



**INVERNESS
RESEARCH**

P.O. Box 313 15 Inverness Way Inverness, CA 94937 T 415.669.7156 F 415.669.7186

www.inverness-research.org

MEMORANDUM

Date: December 13, 2012
To: Greg DeFrancis and Mike Fenzel
From: Jen Helms and Becky Carroll, Inverness Research
Re: **Montshire NIH Health Research Project: Interim Evaluation Report**

Introduction, background, purpose of the memo

This interim report highlights our findings from Inverness Research's evaluation work so far in 2012. The feedback and findings are based on three data sources: observations of the May research symposium at the Montshire, surveys of the teachers following the symposium, and surveys of students both before and after experiencing the unit (either sun safety or nutrition).

We envision the findings presented here as formative feedback to assist you in your future planning.

Research Symposium at the Montshire, May 2012

The symposium this year involved 4 schools and about 100 students total. There were a few teachers and parents also present. As people arrived, they brought their posters to the community room, which was set up with chairs for the whole group. After a brief overview by Mike and Greg of the program at the MMS and the NIH SEPA program, the large group was divided into 4 smaller groups where each group heard 5 presentations. Each small group had about 25 people in the room, including adults and MMS staff). Students who were not presenting were assigned a space to go to, and were encouraged to listen carefully and ask questions.

There were no Dartmouth Researchers at the event.

Posters

Several students brought posters of their health projects that may or may not have connected to the topic of nutrition or sun safety. Some schools brought only students that were presenting, like Middletown Springs, and some schools brought all their students, but

not all of them presented (Thetford, 35 total came). Haverhill brought the entire 6th grade (50 kids), and all of their posters, but only 9 posters were presented.

In general, students seemed very well prepared with notes, and had a presentation plan (who speaks when and about what). One student from Middletown Springs had a pretty elaborate power point presentation. The posters from Haverhill all had a very similar structure, suggesting that they were given quite a lot of guidance in what their poster should include.

Breakdown of presentations:

Middletown Springs: 5 posters, 6 students

Thetford: 5 posters, 6 students

Deerfield Valley: 1 poster, 2 students

Haverhill: 9 posters, 19 students.

Student research questions for the posters include (Note: not all of these were presented):

- Is there a difference in how many breaths an active and inactive person takes in 30 seconds?
- Does chocolate effect your memory?
- Do people who play sports have a higher risk of breaking a bone than someone who doesn't play sports?
- Does eating a brownie affect the number of jumping jacks you can do in one minute?
- Do girls like sweet things more than boys?
- Do computer games cause stress?
- How high will your heartbeat go when you shoot hoops and when you play on the computer?
- How does drinking milk affect people's teeth?
- Does stretching before running affect how fast you run?
- Do different types of music affect students' appetites?
- Do students eat healthy or unhealthy foods?
- Is there a difference between the lung capacity of athletes who play band, athletes who do not play band, non-athletes who play band and non-athletes who don't play band?
- Do people know what foods are healthy and unhealthy for the heart?
- Does running in place effect your memory?
- Does height affect blood pressure?
- How is the price of an apple related to apple sauce, apple juice, and apple jacks?
- How does the amount of calories in organic foods compare to the amount in non-organic foods?
- Does salt effect thirst while doing a physical activity?
- Can 7th graders identify the correct serving size of different foods?
- Which activity has more movement and exercise in PE?
- What is the difference in athletes and non-athletes' pulse rates after doing sit-ups?
- Which grade drinks the most energy drinks?

The presentations went very quickly in most rooms, depending on the number and extent of questions the audience members had for the presentations. One staff member said that in the room she was facilitating, by the last couple of presentations more students were asking questions of the presenters. I didn't see this in either room, where almost exclusively the adults asked the questions.

Highlights of a few of the presentations

Deerfield Valley. 2 girls investigated the question of what types of activities in PE were best for exercise. They observed PE classes and timed the amount of time kids were "active" during different activities. At that time, the choices, were rope climbing, archery, and soccer. They concluded that soccer was more active than rope climbing.

Haverhill. 2 girls investigated whether or not there was a difference in pulse rate after doing sit-ups in non-athletes vs. athletes. They had a sample size of 30 (15 girls and 15 boys), half of whom were athletes (self-appointed) and half were non-athletes. They found that athletes had a higher pulse rate (which should actually not be the case!). The students noted that more subjects would have improved their study, as well as doing it one by one (they did it in groups), because they tended to talk to one another, which they believe may have influenced the results.

Thetford. One boy investigated which grade at his school tended to drink the most energy drinks. After surveying the entire student body (280), he found that overwhelmingly, the 10th graders drank the most. This boy was painfully shy, really hating having to present! He did a good job though, and answered the questions thoughtfully (eg. how did you get the students to respond to the survey? What questions did your survey include? What is the danger of too many energy drinks? What role might the media play in kids choosing energy drinks?)

Haverhill. 3 students investigated the question of whether or not girls like sweet things more than boys. Their hypothesis was that they would, since "girls are sweet!" They found that girls do not prefer sweets more than boys. They also said they read a Danish study that found that girls can taste flavors that are less defined than boys.

Middletown Springs. One boy reported on an elaborate study testing UV protection using UV beads and a variety of variables – sunscreens of different strengths, regular clothing, UV clothing, and shade. He also tested both in VT and the US Virgin Islands.

Informal conversations with teachers and students

Conversations with students and teachers revealed that they were very excited to be at the Montshire and participating in the symposium. Overall, the teachers were pleased with their students' performances. One teacher allowed the class to vote on which projects would be presenting at the symposium.

The students were very enthusiastic about their research projects, as well as the opportunity to present at the symposium. Their major message was that they prefer this kind of science learning because "we can choose anything we want to study, and the teacher doesn't know

the answer. It is better than the kits because we learn what we want to learn.” They also said that they felt that doing the projects did impact their behavior in terms of snacking, sun protection, and video game playing.

Over lunch, I spoke with a group of girls from Haverhill. The following quotes illustrate their enthusiasm for this project, and for the symposium experience:

I like this project because we can ask whatever questions we like.

This project was different because we worked with people we didn't know and got to know them better.

I really liked finding out if the type of music people listen to affect how much they eat. Rock music made people eat the most, and spooky music made them eat the least. The people listening to the spooky music were laughing and screaming a lot.

I wondered if stretching before running made you run faster. It does not – it makes you run slower.

I was scared [to present] at first, but then it was ok when I realized the group was smaller [than the whole group in the beginning]. It really does build your confidence to do this kind of thing! I would like to ask more questions about music and appetite. I think if I could do 5 projects on this it would be fun!

I also talked briefly with a parent from Haverhill who was very excited about what she saw, but still had questions about who was doing what, where the grant came from.

IR reflections

Overall, the symposium was a success. The teachers, students, parents and staff seemed pleased with the level of engagement and enthusiasm of the teachers and students. In a debrief with Greg and Mike following the meeting, we discussed a few issues that could be addressed for future planning:

- The role of the Dartmouth researchers at the symposium. This year, they were not invited to the symposium. We discussed the importance of having them there because they are part of the project and would be interested in what the students did, and simply for good will. Also, parents might find it interesting to meet and hear from them. The key is devising a meaningful role for them while at the meeting. Perhaps they could do a short presentation on their work, as well as the connections between the research they do and what the students did.
- Keeping teachers engaged in the project over time. There is a handful of very enthusiastic, dedicated teachers who could be tapped to stay involved in meaningful ways, particularly with respect to the research aspect of the project. Could they participate as facilitators of future workshops or the research symposia? Help other teachers in their classrooms with the materials? It makes sense to think about

meaningful roles for these teachers going forward. The idea of a Facebook page, or other online means of staying connected was discussed.

- How to accommodate a growing interest in attending the research symposium? As more cohorts are added to the project, more teachers will want to attend the symposium. There is, of course, limited space for them at the museum. We discussed the possibility of having two symposia. The small group presentations discussions are an important design feature of the symposium – it would be beneficial to devise a way to maintain this design while accommodating all who are interested in participating.
- Parent and administrator involvement. Talking with the one parent who was excited about the project but knew very little about it raised the question of how to reach out more purposefully to the larger school community, including parents and administrators.

Data from the teacher survey

We included questions about the research symposium on the survey we administered following the symposium (the remaining results from the survey are in the following section).

Four of eight teachers responded that they attended the research symposium. Of those four, one said s/he brought mostly higher performing students, one said a cross-section, and two specified “other” – with explanations below:

All of my students attended. The presenters were a cross-section of my students.

Mostly brighter students, one who is bright but not very motivated and one who I would say is average.

We asked teachers to rate their experiences at the research symposium. The table below includes their responses.

Answer Options	Disagree Strongly	Disagree	Mixed	Agree	Agree Strongly
I came to the symposium with clear expectations about how my students would be expected to participate.	0	0	0	1	3
My students came to the symposium with clear expectations for their participation.	0	0	1	1	2
The opportunity to present their research was exciting for my students.	0	0	0	1	3

My students were well prepared to present their research.	0	0	0	2	2
The breakouts worked well as a way for my students to share and learn about research.	0	0	1	1	2
The symposium was well-paced (e.g., there was enough time to ask questions and interact with Dartmouth researchers).	0	0	1	2	1
My students were interested in other presentations.	0	0	1	1	2
I thought the experience was valuable for my students.	0	0	0	1	3
My students thought the experience was valuable.	0	0	1	0	3

All of the teachers who responded said they would recommend the symposium to other teachers. Their comments are below:

It's a great opportunity to show their projects to an audience in a scientific setting.

Unlike some, I think competition is good for students. I think the symposium is great for the academic person...Here is a chance where the academically gifted get a chance to shine (as opposed to just athletes). The learning from seeing what others have done is probably better than my telling them what others do.

It is a great way for students to ask and answer questions, and learn about the scientific process.

It was a wonderful experience for my students - from developing a question to presenting their work to others. All of my students, not just the symposium presenters learned a lot about the process. I was a bit disappointed that there did not seem to be any Dartmouth researchers in our group. I had 'talked that part up' quite a bit. Maybe they were there, but I didn't hear any questions from them.

Advice they would give other teachers attending the symposium:

Do it!!

Do it...the year after you will have to do less 'selling' of the idea because the students who went the previous year will do the selling for you!

Coordinate the project with the grade level classroom teachers to assist with the math and set up of the project.

If your students can come up with a testable question, and an idea of how the results might be able to influence the behavior of others, then they are on the right track.

Teacher Feedback

We invited all of the teachers involved in the project to complete a survey administered online via Survey Monkey. Fifteen teachers completed the survey.

Teacher Characteristics

Grade levels taught

Grade Level	# Ts
3	1
4	3
5	8
6	6
7	5
8	5

The majority of the teachers are teaching in upper elementary or middle school. This is an experienced group of teachers, with 80% of them teaching at least 4 years, and ½ of those teaching 11 or more years.

Subjects taught

7 teachers are elementary education generalists, 4 are health teachers, 2 are PE teachers and 7 are science teachers. All but one of these teachers have been teaching these subjects for at least 4 years, 10 of them 11 years or more.

Teaching context

The majority of the teachers characterize their teaching context as rural (80%), serving either a low (33%) or mixed (47%) SES population. While there are very few ELL students in these schools, teachers report approximately 24% the students are special education.

Nutrition Unit

Prior to joining the project, only 28% reported being familiar with effective approaches to teaching nutrition. 47% reported being somewhat familiar, and 27% reported being not at all or slightly familiar.

At the time of the survey, 10 teachers had used the nutrition materials in their teaching, 4 had not but planned to, and 1 had not and had no plans to. Most of the teachers did not use

the materials this year because they teach mixed grade classes and will address nutrition every other year. Complete answers regarding reasons for not using them yet are below:

The human body/nutrition unit is one that is implemented in 5th grade (which I will "loop back" to for the 1012-2013 academic year). The unit is co-taught with our health educator as part of the 5th grade health curriculum.

My student teacher did her own human body unit at the beginning of the year and included some nutrition info. Additionally, the guidance counselor brought in someone to discuss health and nutrition with the 5th grade class. I also had other material to cover and ran out of time.

I only teach the human body every other year. This year we only did sun safety

I loop, so I used them last year and will use them again next year.

Half of the teachers that used the materials this year spent at least 1 week on the materials, with a couple of teachers spending more than 2 weeks. Seven teachers noted said that it took about as much time as s/he expected, 3 said it took more time than expected.

Teachers do not appear to be modifying the materials. Of those who used them this year, 7 modified them to a small extent if at all, one person modified to some extent, one to a large extent, and one to a very great extent. Comments about the nature of their modifications are below:

I added a nutrition diary

I added school-based information.

It was a follow-up to food chemistry so I made connections to that information they learned from testing foods.

I didn't have time to do them all so selected the ones that were most applicable. Time was too short to do full units. I also used them for younger students, k-3.

I mostly just focused on energy balance and basic nutrients.

I had students do a food collage with build a meal, and I used visuals to illustrate portion size.

I used it as part of an organic molecules unit and as components of cells. Later in the year I reintroduced it as part of the digestive system

We used a Food Chemistry kit along with the Montshire materials.

We asked teachers to rate their agreement with a range of statements about their experience teaching the unit. The table below includes a summary of these statements and their responses.

Answer Options	Disagree strongly	Disagree	Mixed	Agree	Agree strongly
The unit was easy to use	0	0	0	8	2
The unit taught important content.	0	0	0	6	4
The unit fit within or alongside my other curriculum.	0	0	0	7	3
The unit was complete.	0	0	1	6	2
The unit was accessible to students.	0	0	1	8	1
The unit was interesting to students.	0	0	3	4	3
My students understood the key concepts.	0	0	2	5	3
The unit positively influenced students' behaviors related to health.	0	0	5	3	2

Overall teachers agree with the statements above. Interestingly, fewer agree that the unit positively influenced students' behaviors related to health, yet well over half of the teachers provided an example of ways this happened, below:

Students became very aware of their nutrition and activities.

I could tell they were thinking about making changes - from students who have very poor nutritional awareness and diet.

As a result of charting physical activity in 15-minute intervals, students frequently commented on the need to up their activity level. They asked for the opportunity to walk laps outside when they were feeling sluggish.

I think kids became more aware of what they (and others) were eating.

Students asked good questions for their research projects and created ways to get answers. They learned a lot about eating habits, especially around the school lunch program.

Student behavior towards nutrition and healthy choices has shifted greatly in a positive manner towards making healthy choices.

After the short lessons that we did students started talking more about their snack choices. Because students were excited about it, some teachers started to keep tallies of healthy snacks in their

classrooms. I also saw more water bottles coming to school and more willingness to try new fruits and veggies.

Students learned that the majority of the school day was sitting.

Students developed an understanding of why we need to eat certain foods, what they provide for us in order to build cells and what foods provide which nutrients.

Our faculty decided to incorporate a school wide focus on being active. As part of this focus, I took my 4th and 5th graders outside for a quick walk around the school (1/4 mile) every day after snack. They loved it and asked every single day, "Are we going for our walk today?"

Reports were mixed regarding the extent to which teachers incorporated the information that was presented by the Dartmouth researchers. Two teachers incorporated the research to a large or very great extent, 3 to some extent, 3 to a small extent, and 2 did not try. The teachers who were able to incorporate the research made the following comments:

I cited some of research and worked with students to look themselves.

The obesity information was something shared both with staff at the school and with my group of students. It was interesting to talk about the trends and what could be causing them.

We had just completed a unit on the human body with kids having researched various body systems. We had done cells earlier the year. This fit nicely with our unit.

Mike came to school and taught research design.

I was able to share with my students some of their work, to give them an idea of what their own projects might lead to.

In terms of overall quality and value of the nutrition unit, teachers rated the value of the unit slightly higher than the quality.

Answer Options	Very Low	Low	Medium /Mixed	High	Very high
Quality of the unit	0	0	3	4	1
Value of the unit to me	0	0	1	3	3

We asked teachers to list up to three major strengths of the unit. They are all listed, below:

- It is creative, kids liked it.
- It doesn't single individuals out
- Hands on / visual for kids

- Easy to follow
- Hands on activities
- Organized, logical progression
- Hands on activities
- Research element!
- It gets students excited by contributing to "class fact finding" in a fun way
- Clear objectives
- Availability and help from Montshire staff!
- Experimental design (asking questions and defining variables)
- It is interesting to students
- Age appropriate
- The effort to explain what calories are
- Everyone can understand and participate
- Relevant to everyone
- The visual of amount of activity for students in a typical day.

We also asked teachers to list up to three major barriers or challenges they experienced using the materials. Listed below:

- Many families have no resources to obtain information regarding good nutrition, so it takes longer to break through prior family notions regarding nutrition.
- I wanted to do more with advertising - limited stores / signs - not in walking distance
- Time!
- I did not allow enough time
- Lack of class time
- First time teacher
- Time
- Health issues (for me)
- All lessons did not fit great in a 1 day per week P.E setting
- Multi level abilities in the class
- Coordinating with other faculty

Eight teachers answered the question: "Would you teach the unit again?" Seven answered yes, and one answered "not sure." We asked them when they expect to teach the unit again, responses below:

Answer Options	#Ts
Early in the 2012-13 school year	2
Mid year 2012-13	2
Late in 2012-13	0
2013-14 or later	1
Not sure	2

We asked teachers to provide ideas for improvements, additions or changes to the unit that they would recommend:

No improvements to the unit to suggest, but I found that repeating activities like snack portions and activity levels helped to keep it in their focus.

I will allow more time and do more of the activities as developed by the Montshire.

Maybe more activities with the food plate (understanding where certain foods fall on the plate). And maybe address certain important nutritional aspects of food (the Food Chemistry unit covered fats, starch, glucose, protein and a few common vitamins - I felt the students learned a lot from these activities).

Sun Safety Unit

Prior to joining the project, only 23% reported being somewhat familiar with effective approaches to teaching sun safety. 46% reported being not at all familiar, and 30% reported being slightly familiar.

At the time of the survey, 3 teachers had used the sun safety materials in their teaching, 3 had not but planned to, and 1 had not and had no plans to. Answers regarding reasons for not using them yet are below:

My co-teacher left the district. I will use it sometime in 2012-13 year, but do not know when the new co-teacher will be ready. We have discussed it and the new teacher is excited about it – I will send him if there is another workshop.

*I will implement them in the following year (6th grade).
We didn't get much curriculum concerning sun safety...*

I see students 1 day per week for a short class. I have a PE curriculum to get through. I will run a whole school wellness workshop on sun safety and use 1 lesson and activity from the materials.

Of the three teachers that used the materials, 2 of them spent 2 days on the unit, and 1 spent 1-2 weeks. Two teachers said it took them about as much time as expected, one teacher said it took much less time than expected.

Each of the three teachers approached the materials differently, with one modifying them to a small extent, one to some extent, and one did not modify them at all. Comments about the nature of their modifications are below:

We, the 6-8th grade science teacher and I, did another fun activity. With the money we received from participating in last year's program, we purchased sun sensitive wrist bracelets for each of the students. These are a great way to remind students about protecting themselves from harmful rays. They change colors depending on the intensity of the light. We also got light sensitive beads for them to use. We sent students to various parts of our campus to determine where they were more protected

from the intense rays of the sun during the noon hours. Students also mapped out where it would be safer to be during the hottest time of the day.

I did not feel as prepared/ comfortable as I have in other units so I googled/ searched the internet for more information/ descriptive/ step by step lesson plans...

We asked teachers to rate their agreement with a range of statements about their experience teaching the unit. The table below includes a summary of these statements and their responses.

Answer Options	Disagree strongly	Dis-agree	Mixed	Agree	Agree strongly
The unit was easy to use	0	1	0	2	0
The unit taught important content.	0	0	0	1	2
The unit fit within or alongside my other curriculum.	0	0	1	1	1
The unit was complete.	0	1	0	1	1
The unit was accessible to students.	0	0	1	1	1
The unit was interesting to students.	0	0	0	2	1
My students understood the key concepts.	0	0	0	3	0
The unit positively influenced students' behaviors related to health.	0	0	1	2	0

We asked teachers to provide an example of how the unit positively influenced their students' behavior. Comments are below:

Students were impressed with the experiments. They clearly understood that the sun is powerful, even when we may least expect it. They realized that the use of a sunscreen, or other low cost protection, has a dramatic effect and is worthwhile to use.

As part of our sun safety lessons, we gave the students the wristbands that show the effects of too much sun. They have worn them for several days in a row. They are now a little more aware of the sun's effects and some rather low cost measures they can take to avoid harmful rays. The kids were talking about UV rays the next few days when they wore their bracelet. One good thing I learned is that the majority of them are already in the healthful habit of wearing sunscreen during the seasons of more sunshine.

I think that students are far more aware of what the sun can do negatively to their bodies...I don't think they knew the long range dangers of sun exposure and only thought of the short term. i.e. sun burn hurts now...They didn't see that sun burn is damage to the skin for longer than they can see it.

Two of the teachers were able to incorporate the research to a large extent, one teacher to some extent. The teachers who were able to incorporate the research made the following comments:

Mike came to our school to do the light experiments with the group of 5th and 6th graders. The students really enjoyed that hands-on learning.

I used what was provided. Again, I don't think it was as well-prepared as the nutrition unit. I felt like I had lesson plans and a pretty good format to follow as an inexperienced teacher of nutrition...I did not feel the same way about the Sun/Skin care unit.

In terms of overall quality and value of the nutrition unit, teachers rated the value of the unit slightly higher than the quality.

Answer Options	Very Low	Low	Medium/Mixed	High	Very high
Quality of the unit	0	1	0	2	0
Value of the unit to me	0	1	0	2	0

We asked teachers to list up to three major strengths of the unit. They are all listed, below:

- The availability of materials and personnel from the Montshire for us to use
- Fun ways for students for students to learn
- Very important unit to teach kids
- The relevance of the material to young teenagers and pre-teenagers.
- The materials were easily understandable for students
- The light experiences that are hands on
- Students increased understanding of the subject matter

We also asked teachers to list up to three major barriers or challenges they experienced using the materials. Listed below:

- The materials being at school to use when we decide it is time for the unit
- Availability of a dermascan to emphasize the effects of the sun
- The unit did not have specific lesson plans for inexperienced teachers.
- We are trying to do it in the spring time near the end of the school year when sun exposure is more likely to happen.
- Cost of materials
- Time, time, time

All three teachers who taught the unit this year said they would teach it again. The table below indicates when they might teach the unit again.

Answer Options	#Ts
Early in the 2012-13 school year	0
Mid year 2012-13	0
Late in 2012-13	1
2013-14 or later	2
Not sure	0

We asked teachers to provide ideas for improvements, additions or changes to the unit that they would recommend:

I like the idea of the Montshire having the materials available to lend out to schools. That would be very helpful.

For inexperienced teachers of this topic...give specific lesson plans, resources and hand-outs.

The Research Project

Only two teachers reported that their students conducted research projects this year. For one teacher, 20% of their students conducted a project for the other, 75% conducted a project.

Below are descriptions by the two teachers of the projects their students designed.

Students designed a project that included in what types of PE activities were students more active?

My students were given the choice of nutrition, sun safety, or media. These are their projects:

- *light-sensitive beads with sun screen experiment*
- *audio-video or written delivery of information to see which students learn from the best*
- *do computer games cause stress*
- *do teachers prefer healthy or junk food snacks*
- *whether kids involved in electronic media will want to stop to play a physical game*
- *does the camera angle of a video make a difference in preference/liking the video*
- *does what someone eats affect their physical ability*
- *does exercise lower stress*
- *which fruit goes bad the quickest*
- *which activities cause/ lower stress*

In terms of their students' experience designing and carrying out research projects, one teacher said they had no previous experience, and one teacher said they had some experience.

Two teachers provided data on their students' success in carrying out five aspects of a research project before and after they (the teachers) worked with the Montshire. Both teachers have taught at least 11 years and are enthusiastic about their work with Montshire. Teacher 1 had 20% of his/her students conduct a research project; Teacher 2 had all of his/her students participate.

Teacher 1 saw considerable growth in the students' success in carrying out the research projects. For example, before their teacher's work with the Montshire, few if any of the students could form a testable research question, while afterwards, all or almost all could.

Teacher 2 saw growth in every aspect. Whereas about half of his/her students were successful in each aspect before the teacher's work with the Montshire, many were successful afterwards.

Proportion of students in two classrooms who successfully carried out five aspects of research projects before and after their teachers worked with the Montshire

	Teacher 1's Students		Teacher 2's Students	
	Before work with the Montshire	After work with the Montshire	Before work with the Montshire	After work with the Montshire
Form a testable research question	Few if any	All or almost all	About half	Many
Collect data	About half	All or almost all	About half	Many
Analyze/interpret data	Few if any	Many	About half	Many
Draw conclusions from data	Many	All or almost all	About half	Many
Represent data	Few if any	Many	About half	Many

Both teachers also agreed or agreed strongly that: their students were mostly very engaged in conducting the research project, their students were more engaged than they typically are for science-related projects, the experience of designing and conducting a research project positively impacted their overall enthusiasm for and interest in science, and their students generated additional questions from their research that they were interested in pursuing.

The teachers commented:

The student experience was a positive one as they took pride in their work knowing that they were going to present.

I think the key is to help a student find an experiment that is meaningful to them. Secondly, making sure it is something that is within their realm to test adequately...then, I need to be better able to keep up with what they are doing, progress wise.

Science has always generated high enthusiasm, this was a way of understanding their activity level and healthy choices.

I think they enjoy it if they are motivated by the stated problem...those who do well picking a topic, are the most motivated.

Two teachers responded to our request for a brief explanation for why their students had not designed a research project.

We did not do the nutrition unit this school year. We did do the sun safety unit and we did not have students do projects. It is a more limited topic, and we just did not have the time at the end of the year to get involved in any further projects.

This unit was taught late in the school year, and there were already too many demands on our time to design and carry out a project. Also, I was working on Environmental Detectives with my grade 7/8 which has a huge presentation piece.

Montshire Assistance

Eight of eleven teachers said that they received assistance from the Montshire this year. In terms of types of assistance, the teachers reported the following:

Answer Options	#Ts
Emails with Mike/Greg about the unit	6
Phone calls with Mike/Greg about the unit	2
Visit to your school to help teach some of the unit	7
Borrowed materials to help teach the unit	6
Other	2

Other responses included:

We didn't really borrow materials. Mike brought them with him when he made an on site visit.

Mike came for an afternoon to help with experiments.

Seven teachers found the assistance from the Montshire to be very helpful, one found it extremely helpful. In terms of the most beneficial assistance, teachers commented the following:

Mike's visit to school to show the calorie content in food – we would not have had the equipment to do that. Also a visit to help direct some research questions. That was really helpful. A school event

kept us from attending, but the students benefitted from the experience of designing and carrying out their research. We will do more of this.

Mike came up on two different occasions to do a lesson with my class. It was very beneficial. He brought the chips and the “graph” which were materials I did not have. It was a “jump start” for me and got me going! He was great.

Borrowing the materials.

Having Mike come, give instruction, and bring hands on materials for the students was the most beneficial.

More visits and materials that we are able to keep on hand to use whenever we do these topics.

The hands on assistance where they came down to do a lesson with the students was exceptional. We chose the lessons that required lots of materials that the Montshire had due to our budget constraints on purchasing such equipment.

Borrowing material and utilizing Mike to teach.

Mike came and did the calorie burning activity with our students as we did not have access to similar apparatus. He also came to speak with our students when we were at the question generating stage. He answered my emailed questions in a timely manner.

One teacher commented on assistance s/he would have liked:

The thing that held me back a little was the perceived ease/lack of ease of getting materials from the Montshire back and forth. We saw some cool hands on things to use with this unit that I would have liked to use in the classroom but I did not make it happen, partly because of the logistics of getting to the classroom and back (driving to pick it up/return it).

Attending as a team

We asked teachers to rate their experience attending the workshop as part of a team. Their responses are collected in the table below:

Answer Options	Disagree Strongly	Disagree	Mixed	Agree	Agree Strongly
I benefitted from attending the Montshire workshop as a member of a team rather than alone.	0	0	1	7	5
There were disadvantages to attending the Montshire workshop as a team member rather than alone.	6	6	1	0	0

The Montshire workshop prepared us well to team teach or collaborate to teach the health unit.	0	0	2	8	3
I would recommend that all teachers attending the workshop come as part of a team.	0	1	2	5	6

While a few of the teachers had a mixed reaction to attending as a team, for the most part, this was a positive feature of the workshop.

Teachers' comments about attending the workshop as part of a team are below:

It IS desirable- this district has had difficulty fielding a team, but this should be different in 2012-13 – YAY!

After attending the first year (nutrition unit), although we already worked as a team, we were more enthusiastic and committed to teaching hands on science, and started our year with the unit.

In the summer we got so fired up about this topic. We decided to have students and teachers count 15-minute exercise “miles” and to “travel” across the US, learning about different landmarks in the process. We also planned a faculty meeting to share information. Without a team, you return from summer and become focused on the new year. It would be easy to keep putting off your plans until things slowed down at school. The team keep nudging each other with reminders about what we said we’d do. No slacking allowed! It made us commit to follow-through and troubleshoot with each other.

Attending with a team allows for collaboration within your school. I think it’s important to have the support of a colleague(s) to better implement the unit.

Having another teacher take these workshops with me is beneficial because we help to keep each other focused on completing the unit. If I forget how we did something, then I have someone close by to help. This also works both ways in that I can help my team member.

[My partner] and I have been working together on science topics for many years. The Montshire units fit nicely into what we do.

Attending with a team is more useful because you can use all who attended to break up teaching aspects of the unit. You can bounce ideas off of each other.

I think the biggest plus for going as a team is the motivation/ need to schedule and work together which ensures it happening. It also helps with getting buy in from administration (although I did not have an issue with this). The positive of doing it by oneself is the freedom to teach it when it fits...no artificial timelines.

I came alone and it has been very hard to get others to collaborate with me on teaching these units. If I had a team with me I think we would have been much more successful at using most of the materials.

I was lucky to be able to attend with 2 others from my school, and we conferred often throughout the school year. Coming from a small school, I can see how it could be limiting for some to have the opportunity to come as a team – maybe no one else wants to or is able to participate. I feel I could have completed these activities as an individual teacher, so I am not sure I feel it is fair to ‘lock them out’.

Of the teachers who taught one of the units, 5 taught it alone, 7 collaborated in teaching the unit, and 2 team-taught the unit with another teacher.

Of those who team-taught or collaborated, they rated the experience in the following ways:

Answer Options	Disagree Strongly	Disagree	Mixed	Agree	Agree Strongly
I benefitted from team teaching or collaborating to teach the health unit.	0	0	0	4	5
I think my students benefitted because I team-taught or collaborated to teach the health unit.	0	0	0	5	4
There were disadvantages to team teaching or collaborating to teach the health unit.	3	5	1	0	0

Again, teachers found team-teaching the units to be beneficial.

Comments about the above:

Desirable – one of us is more fitness focused, other is more science and health focused – works well to reach more students.

Our team is committed to collaboration so that all 3 classrooms at the grade level have similar experiences. We consider the lack of consistency that often (frequently occurs when students are confined to self contained classrooms is unacceptable and unfair to the students, in all subjects.

Two heads are better than one. When you collaborate, the other person sees things in a different way. That enables you to have the best of both worlds.

Team teaching would be VERY desirable, unfortunately at our school the schedule did not allow for this.

Having a new mix of students in a science class is one of the benefits of collaborating to teach these units. Also, teamwork allows each of us to focus on part of the material that we may feel more comfortable with. We also are free to add to the other teacher's information as she teaches. We have a good working relationship and this gives us another opportunity to share knowledge and encourage student learning. We each bring a strength to the unit.

I think it is desirable, however, it is difficult to coordinate our times to be able to work together. Scheduling is always a nightmare!

I am a PE teacher and it would have been nice if I could have done the active parts of lessons and a classroom teacher or teachers could have done the more sedentary class portions.

It helped me be able to do the research project with the whole grade at the same time.

It's ALWAYS good to bounce ideas off each other.

Overall Assessment

We asked teachers to rate the extent to which their participation in the Montshire health project has contributed to their teaching of health this year.

Answer Options	#Ts
Not at all	0
To a small extent	3
To some extent	3
To a large extent	5
To a very great extent	3

The majority of teachers believe that their participation in the project has at least to some extent contributed to their teaching of health this year.

We asked second-year teachers to compare the two years, in terms of quality, support provided, student impact, etc. Their comments are below:

Excellent – I do think the nutrition unit is stronger for youth – more exciting for this age group.

We were "swamped" with school/district initiatives and, therefore, did not fully participate, unfortunately.

I didn't really use the materials this year.

I feel that the health and nutrition has a lot more material, information, and work involved compared to the sun safety unit. Both are age appropriate topics and have their own value. I feel that the quality of the curriculum is right on with our standards as well as the state's. The Montshire always gives the best of support and help with student involvement. I give an A+ to the Montshire science staff!

It is really our 4th year involved in the project. Every year we have implemented a new component. Mike has been working with us each year. Last year we were able to use pieces from the first two years on our own while Mike introduced new topics. I have found the whole experience to be helpful. The lessons have evolved as time goes on and they are very user friendly.

Nutrition unit was better prepared. I think there are positives and negatives to being the first group through. I saw last summer that Greg and Mike had learned from the first groups experience and that improved the Nutrition unit. I expect the same will be true of the Sun Unit.

It was interesting and helpful this year to hear all of the teacher's different experiences with teaching the unit. What worked well, what could have been better. The first year only a couple teachers had actually tried the unit with students.

Final Comments

We asked teachers if they had any final comments about the project. All of the comments were quite positive, indicating that the workshop and curriculum were valuable to them professionally and beneficial for their students. They also were very enthusiastic about the symposium, and urged the Montshire to continue this dimension of the project. A few comments are below:

The nutrition unit experience from the first year opened our eyes to many possibilities. The students benefitted and parents were supportive!

I feel that the Montshire is a major help in my professional development. I wouldn't be the teacher I am today if it wasn't for them.

Keep up the symposiums (sp?)...it is a real motivator for my students! Thanks for allowing us the opportunity to attend!

I would like to thank you all for the experience. Again, I can't say enough about how valuable the research piece and the symposium were. All of my students were able to complete a 'presentable' project. Not all were quite ready by the day of the symposium, and not all desired to attend as it was a special day at our school, but they all (and we are talking 4th and 5th graders) 'pulled it off!' I was so darn proud of them and told them so. They worked hard. It wasn't an easy project. It was hard work, and they did it!

Student Survey Data

Pre- and post- unit surveys were made available to the teachers who participated and taught the nutrition unit. We received a total of 113 pre-unit surveys and 108 post-unit surveys. In this section, we highlight the pre- and post- survey data for each question that is comparable.

Student interest in nutrition and health. In the pre-survey, we asked: Overall, how interested are you in learning about nutrition and health? In the post-survey, we asked: Overall, how interesting was nutrition and health as a topic of study?

The unit had mixed success in increasing student interest in science and health. 45% say they are interested or very interested on the post survey (17% more than on the pre-survey), but 29% are still not very interested.

Total PRE survey responses: 113 Total POST survey responses: 108	Not interested	-1	-2	Somewhat interested	-3	-4	Very interested	-5	Not Answered (n/a)			
PREs	14	12%	17	15%	49	43%	17	15%	1	1%		
Posts	16	15%	15	14%	27	25%	27	25%	22	20%	1	1%
Percentage Differentials	3%	-1%	-18%	10%	7%	-						

Student Knowledge about Nutrition and Health. In the pre-survey, we asked: How much would you say you know about nutrition and health? In the post-survey, we asked: Please rate how much you know about nutrition and health after working through these lessons.

Total PRE survey responses: 113 Total POST survey responses: 108	Not much	-1	-2	A little	-3	-4	A lot	-5	Not Answered (n/a)			
PREs	19	17%	15	13%	48	42%	23	20%	6	5%	2	2%
Posts	1	1%	8	7%	29	27%	46	43%	23	21%	1	1%
Percentage Differentials	-16%	-6%	-15%	23%	16%	-1%						

The unit was more successful in increasing students' perceptions of their knowledge about nutrition and health. 39% more say they know more than a little about nutrition and health (4s and 5s). However, if we look below at the answers to specific knowledge questions, we see that on two of the questions about 20% more gave correct answers on the post-test, suggesting that some students may be rating their knowledge increase higher than actual changes.

What 2 things influence MOST what you eat? In the pre-survey, we asked: From the following list, choose the two things that have the most influence on you when you are deciding what to eat. In the post-survey, we asked: From the following list, choose the two things that have the most influence on you when you are deciding what to eat, and how much to eat.

NOTE: Since students were asked to choose the 2 items on the list which MOST influenced their decisions about what to eat, the totals do not correspond to complete totals of survey responses. The totals and percentages indicate preferences.

Total PRE survey responses for this question: 237		Total POST survey responses for this question: 220	
		Responses	
Commercials/advertising			
PREs	9	4%	
Posts	15	7%	
Percentage Differentials		3%	
The food my parents make for me			
PREs	75	32%	
Posts	63	29%	
Percentage Differentials		-3%	
The food that's available at home			
PREs	64	27%	
Posts	57	26%	
Percentage Differentials		-1%	
The food that's available at school			
PREs	25	11%	
Posts	23	10%	
Percentage Differentials		-1%	
The labels on the packages			
PREs	31	13%	
Posts	19	9%	
Percentage Differentials		-4%	
The much time I have to eat			
PREs	13	5%	
Posts	28	13%	
Percentage Differentials		8%	
The food stores that are in my neighborhood			
PREs	16	7%	
Posts	11	5%	
Percentage Differentials		-2%	
The food stores that are near my school			
PREs	4	2%	
Posts	4	2%	
Percentage Differentials		0%	
Not Answered			
PREs	0	0%	
Posts	0	0%	
Percentage Differentials		0%	

There is not much change here, especially with respect to “labels”, which is an area in which one might like to see a change. Commercials and time available increased slightly. Food available and cooked at home have the most influence. Interestingly, students at home are making personal choices of what to eat about as often as they are eating what their parents cook.

Students Rate their Diet Habits. In the pre-survey, we asked: How would you rate your diet habits? In the post-survey, we asked: How would you rate your diet habits?

About two thirds of the students pre and post say they eat nutritious food the majority of the time. If so, looking at the table of primary factors above, it is largely due to the food available at home and the food parents cook.

	I don't eat many nutritious foods	-2	I eat nutritious foods some of the time	-3	-4	I eat nutritious foods most of the time	-5	Not Answered (n/a)
Total PRE survey responses: 113								
Total POST survey responses: 108								
PREs	2	4	31	47	29	0		
	2%	4%	27%	42%	26%	0%		
Posts	0	4	33	45	26	0		
	0%	4%	31%	42%	24%	0%		
Percentage Differentials	0%	0%	4%	0%	-2%	0%		

Students Rate their Exercise Habits. In the pre-survey, we asked: How would you rate your exercise habits? In the post-survey, we asked: How would you rate your exercise habits?

A small minority (14%) may be more aware that the actual level of exercise they are getting is not as much as they thought. Note the shift from 5s to 4s.

	I don't exercise much at all	-2	I exercise a little	-3	-4	I exercise a lot	-5	Not Answered (n/a)
Total PRE survey responses: 113								
Total POST survey responses: 108								
PREs	1	9	23	28	51	1		
	1%	8%	20%	25%	45%	1%		
Posts	2	4	22	46	34	0		
	2%	4%	20%	43%	31%	0%		
Percentage Differentials	2%	-4%	0%	18%	-14%	-1%		

Students Rate Understanding of Caloric Needs. On the pre-survey we asked: Rate the following: A school-aged student needs 1,600-2,500 calories in a day. In the post-survey we asked: Rate the following: A school-aged student needs 1,600-2,500 calories in a day.

23% more know this after the unit (up to 45% from 22%) indicating a moderate change.

Total PRE survey responses: 113 Total POST survey responses: 108	Disagree -1	-2	Unsure -3	-4	Totally agree -5	Not Answered (n/a)
PREs	20 18%	12 11%	57 50%	13 12%	11 10%	0 0%
Posts	8 7%	10 9%	42 39%	28 26%	20 19%	0 0%
<i>Percentage Differentials</i>	<i>-11%</i>	<i>-2%</i>	<i>-11%</i>	<i>14%</i>	<i>9%</i>	<i>0%</i>

Students Rate Understanding of Calorie-Weight connection. On the pre-survey we asked: RATE the following: If we take in more calories than we use each day, our body weight will stay the same. On the post-survey we asked: Rate the following: If we take in more calories than we use each day, our body weight will stay the same.

Most disagree (correct answer), and 20% more disagree on the post survey.

Total PRE survey responses: 113 Total POST survey responses: 108	Disagree -1	-2	Unsure -3	-4	Totally agree -5	Not Answered (n/a)
PREs	61 54%	15 13%	21 19%	9 8%	7 6%	0 0%
Posts	77 71%	11 10%	17 16%	1 1%	2 2%	0 0%
<i>Percentage Differentials</i>	<i>17%</i>	<i>-3%</i>	<i>-3%</i>	<i>-7%</i>	<i>-4%</i>	<i>0%</i>

Students Rate Understanding of Calories in Soda/burn-off. On the pre-survey we asked: RATE the following: It takes about 1 hour of walking to burn off the calories in one can of soda. On the post survey we asked: Rate the following: It takes about 1 hour of walking to burn off the calories in one can of soda.

Total PRE survey responses: 113 Total POST survey responses: 108	Disagree -1	-2	Unsure -3	-4	Totally agree -5	Not Answered (n/a)
PREs	14 12%	10 9%	46 41%	24 21%	14 12%	5 4%
Posts	11 10%	8 7%	56 52%	17 16%	14 13%	2 2%
<i>Percentage Differentials</i>	<i>-2%</i>	<i>-2%</i>	<i>11%</i>	<i>-5%</i>	<i>1%</i>	<i>-2%</i>

Students Experience/Confidence in Conducting Own Research. On the pre-survey we asked: How much experience have you had conducting your own research projects? On the post-survey we asked: How would you rate your confidence in your ability to conduct your own research project in the future?

Before the unit, 62% had had at least a little experience conducting their own research, including 32% who have had some or a lot. Afterwards 85% are at least somewhat confident, including 46% who are confident or very confident.

PRE-survey question: How much experience have you had conducting your own research projects?						
Total PRE survey responses: 113	Not much		A little		A lot	Not Answered
Total POST survey responses: 108	-1	-2	-3	-4	-5	(n/a)
PREs	16	21	34	23	14	5
	14%	19%	30%	20%	12%	4%
POST-survey question: How would you rate your confidence in your ability to conduct your own research project in the future?						
Total PRE survey responses: 113	Not confident		Somewhat confident		Very confident	Not Answered
Total POST survey responses: 108	-1	-2	-3	-4	-5	(n/a)
Posts	8	7	39	29	21	4
	7%	6%	36%	27%	19%	4%
Percentage Differentials	-7%	-13%	6%	7%	7%	0%

What are the most important things in designing a research project? On the pre-survey we asked: What are the important things to consider when designing a research project? (check all that apply) On the post-survey we asked: What are the important things to consider when designing a research project? (check all that apply)

NOTE: Since students were asked to 'check all that apply' on the list the totals do not correspond to the totals of survey responses. The totals and percentages indicate preferences.

There is no consensus among students as to what consideration(s) are most important - each option is selected by between 20% and 32% of the respondents on the pre- and post- tests.

Total PRE survey responses for this question: 284		Responses
Total POST survey responses for this question: 220		
Coming up with a testable question		
PREs	61	21%
Posts	90	27%
<i>Percentage Differentials</i>		6%
Gathering data		
PREs	92	32%
Posts	95	29%
<i>Percentage Differentials</i>		-3%
Analyzing the data		
PREs	59	21%
Posts	76	23%
<i>Percentage Differentials</i>		2%
Presenting the data		
PREs	66	23%
Posts	66	20%
<i>Percentage Differentials</i>		-3%
Not Answered		
PREs	6	6%
Posts	2	1%
<i>Percentage Differentials</i>		-5%

Overall, there appears to be moderate change in the students' behavior or knowledge before and after the nutrition unit.