APPENDIX A
Combined Project Data Sheet
Division of Elementary, Secondary, and Informal Education

A completed project data sheet must accompany the proposal. All proposals to ESIE should include Section I. In addition, all proposals should include one of the following sections: II (ISE) or III (IMD) or IV (TE) depending on the section of the Guidelines to which the proposal responds. (If convenient, unneeded sections may be deleted from this form before submission.) This data sheet may be downloaded at: http://www.ehr.nsf.gov/ehr/esie/datasheet.doc.

Section I
A. Project Information
Principal Investigator: Mable B. Kinzie, Ph.D.
Project Title: Movie Play: On-Line Games for Middle School Science
Institution: University of Virginia

B. Sources of Funding [Sum = 100% of budget]
Total NSF Request $ 1,619,885
Industrial Funds $__________
State Funds $__________
Grantee Institution(s) $ 185,816
Other (non-NSF) Federal $__________
International Funds $__________
Local Government $__________
Other Funds $__________

C. Science/Mathematics Content [Sum = 100%]
Astronomy (11) 8% Geography (88) 2%
Biology (61) 23% General Science (99) 20%
Chemistry (12) 12% Mathematics (21) __%
Computer Science (31) __% Physics (13) 5%
Earth Science (42) 5% Psychology (70) 3%
Engineering (50) 12% Social Sciences (80) __%
Environmental Science (40) __% Technology Educ. (58) __%

D. Scope [Check one]
Local (list states) ____ Regional (list states) ________ National (check) XX

E. Special Emphases [Check all that apply]
Minorities X Urban Environment ____ Women ____
Rural Environment ____ Persons with Disabilities ____
Other (explain) __________________________

Section II (Informal Science Education projects only)
F. Type of Project [Check one]
Museum ___ Media X Youth/Community-based ___ Research ___ Prof. Develop. ___
ASCEND ___

G. Level of Participants/Target Audience [List # in each category]
Preschool ____ Secondary ___ Family X ___
Elementary ____ Undergraduate ____ Adult ___
Middle School X ___ Graduate ___ Other (explain) __________________
Character Treatments:

**Memphis Blue** has a mind full of questions, a skeptical eye, and a knack for adventure — not to mention the homework load and skin care concerns of a thirteen-year-old girl. Of all the students at Middlemont Middle School, Memphis is the first to notice when something just doesn’t seem right, doesn’t look copasetic or sounds fishy. Whether providing direction in the secret, underground science lab (accessible via the broom closet in the hall outside the chorus room) or searching out her next quest, this natural-born leader is out to save the world — again.

**Sketch:** To every impending biological terror or supernatural threat that his stepsister, Memphis, finds, there is a silver lining: at least Sketch thinks so. His artistic skill is reflected in his ever-changing skateboard designs. He can fix anything that is broken and sees the good in everything — so much so that he may not always seem grounded in the world the rest of us live in. His wild hair may always be covering up his eyes, but Sketch has vision and can picture almost any situation. That backpack is heavy enough — *what does he keep in that thing?*

**Lexie:** Lexie thinks half the battle is finding the information you need. And she is a walking database—In addition to speaking 3 languages (Lexie’s folks are in the Air Force, so they have moved a lot) and knowing the capital of every country, this girl is wired. Her laptop, personal digital assistant, mp3 player and cell phone are just the beginning. She stays on top of technology and loves to find things out. Lexie loves school, but is often frustrated by the limited information in her textbooks: she has found it easier to do her own research and submit supplements for the teacher on each topic.

**Lunch Lady Grady:** The hair net, ever-present smirk and pencil thin eyebrows conceal the greatest microbiological mind of this century. Lunch Lady Grady — *aka* special agent 872 — is keeping tabs on our enterprising trio. She worked for NASA, the FBI and the CIA before hiring on with a top-secret international organization. She was placed in the lunchroom as a talent scout and has decided to bring Memphis, Sketch and Lexie onto the team and into the lab. As for planning meals and snacks on a limited budget for 500 picky middle school students? It’s the hardest job she’s ever had.

**Dr. Factfixer:** The truth is, we know very little about this man. He just sort of appeared one day and man, can he talk! Dr. Factfixer is smooth, charming and full of charisma. The school board has endorsed his “Dr. Factfixer Make-Ya-Smarter Elixir” (those district-wide tests are just around the corner…) and he’s come to Middlemont to sell the kids on it. The elixir is all-natural, tastes great and is “chock full of good things that will make you smart” — at least that is what the brochure says. To kids, he always lets it slip that popularity is greatly enhanced. His pie charts, brochures and quotes from satisfied customers prove that this elixir is the best thing since, well… since “Dr. Factfixer’s Burp Less Bubble Gum.”
<table>
<thead>
<tr>
<th>Movie:</th>
<th>Sketch can’t get enough of that fabulous green gooey elixir… until his lips tingle, his cheeks start swelling and he itches all over. Lunch Lady Grady sure seems interested… she told him not to have five glasses of the stuff!</th>
</tr>
</thead>
</table>
| Green Goo Makes Sketch turn Blue | **Activity:**

**Discovery Race**

It’s a race through the halls of the never-ending middle school to the school nurse. Sketch’s symptoms intensify, and our team makes some important observations that will help the nurse predict what’s wrong with Sketch. After treating Sketch so that he is stable and breathing properly, the nurse wants to know:

*What were Sketch’s symptoms and when did they happen?*

*Is anyone else in school sick?*

*Is anything going on in school that could have made Sketch sick?*

*Has Sketch ever reacted like this before?*

If they were paying attention on that race through the halls, our team will have all the information they need to recognize allergic reactions.

<table>
<thead>
<tr>
<th>Movie:</th>
<th>In the nurse’s office, the kids are told that poor Sketch is stuck eating only rice, potatoes and mineral water until the allergen is discovered.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lunch Lady Grady’s Secret</td>
<td>Just outside the nurse’s office, Lunch Lady Grady is waiting for them with an expression that would cut diamonds. “Clearly, it is time….,” she says. “Follow me.” They follow her with puzzled looks on their faces… all the way down the hall to the chorus room door and then darting into the broom closet?!</td>
</tr>
</tbody>
</table>

With a loud whooshing noise, they are swept down 32 floors to a secret underground lab where Secret Agent Grady reveals her true identity and welcomes the team to their new scientific surroundings. She’s been suspicious of the all natural, all organic ‘Make Ya Smarter’ elixir from the beginning. She believes the team can provide answers for her suspicions as well as determine what made Sketch sick. She’ll guide our team throughout the rest of their queries.

<table>
<thead>
<tr>
<th>Activity:</th>
<th>Clearly, there is something in that elixir that Sketch is allergic to. The team decides to help him identify it and save him from his boring diet. Time to use the secret science lab (fortunately, this lab is well-stocked and comes equipped with a wireless Internet connection and links to experts in various fields who can help interpret results!) to analyze ingredients. Armed with the elixir and a list of its ingredients, and a fresh test-tube of Sketch’s blood, our team must use deductive reasoning to understand why Sketch reacted the way he did… and discover some surprising information about the suspicious smoothie.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ingredient Quest</td>
<td>Our trio comes to understand how allergens are identified and learns about the ingredients in the drink. They realize that everything we put in our bodies has some effect — even natural ingredients. Which raises the question: Does the elixir make the drinker any smarter? They devise an experiment to try answer this question. Lunch Lady Grady (err, we mean Secret Agent Grady) and the other scientists help them as they consider the research already done, variables that may affect the experiment and ethical issues of experiments with animals and humans.</td>
</tr>
<tr>
<td>Activity: Experiment Intelligencia</td>
<td>The kids are disappointed when they learn that their experiment will take several weeks to conduct. But, as they wander around in the lab, (Man, this underground lab is huge!) they discover a door to a time machine! They go back in time (making sure they have elixir with them) and set up the experiment. When they return to the present, they find their “Does It Make You Smarter? Maze,” with the experiment just finishing up!! Hmmm. There are a lot of things to consider as they review the data and describe it to the other scientists. It is not so hard to describe, but how can they explain it!</td>
</tr>
<tr>
<td>Movie: Popularity Potion</td>
<td>Days later, our questioning team cannot conclude that the elixir makes anyone smarter… but weren’t they all feeling more popular? Well… except for Scratch? Take a look at Brandy and Tijo… Three weeks ago no one would even talk to them, and now they are magnets for attention. The elixir must be having some effect…</td>
</tr>
<tr>
<td>Activity: Popularity Probability</td>
<td>The little engine believed that he could climb the hill, and that was all he needed. Perhaps believing that one is becoming more popular helps make it so! Our sleuths use modeling on the computer to replicate the exponential growth of popularity based on one cheerleader’s opinion — discovering the powerful potential of word of mouth</td>
</tr>
<tr>
<td>Movie: Fixed Facts</td>
<td>So, the elixir doesn’t make anyone smarter or more popular. What obligations does the team have to the rest of the school? They come clean with the facts, breaking the bad news to Brandy and Tijo, and giving Dr. FactFixer a little education. Wait a minute… that guy can spin anything! How do you battle a man half-armed with information?</td>
</tr>
<tr>
<td>Activity: Conclusions Conundrum</td>
<td>Dr. Factfixer received his degree in spinning the stats. He can take any information and spin it, sell it and show how science proves his point. In this game show, our team must spot the logical fallacies and question the ‘scientific’ facts. They must sway audience opinion, by understanding the data presented, accurately interpreting charts, and counteracting Factfixer’s half-baked facts.</td>
</tr>
<tr>
<td>Movie: Even Superheroes Have Sixth Period</td>
<td>Sketch sure misses the taste of that elixir, but knows he didn’t need the drink to make him smart. He also knows how to prevent future allergic reactions. The team reviews how they solved the case, reflecting on the processes we recognize as scientific principles. It is a good thing the whole Factfixer Elixir is behind them — they’ve got homework to do! Lunch Lady Grady is back behind the mac and cheese, our team is ready for their next adventure…</td>
</tr>
</tbody>
</table>
| Culminating Activities | The game player can choose to play the game again, but will most likely go to the ‘Movie Extra’ section where they can:  
- Watch movie outtakes,  
- Design and print the movie poster (including their name), and  
- Participate in culminating activities and games that help them reflect on what they have learned.  
For example, they can play the “‘Now that I’m an Allergy Specialist’ Shootout” and shoot down the ‘creatures’ (e.g. allergens, antibodies and cells) that caused Sketch’s allergy. |
Appendix C: Biographical Summaries for Senior Project Personnel

**Project Leads:**

**Mable B. Kinzie,** Ph.D., is an Associate Professor of Instructional Technology at the University of Virginia, where she has been recognized as an outstanding faculty member. She specializes in user-centered instructional design, based on needs assessment and validated through rapid prototyping. She has produced 40 instructional/interactive products (including one of the first instructional websites, the Interactive Frog Dissection [http://frog.edschool.virginia.edu](http://frog.edschool.virginia.edu)) and 30 publications, with products in use for K-12 education, e-learning, and consumer/public health education, among other areas. Her work has earned awards for development and scholarship. So far, she's found it's impossible to have too much fun.

**Project Responsibilities:** Principal Investigator. Oversee project, coordinate efforts with NSF, prepare reports, establish collaborations, and obtain additional funding.

**Barbara Chamberlin** is completing her PhD with research evaluating the entertainment and educational outcomes of an educational games site she developed relating to food safety: [http://www.fooddetectives.com](http://www.fooddetectives.com). Her previous experience includes lead design/project management for a variety of multimedia CD-ROMs, educational web-sites and touch screen kiosks for museums and informal learning environments, several of which served children. Her research and development work is centered around developing educational games that are so entertaining, children choose to use them in their spare time, while yielding measurable learning outcomes.

**Project Responsibilities:** Project Director. Oversee all development and project staff, serve as creative lead for all games, coordinate formative and summative evaluation efforts.

**Sandra Pelletier, Ph.D.** is an Instructor of Research in the divisions of Health Services Research and Outcomes and Informatics at the University of Virginia. She has a PhD in Biochemistry and more than 10 years of laboratory research experience in molecular biology (genetics and protein structure and function). For the last 5 years Sandra has focused on bringing basic science discoveries into patient care, leading clinical and genetic specialists in the development of health education and algorithms to assess risk (See Health Heritage, at [http://www.healthheritage.net](http://www.healthheritage.net)). She is currently developing analytic tools for clinical and biological data. She remains fascinated with the workings of the human body (especially at the molecular level)

**Project Responsibilities:** Director of Content Development. Ensure accuracy and appropriateness for all science content and learning objectives, align development with national learning standards, coordinate feedback and contributions of science advisors. Serve as content expert for nutrition and molecular biology.
Content-Area Advisors:

**Laura F. Galloway, Ph.D.** is an Assistant Professor in the Biology Department at the University of Virginia. Her research is in plant ecological genetics, focusing on mechanisms of plant adaptation in natural environments. She also has a long-term interest in plant reproductive biology. Her recent NSF-funded research has supported ten publications in peer-reviewed journals. Her two main goals in teaching are to demonstrate that: 1) Evolution happens all around us all the time and, 2) Plants are fascinating.

**Project Responsibilities:** Content Specialist for Biology and Genetics. Serve on design team and provide guidance in developing relevant plant genetic and biology education materials. Serve as science advisor in developing game play and movie scripts.

**Edward M. Murphy** is an Assistant Professor in the Department of Astronomy at the University of Virginia. In addition to teaching and research, he is responsible for expanding and managing the Department's education and public outreach program. He is the Director of a summer 2002 Eisenhower Professional Development Program workshop for teachers in grades 4-9. Dr. Murphy has been selected as a University of Virginia Teaching and Technology Initiative Fellow during the 2002-2003 academic year to develop a series of interactive, on-line astronomical tutorials.

**Project Responsibilities:** Content Specialist for Astronomy. Serve on design team and provide guidance in developing relevant astronomy and earth science materials. Serves as science advisor in developing game play and movie scripts.

**Larry G. Richards** is an Associate Professor in the Department of Mechanical and Aerospace Engineering at the University of Virginia. He is one of two psychologists in engineering at UVa (Ph.D. in Psychology, 1971, University of Illinois). He has developed instructional materials for practicing engineers in industry, graduate and undergraduate students, and middle and high school students, and teachers. These include text- and computer-based materials, case studies, team projects, and distance and asynchronous learning materials. He teaches courses on Invention and Design, Creativity and New Product Development, Computer Aided Engineering and Design, and Statistics (at both the graduate and undergraduate levels). Last year, Larry started the Virginia Middle School Engineering Education Initiative (VMSEEI) to develop engineering teaching kits (ETKs), and bring engineering design activities into middle school classrooms.

**Project Responsibilities:** Content Specialist for Mechanical Engineering and Physics. Serve on design team and provide guidance in developing relevant engineering and physics materials. Serve as science advisor in developing game play and movie scripts.

(See also **Sandra Pelletier, Ph.D., above.**)
Development/Implementation Advisors:

**Robert W. Covert, Ph.D.**, is an Associate Professor of Education at the Curry School of Education at the University of Virginia. He teaches Multicultural Education at the undergraduate and graduate levels, and conducts cultural awareness training for educators, government employees, and community groups. For the past ten years he has conducted an annual summer institute on multicultural education for teachers and administrators. He also teaches qualitative methods at the graduate level. Besides his own research, Dr. Covert has served on over 100 qualitative doctoral dissertations and annually directs a number of evaluation projects which utilize both qualitative and quantitative methods.

**Project Responsibilities:** Multicultural Education Specialist, Evaluation Specialist. Serve on design team and guides development to ensure multi-cultural viewpoints and needs are represented, guide design and implementation of project evaluation efforts.

**Johanna Drucker** is Robertson Professor of Media Studies and Director of the Media Studies program at the University of Virginia. She has published and lectured widely on issues related to digital media, visual representation, and design in the production of meaning. Her works on typography and poetics, *The Visible Word* (University of Chicago Press, 1994), *The Alphabetic Labyrinth* (Thames and Hudson, 1995), and *Figuring the Word* (Granary Books, 1999) focus on the communicative features of visual media in language. She has held faculty positions at Yale University, Harvard University, Columbia University, and the State University of New York where she has taught theory, history, and design issues across a wide range of modern media. Since arriving at Virginia she has established several research projects (under the title Speculative Computing Lab) an Intel-sponsored initiative on the visualization of temporal relations for humanities data and on the Ivanhoe Project: A Game of Interpretation.

**Project Responsibilities:** Media/story creation advisor to the project, with special emphasis on storytelling and its influence on the immersive game experience. Oversee the efforts of a graduate research assistant on story writing, editing, and continuity.
July 22, 2002

Informal Science Education
National Science Foundation
4201 Wilson Blvd., Room 885
Arlington, VA 22230

Dear ISE Program Officer:

I am pleased to write this letter in support of the grant application to develop on-line educational games for middle school science by the University of Virginia, Curry School of Education project team. Faculty member Dr. Mable Kinzie, and the Curry School, have a strong track record in delivering web-based educational content.

I believe this project will be of significant value to the students of Albemarle County and other school districts across the country. The proposed games will provide an ideal opportunity to encourage science learning while allowing students to engage in an activity they find enjoyable and rewarding. It is also clear that this project addresses issues critical to our schools, such as science literacy, gender issues in science teaching and learning, and ways to offer meaningful educational experiences outside the classroom setting.

In addition, I am excited about the prospect of our students working with the game development team. If this grant is funded, I will work with the development team and our own Technology Director, Ms. Tammy Scot, to coordinate weekly design and evaluation activities for our upper-level students and alumni, using the Cale Elementary School computer laboratory. Ms. Scot will assemble teams of students to assist with the design of the games and their formative and summative evaluation. This project will provide our students an empowering opportunity to participate in a high-visibility project and to have a voice in the design and evaluation process. We look forward to the prospect.

If there is anything that I or Albemarle County Schools can do to assist you as you review this grant proposal, please do not hesitate to ask.

Kindest regards,

Matthew Landahl
Principal, Cale Elementary
Albemarle County School District
July 22, 2002

Informal Science Education
National Science Foundation
4201 Wilson Blvd., Room 885
Arlington, VA 22230

Dear ISE Program Officer:

All students, regardless of race, gender, and socioeconomic status, deserve equitable access to meaningful learning and achievement in science. Many educators are becoming increasingly aware that most students, particularly ethnic and language minorities and females, are not being served adequately by many of the existing science programs. As the Director of a computer training and mentor program for at risk youth, I have also made this observation.

Students who attend the Computers4Kids computer lab must earn their free time on the computer by spending at least thirty minutes in one or more of the following activities: (i) working on school/homework, (ii) engaged in educational activities on approved websites, or (iii) using approved educational software. The most popular educational activities are games that are entertaining and engage the students.

Movie Play: On-Line Games for Middle School Science, upon completion, would be a tremendous hit with our students. In addition to encouraging knowledge development in scientific areas suggested by the National Science Education standards, I feel a true strength to this project is that it will help students realize the diversity of careers that are available in science.

I am eager for our students to be participants in the evolution of the design of this wonderful online tool. This opportunity will provide a voice to many students who, on their own, are often not heard.

I look forward to working with Dr. Mable Kinzie and the Curry School of Education project team and applaud them for their dedication to ensuring that ALL students have equal education opportunities.

Very truly yours,

Kala E. Somerville
Executive Director
Dear Dr. Kinzie:

It is with great pleasure that I send you this letter of support to your NSF proposal, “Movie Play Games for Middle School Science.” We look forward to collaborating with you to create powerful technology-based instructional modules that will provide opportunities for active construction of science concepts in the minds of young students.

The mission of the Science Museum of Virginia is to bring science and technology education to all citizens of Virginia. This project coincides with our mission and gives us another opportunity to leverage our work through collaboration. It is vitally important to use technology to stimulate young minds with authentic science content. A movie game format is a perfect vehicle for reaching middle-school youth.

We are excited about the possibility of creating a Web Portal for Movie Play games at our own website. We, like many other science museums, wish to provide high-quality, web-based interactive activities on our website, but have found development costs prohibitive. The proposed partnership with UVA would allow the museum to present Movie Play on our own site, providing valuable outreach to online users, some of whom may be unable to visit the museum in Richmond. More important, we wish to develop a model for other museums and science centers to follow in linking with Movie Play games. We envision customized portals for each museum, so that each institution could have a unique Movie play interface on their web site, integrating Movie Play games with their own educational activities. Additionally, our model may include teacher's activities or exhibit integration of Movie Play game concepts and activities.

We are writing this letter to support your proposal. If it is funded, we can provide support to your efforts in three ways:

a. We can integrate the Movie Play ideas in our education and outreach programs, including dissemination in our Community Technology Studio.
b. We can create a web portal and present a viable model so other museums/science centers will see how to use Movie Play Science Games.
c. We can share our experiences with Movie Play Science Games with the museum community via presentations at Association of Science and Technology Center (ASTC) conferences. We are especially pleased to anticipate this opportunity when the project’s final product is completed in 2005, the same year we will be hosting ASTC in Richmond, Virginia.

On behalf of the Science Museum of Virginia’s Center for Science Education, we endorse your proposal to request funding for this project.

Sincerely yours,

Dr. Pat Fishback, Director of Education
Center for Science Education