I. Abstract of Project/Activity

The Career and Technology department at Coppell High School (CHS) has defined career pathways (see Career Pathway Handbook, Appendices 1) to assist students in determining high school courses that will prepare them for the career in which they are interested. Engineering Technologies Pathway (ETP) was identified as field of study that would appeal to CHS student clientele; however, it was also determined to be a program area in need of upgrading and expansion. Therefore, in order to strengthen existing ETP courses as well as implement a new course at Coppell High School, Coppell ISD is requesting **$58,550** from the Coppell Education Development Corporation.

The Infinity Project is an innovative, year-long program intended to spark students' interest in the pursuit of careers in engineering and technology related fields. This course will be taught in existing lab facilities by a current CHS Career and Technology Education teacher. The goal for the first year of Infinity Project is to schedule at least two sections of up to 24 students each and to increase the number of sections in upcoming years. Grant funds will be used to purchase the Infinity Project technology kits, text and workbooks, staff development, lab computers, and a printer.

In order to enhance current CHS Engineering Technologies courses, CEDC grant funds will be used to purchase new lab computers, as well as program resources that include on-line CompTIA A+ Training for CHS Cowboy Tech Force students, LEGO Robotics kits & curriculum for Infinity Project program enrichment and student contest opportunities, and a CNC Jr. Table-top Mill with CAD-CAM software for Engineering Graphics and Infinity Project students which will allow them to see their work to fruition. These items will support the other two ETP labs that accommodate twelve classes of approximately 24 students each.

II. Description of Proposal & Nature of Request

Take a look around you. Virtually everything within arms reach - portable disc players, televisions, video games, automobiles, computers, cell phones, buildings, bridges. All were designed, developed or created using engineering. Engineers from a variety of disciplines - electrical, civil, industrial, chemical, manufacturing, computer and more - are responsible for conceiving and producing just about every product imaginable. Sounds like fun, doesn't it?

In order to provide Coppell High School students the opportunity to develop an interest and educational background in the field of engineering, CISD is requesting CEDC grant funds to enhance existing engineering technology courses and add a new pre-engineering class, Infinity Project (IP). The **Engineering Technologies Pathway** (ETP) includes a coherent sequence of courses that introduce students to a wide variety of engineering careers. Existing CHS courses in this pathway include Technology Systems, Architectural Graphics, Engineering Graphics, Electricity/Electronics, and Independent Study in Research, Design and Development. The CEDC grant funds will provide resources to purchase the equipment, computers and software necessary to update three Career and Technology Education (CATE) labs that support six pathway courses to a level that will properly support the existing ETP programs, as well as to implement Infinity Project.

One lab will accommodate Infinity Project, as well as the Cowboy Tech Force program. Infinity Project was developed locally by Texas Instruments and the SMU School of Engineering to create more interest in the marvelous world of engineering among today's high school students. The IP curriculum targets students with a strong background and interest in math and science. This one-year program helps all students realize, through hands-on experiments and general coursework, that math and science concepts and skills are utilized to engineer real-world products, processes, and systems. The IP students will be required to complete Algebra II and at least one lab science course before enrolling in this course. With Infinity, students will use state-

of-the-art technology tools to learn how engineers turn ideas into reality. Using special software and peripherals attached to Career and Technology lab computers, the student will learn how to process digital signals to create their own unique audio, video and graphics programs. The CEDC grant will provide the budget for Infinity Project staff development, IP project kits, students textbooks, lab manuals, LEGO Robotics kits, a laser printer and lab computers. By adding Infinity Project, CHS will bring in a new level of rigor to the existing pathway.

The Cowboy Tech Force is a Computer Technologies Pathway course that provides student-interns with the opportunity to gain real-world, hands-on training and experience. The Tech Force students assist district and campus technicians in providing hardware and software support for CHS students, teachers, and staff three days a week during this year-long course. The other two days will be reserved for A+ on-line training which will be administered in the Infinity Project lab under the direction of the IP teacher. Upon completion of the on-line course, Tech Force students may elect to take the CompTIA A+ Certification Exam which will count as a DAP measure for graduation, as well as increasing the students' employability and earning potential.

The Technology Systems and Electricity/Electronics courses are taught in another CATE lab. Technology Systems is an entry-level course which works as an excellent spring-board to other engineering courses. These courses utilize modular curriculum rotations including biomedical, computer graphic, automotive, lasers, analog and digital circuits, etc. The existing computers in this, as well as the Infinity lab, were purchased with building bond funds during the summer of 2000 with the following specs: Pentium III, 550 MHz, 128 MB RAM. It is imperative that these computers be upgraded in order to effectively meet the curricular requirements of these courses.

Engineering and Architectural Graphics as well as Graphic Communications (Communication Technologies Pathway) are taught in the third lab to benefit by this grant

proposal. The full and LT versions of AutoCAD 2004 are utilized by the Engineering and Architectural Graphics students; however, the existing computers (Pentium III, 733 MHz, 128 MB RAM) cannot support the full-functionality of these programs. Therefore, new and more powerful computers are needed in this lab. The final request is for a CNC Jr. Table-top Mill and CAD-CAM software. The mill will serve CHS students of varied academic levels and career aspirations by allowing them to have hands-on engineering experience from conception, through design, and finally to the actual milling of the product.

In today's digital world, students need to be exposed to fundamental elements of technology so they will become competent, functioning, well-rounded citizens of the information age. With the United Stated seeing a decline in engineering students at Universities across the nation, Coppell High School wants to expand student interest the field of engineering by exposing them to it an earlier age. Resources provided by this **Engineering Technologies Pathway** (ETP) grant will allow students to increase their educational and career opportunities.

Upon grant approval, the implementation process will begin as soon as this school year is over with the purchase and installation of lab computers, printer, Infinity Project kits, robotic kits, software, and on-line training subscriptions. Two teachers will attend the Infinity Project Development Institute during the summer, and curriculum resources will be procured. Additionally, the CNC mill, CAD-CAM software and consumable materials will be purchased, installed, and tested. All labs will be fully up and running for classes to begin Fall, 2005 instructed by current CHS Career and Technology teachers. Considering students in all of the classes taught in the three labs positively impacted by grant funds, 380 Freshmen – Seniors out of a student body of 2,900 will be benefited, at a ratio of 1 to 7.5. If CEDC grant funds were denied, CHS would not be able to offer the Infinity Project and would have to evaluate the other related courses to determine how to best maintain these courses without the appropriate resources.

III. Detailed Budget

Detailed Description of Items Needed for CHS Engineering Technologies Pathway CEDC Grant Proposal	**#**	**Cost**	**Extended Cost**
Infinity Project Professional Development Institute @ SMU University	2	$ 750	$1,500
Meals & mileage for above training	2	$ 125	$250
Infinity Project Technology Kits	13	$ 400	$5,200
Engineering Our Digital Future 1st Edition -- Student Edition (ISBN 131848283)	25	$ 50	$1,250
Engineering Our Digital Future 1st Edition -- Lab Manual (ISBN 130355542)	48	$ 25	$1,200
LEGO Robotics Starter Kit & Resources	1	$ 600	$600
CNC Jr. Table-top Mill w/ Masters software w/ G-code file interpreter, x & y ball screws w/ preloaded ball nuts, and CNC control unit. Package A including stand, clamping set, Collet set, End-mill set. Incl. shh & crating	1	$6,600	$6,600
XYZ CAD-CAM Plus software	1	$ 600	$600
Consumable materials (wood, plastic, & aluminum) and Shop Vac	1	$ 500	$500
CompTIA A+ Online Training Course by trainingcenter.com (12 A+, 1 Technical Value Pack, 1 Microsoft Value Pack)	1	$1,250	$1,250
Dell Computers and MS Office licenses for 3 labs serving Infinity Project & Tech Force (13), Engineering and Architectural Grahics (22), & Tech Systems and Electricity/Electronics (13)	48	$ 800	$38,400
HP Network laser printer for Infinity lab	1	$1,200	$1,200
			$58,550

IV. Project Measurements and Evaluation

Additions and enhancements to CHS Engineering Technologies Pathway (ETP) programs with CEDC funds will support new and existing courses in three Career and Technology Education (CATE) labs. Students ranging from freshmen to senior grade levels are eligible to take these courses. Funding this grant will provide a direct impact on as many as fourteen classes of up to 24 students each enrolled in Infinity Project, Engineering Graphics, Architectural Graphics, Technology Systems, Electricity/Electronics and Cowboy Tech Force, with the potential of reaching 340 students. Considering that Communication Graphics is also taught in one of these labs, an additional 40 students reap the benefits of the new computers. This provides a 1:7.5 ratio of students served versus total student body of 2,900. The projected cost per student served by the Engineering Technologies Pathway grant will be $154 if the expenditures are incurred over only the first year of implementation. However, it is more realistic to average the program expenses over a three year period considering **yearly consumable expenses of $3,550** which brings the cost per student served to just over $57.50.

On-going evaluation will be critical to ensure pathway effectiveness and facilitate improvements in the Engineering Technologies Pathways program. End-of-year evaluations developed by TEA and Infinity Project, as well as post-graduation follow-up evaluations will be given to instructors and program participants to critique the following:

- Effectiveness of the EFT program to increase students' interest in pursuing engineering or other technology-related studies at the post-secondary level and as a career choice
- Effectiveness in achieving the TEKS established by TEA in all classes in the Engineering Technologies Pathways program
- Effectiveness of course curriculum, activities, and assessments in meeting the educational goals set forth for the students

- Effectiveness of the resources provided for the courses, including, but not limited to: Infinity kits, robotics kits, CNC mill w/ CAD-CAM software, A+ Certification training, and lab computers/printer.

Feedback will be gathered and evaluated by the Career & Technology Advisory Committee. Recommendations will be documented regarding career focus, curriculum, course content, course management, and resources. Strategies for program expansion, development and improvement will be based on the recommendations of the advisory committee.