

Curriculum Is Just the Beginning



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Session Purpose

- ◆ Discuss some of the issues around curriculum reform
- ◆ Examine course structure and content of a new curriculum
- ◆ Reflect on Assessment

Big Questions

- ◆ Who sets the vision?
- ◆ Is it an inside or outside job?
- ◆ Is there anything more than paper?
- ◆ A new curriculum but the same old people?
- ◆ New people but the same old resources?
- ◆ The same people with the same frustrations?

The Vision

- ◆ Often the focus for high school computing is set at the state or district level but implementation is always a teacher thing.
- ◆ Too often watered-down curriculum results from too much focus/value on:
 - ◆ across the curriculum issues
 - ◆ flash over substance
 - ◆ anything that's new

The Big Crunch

- ◆ Even the best curriculum can be sabotaged by:
 - ◆ no on-going teacher training program
 - ◆ no real resource committment

What you know is a lot more important than what you have but having nothing is still a real drag.

The Ontario Curriculum

- ◆ There was a definite choice to create a real computer science stream that:
 - ◆ offered students some new choices
 - ◆ covered grades 9 through 12
 - ◆ was even more rigorous
- ◆ Developed by a team including:
 - ◆ four high school teachers
 - ◆ one university professor
 - ◆ one technical college professor
 - ◆ one industry representative

Computer Studies Courses

Grade 10 - Integrated Technologies

Computer & Information Science

Grade 10 - Open

Grade 11 - University/College

Grade 12 - University /College

Computer Engineering Technology

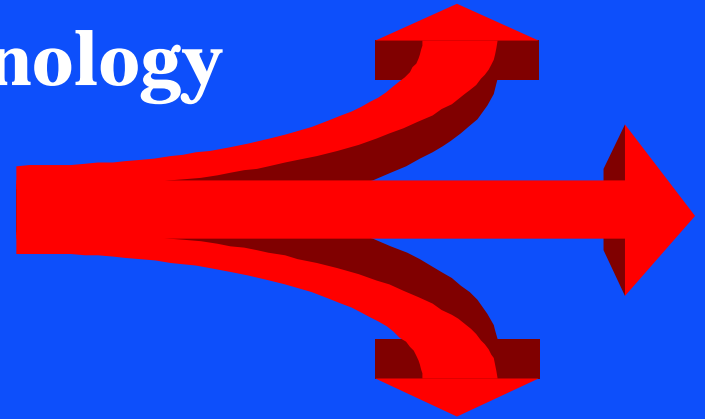
Grade 10 - Open

Grade 11 - University/College

Grade 11 - Workplace

Grade 12 - University/ College

Grade 12 - Workplace



CIS Sub-organizers

Theory and Foundation / Skills and Processes

- ◆ Programming Concepts
- ◆ Problem Solving, Logic, and Design
- ◆ Hardware, Interfaces, and Networking

Impact and Consequences

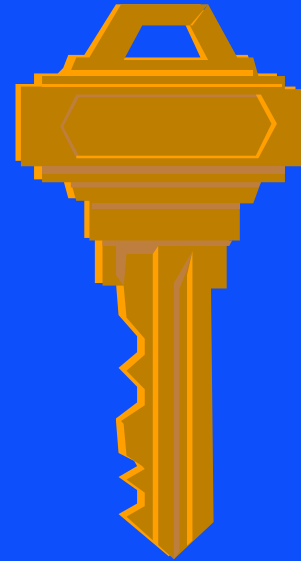
- ◆ Careers
- ◆ Social issues

Computer and Information Science

Introduces students to computer science concepts:

- ◆ software design
- ◆ fundamental programming constructs
- ◆ evolution of programming languages
- ◆ relationship to hardware, networks, operating systems, and application software

Key CIS Concepts



Software design

- ◆ clear specifications of problems to be solved
- ◆ use of a defined problem solving process
- ◆ use of specifications to evaluate proposed solutions

Program planning and documentation

- ◆ identifying input, processing, output
- ◆ clearly communicating what they did and why

Key CIS Concepts (continued)

Algorithm development

- ◆ understanding programming concepts
- ◆ choosing the appropriate programming structures
- ◆ writing the program
- ◆ testing the program against valid and invalid data

Down the Road?

By Grade 12 we are looking at a very challenging curriculum to prepare students for university/college:

- ◆ code re-use (building code libraries)
- ◆ objects, classes, and inheritance (O-O programming)
- ◆ software maintenance issues
- ◆ algorithm comparison
- ◆ role and function of computer networks

Computer Engineering Concepts

Introduces students to computer engineering
(hardware and components)

- ◆ computer components and peripherals
- ◆ logic gates
- ◆ numbering and character representation systems
- ◆ networks and operating systems
- ◆ programming

Key CE Concepts (continued)

Components and peripherals

- ◆ basic components and their functions
- ◆ computer internals and peripheral devices and their relationship
- ◆ computer set up and software installation

Interfaces

- ◆ building interfaces to connect the computer to simple peripheral devices
- ◆ tracing the operation of a system

Key CE Concepts

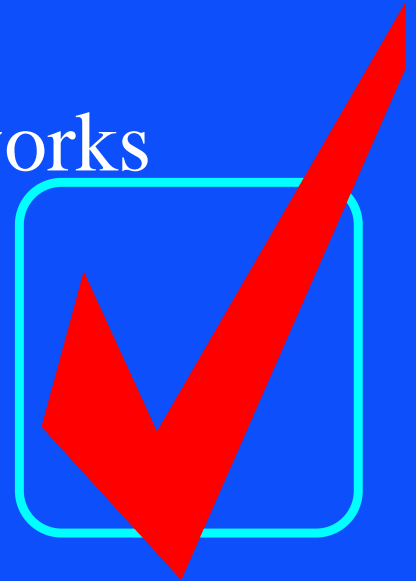


Computer Logic

- ◆ fundamental gates
- ◆ binary number system
- ◆ representing characters in binary code
- ◆ truth tables
- ◆ boolean equations

Common Elements

- ◆ Problem solving and design
- ◆ Introduction to hardware and networks
- ◆ Computer programming
- ◆ Impact and consequences
- ◆ Career awareness and preparation



Different Focus

Computer & Information Science

- ◆ Software design
- ◆ Program planning and documentation
- ◆ Algorithm development

Computer Engineering

- ◆ Chips, gates and computer logic
- ◆ Components and peripherals
- ◆ Interfaces



Programming Language?

No language was suggested but the following guidelines were proposed:

- ◆ must be capable of meeting all of the programming expectations
- ◆ must be grade level appropriate
- ◆ consider whether it can be used in both CIS and CE
- ◆ consider availability of curriculum/technical support resources

Assessment, Evaluation, Reporting

- ◆ Clear performance standards
- ◆ Judgement based on clear performance standards and demonstrations of work over time
- ◆ Culture of assessment leading to improvement of student learning

Teacher as Assessor

- ◆ Establish assessment plan
- ◆ Select appropriate methods, strategies, tools
- ◆ Share criteria and samples of work with students
- ◆ Use results to give feedback for improvement
- ◆ Use results to establish next steps

Types of Assessment & Evaluation

Diagnostic

- ◆ used to determine the status of a student in relation to expectations which will be taught during the unit

Formative

- ◆ ongoing, designed to provide continuous feedback for improvement

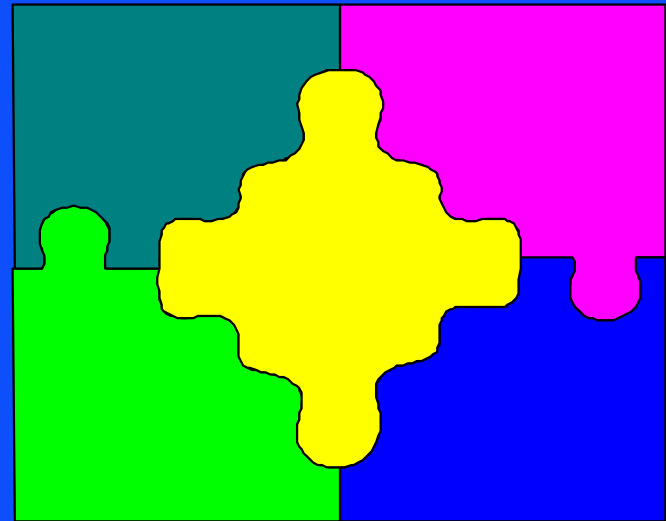
Summative

- ◆ determines student achievement at the end of the unit or course to be used in reporting results

Assessment Strategies

In addition to common methods (quizzes and tests) computer studies provides excellent opportunities for performance based assessment

- ◆ computer programs
- ◆ documentation
- ◆ class presentations
- ◆ peer teaching
- ◆ portfolios
- ◆ skill demonstrations
- ◆ debates



The Next Big Steps

- ◆ Ongoing professional development initiatives:
 - ◆ district-wide courses/workshops
 - ◆ province-wide Summer Institutes
 - ◆ opportunities for on-line learning
- ◆ Province-wide license for software
- ◆ Teacher qualifications
- ◆ Ongoing certification requirements

Resources

◆ Curriculum Policy Documents

[http://www.edu.gov.on.ca/eng/document/
curricul/curricul.html](http://www.edu.gov.on.ca/eng/document/curricul/curricul.html)

(Look under Technological Education)

◆ Subject Association

www.acse.net