



Research Assignment - 2009

Title of research assignment

Development of Teacher's Manual for Geckoman -- A video game to teach middle school students about nanoscale forces

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Research abstract

Developed originally as an informal science education tool, an educational video game has been created for middle school students (grades 6-8). The game, Geckoman, teaches kids about nanoscale forces as they navigate the nanoscale world and outsmart the enemy nanoids. In the microscale world, concepts of capillary forces are introduced, while in the macroworld, electrostatic forces are used to propel the player past obstacles and enemy fire. To utilize this game as a complement to formal in-class education, a Teacher's Manual would provide instructional materials for teachers' use. Two RET teachers will work in the Center for High-rate Nanomanufacturing to create lab experiments and video demonstrations that map to the learning objectives for each level of the video game. RETs can also select from existing instructional materials developed elsewhere for use in the Teacher's Manual. The video game can be used to reinforce the concepts illustrated in the demonstrations and experiments. See demo of the video game at <http://www.metaversalstudios.com/games/geckoman/> and click on picture to run the trailer.

Research activities/experience

Applicants must be skilled at playing basic video games, and have an understanding of nanoscale forces, capillary forces and electrostatic forces. (A demo version of the game is available after the trailer at: <http://www.metaversalstudios.com/games/geckoman/>.) RETs will have opportunity to observe, video capture and potentially use equipment in the Kostas Nanomanufacturing Center clean rooms (<http://www.kostas.neu.edu/>). Resources and additional support will be available from the NU EdTech Center

(<http://www.edtech.neu.edu/>) and from Metaversal Studios (the game designer) for creating graphically interesting on-line content for the manual. An opportunity to test Geckoman and new demonstrations exists during visits from students in the 2009 ExxonMobil Bernard Harris Summer Science Camp Program (7th and 8th graders).

Expectations of RET

Development of several experiments / demonstrations / activities that exemplify the learning objectives in the game. Written "chapters" for the Teacher's Manual to guide other instructors through the activities. Development of assessment materials to allow teachers to determine level of understanding for their students.

Special skills or interests that would help a RET participant with this assignment (i.e., an interest in physics, experience with specific laboratory equipment, etc.)

An understanding of nanoscale forces, capillary forces and electrostatic forces.

Lab safety/issues unique to this laboratory. A general Lab Safety Overview will be presented by Environment Health and Safety to both RET and YSP participants prior to the beginning of lab assignments.

There are special protocols for working in clean rooms, and there are special issues for working with nanoparticles that will be discussed prior to commencement of lab work.

Suggested literature to be reviewed prior to beginning this research assignment.

There is a web blog of complementary instructional materials that we have begun to gather. This will be made available to the RETs selected for these positions. There is also a 2008 ASEE conference paper that explains the design of the game itself.

Research/Lab Summer Hours : a.m. – : p.m. Monday through Thursday
 Monday through Friday

Scheduled Research/Lab Meetings : p.m. – : p.m. Daily Wednesday To be determined
 Monday Thursday
 Tuesday Friday

Lab/research project URL

<http://www.metaversalstudios.com/games/geckoman/>

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