Budget

University Of Akron (062869) - Summit County - 2014 - Straight A Fund - Rev 0 - Straight A Fund - Application Number (312)

U.S.A.S. Fund #:
Plus/Minus Sheet (opens new window)

Purpose Code / Object Code	Salaries 100	Retirement Fringe Benefits 200	Purchased Services 400	Supplies 500	Capital Outlay 600	Other 800	Total
Instruction	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Support Services	62,404.00	19,095.00	3,507,500.00	75,000.00	0.00	0.00	3,663,999.00
Governance/Admin	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Prof Development	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Family/Community	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Safety	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Facilities	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Transportation	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	62,404.00	19,095.00	3,507,500.00	75,000.00	0.00	0.00	3,663,999.00
						Adjusted Allocation	0.00
						Remaining	-3,663,999.00

Application

University Of Akron (062869) - Summit County - 2014 - Straight A Fund - Rev 0 - Straight A Fund - Application Number (312)

Applicants shall respond to the prompts or questions in the areas listed below in a narrative form.

A) APPLICANT INFORMATION - General Information, Experience and Capacity

1. Project Title:Racing to a Straight A: A Partnership Between The University of Akron and the International Soap Box Derby to Disseminate the Gravity Racin

2.Executive summary: Provide an executive summary of your project proposal and which goal(s) in question 9 you seek to achieve. Please limit your responses to no more than three sentences.

This Racing to a Straight A Student Achievement Project can provide 5th grade teachers across Ohio with the International Soap Box Derby's "Gravity Racing Challenge (GRC)", which is designed to meet the following five project goals: (1) develop Gravity Racing Challenge resources, curriculum, and measurable assessments aligned to Ohio's New Learning Standards and State Achievement Tests, (2) use Soap Box Cars and "tool kits" to create an engaging, differential, interactive learning environment to improve students' academic achievement in science and math, (3) provide professional development and collaborative teaching opportunities for educators through workshops, webinars, resources, and support to successfully implement this Project in their classrooms, (3) connect student learning to higher education, life, and careers through collaborative efforts, teaching, and mentorship by educators and students in grades 6-12, higher education, professional organizations, and businesses and (5) provide educators with the necessary resources, support, and training to build and maintain community partnership necessary for continued support and sustainability of this Project in their schools. Strong collaboration with the International Soap Box Derby (an organization that has a historic track record spanning seventy-seven years of providing over one million youth with educational opportunities and experiences through gravity racing) and the University of Akron's (UA) College of Engineering (faculty, internationally -ranked (top 10) Society of Automotive Engineers Student Design Team), College of Education, and other resources at UA, will provide the necessary support and resources for the overall GRC program. Currently with schools in twenty-four Ohio School Districts using the GRC to meet the stated goals, this Project will allow the University of Akron and the International Soap Box Derby to further develop, implement, evaluate, and expand the GRC into about one thousand 5th grade classrooms in Ohio.

25000 3. Total Students Impacted:

4. Lead applicant primary contact: - Provide the following information:

First Name, last Name of contact for lead applicant: Donald Visco

Organizational name of lead applicant: The University of Akron

Unique Identifier (IRN/Fed Tax ID): 062869

Address of lead applicant: 302 Buchtel Common, Akron, OH 44325-3901

Phone Number of lead applicant: 330-972-7930

Email Address of lead applicant: dviscoj@uakron.edu

5. Secondary applicant contact: - Provide the following information, if applicable:

First Name, last Name of contact for secondary applicant: Linda Hubbell

Organizational name of secondary applicant: The International Soap Box Derby

Unique Identifier (IRN/Fed Tax ID): [redacted]

Address of secondary applicant: PO Box 7225, Akron, OH 44306

Phone number of secondary applicant: 330-733-8723

Email address of secondary applicant: linda@aasbd.org

6. List all other participating entities by name: Provide the following information for each additional participating entity, if applicable: Mention First Name, Last Name, Organizational Name, Unique Identifier (IRN/Fed Tax ID), Address, Phone Number, Email Address of Contact for All Secondary Applicants in the box below.

not applicable

7. Partnership and consortia agreements and letters of support: - (Click on the link below to upload necessary documents).

* Letters of support are for districts in academic or fiscal distress only. If school or district is in academic or fiscal distress and has a commission assigned, please include a resolution from the commission in support of the project.

* If a partnership or consortium will be established, please include the signed Straight A Description of Nature of Partnership or Description of Nature of Consortium Agreement.

UploadGrantApplicationAttachment.aspx

8. Please provide a brief description of the team or individuals responsible for the implementation of this project including relevant experience in other innovative projects. You should also include descriptions and experiences of partnering entities.

Dr. Donald P. Visco, Jr. - Dr. Visco is the Associate Dean for Undergraduate Studies and a Professor of Chemical Engineering at The University of Akron. Dr. Visco has been PI or Co-PI on externally funded projects totaling more than $3M, thus he is sensitive to the management and oversight of large projects. He will be responsible for coordinating activities from the College of Engineering in support of the implementation of the project as well as facilitating communication between the ISBD and UA. Dr. Nidaa Makki - Dr. Makki, a former Physics Teacher, is an Assistant Professor of Curriculum and Instructor in the College of Education at The University of Akron with expertise in STEM education. Dr. Makki has been PI or Co-PI on several STEM projects including integrating engineering in the classroom. Accordingly, she will be responsible for curriculum development, aligning activities with the New Ohio Learning Standards, the design and implementation of the assessment and coordinating the evaluation strategy for this project. Linda Hubbell - Ms. Hubbell, a former 4th and 5th grade Elementary School Teacher, is the Education Program Director for the International Soap Box Derby (ISBD). Ms. Hubbell has worked for the International Soap Box Derby to develop the Gravity Racing Challenge. She will be responsible for coordinating the Project at ISBD, assisting with implementation of the Project in Ohio schools as well as assisting with curriculum and resource development. Ms. Hubbell will also manage two assistants to help with the logistics associated with receiving requests from schools and shipping the items to the 1000 schools in the time period of the proposal. Dr. Kristin Koskey - Dr. Kristin Koskey is an Assistant Professor in the College of Education at the University of Akron. She earned her Ph.D. in Educational Research and Measurement at the University of Toledo in 2009. Dr. Koskey teaches courses in evaluation, assessment, research design, and statistics. She also is a partner at MetriKs Amerique for which she consults in psychometric analyses, evaluations, and facilitating item-writing workshops for different organizations. Her areas of expertise include psychometrics, evaluation, and mixed-methods research design. Dr. Koskey's work is published in leading journals such as Studies in Educational Evaluation, Journal of Applied Measurement, Journal of Mixed Methods Research, Journal of Experimental Education, and Educational and Psychological Measurement. She has contributed to the evaluations on grants such as the Franco-American Teachers-in-Training Institute (U.S. Department of State), Math and Science Partnership - Motivation Assessment Program (NSF), and a grant funded by the Jacobs Foundation. Further, she served on an evaluation team for the Laying the Foundation, a program implemented across multiple states. - TBN: a project coordinator at UA will be hired to manage the logistics and paperwork associated with the financial management of the project. The team has already identified a few persons eligible to fulfill this role with the necessary qualifications. Thus, they will be able to act quickly if the project is funded.

B) PROJECT DESCRIPTION - Overall description of project and alignment with Outcomes

9. Which of the stated Straight A Fund goals does the proposal aim to achieve? - (Check all that apply)

- [x] Student achievement
- [ ] Spending reductions in the five-year fiscal forecast
- [ ] Utilization of a greater share of resources in the classroom

10. Which of the following best describes the proposed project? - (Select one:)

- [ ] New - never before implemented
- [ ] Existing and researched-based - never implemented in your district or community school but proven successful in other educational environments
- [ ] Mixed Concept - incorporates new and existing elements
- [x] Enhancing/Scale Up - elevating or expanding an effective program that is already implemented in your district, school, or consortia partnership

11. Describe the innovative project.

Ohio's New Learning Standards and Model Curriculum in Science has two major expectations based in STEM: (1) Expectations for Learning Cognitive Demands and (2) Expectations for Technological and Engineering Design. Engineering design is also strongly emphasized in the newly released national standards in science (Next Generation Science Standards). Students are expected to be able to ask scientific questions, define engineering problems, and understand the difference between engineering and science practices (Bybee, 2011). However, the standard science curriculum does not address engineering clearly. Hence, there is a strong need to establish partnerships to infuse the science curriculum with engineering activities that have shown past success, especially at the middle school level, where the interest in science is shown to begin to decline. The Racing to a Straight A Student Achievement Project combines the International Soap Box Derby's (ISBD) historical significance, education mission, and youth gravity racing through Soap Box Derby with the academic excellence and resources of the University of Akron's College of Engineering and College of Education to provide 5th grade educators with the resources to implement the Gravity Racing Challenge curriculum to students across Ohio (about 1000 classrooms/25,000 students). This includes curricular resources (e.g. workbooks), Mini Soap Box Derby Classroom Kits and Soap Box Cars, as well as the training and professional development to implement the GRC curriculum. The Mini Soap Box Derby Classroom Kits are small, gravity driven cars (called "Minis") that the students assemble, using tracks and timers provided to explore relevant physics and motion concepts. Each student will have their own car. The assemblage of the larger Soap Box Derby cars will be facilitated by videos created by UA's student design team and will include "tech tips" on both building the car and the physics behind some design decisions the students can make. Additionally, DVDs will be created discussing the implementation of the GRC curriculum in the class as a resource for teachers. Such efforts will also be supported by in-person regional workshops. While not funded through this grant, students completing the Soap Box Derby car then participate in the Gravity Racing Challenge event at Derby Downs in May in Akron. Last May, over 800 educators and students, comprising 90 teams from across Ohio competed in the GRC STEM School Team Competition. Currently educators in 13 states, and internationally in Singapore, New Zealand, Japan, and Germany, are using various aspects of the GRC to support STEM learning. Project dissemination will be aided by those 90 teachers who are already using the GRC curriculum in Ohio, such that they encourage other 5th grade teachers (locally and regionally) on the benefits of the GRC curriculum. This project has the following goals that support student achievement in Ohio: 1) To develop Gravity Racing Challenge resources, curriculum, and measurable assessments aligned to Ohio's New Learning Standards and State Achievement Tests 2) To use Soap Box Cars and "tool kits" to create an engaging, interactive learning environment to improve students' academic achievement in science and math, and increase their interest in STEM fields. 3) To provide professional development and collaborative teaching opportunities for educators through workshops, webinars, resources, and support to successfully implement this Project in their classrooms 4) To connect student learning to higher education, life, and careers through collaborative efforts, teaching, and mentorship by educators and students in grades 6-12, higher education, professional organizations, and businesses. 5) To provide educators with the necessary resources, support, and training to build and maintain community partnership necessary for continued support and sustainability of this Project in their schools.

12. Describe how it will meet the goal(s) selected above. - If school/district receives school improvement funds/support, include a brief explanation of how this project will advance the improvement plan.

The goal of the project is in increasing student achievement in mathematics and science. Through this innovative project, students will be engaged with engineering design activities that teach the academic content in science and mathematics as well as the engineering design process. This project meets the focus in the New Ohio Learning Standards on engineering and technological literacy, and 21st century learning, by embedding them in the curriculum. Goal 1: - Project personnel will create curricular materials that align with 5th grade science learning standards, address learning the engineering design process, as well as 21st century skills of communication and teamwork. The team expertise in engineering, STEM education, assessment, and instructional design will ensure this goal is met. - Training videos will be created to support the needed professional development for teachers to implement GRC. These videos will include informational materials about the GRC, hands-on demonstrations of how to build cars including safety measures, car rebuilding (future use), classroom organization and implementation, and preparing for competitions. Step by step instructions will be provided for the mini car classroom kits. - Assessments will be created (or selected from published instruments) and piloted that provide measures of student learning. The assessments will target content knowledge, engineering design skills, and interest in STEM. The team has expertise in STEM education and assessment and measurement to create these assessments. Goals 2 and 3: - School districts will be identified for implementation using the following strategies: expanding into 5th grade from existing school district participants; working with ESC to disseminate the availability of the resources; contacting existing UA college of education partners; and working with the existing network of technology and engineering educators. - A cadre of teacher mentors will be identified from current teachers who implement GRC - Professional development (face to face or virtual) will be conducted for teachers and resources (videos, curricular materials, car kits) distributed. The professional development will be facilitated by teacher mentors and will occur during the school day for a half day. The mini car kits come equipped with everything the teachers need to implement the project. The curricular materials and videos provide clear implementation guidelines. - A website will be created (hosted by The University of Akron) to provide project information, timeline, and a discussion board for questions and answers. - Using the above resources, teachers will implement the engineering design activities in 5th grade classrooms that are aligned with the New Ohio Learning Standards and assess student learning. Goal 4: - The developed curricular materials provide 5th grade students with concrete applications of science and mathematics to increase their interest in STEM through the mini cars and team competitions. Career applications will be highlighted. Goal 5: - The curricular materials provide teachers with the necessary tools to address the science, technology, engineering, math-related standards in the classroom. - The project expands the collaborative efforts which currently exist between schools participating in the GRC with community organizations, businesses, higher education, and professional organizations to sustain this Project in Ohio schools.

C) SUSTAINABILITY - Planning for ongoing funding of the project, cost breakdown

13. Financial Documentation - All applicants must enter or upload the following supporting information. Responses should refer to specific information in the financial documents when applicable:

a. Enter a project budget

b. Upload the Straight A Financial Impact Template forecasting the expected changes to the five-year forecast resulting from implementation of this project. If applying as a consortia or partnership, please include the five-year forecasts of each school district, community school or STEM school member for review.

c. If subsection (b) is not applicable, please explain why, in addition to how the project will demonstrate sustainability and impact.

The Straight A Financial Table is not directly applicable as the two entities in the partnership are The University of Akron and the International Soap Box Derby. However, and as shown in Question #16, there is an expected savings to a school district that participates in this program. The project will demonstrate sustainability through the fact that recurring costs are small ($285 per classroom) and a pathway to obtain those dollars (from community and industry partners) is available. The project will demonstrate impact through the detailed assessment and evaluation plan provided in Questions 20 - 25.

14. What is the total cost for implementing the innovative project?

3,663,999.00 * Total project cost

* Provide a brief narrative explanation of the overall budget. The narrative should include the source and amount of other funds that may be used to support this concept (e.g., Title I funding, RttT money, local funding, foundation support, etc.), and provide details on the cost of items included in the budget (i.e. staff counts and salary/benefits, equipment to be purchased and cost, etc).

The project requires two local coordinators: one at ISBD and the other at UA. They will be full-time for six months. The local coordinator at ISBD will be in charge with all of the day-to-day operations associated with the distribution of GRC kits to the various schools. That person will also have two administrative personnel working on this project to handle the logistics of receiving the orders and distributing the equipment to the 1000 schools. The local coordinator at UA will handle the day-to-day operations associated with the project, including all of the financial aspects. An external evaluator (Dr. Koskey) will spend 1/4th of her time on the project during the spring semester as well as one summer month. Dr. Makki will serve to assess the goals of the project and work on both curriculum developments aspects as well as professional development. She will spend 1/4th of her time on the project during the spring semester, plus one month in June. As this project involves multiple locations (UA, ISBD and the various schools), Dr. Visco will spend 1 calendar month's time overseeing the implementation of the project, to make sure the project is executed as stated, as well as ensuring communication and logistical lines are open. To produce the Soap Box Derby car video instructions, six students from UAs Baja SAE team will be paid a stipend of $200 each for their participation. A data entry person associated with the assessment activities will be paid $10/hour for 100 hours during the project. To design and develop the DVDs for teachers to use to accompany the GRC curriculum and other multimedia production, $5000 is budgeted for this activity. To help spread the dissemination of this project, we will pay the teachers who currently implement the GRC curriculum to contact others in their region on the benefit of this approach. We will provide a stipend of $250 for up to 100 teachers to help with the dissemination. In order to provide in-person information and training associated with the implementation of the GRC program, there will be up to 25 professional development workshops given throughout the state, as needed. The presenter fee (plus travel) is estimated at $500 per workshop. Additionally, teachers who attend these workshops (which will be given during the school day), will require a substitute teacher. Thus, we are budgeting $125 per teacher to cover the substitute teacher stipend. Equipment The equipment is discussed on a per-classroom basis. Each of the numbers below will be multiplied by 1000 (as there are 1000 classroom implementations planned across the state). Each Soap Box Derby car kit plus shipping will be $1000. Each Mini Car Kit (one for each student in a class) plus the Mini Race Track (including shipping) will be $2230. The teacher resources and materials (curriculum and handouts) are $75 per classroom.

15. What **new/recurring costs** of your innovative project will continue once the grant has expired? If there are no new/recurring costs, please explain why.

0.00 * Specific amount of new/recurring cost (annual cost after project is implemented)

* Narrative explanation/rationale: Provide details on the cost of items included in the budget (i.e. staff counts and salary/benefits, equipment to be purchased and cost, etc.). If there are no new/recurring costs, please explain why.

The Soap Box Derby car can be taken apart and used again, so this is a one-time cost. Additionally, the DVDs and training materials are also one-time costs. However, there may be parts that break with repeated use. Thus, we would estimate $45 per classroom for replacement parts for a Soap Box Derby car (per year). For the Minis, the replacement parts include student consumable items in the classroom kits (activity booklets). For these, we estimate $240 per classroom per year. Thus, the total recurring cost per classroom for equipment and supplies would be $285.

16. Are there **expected savings** that may result from the implementation of the innovative project?

0.00 * Specific amount of expected savings (annual)

* Narrative explanation/rationale: Provide details on the anticipated savings (i.e. staff counts and salary/benefits, equipment to be purchased and cost, etc.)

This Project designed to impact students' achievement in math and science has potential savings of the District's General Fund by decreasing expenditures for student remediation, intervention, and/or retention resulting through reduced costs for staff (salaries and benefits), instructional materials, assessments, and evaluations. In addition, this Project's funding will cover the upfront costs that Districts would normally acquire to develop, train, implement, evaluate, and fund a new educational program aligned to Ohio's New State Standards in their Schools. Additional savings for Districts include the upfront costs covered by this Grant. Over 93% of the Project's initial cost for implementation is covered through this Grant. These costs will cover equipment, supplies, resources, and materials that is designed for continual usage. Project funding for the 2nd to 5th year will be minimal (and sustainable) which will insure continued classroom usage. The Project's overall savings will be reflected in reduced expenditures in the District's General Fund in these areas.

17. Provide a brief explanation of how the project is self-sustaining. If there are ongoing costs associated with the project after the term of the grant, this explanation should provide details on the cost reductions that

will be made that are at least equal to the amount of new/recurring costs detailed above. If there are no new/recurring costs, explain in detail how this project will sustain itself beyond the life of the grant.

The Gravity Racing Challenge started a few years ago with only a few schools in Ohio. Those school districts secured the necessary financial, technical and program support to continue to use the GRC through direct outreach by educators to community organizations and businesses, which has resulted in securing the necessary funding for schools to be able to continue to participate. In addition to financial support, educators have built strong technical and GRC program support networking and collaborations with colleagues, professional organizations, and higher education. This networking, sponsorship, partnerships, and collaborations have resulted in the retention of schools participating in the GRC program, as well as the substantial growth shown by increased school involvement across Ohio. We identify two main levels needed for this project to be self-sustaining: (1) commitment and support from educators who believe in the GRC and (2) educators building partnerships with local industry and the community for financial stability. Both of these currently exist in the schools that participate in the GRC, which creates models for other schools to follow. Level 1: Educators commitment and support of this Project. As previously mentioned, the GRC program is slowly growing in Ohio and those schools who have used it recently are continuing to use the program. One major reason for this is because the GRC meets a lot of criteria that educators desire for their curricular activities, including being standard's based, experiential, measurable, STEM applicable, team building, inclusive, hands-on and motivating. Two quotes follow, which support the impact of the GRC program. "The team experience in the Soap Box Derby is like none I have ever experienced before. Soap box derby requires strong collaboration and team values. Teamwork is vital to building a successful car because almost everything requires a partner or a group. The ingenuity of designing the car and the problem solving skills required to troubleshoot are all key skill we will use in life regardless of the career paths we choose in the future." Kartik S. (student) Westlake H.S. "Students are developing the skills from building the cars to actual testing. In my opinion, there is no better way to teach or to learn than hands-on activities. My students have learned more from the GRC hands-on activity than they would have learned from any textbook (and have a whole lot of fun doing it). I saw what this program has done for my students; I would like to see other schools have the same Opportunity to participate in this program." Marcus Petitjean (Technology Teacher) Russia Local School Level 2: Educators building partnerships with local community and industry for sustainability Educators have been able to continue using the GRC in their schools through outreach and partnership with their community organizations and local industries. Some community partners that are already supporting schools in using the GRC include, but are not limited to, AAA Waterloo Transmissions Bay Kiwanis Time Warner Park Honda Independence Excavating PTA/PTO Groups Romeo Pizza Custom Apparel Fleming Steakhouse Bay Barber Shop Copley-Fairlawn Kiwanis Subway NAPA Stillwater Technologies Northern Technical Group Precision PPG Industries As mentioned, the project's main expense is the upfront cost and this is prohibitive for many schools. However, with the Straight A

D) IMPLEMENTATION - Timeline, communication and contingency planning

18. Fill in the appropriate dates and an explanation of the timeline for the successful implementation of this project. In each explanation, be sure to briefly describe the largest barriers that could derail your concept or timeline for implementation and your plan to proactively mitigate such barriers. In addition, the narrative should list the stakeholders that will be engaged during that stage of the project and describe the communication that occurred as the application was developed.

Describe the ongoing communication plan with the stakeholders as the project is implemented. (Stakeholders can include parents, community leaders, foundation support and businesses, as well as educational personnel in the affected entities.)

* Proposal Timeline Dates

Plan (MM/DD/YYYY): 10/28/2013 - 02/17/2014

* Narrative explanation

What is listed below is the planning stage for this Racing to a Straight A proposal. The biggest barrier in this stage would be getting schools to adopt the Gravity Racing Challenging curriculum. However, we have attempted to address this issue in multiple ways: (1) we have already discussed the GRC with several schools and they have shown interest, (2) we will make use of contacts already collected by the implementation team, (3) we will employ teacher-mentors who will champion the use of the GRC, since they currently are using the curriculum and (4) we will provide in-region, in-person people via workshops to answer questions associated with the implementation, including substitute-teacher funds for that day. 10/28/2013: The team already has contacts for the various schools throughout the State, and will make immediate contacts about this opportunity to those schools. Note that several schools have already shown an interest in this project, if funded. As the partners have been working on other projects together for a few years, communication barriers are minimal. 12/20/2013: Contact schools about program. If we are awarded the grant, we should know by this date. Thus, formal contacts with schools will occur at this point. 01/06/2014: Hire personnel (at UA and ISBD). Both the partners in this proposal (UA and ISBD) have already spoken with appropriate personnel who have the qualifications and interest to be hired in the various positions important to the success of the proposal. This will be completed soon after the start of the new year. 01/07/2014: Contact schools about program (follow-up). A second round of contacts with school personnel throughout the State will occur (post holiday break) about the GRC curriculum. 01/07/2014: Secure commitments from Teacher-Mentors for program dissemination. The teachers already implementing the GRC curriculum (from a previous year) will be contacted to secure their commitments to serve as both champions of the program and as mentors, should other teachers have questions. As this is a potential implementation barrier, teachers will be provided a small stipend for this important function. 01/08/2014 -- 02/07/14 Refining GRC curriculum. The GRC curriculum currently exists and is being used. However, it needs to be refined to better integrate with the curriculum standards. This effort will begin early in January and last one month. At that point, the curriculum will be ready for dissemination. 01/09/2014: Create "how to" videos using UA Baja SAE Team The UA Baja SAE will spend several hours preparing for their video by putting together and taking apart a Soap Box Derby car, identifying important "tech tips" and design decisions the students can make. The video will be completed by the end of January. 01/10/2014: Open website for receipt of orders. Among other approaches (phone, email, etc.), a website will be opened for receipt of orders from 5th grade schools for the GRC project. 01/30/2014: Begin teacher-training workshops in various regions. By the end of January, the first teacher-training workshop will begin in one of the regions. The expectation is a few dozen teachers will attend (during the school day) in that region to learn more about the project. These workshops will continue during the next two months and will go from more of an "informational" workshop to a "training" workshop, as more schools adopt the GRC project. 02/14/2014: Finish any multi-media production. By this time, as the curriculum is complete, the DVDs will be prepared. 02/17/2014: First GRC package shipped to schools. While many teachers will implement the GRC curriculum later in the semester, we expect the first schools to start the implementation in March. Thus, the first GRC package is expected to ship by this date.

Implement (MM/DD/YYYY): 03/03/2014-06/06/2014

* Narrative explanation

What is listed below is the implementation stage for this Racing to a Straight A proposal. The biggest barrier in this stage would be providing the necessary resources for the educators to be successful. However, we have attempted to address this issue in multiple ways: (1) we will provide in-region, in-person people via workshops to answer questions associated with the implementation, including substitute-teacher funds for that day, (2) the teacher-mentors already using the GRC will act as mentors for those who will use the GRC, (3) teachers will have access to the DVDs on how to use the GRC curriculum and (4) a video created by the UA Baja SAE team will be available to help with the Soap Box Derby car build. 03/03/2014: Continue teacher-training workshops in various regions Teacher training workshops may occur during this time frame as well, depending on when a particular school will begin to implement the GRC. 03/03/2014: Implementation of GRC in school begins (Minis). The Minis are the first aspect of the GRC curriculum and it is expected that some schools will start this by the beginning of March. 04/07/2014: Soap-Box Derby build begins. After completion of the Minis aspect of the curriculum, the Soap Box Derby car build will occur. We anticipate some schools will start this by the beginning of April, though others might start this later in the month.

Summative evaluation (MM/DD/YYYY): 01/01/2014-06/30/2014

* Narrative explanation

January 2014: Assessments will be finalized that are aligned with the curricular materials developed. These assessments include science content knowledge test, survey on attitudes towards and interest in STEM, assessment of knowledge of the engineering design process, rubric to assess quality of the engineered mini-cars, and a teacher survey. February 2014: Pilot data will be collected from 2-3 classrooms and results will be analyzed and reported to inform the curriculum development and implementation plan. March 2014 through May 2014: Data collection from all classrooms where GRC is implemented. The assessments will be available online for teachers to administer to students. For teachers who do not have access to administer assessments online, hard copies will be provided. StartFragmentMay 2014 through June 2014: Data analysis and evaluation report will be completed. During the last month, all of the data acquired through the collection period will be analyzed against the project goals and an evaluation report will be prepared. EndFragment

19. Describe the expected changes to the instructional and/or organizational practices in your institution.

The organizational changes at the partner entities (UA and ISBD) will be facilitated through the grant funds to support the personnel and logistics needed for implementation. Without these expenses, this large-scale student achievement project involving 1000 5th grade classrooms and 25,000 students would not be possible. It is noted that personnel listed in the project are already aware of the potential bottlenecks to implementation and have already discussed potential solutions. The University of Akron has had many interactions with school districts on various projects and, thus, has the knowledge and experience to facilitate the grant in the time-frame required. Additionally, UA and ISBD have been working together for the last few years on a variety of projects (meeting regularly). Thus, the communication required for implementation of this project between the partner entities will just be an extension of what already exists.

E) SUBSTANTIAL IMPACT AND LASTING VALUE - Impact, evaluation and replication

20. Describe the rationale, research or past success that supports the innovative project and its impact on student achievement, spending reduction in the five-year fiscal forecast or utilization of a greater share of resources in the classroom.

The International Soap Box Derby is an organization with a historic track record spanning seventy-seven years of providing over one million youth with educational opportunities and experiences through gravity racing. Currently, the program is running with schools in twenty-four Ohio School Districts using the GRC successfully. The ISBD staff are equipped to scale the project to 1000 classrooms in Ohio. Targeting one grade level and aligning the GRC activities with the New Ohio Learning Standards ensures that the program will fill an existing need in schools. A review of research on the impact of engineering education point to the potential of engineering activities to increase motivation to learn mathematics and science, and in turn impact students' achievement (Engineering in K-12 Education: Understanding the Status and Improving the Prospects, 2009). Several studies conducted to evaluate the impact of various engineering activities indicate that students become more motivated to learn mathematics and science, and increase their understanding of these subjects (Lam et al, Journal of STEM Education, 2008). In addition, they gain valuable twenty first century skills such as technological literacy, communication skills, teamwork, project management, and problem solving skills (Evaluation of First Lego League, Center for Youth and Communities, Brandeis University, 2009). Furthermore, this program is based on characteristics that have been shown to be successful at impacting students achievement and interest in STEM, such as focusing on developing core concepts using engineering design activities, encouraging purposeful revisions of students' designs, and sequencing the lessons from easy to learn concept to more difficult concepts (Engineering in K-12 Education: Understanding the Status and Improving the Prospects, 2009).

21. Is this project able to be replicated in other districts in Ohio?

☑ Yes ☐ No

22. If so, how?

The project can be replicated in other districts after the initial implementation. The proposed expansion to 1000 classrooms will create an infrastructure of trained teachers who can support further dissemination. The project funds will help create training materials for teachers, and curricular materials to be used in the classroom. These materials will be readily available for other districts/teachers who are interested in implementing engineering in their middle schools. While there is a cost associated with purchasing classroom kits, this cost can be funded through business partners, or can come from districts allocated funds for implementing science and engineering activities. Teachers have been very successful in the past in securing funds from business partners to participate in GRC race activities. Approximate number of 5th grade classrooms in Districts currently using GRC: County School District No. of Educators Currently Involved Summit Akron Public Schools 11 Medina Medina City SD 2 Summit Springfield Local SD 3 Mahoning Austintown Local SD 2 Portage Rootstown Local SD 1 Portage Streetsboro City SD 1 Richland Lexington Local SD 1 Shelby Russia Local SD 1 Stark Louisville City SD 2 Summit Tallmadge City SD 1 Cuyahoga Bay Village City SD 1 Stark North Canton City SD 1 Cuyahoga North Royalton City SD 1 Cuyahoga Westlake City SD 2 Mahoning Youngstown City SD 1 Union Marysville Local SD 1 Fairfield Pickerington Local SD 2 Tuscarawas Claymont City SD 1 Summit Cuyahoga Falls SD 3 Stark Canton City SD 1 Summit Copley-Fairlawn City SD 1 Summit Revere Local SD 1 Licking Johnstown Monroe Local SD 1 Cuyahoga Independence Local SD 1 Lorain Lorain County JVS 2 Portage Southeast Local Schools 2

23. Describe the substantial value and lasting impact that the project hopes to achieve.

This Project's overall design, format, and delivery invokes high levels of student interest and engagement resulting in students taking an active role in their learning. This engagement and interest are essential to keep students in the STEM pipeline. Furthermore, this project targets 21st learning skills. As active learners in this Project, students will be able to develop high level critical thinking problem solving skills, improve their communication and team building skills, and apply what they learn in novel situations. Students will also acquire organizational skills necessary to complete the project, which will be transferred to other learning situations.

24. What are the specific benchmarks related to the fund goals identified in question 9 that the project aims to achieve in five years? Include any other anticipated outcomes of the project that you hope to achieve that may not be easily benchmarked.

The following outcomes will be used to measure the success of the program: 1. Enhance students' understanding of the engineering design process 2. Develop students understanding of physical science concepts 3. Enhance students' understanding of the application of mathematics and science in everyday life 4. Increase students motivation to learn STEM content 5. Connect physical science concepts to other areas of the curriculum, to achieve a deeper understanding 6. Increase students' opportunities to be involved in STEM competitions Curricular materials will be piloted in 2-3 classrooms in February 2014 during development to gain an understanding of the impact of the program. Assessments on students understanding of science and math content, student motivation to learn STEM, and students understanding of the engineering design process will be administered. A survey will be given to teachers to learn about the successful aspects of the program, and areas for improvements. Results from the analysis of the pilot data will be used to make necessary modification to the curricular materials and website content. The improved program will be rolled out to teachers in time for implementation on a larger scale. This program builds on prior success with Gravity Racing Challenges in over 24 districts in Ohio. The newly developed curricular materials will enhance prior successes. For Outcome 1, teachers' will rate students' products using a standardized Engineering Design Rubric. Teachers will also complete a survey including a component asking them to rate their perception of whether students' understanding of the engineering design process was enhanced as a result of engaging in the GRC activities. Two open-ended items will be included on this portion of the survey. The first open-ended question will ask if they felt students' understanding was enhanced and, if so, in what ways. The second question will ask what improvements they feel could be made to the GRC activities to meet this goal. The Outcomes 2,3, 4, and 5 will be assessed by collecting pre and post-data. Content assessments will be used to assess the program impact on students' understandings of physical concepts. Their understanding of the application of mathematics and science, interest in engineering, and motivation to learn STEM content will be measured using a survey asking students to rate a series of statements using a Likert scale. Items will be adapted from the Test of Science Related Attitudes (TOSRA; Fraser, 1978). Teachers will also rate their perceptions as to whether the program increased these student outcomes. Teachers will also respond to open-ended items asking for specific examples from the classroom illustrating how the program increased these student outcomes (if they felt it did) and in what ways they feel the program could be improved to meet these goals, if any. Outcome 6 will be evaluated by the count of students participating in the Soap Box Derby competition and a survey completed by teachers indicating any additional competitions students participated.

25. Describe the plan to evaluate the impact of the concept, strategy or approaches used.

* Include the method by which progress toward short- and long-term objectives will be measured. (This section should include the types of data to be collected, the formative outputs and outcomes and the systems in place to track the program's progress).

* Include the method, process and/or procedure by which the program will modify or change the program plan if measured progress is insufficient to meet program objectives.

The purpose of this evaluation is to measure the effectiveness of the program, identify the aspects of the program that were successful, as well as areas that can be improved. Evaluation questions: 1. How successful was the program at enhancing students understanding of the engineering design process? 2. How successful was the program at having students develop science concepts that are integrated into the engineering design activities? 3. How successful was the program at increasing students' interest in engineering, and motivation to learn science? 4. What is the success rate in expanding the number of competition teams that participate in the GRC race? Data collection: data collection will be at the local level by teachers and teacher mentors. A sample of students projects will be assessed by project personnel. Data analysis will be performed by the evaluator with assistance from one of the project personnel (Makki). Program goals Program Activity Timeline Data Collection Responsible Person(s) 1. Enhance students' understanding of the engineering design process Teachers are trained on the activities face to face or online Teachers Implement GRC in the classroom Feb-March 14 April-May 14 Engineering Design Rubric (developed by Makki) Teacher Survey Administer Tests (teachers) Manage data (program coordinator) Analysis of Test Results (Evaluator) 2. Develop students understanding of physical science concepts Teachers use the developed curriculum in the GRC activities. April-May 14 Content Assessment (developed by Makki and Koskey) Administer Tests (teachers) Manage data (program coordinator) Analysis of Test Results (Evaluator)) 3. Increase students motivation to learn STEM content Teachers use the developed curriculum April-May 14 Science Attitudes Survey (TOSRA) Teacher Survey Administer Tests (teachers) Analysis of Test Results (Evaluator) 4. Increase students' opportunities to be involved in STEM competitions After school program Spring 2014 Participation in competition Teacher Survey Data monitoring (Program coordinator) Analysis of Test Results (Evaluator) In addition, a survey will be administered to teachers in the program to determine the aspects of the program that were successful and aspects that need improvement.

By virtue of applying for the Straight A Fund, all applicants agree to participate in the overall evaluation of the Straight A Fund for the duration of the evaluation timeframe. The Governing Board of the Straight A Fund reserves the right to conduct evaluation of the plan and request additional information in the form of data, surveys, interviews, focus groups, and any other related data to the legislature, governor, and other interested parties for an overall evaluation of the Straight A Fund.

PROGRAM ASSURANCES: I agree, on behalf of this applicant agency and/or all identified partners to abide by all assurances outlined in the Assurance section of the CCIP. In the box below, enter "I Accept" and indicate your name, title, agency/organization and today's date.

I ACCEPT. Sharon McWhorter Director, Pre-Award Research Administration Office of Research Administration The University of Akron October 25 2013