments. I had kids who live and sleep in the same room as their siblings and parents." (spring)

"In the urban classrooms I have worked in, students have been very open in sharing details of their lives with me. Many of my students have had substantial struggles in their lives, and as such, are concerned about making good life choices. Due to these struggles, many of the students may not have been given as many opportunities as students in suburban communities (e.g. hands on activities, field trips, access to technology, etc.). Through this project, we have been able to provide some of these types of opportunities, for which students express a great deal of gratitude, enthusiasm and appreciation for." (spring)

Did UMass faculty gain an understanding of the needs and culture of the schools that they can apply to future collaborations?

Only two of the five faculty responding found that their involvement provided increased understanding of the needs and culture of urban schools "to a moderate extent" or "to a great extent". This may reflect the fact that faculty in the project had less direct contact with classrooms and schools, but may also reflect the scientist's reluctance to draw conclusions. One wrote that: "I don't think I can answer this question as I have only interacted with a very small number of schools . . . and with a small number of teachers."

Faculty responses reflected a concern for lack of adequate resources and administrative support for good science teaching from what they had seen in these schools, and an admiration for teachers who, in the words of one, ". . . still have a remarkable ability to motivate students and steer them into new directions." Three of the faculty respondents had suggestions for the design of future outreach programs, which indicated that the project had not dampened their interest in future collaborations.

Was the project's student population diverse?

STEM Connections reached a more diverse audience in 2004-2005 than the statewide average for schools, if "diversity" is defined as numbers of non-white students participating. The student population reached in Springfield was also more diverse than that of the Springfield School District as a whole.

At the same time, the STEM Connections project population as a whole was less diverse than for the 2003-2004 school year; student participation identified as other than "white, not of Hispanic origin" shrank from 51.8% to 38.6%. While the project has been aimed primarily at teachers in Springfield, this year saw only five of thirteen teachers (38%) teaching in that district, down from eight of fifteen (53%) in 2003-2004.

Did the project provide middle school students with positive role models and mentors?

Evidence from both teachers and fellows indicates that STEM Connections was successful in providing positive role models and mentors to the students participating in the project.

In the fall email survey, three of nine fellows responding indicated that they believed they had been able to serve as a positive role model "to a great extent". In the spring, four of the seven fellows responding indicated the same.

Three items on the teacher pre/post survey relating to student outcomes provide another perspective on this question. In May, seven of twelve responding teachers (of thirteen total) indicated that the project had been "very successful" at providing "opportunities to develop relationships with scientist role models". The other five indicated that the project had been "fairly successful". In another measure, seven of the twelve teachers indicated that the project had been successful in promoting "awareness of careers in science and the pathways to get there". Three teachers indicated that the project had been "fairly successful" and only two indicated that the project had been "fairly unsuccessful".

Fellow comments in both the fall and spring provide some corroboration. On both email surveys, fellows were asked to relate an example of a success and an example of a challenge experienced as a role model and/or mentor. Even the challenges suggest that the fellows may be having a positive impact. The following representative responses suggest the high quality of the examples set by the UMass fellows:

"One challenge is trying to explain to the students why we as researchers may not understand exactly what is going on. The students seem to have the misconception that as adults in research we should know everything about our topic of research. It has been hard to convey that the reason we continue to do research is because we are seeking more answers." (fall)

"So far the biggest challenge is the kids who say 'I can't do it' or 'I am not smart enough'. I have had two of these experiences one in each school I work in. Both ended up just being confused and when we sat down and worked through it I think they felt like they had accomplished something. It is a delicate balance between helping them understand and still making them work for it. . . ." (fall)

"Several students in our classes are from my country, and as such they see me as a person that they can become in the future. One of the students in particular is very responsible and hardworking but I felt that she is not motivated enough . . . I believe that in the future she needs to develop self-motivation in order to be successful. . . I talked with her and encourage her to continue doing a great job. I also help her when she has problem with the language and remembering her that she can achieve great things. Because of all this she had develop confidence on me and she has been able to talk with me about cultural experiences." (spring)

"It is clear that students view you as a role model when they begin emulating some of your behaviors and actions both inside and outside of the classroom. Kids seem to notice the smallest details and subtleties of behavior. Moreover, they are curious about how you make choices, and how their lives might be similar or different. Whether it is greeting one another when entering and exiting the classroom, using scientific equipment safely and correctly, or eating healthy foods at lunchtime, kids notice!" (spring)

CONCLUSION. This evaluation, using both quantitative and qualitative measures, finds that the 2004-2005 STEM Connections project generally achieved its three major goals. The most room for improvement may be found in the functioning of the faculty/fellow/teacher teams for both teaching and research. In particular, faculty feedback suggested ways to involve teachers more deeply in ongoing research teamwork. The greatest success appears to be in the fellows experience of life in schools, and their ability to provide role models to students and support to teachers.

Part II: Fellows Survey

May 2005

Dear STEM Connections fellows -

Below are the questions I need answered for this spring's check-in on your fellowship experience. You may recall that you answered these questions last fall, as well.

This information will be used in reporting to the National Science Foundation on STEM Connections' success. All responses are confidential. Specific concerns will be forwarded to PI's only with your permission.

You can answer these questions by email, by telephone, or in person. If by email, simply hit reply and answer the questions below. I may need to follow-up with clarifying questions. If you want to answer by telephone or in person, give me two or three 20 minute times that will work for you.

Expansive comments are welcome. I need to collect all comments by Friday, May 13.

Thanks!

1. Have you been able to serve as a positive role model and/or mentor for the students in the classes you are working with?

not at all	to a small extent	to a moderate extent	to a great extent	not sure
		///	////	

An example of a success you have experienced as a role model and/or mentor:

* I mentored 4 African American Students and several White and Hispanic students in after-school and lunch-time workshops. One White student has won a 1st place and one African American student has won a 3rd place award in the school science fair. The White student who won 1st in the school fair and others from the mentoring group will also be entering the state science fair in June 2005.

The 4 African students were entered into a national science fair with NOBCCChE (National Organization for the Advancement of Black Chemists and Chemical Engineers) where one won 1st place and one won 3rd place.

* I believe I served as a successful role model for all the kids in getting them motivated to follow through with their science fair projects and to be proud of the hard work they put into them.

* An example of a success I have experienced would be seeing the excitement in the students as they present projects or papers they created for class. One day a student asked questions about the chemistry activity the class was working on in small groups. To better understand my explanation he pulled out his notebook, turned to the periodic table of elements he was carrying around on his own accord and said, "Do you mean like this? Show me."

* It is clear that students view you as a role model when they begin emulating some of your behaviors and actions both inside and outside of the classroom. Kids seem to notice the smallest details and subtleties of behavior. Moreover, they are curious about how you make choices, and how their lives might be similar or different. Whether it is greeting one another when entering and exiting the classroom, using scientific equipment safely and correctly, or eating healthy foods at lunchtime, kids notice!

In one case, a student has expressed wanting to study Geosciences at UMass in the future. She frequently asks me about my work, the types of classes she will need to take, and what grades she has to earn for a similar career path.

* Several students in our classes are from my country, and as such they see me as a person that they can become in the future. One of the students in particular is very responsible and hard working but I felt that she is not motivated enough and instead she is a good student because of the pressure from her mother. This is a good pressure, but I believe that in the future she needs to develop self-motivation in order to be successful. This is why I had tried to focus myself to provide her the necessary encouragement to develop self-motivation. I talked with her and encourage her to continue doing a great job. I also help her when she has problem with the language and remembering her that she can achieve great things. Because of all this she had develop confidence on me and she has been able to talk with me about cultural experiences.

* I tried to make a strong connection with all the students involved in the STEMS project. I several lessons I made an effort to engage our most challenging students. At the beginning of the year started my lessons with the physics of flight, the third lesson involved dropping parachutes from a weather balloon and timing the parachutes decent back to earth. I chose, [student], one of [teacher]'s most hyperactive student's. I let [student] become the class leader and operate the weather balloon apparatus. Immediately his hyperactive personality focused on the task at hand. This was an important lesson for me because [student] was ordinarily a big problem

in class.

An example of a challenge you have experienced as a role model and/or mentor:

- * Getting students to believe that they have the potential to succeed with professional careers. Most want to be movie stars, athletes, singers, models and in bands, (from watching too much reality TV).
- * A big challenge remains engaging those who spend a significant amount of their time out of school (suspension, arrests, etc.)
- * One challenge I experienced as a mentor was I did not always know the answer to a question because it was not within my field. The solution was to say, “That is a good question but I really don’t know the answer. But I do know where we might go to find the answer.” Sometimes I had the students find the answer, sometimes I searched on my own and most times we searched together.
- * We have been having a lot of small group activities lately and each time [the teacher] tell them to choose their activities, I have a group of 6 girls who come tearing over to my activity. They are very motivated and enjoy themselves with me. I am sure that it is because of the positive encouragement I give them.
- * It is difficult when students ask you for advice in situations where you cannot be of any practical help. For instance, one student, [student] has ongoing social issues with her classmates. She is very sensitive and often feels isolated from her peers. At times, she thinks others are laughing at her when they are not, while other times, she has described instances where it sounds like she has been targeted. While I can monitor what happens in the science classroom, I otherwise can only advise her what I would do in her situation (e.g. avoid confrontations, report any harassment or otherwise inappropriate behavior to a teacher immediately, work with people she can trust, etc.)
- * It has been very hard for me to see students that don’t like to work hard to achieve things. Recently I was talking with a student that have not being doing very well in some classes and I feel bad because he is one of the students I had tried to motive throughout all the year. The last time I talked to him he told me that he is going to work harder, but I didn’t feel that he was sincere. This is very hard for me because no matter how hard I tried, if he doesn’t want to help himself, not much can be done.
- * I think reaching kids on a personal level in a class of more than twenty five students can be very challenging.

2. Are you gaining new understanding of the culture and needs of urban schools?

not at all	to a small extent	to a moderate extent	to a great extent	not sure
		//	////	

One challenge I have found in working in an urban classroom:

- * Getting students to believe that they have the potential to succeed with professional careers. Most want to be movie stars, athletes, singers, models and in bands, (from watching too much reality TV).
- * Understanding their language and the everyday trials and tribulations they have to deal with when they step outside of school
- * These students are/were a pleasure to work with. Last year I worked in a city setting where the students had no boundaries. This school had a good support system and the students were very well behaved. It was interesting

to see the too extremes. I certainly prefer this group of students.

* Especially learning about the attitudes toward science in this group. A lot of it is quite negative. also the conflict with religious beliefs. One challenge I have found in working in an urban classroom: I have a hard time keeping the volume down and the horsing around down with some of the students. Also I have a hard time telling a student that what they have done is not enough

* I have witnessed other teachers making assumptions about their students based on their (perceived) home and socioeconomic backgrounds. Also, in some cases, teachers do not seem to understand how urban culture(s) may be different than their own in beliefs, attitudes and values. Further, classroom management has been an issue in some cases.

* It has been difficult to realize all the individual problems that students have in their personal lives. Sometimes it seems that those cases have been extracted from movies, but that's not the case. It is a challenge to require students to focus on what they are doing knowing that something could be bothering them.

* I think that classroom management was one of the biggest challenges for me. I was not ready for the vocal volume and excitement of the kids I encountered, especially in the [town] classroom. The frequent chatting was hard to talk over but both [teacher] and [teacher] did a fantastic job of bringing the kids back on topic. The challenges of poverty often played a role in the classroom. I had one student who witnessed the death of a teenage cousin and another student was evicted from her home because her parents could not make the mortgage payments. I had kids who live and sleep in the same room as their siblings and parents.

Something I have enjoyed about working in an urban classroom:

*Seeing attitudinal beliefs change for students and peers, when students win major awards in science, accomplishing something they thought was impossible.

* The kids are not judgmental. Regardless of your background, status, gender, race, age, etc., they welcome you with an open mind.

* This setting was very enjoyable to work in. The students, the school, the surroundings were all wonderful.

* I love my students. They are wonderful people. I will miss them.

* In the urban classrooms I have worked in, students have been very open in sharing details of their lives with me. Many of my students have had substantial struggles in their lives, and as such, are concerned about making good life choices. Due to these struggles, many of the students may not have been given as many opportunities as students in suburban communities (e.g. hands on activities, fieldtrips, access to technology, etc.). Through this project, we have been able to provide some of these types of opportunities, for which students express a great deal of gratitude, enthusiasm and appreciation for.

* It has been great to be working with a huge diversity of students and to know that they get along with each other much better than what it seems in many places of the US. Of course there are exceptions, but not the rule.

* The energy of the kids was great. The camaraderie was fantastic. I found that many of the students were open and honest during their conversations.

3. Has your fellow/teacher/faculty team experienced success thus far?

not at all	to a small extent	to a moderate extent	to a great extent	not sure
/	/	//	//	/

One challenge our team has experienced:

- * Finding time to meet each week to plan lessons, to discuss how previous lessons went, etc.
- * Global Warming did not fit into the curriculum as nicely as we wished it had (one reason is I personally didn't have the background, looking back I regret I did not prepare myself more. But I did start late into the program). The professor working on this project did not participate or help out very much.
- * The school has not been that supportive of our goals lately as the mcas is approaching.
- * In our team, we had hoped to establish a cooperative project where the students would learn and exchange ideas with students from other participating schools. Due to conflicting schedules and differing content needs, this never occurred.
- * I felt all year long that my teacher and I had work alone, and that we were not part of a team. We were working very hard in the topic and to try to push science fair projects to be related to it while this was not the case in other situations. In my experience, I believe that the team concept didn't work pretty well.
- * I believe communication was our biggest weakness, I think that more frequent contact with the advisor and team members would have benefited all of us.

One success our team has experienced:

* My STEM teacher was able to go with me and the 4 African American students to the NOBCChE National Science Fair, where she was able to understand the impact on students from being able to be in the presence of a large number of very successful African American role models.

Cultural role models are important and extremely necessary.

- * We work well as a team and we use our time together very efficiently
- * The Earth & Sky Young producer's radio contest was a good place to teach and have the students learn and explain on their own what Global Warming means to them.
- * I believe I have shown quite a few students that math and science is interesting and worth working at.
- * We were able to use some of the materials and activities developed by other team members and share outcomes and experiences.
- * One success that my teacher and I have experienced is that we have developed a strong relation that allowed us to work more efficiently during the class periods, spending more time helping students. As with the whole team, I didn't see any success.
- * The diverse backgrounds and experiences have combined to make for strong planning when we have gathered.

4. Is this fellowship affecting your career preparation?

not at all	to a small extent	to a moderate extent	to a great extent	not sure
		/	/////	

One positive effect on your career preparation, if any:

* I am now aware that I need to focus more on changing attitudinal beliefs, because I have found that they are very difficult to change.

* It further teaches me how to manage my time efficiently

* This fellowship helped me greatly in seeing successful classroom management techniques at work. In the classroom the teacher was very clear about guidelines and expectations. The school support system worked tightly with the teacher. I also learned how to slow down my teaching techniques, how to explain topics more clearly.

* I am planning to teach next fall if I can get a job.

* This fellowship has allowed me a chance to gain valuable teaching experience and learn effective teaching strategies, such as inquiry-based learning and project based instruction. In the future, I think I will reflect more on my methods of instruction. In addition, I think I will change my expectations of students to include both process and content learning goals.

* My area of research is related to education at college level. The experience that I have acquired throughout all this year has helped me to answer many of the questions about undergraduate students. I have found (not proved scientifically) some patterns in the children that are carried all the way to college. For example, I have seen both kinds of students having similar problems when dealing with units and simple mathematical procedures (probably at different levels).

* I learned that I truly enjoy teaching! My experiences with connecting students with nature and science were great. I will continue this process for the rest of my professional life.

One negative effect on your career preparation, if any:

* That it is difficult for one person or one teacher to help the many, many students who need individual one-on-one help to get them a path to successful academic and career outcomes. A good teacher can always help some, but many are falling through the cracks.

* A significant amount of time has been taken away from my Ph.D. studies

* None come to mind.

* This school has been quite unique. I am not sure how it will be at another school. It might be hard for me to adjust my expectations.

* This fellowship is also quite time consuming. Some weeks, it is very difficult to balance classes, research and teaching, particularly when school schedules change due to holidays, assemblies, testing, etc.

* If any, I would have to say time. I'm a kind of person that likes to do things as best as possible and this sometimes is time requiring when I'm planning an activity for the students.

* None

5. Please add any comments that will help to provide a picture of your experience thus far:

* My experience so far has been very positive. Although we did not focus on our topic entirely on Global Warming, we are having the students focus their school science fair projects and the UMass science conference projects on the 5 main STEM Connection topics. Most of the students seem to have a positive and interested outlook. This coming week the students will present their projects and I know they will be proud of their accomplishments.

Being a STEM Fellow in the classroom is a great opportunity for me to see first hand how a progressive classroom can be run. The teachers I worked with were supportive of me and open to my contributions to the classroom. The students definitely benefited by having an extra mind and helping hands in the class. The Fellow position also allowed for more hands on activities, more inquiry based activities and scientific input in the classroom.

* It has been hard for me to assist in this classroom. I think I want to have more control over the planning, but that has not really been possible for me. I have a feeling that I am being tolerated, but barely. This has an affect on my self esteem at work. This is because the teacher I work with does not want to make many changes in what he plans, and does not want me to have much input. We did end up with a pretty good compromise lately by my doing one out of the three science activities each day I am there. This has allowed me to explore a little to find my own style of teaching and to be creative.

* In general I had a great experience, but I think I feel this way because my teacher has helped me very much in dealing with the school environment and we have developed a good relation and communication. If this were not case, I presume (but I can't guarantee) that the experience would not had been positive.

* Thank you for allowing me to participate in this wonderful experience my knowledge of teaching and bird biology has grown enormously.

Part III: Did STEM Connections reach a diverse population of middle school students in 2004-2005?

STEM Connections reached a more diverse audience in 2004-2005 than the statewide average for schools, if "diversity" is defined as numbers of non-white students participating. The student population reached in Springfield was also more diverse than that of the Springfield School District as a whole. At the same time, the STEM Connections project population as a whole was less diverse than for the 2003-2004 school year; student participation identified as other than "white, not of Hispanic origin" shrank from 51.8% to 38.6%. While the project has been aimed primarily at teachers in Springfield, this year saw only five of thirteen teachers (38%) teaching in that district, down from eight of fifteen (53%) in 2003-2004.

The following table expresses the diversity of STEM Connections student participation in terms of the total participants and Springfield participants. Springfield, by far the most racially diverse community represented in the project, made up only about one third of total project participants.

Data sources for the table: We asked teachers to estimate the numbers of students who were involved in the project for the 2004-2005 school year, including numbers of students by racial/ethnic identification ("how they identify themselves, your best estimate of numbers"). All thirteen participating teachers completed the form, providing a complete and fairly accurate estimate of numbers. We used the racial/ethnic categories below (based on Extension reporting for USDA) which differ slightly from the Massachusetts DoE categories. Statewide and Springfield school district percentages, included for comparison, were drawn from the Massachusetts Department of Education website at <http://profiles.doe.mass.edu>.

	American Indian	Asian	Black not of Hispanic origin	Hispanic	White not of Hispanic origin	multi-racial	total
STEM Connections participants - actual numbers	1	28	140	272	728	17	1186
STEM Connections participation - expressed as a percentage of all project participants	.1%	2.4%	11.8%	22.9%	61.4%	1.4%	
Statewide school enrollment percentages (for comparison)	.3%	4.7%	8.8%	11.5%	74.6%	--	
Springfield STEM Connections participants - actual numbers	--	18	123	173	71	10	395
Springfield STEM Connections participation - expressed as a percentage of Springfield participants	--	4.6%	31.1%	43.8%	18.0%	2.5%	
Springfield district enrollment percentages (for comparison)	.2%	2.4%	28.3%	48.5%	20.7%	--	