# The Stephen Shane Fincher Memorial Foundation Grant

## APPLICATION COVER PAGE

**SCHOOL NAME:** Westarea Elementary School

**SCHOOL ADDRESS:** 941 Country Club Drive

Fayetteville, North Carolina 28301

**PRINCIPAL NAME:** Zakiyyah Backman,

**CONTACT PERSON:** Sylvia Caldwell

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**PROJECT NAME:** Engineering is Elementary

**DATE SUBMITTED:** September 26, 2013

**CURRICULUM AREA:** Science

**TOTAL AMOUNT REQUESTED** $4995.00

**BRIEF SUMMARY (3-5) SENTENCES**

"Engineering is Elementary" is a research-based, standards-driven, classroom-tested curriculum that integrates engineering and technology concepts, and skills and elementary science topics and mathematics learning, as well as literacy and social studies. Students are actively engaged in hands-on real-world engineering experiences.

Westarea Elementary School

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Zakiyyah Backman
*Principal*

Arvita Callejas
*Assistant Principal*

**Stephen Shane Fincher Memorial Foundation Grant Proposal**

**I. Project Name**: Engineering Is Elementary

**II. Need/Purpose:**

As our society becomes increasingly dependent on engineering and technology, it is more important than ever that everyone be aware of what engineers do and understand the uses and implications of the technologies they create. Yet few American citizens are technologically literate, largely because technology and engineering have not been taught in our schools.

Children and many adults know shockingly little about technology and engineering. In fact, the vast majority believe the term "technology" refers only to electronics and computers and that engineering and science are basically the same. To understand the human-made world in which we live, it is vital that we increase engineering and technological literacy among all people, even young children!

Children are born engineers-they are fascinated with designing their own creations, with taking things apart, and with figuring out how things work.

This project, "Engineering is Elementary" is designed to engage and interest all children in engineering and science, particularly children in groups that have traditionally been unrepresented and underserved. The materials have been designed to engage marginalized and at risk populations such as girls, minorities, youngsters with disabilities and children from low socioeconomic backgrounds.

The chart below indicates the students who will benefit from this project in grades 3-5.

| Grade Level | Number of Students | Number of Highly Certified Teachers |
|---|---|---|
| Third Grade | 76 | 5 |
| Fourth Grade | 93 | 5 |
| Fifth Grade | 61 | 4 |
| Total | 230 | 14 |

Teachers will implement a common structure consisting of a preparatory lesson designed to prompt students to think about engineering, technology, and the engineering design process and four unit lessons. The EIE unit guide will provide each teacher with lesson plans, student duplication

masters, background resources and assessment items. By design, this project will require students to DO engineering, there is no textbook.

**Structure of Each Unit**

**Lesson 1 Engineering Story**. To provide a context for the unit, to introduce engineering to teachers through a comfortable medium ( language arts), and to piggyback on the abundant time available for reading in elementary school classes, the units begin with an illustrated storybook. The stories, which are set in cultures and countries around the world, feature child protagonist who confronts a real-world problem. An adult engineer in the child's life introduces the engineering design process and invites the child character to apply it to develop a solution to the problem in the classroom, students are then challenged to solve a similar problem.

**Lesson 2 A Broad View of an Elementary Field.** The second lesson helps students develop a broad perspective on the engineering field of focus. Through hands-on activities, students learn about the kind of work done by engineers in that field and the technologies they produce.

**Lesson 3 Scientific Data to Inform Engineering Design.** The third lesson is designed to help students improve their understanding of underlying science concepts, explore available materials, and determine which properties of these materials are relevant to the challenge at hand. These lessons also help children recognize linkages between science, mathematics, and engineering. In this lesson, children collect and analyze scientific data they can refer to in Lesson 4 to inform their designs.

**Lesson 4 Engineering Design Challenge.** The unit culminates with an engineering design challenge. Following the five steps of the EIE engineering design process, students ask, imagine, plan, create, and improve solutions to an engineering problem.

## III. Project Goals:

A. Increase children's technological literacy.

B. Improve elementary educator's ability to teach engineering and technology

C. Engage in the engineering design process

D. Apply science and mathematics to engineering problems

## IV Project Objectives:

A. The learner will use creativity and careful thinking to solve real-life problems.

B. The learner will learn math and science concepts by illustrating relevant applications.

C. The learner will use problem formulation, iteration, testing of alternative solutions, and evaluation of data to guide decisions.

D. The learner will gain an awareness and interest in pursuing a career in engineering.

Research has shown that the number of American citizens pursuing engineering is decreasing. An early introduction to engineering can encourage many capable students, especially girls and minorities, to consider it as a career. As our society increasingly depends on engineering and technology, our children need to understand these fields. This project is a springboard which will engage our students in the natural design process, help them develop a positive association with engineering and increase their desire to pursue such activities in the future.

**V. Project Budget:**

All items will be processed through our school media center. The contact person, Sylvia Caldwell, will be responsible for implementing the project. The school bookkeeper will adhere to the CCS accounting procedures, when depositing grant funds and ordering materials. The Principal will ensure the project is implemented and accounting reports are made to the Stephen Shane Fincher Memorial Foundation before May 14, 2014.

# Engineering Is Elementary Project

## Itemized Project Budget

| Item | Unit Price | Quantity | Cost |
|---|---|---|---|
| Catching the Wind: Set of 8 Teacher Guides | 360.00 | 1 | 360.00 |
| Catching the Wind: Designing Windmills Kit | 325.00 | 1 | 325.00 |
| A Sticky Situation: Set of 8 Teacher Guides | 360.00 | 1 | 360.00 |
| A Sticky Situation: Designing Walls Kit | 375.00 | 1 | 375.00 |
| Water, Water Everywhere: Designing Water Filters: Set of 8 Teacher Guides | 360.00 | 1 | 360.00 |
| Water, Water Everywhere: Designing Water Filters Kit | 300.00 | 1 | 300.00 |
| To Get to the Other Side: Designing Bridges: Set of 8 Teacher Guides | 360.00 | 1 | 360.00 |
| To Get To the Other Side: Designing Bridges Kit | 300.00 | 1 | 300.00 |
| Marvelous Machines: Set of 8 Teacher Guides | 360.00 | 1 | 360.00 |
| Marvelous Machines Kit | 450.00 | 1 | 250.00 |
| A Work In Process: Improving a Play Dough Process: Set of 8 Teacher Guides | 360.00 | 1 | 360.00 |
| A Work In Process Kit | 300.00 | 1 | 200.00 |
| Tehya's Pollution Solution: Set of 8 Teacher Guides | 360.00 | 1 | 360.00 |
| A Sticky Solution: Cleaning an Oil Spill Kit | 325.00 | 1 | 300.00 |
| A Sticky Solution; Cleaning an Oil Spill Safety Kit | 100.00 | 1 | 100.00 |
| No Bones About it: Designing a Knee Brace: Set of 3 teacher Guides | 142.50 | 1 | 142.50 |
| No Bones About It Kit | 325.00 | 1 | 325.00 |
| Total | 4995.00 | 17 | 4995.00 |