TO: **Mr. John Webber, DESE**

WHEN: **2009-2010 school year**

PROPOSED BY: **Kerry Sachetta Ed.D., Principal of Joplin High School, David Rockers, Director of Franklin Technology Center, and Steve Reed, Assistant Director of Franklin Technology Center**

DATE: **February 24, 2009**

Joplin High School (JHS) and Franklin Technology Center (FTC) is requesting the Missouri Department of Elementary and Secondary Education (DESE) to approve that students be awarded "embedded core academic credit" in approved courses/programs for the 2009-2010 school year and beyond.

Joplin High School, other sending schools, and Franklin Technology Center teachers and administrators have collaborated, planned, and made preparations with guidance from the *Graduation Requirements for Students in Missouri Public Schools,* c. 2006. Due to the amount of core academic content covered in some of the FTC programs, embedding a credit for specific content is the consensus of all sending school counselors. An embedded credit course incorporates competencies from one subject into another subject and allows students to earn credit in both courses to meet graduation requirements.

After meeting with the administration and counselors of the sending schools, FTC faculty, we feel confident in the rigor and relevance of the academic content covered in our programs.

Rational for Embedded Credit

The concept of "embedded" credit may seem revolutionary, however, other schools in Missouri and other states are offering math and/or science credit through vocational and agriculture programs. What has been developed is an integration of mathematics and communication arts into all career & tech programs. We feel the concept of earning academic credit for completion of a career & tech program is a perfect fit for Joplin R-VIII, Franklin Technology Center, and its sending schools.

The key to the program is that the students will not be "given credit," they will earn it by passing a test (math) or by demonstration of their work through a portfolio for communication arts. It is also important to realize that there will be additional work required of students who attempt to earn "embedded" credit. Again, it is important to understand that the students will have to earn the credit; it will not be automatically given to them for completion of a career & tech program. The integration of academic credit into vocational classes (with additional requirements) meets the intent or requirements of the following:

The Perkins IV program has accountability requirements that are based on student achievement in mathematics and communication arts. The Congressional debate over future Perkins funding is continually centered on the idea that CTE classes may not assist in raising overall academic achievement scores. This program will allow for an academic focus in CTE classes while maintaining the technical learning within the various trades.

The majority of the sending school students attending FTC lose credits due to travel. Most of the sending school students have a bus ride to Franklin Tech and a bus ride back to their home school. This program would provide them the opportunity to earn as many credits as other students in their schools.

Granting embedded credit will help all districts meet the MSIP requirement for lowering dropout rates by allowing career & tech students to earn additional credits and remain on track to graduate with their class. This process will be even more important as accountability moves from dropouts to graduation rates and our persistence to graduation initiative.

The number of CTE students who have to take remedial writing, reading, or math classes while continuing their education at local community colleges will be reduced. Most career & tech classes at FTC have articulation agreements with area colleges for up to 15 college credits. Most of the students who attend post-secondary education have to take remedial classes and cannot graduate within the normal two years. Therefore they have higher educational costs and longer community college enrollments.

Career & Tech students need to be well-educated citizens who are prepared to enter the workforce equipped in the areas of mathematics, science, engineering, and technology while at the same time they must be prepared academically to enter postsecondary education. Many of our graduates will eventually be employed in fields that have not even been developed. FTC graduates must be prepared for the future and they must be prepared to continue their education after secondary graduation.

There are several areas of the High Schools That Work reform model that the granting of "embedded" credit will allow the district to meet. Academic and vocational integration is critical for both the high school and the career & tech school. The extra work to earn the "embedded" credit will add rigor to our career & tech programs and will most likely require homework for most of the students.

All students need more mathematics and as Cohen, (1995) has stated, "Technical programs place strong emphasis on mathematics in the context of real applications. Students should learn to appreciate mathematics and to use mathematics to solve problems in a variety of fields so that they will be able to adapt to change in their career and educational goals." This cannot be accomplished if the typical CTE student ends their high school mathematics at the 10th grade. The key here is the contextual learning of mathematics that is "embedded" in each career & tech program.

The National Council of Teachers of Mathematics states, "All students should study mathematics in each of the four years they are enrolled in high school." "Because student's interests and aspirations may change during and after high school, their mathematics education should guarantee access to a broad

spectrum of career and educational options. They should experience the interplay of algebra, geometry, statistics, probability, and discrete mathematics."

Our placement rate should improve since our graduates will have the basic academic skills that employers are looking for in new hires. Most business and industry representatives say they can teach the technical skills but do not have the resources to improve basic academic skills for their employees. This project will increase higher order thinking skills for all career & tech students and increase basic reading, writing and mathematics skills. By acquiring these skills, our graduates will be better prepared for entry into the workforce. This will be true if they enter it upon graduation or continue their education through post-secondary education.

The embedded credit concept is designed to align mathematics and language arts in a setting where students understand that it is needed in their future. This is real world. The following are basic principals for post-secondary mathematics, according to Cohen (1995), that relate to all the reform efforts the district is striving for:
All students should grow in their knowledge of mathematics.
The mathematics that students study should be meaningful and relevant.
Mathematics must be taught as a laboratory discipline.
The use of technology is an essential part of an up-to-date curriculum.
Increased participation by all students in mathematics and in careers using mathematics is a critical goal in our heterogeneous society.
As well, all students need more communication skills and technical programs place strong emphasis on communication in the context of real applications.

Students should learn to appreciate the skills they have learned in previous language arts class and use those skills to communicate in a variety of fields so that they will be able to adapt to change in their career and educational goals. The key here is the communication is contextual learning that is "embedded" in each career & tech program.

Definition: Technical writing is communication written for and about business and industry, focusing on products and services – how to manufacture them,

market them, manage them, deliver them, and use them. Technical writing is a necessary component of every employee's professional skill.

Technical writing, why teach it? Constantly advisory members tell us that employers want to hire people who can communicate effectively, both in writing and orally. Career counselors reiterate this.

In fact, we are told that on the job, an employee will spend at least 20 percent of his or her time writing. This number increases as an employee's responsibilities increase. Managers spend up to 50 percent of their time writing. CEOs spend between 80 and 100 percent of their work week communicating.

Once students are employed, will they have to write on the job? The answer is a resounding YES! Students often do not believe they will have to write at work; they assume that once their education is completed, writing will be a distant memory. They are WRONG. When our students are employed and have to write on the job, will they write essays? The answer is NO. They will write essays while working on their college degrees; they might even be asked to write and essay on their job application when applying for work. However, once the job begins, essays end.

What takes the place of the essay? The answer is technical writing – memos, letters, reports, email, proposals, instructions, even web pages. That's why technical writing is important. Technical writing is the type of written communication that our students will be responsible for on the job. Technical writing is written in the work environment (in the office, from 8:00 – 5:00, not counting overtime). For supervisors, colleagues, subordinates, vendors, and customers Technical writing, which must be understood easily and quickly, includes

Memos	A memo listing meetings agendas
E-mails	An instructional manual for repairing machinery
Letters	A letter form a vendor to a client
Reports	A recommendation report proposing a new computer system
Instructions	Brochures and newsletters

Resumes

Web pages

Technical writing is the resume that helps get a job and the web page that promotes a company. In each case, the technical document must be quantifiable, precise, and easily understood. Another reason for teaching Technical Writing is so students will know the types of documents they will write on the job.

People read literature for pleasure, essays for enlightenment, and journalism for news. – People read technical writing to accomplish a job.

How are we going to ensure rigor in the career education courses in terms of core academic objectives?

FTC career education teachers have met and agreed with core academic teachers from the sending schools over the past few months. There is agreement on the titles of the classes as well as the objectives of the courses for core academic credit. In addition, each FTC teacher who offers core academic in their program will be required to attend a summer workshop with core academic teachers.

Finally, during the course of the school year on a bi-monthly basis career education teachers and core academic teachers will meet regularly to review teaching strategies, course content, student products of work, and the overall effectiveness of the "embedded credit" approach. On going job embedded professional development will be required between the career education and core academic teachers involved in this project.

How will the core academic objectives be "embedded" in the career education course content?

Each career education teacher will immerse the core academic content into the mainstream of their career education class. Both traditional classroom settings and lab exercises will be utilized to introduce, practice, and implement core academic content. In addition, career education course competencies will include core academic objectives.

All career education courses will require each student to have numerous activities on a daily or weekly basis whereby the student uses the core academic skills within the content of the career education course. Each quarter students will be required to successfully complete a quarterly assessment over common objectives that addresses that particular career education course's content with the objectives of the core academic course in a practical application manner. In addition, a "portfolio approach" will also be utilized in Applied Communications and many labs and activities will provide sufficient examples of core academic requirements that will become part of each student's overall grade.

Each student who masters the career education competencies will also be required to master the core academic competencies in that subject. If a student fails to do so, credit will not be issued for the course. In short, to successfully complete the core academic requirements the students will also be required to successfully complete the career education course. In essence a students will automatically receive both career education credit and core academic credit for enrolling and successfully completing the course.

How and when will "core academic" credit be issued?

Core academic credit will be issued each semester or year like a career education course credit is issued currently. Example… if a student is enrolled in a welding course for three hours per day for one year and the welding program is a two year program, the student would earn ½ credit of Technical Math and ½ credit of Applied Communications upon successful completion of the program after one year.

Approved programs that require the student to be enrolled two hours per day for one year will earn one full credit of the approved core academic credit upon successful completion of the course. It should be noted that students may not earn the exact same grade in a core academic course as they do in the career education course they are enrolled in simultaneously.

Each sending school who accepts core academic credit will be able to transcript the core academic credit at their own discretion, for the student, when they wish; however, Joplin High School plans utilize the aforementioned method. In addition, a student who enrolls in a career education course with "embedded credits" will also automatically be enrolled in the core academic course too and all grade points associated with the dual enrollment will be assessed for the student. Finally, depending on what credits the student needs for graduation requirements will determine whether of not the credit is counted as a core requirement or an elective requirement,

What core academic courses are being proposed to be embedded in career education courses/programs for approval?

A full list of the courses/programs requesting approval is listed:

Teacher	***COURSE/Program***	Applied Communications ***COMM. ARTS***	Technical Math ***MATH***	Life Science ***SCIENCE***
Commons, Randy	Bio Technology			**X** 1 credit after one full Year
Commons, Randy	Greenhouse/ Landscaping I and II	**X** ½ credit Year One and additional ½ credit after Year Two of Program	**X** ½ credit Year One and additional ½ credit after Year Two of Program	
Essley, Karen	Culinary 1	**x** ½ Credit Year One of Program	**x** ½ Credit Year One of Program	
Barksdale, Jennifer	Culinary 2	**x** ½ Credit Year Two of Program	**x** ½ Credit Year two of Program	
Anderson, Deonna	Engineering	**X** ½ credit Year One and additional ½ credit after Year Two of Program	**X** ½ credit Year One and additional ½ credit after Year Two of Program	
Dorton, Joe	HVAC	**X** ½ credit Year One and additional ½ credit after Year Two of Program	**X** ½ credit Year One and additional ½ credit after Year Two of Program	
Hurst, Dale	Collision	**X** ½ credit Year One and additional ½ credit after Year Two of Program	**X** ½ credit Year One and additional ½ credit after Year Two of Program	
Rutledge, John	Auto Tech	**X** ½ credit Year One and additional ½ credit after Year Two of Program	**X** ½ credit Year One and additional ½ credit after Year Two of Program	
White, Mike	Computer Precision Machining	**X** ½ credit Year One and additional ½ credit after Year Two of Program	**X** ½ credit Year One and additional ½ credit after Year Two of Program	
Noah, Dave	Welding	**X** ½ credit Year One and additional ½ credit after Year Two of Program	**X** ½ credit Year One and additional ½ credit after Year Two of Program	
Hales, Bill	Construction	**X** ½ credit Year One and additional ½ credit after Year Two of Program	**X** ½ credit Year One and additional ½ credit after Year Two of Program	
Jared Dorsey	Graphic Arts	**X** ½ credit Year One and additional ½ credit after Year Two	**X** ½ credit Year One and additional ½ credit after Year Two	
Harrison, Edie	Intro to Medical Science	**x** ½ Credit Year One of Medical Program		**X** 1 credit after one full Year
Hartley, Shelley	Certified Nurse Assistant	**x** ½ Credit Year Two Option of Medical Program		
Strait, Tom	Diversified Health Occ.	**x** ½ Credit Year Two Option of Medical Program		
Weber, Jim	Computer Information Systems	**X** ½ credit Year One and additional ½ credit after Year Two	**X** ½ credit Year One and additional ½ credit after Year Two	

How will embedded credits affect students being required to take end of course exams? Enrollment in career education courses with required end of course exams for state and national accountability measures will not be a concern under this proposed plan. However, if a new state accountability exam is proposed and required and is based off of the objectives found in a core academic course that is embedded in a career education course, then the student will be required to take the end of course exam upon the completion of the course/program.

Technical Math Objectives

I. Numbers and Operations

A. Use whole number operations to solve problems
1. Compare whole numbers
2. Add/Subtract/Multiply/Divide whole numbers
3. Use correct order of operations

B. Use fractional number operations to solve problems
1. Compare and order fractions
2. Add/Subtract/Multiply/Divide fractions
3. Make appropriate conversions between whole numbers, fractions, mixed numbers, decimals and percentages

C. Use decimal number operations to solve problems
1. Compare and order decimals
2. Add/Subtract/Multiply/Divide decimals
3. Make appropriate conversions between whole numbers, fractions, mixed numbers, and decimals
4. Determine acceptable degree of accuracy and correctly round a decimal

D. Solve problems using percents

E. Solve problems using ratio and proportion

F. Use signed numbers, powers and roots to solve problems
1. Compare, order, & perform operations with signed numbers
2. Perform operations of powers and roots

G. Determine the reasonableness of a solution

H. Utilize the appropriate technology to perform mathematical operations

II. Algebraic Relationships

A. Solve problems using equations
    1. Evaluate and simplify expressions
    2. Solve simple algebraic equations
    3. Express word statements as mathematical symbols or equations

B. Solve problems using formulas
    1. Choose appropriate formula
    2. Determine the effects of variable changes

III. Geometric and Spatial Relationships

A. Apply geometric principles in problem solving
    1. Draw or use visual models to represent and solve problems
    2. Use the Pythagorean theorem
    3. Find the perimeter, area and volume of geometric figures

B. Use trigonometric relationships with right triangles to determine lengths and angle measures.

IV. Measurement

A. Utilize the appropriate measurement tools

B. Determine the precision and accuracy of measurement

C. Convert to appropriate units of measure

V. Data and Probability

A. Select, interpret, and create appropriate graphical representations of Data (i.e. Charts, diagram, bar graphs, line graphs, circle graphs)

B. Calculate measures of central tendency (ie. Mean, median, mode)

Applied Communications – Project Requirements

The embedded credit concept is designed to align the GLE's from language arts in a setting where students understand the need & can relate it to their future jobs. This is real world. Academic and vocational integration is critical for both the high school and the career & tech school. The extra work to earn the "embedded" credit will add rigor to our career & tech programs and will most likely require homework for most of the students. The Applied Communication Arts credit will be awarded to the student based on the completion of at least 16 projects from the following proposed list. Students will receive a ½ credit for each year of technical training, 1 credit total after successfully completing a 2 year program (or as prescribed by each sending school). Each project will have a scoring guide developed for it along with a system to determine an overall percentage for scoring.

1. Prepare newsletter / brochure advertizing your program area
2. Prepare a research paper using professional style format
3. Use job-related vocabulary
4. Write an job invoice or estimate sheet
5. Develop a PowerPoint presentation
6. Presentation of an idea, procedure or topic to supervisor or peers (outline req.)
7. Follow a written procedure on a skill exercise
8. Write a minimum of eight (8) article reviews
9. Conduct a research project through technical manuals
10. Read and interpret technical documents and/or diagrams
11. Keep a log book to document procedures used to solve problems
12. Write up a purchase requisition (P.O.)
13. Write a cover letter & prepare a resume (interview ready)
14. Write a business letter
15. Evaluate lectures, sales presentations, and/or informational presentations
16. Perform job skill demonstrations
17. Debate an issue (i.e. masonry block wall vs. poured in place concrete or health-related issue, computer-related etc.)
18. Demonstrate interpersonal skills when working with customers/public
19. Demonstrate professional communication (E-mail/phone)
20. Create a professional portfolio

Life Science Embedded Credit - ANATOMY AND PHYSIOLOGY

Common Objective/Competencies covered in Intro to Medical Science:

Describe the body anatomically

Explain the organizational structure of the body from the simple to the complex

Identify the structure of the skin and its appendages

Explain the functions of the skin and its appendages

Identify the structures of the digestive system

Explain the functions of the digestive system

Describe nutrition and its relationship to good health

Identify the structures of the musculoskeletal system

Explain the functions of the musculoskeletal system

Identify the structures of the cardiovascular system

Explain the functions of the cardiovascular system

Identify the structures of the respiratory system

Explain the functions of the respiratory system

Identify the structures of the nervous system

Explain the functions of the nervous system

Identify the structures of the sensory system

Explain the functions of the sensory system

Identify the structures of the endocrine system

Explain the functions of the endocrine system

Identify the structures of the urinary system

Explain the functions of the urinary system

Identify the structures of the reproductive system

Explain the functions of the reproductive system

Life Science Embedded Credit - Applications in Agriculture

Common Objectives/Competencies covered: Biotechnology

A. Introduction to Biotechnology

1. Summarize the importance of biotechnology to agriculture – SS 3 & 8

B. Issues in Biotechnology

1. Explain the major issues associated with agricultural biotechnology – SS 3 & 8
2. Identify government agencies involved in biotechnology - SS 3 & 8
3. Identify procedures involved in obtaining a patent for a biotechnology product - SS 8

C. Basic Laboratory Skills

1. Describe the steps in the scientific method – SS 7
2. Demonstrate the proper use of laboratory equipment and techniques – SS 7
3. Explain why safety practices should be followed in the laboratory – SS 7

D. Foundations of Genetic Engineering

1. Identify the parts of a cell, including DNA, and their functions – SS 3
2. Explain how cells reproduce – SS 3
3. Describe the process of genetic modification – SS 3

E. Animal Technologies

1. Describe the process of artificial insemination –SS 3 & 8
2. Describe the process of embryo transfer – SS 3 & 8
3. Identify other applications of biotechnology in animals – SS 3 & 8
4. Summarize the impact of biotechnology on animal agriculture SS 3 & 8

F. Plant Technologies

1. Describe traditional plant breeding processes – SS 3
2. Explain the process of tissue culture – SS 8
3. Describe current applications of biotechnology in plants – SS 8
4. Identify emerging applications of biotechnology in plants – SS 8
5. Summarize the impact of biotechnology on plant agriculture – SS 8

SS = Science Standard
3 = Characteristics and interactions of living organisms
7 = Processes of Scientific Inquiry
8 = Impact of Science technology and human activity

Reference text books used for embedded credit

All teachers will use:

Mathematics for the Trades 8th Edition; Carman, Saunders – ISBN-13: 978-0-13-232102-0 – Pearson/Prentice Hall

Examples of Supplemental Material used in individual classrooms:

Practical Problems in Mathematics for Heating & Cooling Technicians 4th Edition; Devore – ISBN-13: 978-1-4018-4177-5 – Thomson/Delmar

Math for Welders; Nino Marion – ISBN – 1-59070-583-1 – Goodheart Wilcox

Practical Problems in Mathematics for Machinists; John Bradley – ISBN -0-8273-0281-9 – Delmar

Math Principles for Food Service Occupations 3rd Edition; Robert Haines, - ISBN 0-8273-6649-3 –Delmar

Math for the Automotive Trade 4th Edition; Peterson, deKryger – ISBN-13: 978-1-4180-3101-5 – Thomson/Delmar

Franklin Technology Center

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Dave Rockers, Director

Important Message about FTC's Technology Programs and Embedded Credit:

Students accepted into certain FTC "Technology Program" need to be informed about the embedded Math and English (Communication Arts) credits which are part of the program requirements.

The Math and English embedded credits are earned in conjunction with the Technology Program and will be called Technical Math and Applied Communication Arts. Students are enrolled in Technical Math and Applied Communication Arts by virtue of being in a Technology Program at FTC.

A student may earn ½ unit of credit for Technical Math and Applied Communication Arts each year he/she is enrolled in the Technology Program. Upon completion of a two-year program the student may earn one full credit each for both the Technical Math and Applied Communication Arts. The letter grades earned will be reflected on a grade report and transcript.

Partial credit in Technical Math or Applied Communication Arts will not be given if the student is dismissed from or drops from the Technology Program. If a student transfers out of the district, a transfer grade for the Technology Program and the Technical Math and Applied Communication Arts will be provided.

A student may participate in the FTC Technology Internship Program during their final semester if all internship criteria is met, including program competencies and embedded credit competencies at the 80% mastery level.
I have read and understand the requirements for the Technology Programs and the embedded credit program at FTC.

Signed _____ _____

Student Parent/Guardian

Date _____