KAREN NORTH

- Westside High School, Houston ISD
  - Magnet for Integrated Technology
  - Technology Systems / Multimedia Teacher
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  - Mathematics
  - Computer Science
  - Business
  - Technology Education
- Cognitive Science Research Writer
  - College Board AP Central
    - "Supporting Girls in CS by Programming with Graphics"
    - "The "Write" Tool for Introductory Computer Science Courses"
  - Houston A+ Challenge, Teacher As a Researcher
    - "Using Programming to Teach Algebra"
  - Brown University TeachScheme Anniversary Workshop
    - "Using DrScheme and the Design Recipe in Algebra"

COMPUTER SCIENCE IS RIGOROUS

Computer Science is the only rigorous technology course with two Advanced Placement tests. Computer Science enrollment has been declining, even though the number of students in Texas has increased, CS has decreased by 20% from 1997-2004; Web Mastering has increased by 500%. Approving CS as a math/science course would help to ensure it's survival in many schools/districts. The prerequisite of Algebra II can be required by school districts to meet the SBOE definition of a rigorous math course.

NUMBER OF STUDENTS ENROLLED IN TECHNOLOGY APPLICATIONS HIGH SCHOOL COURSES

Course Name	1997-1998	1998-1999	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004
Computer Science	26,318	31,320	29,070	26,645	26,136	23,912	21,128
Desktop Publishing	271	3,125	4,907	7,495	10,044	13,650	13,226
Digital Graphics & Animation	20	1,405	2,401	3,892	5,333	8,602	10,328
Multimedia	142	4,649	5,687	6,398	7,882	10,643	11,068
Video Technology	54	789	1,037	2,146	3,247	5,252	6,125
Web Mastering	46	7,114	11,050	16,176	21,785	25,129	24,189
Independent Study	43	780	1,926	1,683	2,949	2,676	2,994
Total Courses	26,894	49,182	56,078	64,435	77,376	89,864	89,058

Source: PEIMS Data

Most students pick the easiest of the 17 choices for Technology Application courses. Adding computer science as a 4th year rigorous course will expose more students to this 21st century problem solving course.

Technology Application
1. Computer Science I
2. Computer Science II
3. Desktop Publishing
4. Digital Graphics/Animation
5. Multimedia
6. Video Technology
7. Web Mastering
8. Independent Study in Technology Applications

Business Education
9. Business Computer Information Systems I
10. Business Computer Information Systems II
11. Business Image Management and Multimedia
12. Telecommunications and Networking
13. Business Programming

Technology Education
14. Computer Applications
15. Technology Systems
16. Communication Graphics
17. Computer Multimedia and Animation Technology

COMPUTER SCIENCE IS A LABORATORY SCIENCE

Letter from WesternGeco:
Computer Science is the scientific laboratory of the 21st century.
- All sciences model problems in research using the computer first.
- In Seismic Data Processing, computer science is used to compute data using algebraic computation and provides technical applications of mathematical data analysis.
- Computer Scientists create 3D models on computers for research and development, which is based on integrated Science and mathematical computation.
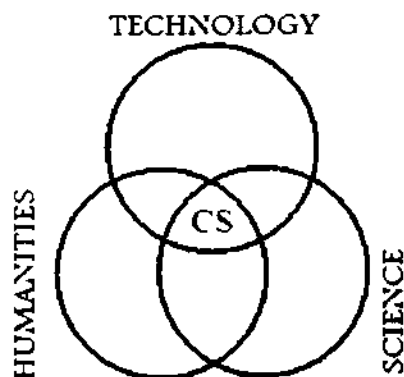
- Humanities are the study of the social world and include English and Social Studies.
- Science is the study of the natural world and includes math and science.
- Technology is the study of the man-made world and includes engineering.
- Computer Science uses a language to program the computer applying scientific data and research.
- Technologists are not observers; they become directly involved with the processes they develop and use.

The 4x4 academic curriculum leaves out hands-on learning that develops a product. That is technology. Engineering has been added as a science credit. Computer Science is equally a laboratory to apply scientific principals. Computer Science is the hands-on laboratory of algebraic computation.

"BIO 2010 – Transforming Undergraduate Education for Future Research Biologists" committee recognized that all undergraduate science education is interconnected. It calls for renewed discussion on the ways that engineering and computer science are presented to life science students. It contains ideas on how knowledge of cognitive science can inform teaching and learning. The panel felt that flexibility in offerings is more advisable than a fixed curriculum. It recommended all biology students receive instruction in computer science.
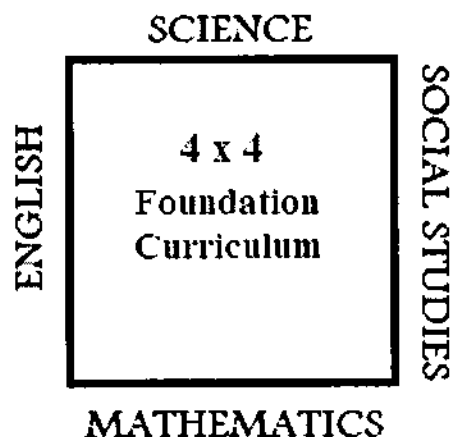
Texas can lead the nation in computer science education by giving students the opportunity to choose computer science as their 4th year math or science course. This allows for combinations such as engineering/computer science, earth science/computer science or calculus/computer science. Thank you for your consideration!

```scheme
;;------------- TRIGONOMETRIC CONSTANTS USED IN STAR -------------
;;radians: number -> number
;;convert degrees to radians for use in trig functions
(define (radians degrees)(/ (* degrees 22/7) 180))
(define 18d (radians 18))
(define 72d (radians 72))
(define 54d (radians 54))
(define 36d (radians 36))


;;------------- The FIVE POINTS ----------------------------
;;All Points: posn number -> Boolean

;;Draw the top point in a 5 pointed star
(define (topPoint center side)
  (make-posn
   (posn-x center)
   (round (- (posn-y center)
             (* side (sin 72d))
             (* (* side (sin 18d))(tan 54d))))))

;;Draw the right point in a 5 pointed star
(define (right center side)
  (make-posn
   (round(+(posn-x center)
           (* side(sin 18d))side))
   (round(-(posn-y center)(*(* side(sin 18d))(tan 54d))))))

;;Draw the left point in a 5 pointed star
(define(left center side)
  (make-posn
   (round(-(posn-x center)
           (* side (sin 18d))side))
   (round(-(posn-y center)(*(* side (sin 18d))(tan 54d))))))

;;Draw the bottom left point in a 5 point star
(define(leftBottom center side)
  (make-posn
   (round(-(posn-x center)
           (* side (sin 54d))))
   (round(+(posn-y center)
           (/ (* side (sin 18d))
              (cos 54d))
           (* side (sin 36d))))))

;;Draw the right bottom right point in a 5 points star
(define(rightBottom center side)
  (make-posn
   (round(+(posn-x center)
           (* side(sin 54d))))
   (round(+(posn-y center)(/(* side (sin 18d))(cos 54d))(* side (sin 36d))))))

;;-------------------- FIVE LINES ----------------------------
;;AllLines: posn number -> boolean

;;Draw the left line of a 5 pointed star
(define (leftLine center side)
  (draw-solid-line(topPoint center side)(leftBottom center side)BLACK))

;;Draw the horizontal line of a 5 pointed star
(define(hortLine center side)
  (draw-solid-line(right center side)(left center side)BLACK))

;;Draw the right line of a 5 pointed star
```

```
(define(rightLine center side)
  (draw-solid-line(rightBottom center side)(topPoint center side)BLACK))

;;Draw the line from the horizontal line to the left bottompoint
(define(hortLeft center side)
  (draw-solid-line(leftBottom center side)(right center side)BLACK))

;;Draw the lline from the horizontal line to the right bottom
(define(hortRight center side)
  (draw-solid-line(left center side)(rightBottom center side)BLACK))

;;--------------------- CENTER CIRCLE ----------------------------
;;circleCenter: posn number -> Boolean
;;Draw the center circle to cover up the lines
(define (circleCenter center side)
  (draw-solid-disk
   (make-posn(posn-x center)(posn-y center))
   (round(/(* side(sin 18d))(sin 36d)))WHITE))

;;------------------- THE MAIN STAR PROGRAM ------------------------
;;star:posn number -> boolean
;;draw five point star
(define(star center side)
  (and(leftLine center side)
      (hortLeft center side)
      (hortLine center side)
      (hortRight center side)
      (rightLine center side)
      (circleCenter center side)))

;;------------------- RECURSIVE STAR -------------------------------
;;starBullseye: posn number number -> Boolean
;;draw a series of stars reduced by a specified value
(define(starBullseye center side decrement)
  (cond
    [(< side 1) true]
    [else (and(star center side)
              (starBullseye center (- side decrement) decrement))]))
```