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| **$1000 GRANT FOR INNOVATIVE TEACHERS** | | | | | | | | | |
| *COVER SHEET* | | | | | | | | | |
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| ***DEADLINE TO SUBMIT is OCTOBER 16, 2009*** | | | | | | | | | |
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|  |  |  |  |  |  |  |  | Grant #\_\_\_\_\_\_\_\_\_\_ | |
|  |  |  |  |  |  |  |  | (Office Use Only) | |
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| PROJECT TITLE: | | Robotics |  |  |  |  |  |  |  |
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| TEACHER(S): | | Kim Mulkey |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| SCHOOL NAME: | | Woodward Academy Lower School | | | |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |
| ADDRESS: |  | 3400 Madison Street | |  |  |  |  |  |  |
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| CITY, STATE, ZIP: | | College Park, Georgia, 30337 | | |  |  |  |  |  |
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| GRADE LEVEL: | | Fifth and Sixth Grade | |  | SUBJECT: | Integrated | Technology |  |  |
|  |  |  |  |  |  |  |  |  |  |
| AMOUNT OF GRANT: | | $1,000.00 |  |  |  |  |  |  |  |
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| Principal's / Headmaster's Signature | | | | | | | | | |
| **REQUIRED FOR ACCEPTANCE** | | | | | | | | | |
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| Please submit one (1) copy of the cover page and one (1) copy of your application form to: | | | | | | | | | |
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| **GISA TEACHER SERVICES COMMITTEE** | | | | | | | | | |
| c/o Dr. Jeff Jackson, Executive Director | | | | | | | | | |
| Georgia Independent School Association | | | | | | | | | |
| Post Office Box 1505 | | | | | | | | | |
| Griffin, GA 30224-0036 | | | | | | | | | |

**Introduction**

This grant proposal for funding of a robotics program is for Woodward Academy’s Lower School. This is an independent school located in College Park, Georgia. The population is 490 students ranging from fourth through sixth grades. The Lower School is a division of Woodward Academy which is approximately 2,800 students ranging from pre-k through twelfth grade. It is a college preparatory school, so the curriculum is rigorous. There is a technology facilitator at the Lower School that will be implementing the instruction for this project. This endeavor will be successful, because the staff is committed to using innovative instruction that will benefit students’ moving into the 21st century.

**Statement of Need**

Many schools today are still teaching students with traditional methods. It is a goal the school to bring instruction and learning into the 21st century. Bloom’s Taxonomy is not new but applying technology to these skills is needed in classrooms. Students need to be engaged in higher levels of thinking skills. They need to be exposed and have opportunities to solve problems, be creative, and incorporate technology into their learning. Creativity and problem solving are not new, but these concepts of problem solving and creativity can be explored with the use of technology and robotics.

Activities, such as robotics, allow students to practice using 21century skills, by allowing students to think. In order to expose students to robotics, this grant proposal is for a two-year plan. This proposal meets the requirements for this funding due to the fact it is an innovation that will directly impact a large portion of the school’s population.

**The Goals of the Grant**

The ultimate goal of the grant consists of fifth and sixth students being exposed to the Lego Robotics program. Another goal is the students’ eventual ability to solve problems using hypothesizing, planning, and creating alternate courses of action based on results. Students will have the opportunity to learn, even if they don’t succeed. Problem solving is often a process of trial and failure, and trying again. They will have the opportunity to have an integrated approach to science, technology, engineering, and math (STEM) while exploring with the robotics program. This approach will allow the students to understand the factors involved in combining STEM activities, and be able to apply them to other situations in the future. Sixth grade students will be applying these concepts while involved in inquiry projects during science class. These goals can be accomplished by teaching in small group settings and allowing students to discover and investigate the use of the Legos®. The teacher will be process oriented, using student centered and inquiry based instruction.

**Objectives**

In the first year, the fifth grade students will be the group targeted for robotics. The second year, the sixth grade students will be using these skills to apply them to new situations. The students will exhibit the ability to synthesize by hypothesizing and constructing their robot. In programming their robot, students will demonstrate the ability to analyze by creating step by step directions for the robot to execute. The students will also apply mathematic skills by formulating force and speed. The students will solve the scripted problems first, and then will apply these skills to their own hypothesis and solution. The students will make these attempts for as long as needed. The objective will not be achieved with accuracy, but with the students demonstrating the ability to evaluate their work and make adjustments or changes. The success of the lesson will be the ability to make changes and improvements upon their project. These changes will be assessment in a journal that the students write to document their changes. Students’ robots should either correctly perform the task with 100% accuracy or show at least 3 changes to their robot.

**Grant Activities**

The focus of the grant proposal is to promote problem solving and creativity through the process of constructing and programming Lego® robots.

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| The students will exhibit the ability to synthesize by hypothesizing and constructing their robot. | The students will build their robot using Legos® and hypothesize what their robot will be able to do. They will log their process in a journal. |
| In programming their robot, students will demonstrate the ability to analyze by creating step by step directions for the robot to execute. | Students will use program software to create their task for the robot to perform. They will make adjustments to the program as needed. The journal will be continued. |
| The students will also apply mathematic skills by formulating force and speed. | They will need to calculate adjustments based on speed and force.  The journal will be continued. |
| The students will solve the scripted problems first, and then will apply these skills to their own hypothesis and solution. | All of the above processes will be repeated with a new problem created by the students. Each step will be documented in their journal. |

**Timeline**

The timeline for this proposal is two years. The first year will begin in the spring of 2010 and end in the spring of 2012. However, the cycle will repeat each year, so that each student completes the objectives for fifth grade and sixth grade. Classes will rotate into the lab using small groups until all student in the fifth grade have had an opportunity to complete the process. Each group will work five days for one 45 minute period each day. It will take approximately 20 weeks for each student to have their turn. There will also be a robotics club for students who want to pursue other opportunities. The ongoing progress will be displayed on the school’s technology blog to share the project with others. At the end of the two years, a presentation will be made at a professional conference.

**Evaluation Plan**

The project will be evaluated during the course of the two years. The following rubric will be used to assess the students understanding and success. The rubric will be used at each step of the process. Students will assess themselves, as well. The journals and evaluations from the rubric will be used to assess if the objectives were successful. The formative data will be used to make changes in the program for the following year.

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| Function | Structure functions extraordinarily well, holding up under atypical stresses. | Structure functions well, holding up under typical stresses. | Structure functions pretty well, but deteriorates under typical stresses. | Fatal flaws in function with complete failure under typical stresses. |
| Journal/Log - Content | Journal provides a complete record of planning, construction, testing, modifications, reasons for modifications, and some reflection about the strategies used and the results. | Journal provides a complete record of planning, construction, testing, modifications, and reasons for modifications. | Journal provides quite a bit of detail about planning, construction, testing, modifications, and reasons for modifications. | Journal provides very little detail about several aspects of the planning, construction, and testing process. |
| Scientific Knowledge | Explanations by all group members indicate a clear and accurate understanding of scientific principles underlying the construction and modifications. | Explanations by all group members indicate a relatively accurate understanding of scientific principles underlying the construction and modifications. | Explanations by most group members indicate relatively accurate understanding of scientific principles underlying the construction and modifications. | Explanations by several members of the group do not illustrate much understanding of scientific principles underlying the construction and modifications. |
| Modification/Testing | Clear evidence of troubleshooting, testing, and refinements based on data or scientific principles. | Clear evidence of troubleshooting, testing and refinements. | Some evidence of troubleshooting, testing and refinements. | Little evidence of troubleshooting, testing or refinement. |

Rubric from <http://rubistar.com>

**Budget**

The total funds needed for this project are $3,045.90. (See the attached spreadsheet for the specific breakdown of cost). The funding is only for materials needed from Lego®. There will be two purchases; the first will be grant funded and the remaining portion will be funded by the Lower School principal’s budget. The technology teacher will be using the Lego® directions and books that are already owned to learn how to implement the program, so no professional development funds will be needed.