

Friends of Detectives

Science Education Partnership Award

Winter 2002

Pilot Testing at School 9 in Paterson

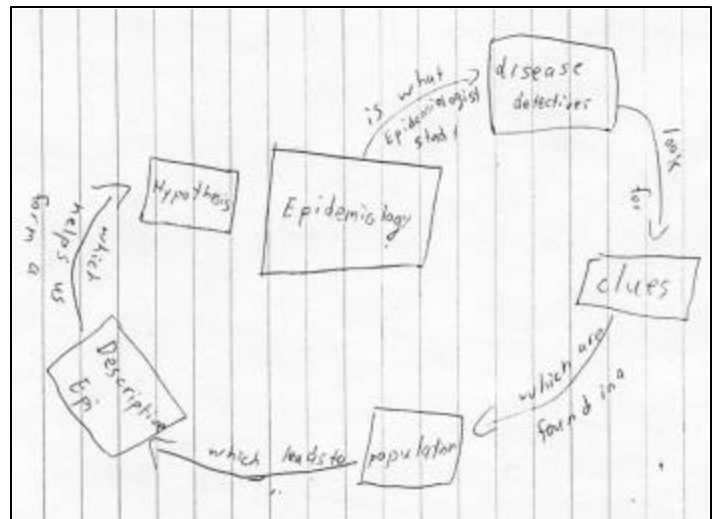
Lynn Tarant has been pilot testing *Detectives* at School 9 in Paterson since November. During that time she has completed the investigations (lessons) for Modules 1 and 2. The effectiveness of Investigation 1-6, **Concept Connections**, was especially noteworthy. In this investigation, Epi Teams created concept maps that showed how epidemiologists answer the Essential Question: “Why are some people getting sick while others remain healthy?”

Students did this by writing the concepts on 3x5 cards, arranging the cards in a way that “tells a story,” drawing arrows between concepts, and labeling the arrows to describe the connections. Students evaluated their maps by deciding if they successfully demonstrated the development of the Enduring Understanding that: “Clues for formulating hypotheses can be found by describing the way a disease is distributed in a population, in terms of person, place and time.”

After students created the maps in the Epi Teams, they created their own individual maps. See example to the right.



An Epi Team from Lynn Tarant’s science class works on their concept map.



An example of a student’s individual Understanding 1 concept map

The investigations for Module 2 are aimed at preparing students to answer the Essential Question, “Is there an association between the hypothesized cause and the disease?” In Investigation 2-5, **Observational Studies**, Epi Teams designed and conducted in-class observational studies to test their own hypotheses.

Using a 2x2 table, each Epi Team performed its in-class observational study by collecting and analyzing data from the “natural experiment” performed by their classmates as they went about their daily lives. Students then presented their methods, results, and inferences in class. Among the student-generated hypotheses that were tested were: feeling left out causes depression; watching violent movies causes violent behavior; watching scary movies causes nightmares; eating cafeteria food causes stomach aches; and listening to rap music causes cursing. Among the lessons students learned were the importance of defining variables precisely (What is depression?) and the realization of the possibility that students may not have always answered a question honestly (Do you behave violently?)

Lynn began teaching the investigations for Module 3 in March. The investigations will teach students how to answer the Essential Question: Is the association causal?

[Pilot Testing at Renaissance School in Montclair](#)

In January and February, Tim Purnell pilot tested the investigations for Modules 1 and 2 with his 7th grade science students at the Renaissance School in Montclair. One of the highlights of the pilot testing occurred after the completion of Investigation 2-3, ***What’s Wrong with This Picture?***, when Tim asked the Epi Teams to choose a hypothesis and diagram an ethical way to study it. It turned out to be a valuable experience for the students to apply what they had learned about ethical human experimentation and the Belmont Report.

Students in the pilot-test were excited to have a ***Newark Star Ledger*** reporter and photographer in the classroom during Investigation 2-4, ***Backpacks***. This investigation allowed the guests to see how the students could test the hypothesis, *carrying heavy backpacks causes back pain* by using a 2x2 table and counting, dividing, and comparing (CDC). (More of Tim’s students know that CDC stands for count, divide, and compare, than for the Centers for Disease Control and Prevention.)

At the conclusion of the pilot test, Tim’s students received certificates acknowledging their contributions to the development of the ***Detectives in the Classroom*** curriculum.



Tim Purnell and Mark Kaelin team-up to explain “Which Design Is Best” to a Renaissance School science class.



Science teacher Tim Purnell helps seventh-grader Jordan Gooden weigh his backpack during the “Detectives in the Classroom” program.

Advisory Board Meeting

On January 22, 2002, we held our first meeting with our full Advisory Board that included health officers, Montclair State University (MSU) faculty, a director of science education, directors of after-school programs, curriculum developers, a school nurse practitioner, middle school science teachers, and epidemiologists. Susan Nanney, Director of Research and Sponsored Programs, Ada Beth Cutler, Dean of the College of Education and Human Services, and Tim Sullivan, Chair of the Department of Health Professions, also joined us from MSU. Members of the Advisory Board are:

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|----------------------|---|--|
| Susan Amirian | Director | Curriculum Resource Center, MSU |
| Helene Cross | Professor | Educational Foundations, MSU |
| Wayne A. Fisher | Health Officer | Township of Teaneck |
| Frank Gallagher | Administration of Interpretive and Educational Services | Project Learning Tree, Jackson |
| Jaime Grinberg | Professor | NJ Network for Educational Renewal, MSU |
| Dorothy Knauer | Deputy Director | Community Agencies Corporation, Newark |
| Debra Lesnick | Education Director | Boys and Girls Club, Clifton |
| Mary Jane Linnehan | Nurse Practitioner | Quitman School, Newark |
| Victoria Madden | Professor | Middle and Secondary Education, William Paterson University |
| Marc Paladini | Epidemiologist | Bergen County Department of Health Services |
| Stu Palfryman | Health Officer | City of Summit |
| Anthony V. Piccolino | Professor | Mathematics and Computer Science, MSU |
| Tim Purnell | Science Teacher | Renaissance School, Montclair |
| Lynn Tarant | Science Teacher | School 9, Paterson |

The Advisory Board was oriented to the developmental status of ***Detectives in the Classroom***, introduced to the web site format, and shown a videotape of students participating in one of the investigations. The highlights of the night occurred when Tim Purnell and Lynn Tarant had the Advisory Board experience two of the investigations (Investigation 1-1, ***Why are These Students Getting Sick?***) (Investigation 1-3, ***What's My Hypothesis?***).

We were pleased with Board members' continued willingness to invest their time and energy reviewing the curriculum and offering suggestions for its improvement.




Lynn Tarant (standing) asks (counterclockwise) Ada-Beth Cutler, Frank Gallagher, Dorothy Knauer and MaryJane Linnehan "What's Your Hypothesis?"

Science Education Partnership Award (SEPA) Annual Meeting

From February 24-28, 2002, Wendy Huebner and Mark Kaelin attended SEPA's Annual Project Directors Meeting in Houston. It was a time to interact with directors of more than 60 projects and share experiences and advice. Their **Detectives**' poster and laptop presentations were well received and resulted in two requests for future web site links with other SEPA projects. At the technology workshop, Mark demonstrated how the structure of the web site is aligned with **Detectives**' five Essential Questions and Enduring Understandings. Wendy and Mark joined the National Association of Health Science Education Partnerships and are serving on the Research Committee and Program Planning Committee for the 2003 meeting in San Diego.

Detectives in the Classroom

Science Education Partnership Award



Abstract


We will develop five instructional modules that explore specific health-related issues relevant to students in elementary middle schools through the science of epidemiology. The modules, called "Detectives in the Classroom," will prepare students to make personal and collective, evidence-based health-related decisions. The exploration of health-related issues will be structured based on a coverage map for the discipline of epidemiology and the National Science Education Framework recommendations outlined in the content area of Science Inquiry and Technological Design.

The modules will be created and refined in partnership with a multidisciplinary Advisory Board of teachers and health professionals. As part of module development, the module school teachers, who are members of the Advisory Board, will prepare the prototypes with their students. Prototypes will be refined based on their experience and the advice of the Advisory Board.

The prototype modules will then be field tested by a Pilot Training Team consisting of science teachers from nearby middle school districts at the Texas State Network for Educational Research. These training schools will be randomly assigned to be either experimental or control schools. Teachers from the Pilot Training Team's two experimental schools will be trained to teach the modules and will implement them in their classes.

The impact of the modules will be tested by assessing student abilities to meet National Science Education Framework and students' access to evidence in a controlled, pre/post-test comparison. The prototype modules will be refined further based on the Pilot Training Team's experience for needs of students' assessment and teacher's feedback.


With approval of the Center for Disease Control and Prevention (CDC), the "Detectives in the Classroom" web site will be linked to CDC's EACES (Evidence in Classroom Environments through Teaching Epidemiology) web site.



Module 1

Essential Question
Why are some people getting sick while others are remaining healthy?

Enduring Understanding
Clues for determining causal hypotheses can be found by describing the step in disease or infection in a population of people, in terms of person, place and time.




Sample Investigation

Module 2

Essential Question
Is there an association between the hypothetical cause and the disease?

Enduring Understanding
Causal hypotheses can be tested by observing the exposure and disease of people or their surrogates (e.g., from information from their "observational studies") over time to make and test risk and identity associations.




Sample Investigation

Module 3

Essential Question
Is the association causal?

Enduring Understanding
Causation is only one explanation for finding an association between an exposure and a disease. Because "observational studies" are flawed, other explanations must also be considered.




Sample Investigation

Module 4

Essential Question
What characteristics and settings are most probable causes of disease and death?

Enduring Understanding
When a causal association has been identified, decisions about possible disease prevention strategies are based on more than the scientific evidence. Because of competing values, social, economic, and political factors must also be considered.




Sample Investigation

Module 5

Essential Question
Did the disease prevention strategy work?

Enduring Understanding
The effectiveness of the strategy can be evaluated by testing and comparing rates of disease or progression of people who were exposed to the strategy. Costs, trade-offs and alternative strategies must also be considered.



Sample Investigation

Mark Kaelin and Wendy Huebner, Montclair State University

Detectives in the Classroom
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