COMPUTER SCIENCE CURRICULUM Guide
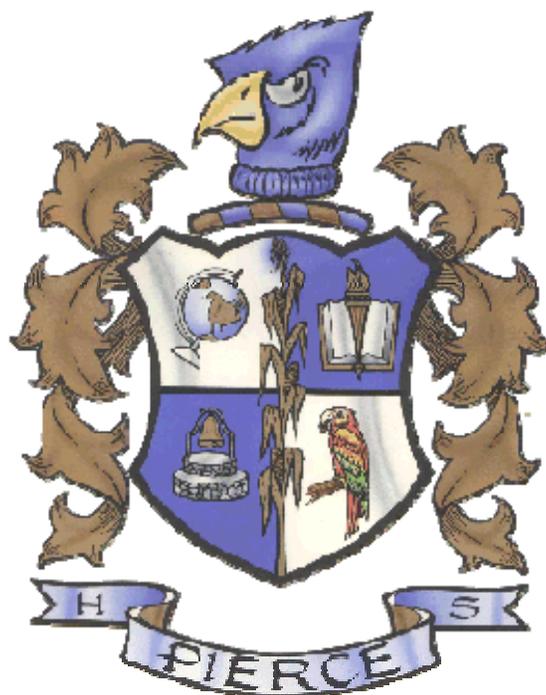
Pierce Public Schools
Pierce, Nebraska

Mission Statements

District Mission Statement:

The mission of Pierce Public Schools is to provide quality programs and a quality staff for all students. We encourage community involvement and support in preparing all students to succeed as responsible citizens, lifelong learners and confident members of a changing society.

Computer Science Mission Statement:

TBA

NOTES and RESOURCES:

1. The following National Educational Technology Standards (NETS) are provided by the International Society for Technology Education (ISTE). They are used a guide only and should be included in all curricular areas.

NETS for Students--Technology Foundation Standards for All Students
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The technology foundation standards for students are divided into six broad categories. Standards within each category are to be introduced, reinforced, and mastered by students. These categories provide a framework for linking performance indicators within the Profiles for Technology Literate Students to the standards. Teachers can use these standards and profiles as guidelines for planning technology-based activities in which students achieve success in learning, communication, and life skills.

1 Basic operations and concepts
 ➢ Students demonstrate a sound understanding of the nature and operation of technology systems.
 ➢ Students are proficient in the use of technology.

2 Social, ethical, and human issues
 ➢ Students understand the ethical, cultural, and societal issues related to technology.
 ➢ Students practice responsible use of technology systems, information, and software.
 ➢ Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity.

3 Technology productivity tools
 ➢ Students use technology tools to enhance learning, increase productivity, and promote creativity.
 ➢ Students use productivity tools to collaborate in constructing technology-enhanced models, prepare publications, and produce other creative works.

4 Technology communications tools
 ➢ Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.
 ➢ Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.

5 Technology research tools
 ➢ Students use technology to locate, evaluate, and collect information from a variety of sources.
 ➢ Students use technology tools to process data and report results.
 ➢ Students evaluate and select new information resources and technological innovations based on the appropriateness for specific tasks.

6 Technology problem-solving and decision-making tools
 ➢ Students use technology resources for solving problems and making informed decisions.
 ➢ Students employ technology in the development of strategies for solving problems in the real world.

2. Nebraska Business Education Standards and BE Standards linked with L.E.A.R.N.S

3. Focus Statements
 9th Grade – Computer Applications I
 Computer Applications II – (Elective)
 Programming I – (Elective)
 Programming II – (Elective)

4. Curriculum Codes
 CS=Computer Science
 CA1 =Computer Applications I
 CA2=Computer Applications II
 P1=Computer Programming I
 P2=Computer Programming II

Course Title: Computer Applications I
Grade Level: 9th
Length of Course: 2 Terms

Purpose: The student will demonstrate skill in using a computer as a productivity tool.

CS–CA1-1   Students will demonstrate basic computer operation.

CS-CA1-1-1	Demonstrate starting/quitting windows.
CS-CA1-1-2	Demonstrate opening/saving/closing documents.
CS-CA1-1-3	Demonstrate using various printing options such as page orientation and previewing.
CS-CA1-1-4	Create and manage files, file folders.
CS-CA1-1-5	Manipulate icons, menus and toolbars.
CS-CA1-1-6	Demonstrate the use of the help system.

CS–CA1-2   Students will create professional word processing documents.

CS-CA1-2-1	Demonstrate basic word processing skills. (including selecting, editing, copy/cut/paste (drag and drop method), find/replace)
CS-CA1-2-2	Use and customize automatic features.
CS-CA1-2-3	Use Microsoft Word specific tools. (such as spell check, grammar check, thesaurus, and research)
CS-CA1-2-4	Demonstrate text formatting techniques.
CS-CA1-2-5	Demonstrate paragraph/document formatting techniques.
CS-CA1-2-7	Create and format tables including borders/shading and sorting.
CS-CA1-2-8	Create a block-style letter, resume, memo, report in MLA format, agenda and minutes, outline, envelopes and labels, and Web page.
CS-CA1-2-9	Work with graphics. (inserting, resizing, and moving clipart, wrapping text, and drawing graphics using draw tools)
CS-CA1-2-10	Create diagrams and charts.
CS-CA1-2-11	Increase efficiency using templates, wizards, mail merge, workgroup collaboration, and hyperlinks.

CS-CA1-3 Students will create a spreadsheet to solve problems involving numbers.

CS-CA1-3-1	Design, create, save, and print spreadsheets.
CS-CA1-3-2	Retrieve, edit, and resave spreadsheets to include updating cell contents, inserting/ deleting columns/rows, etc.
CS-CA1-3-3	Demonstrate cell formatting and alignment features.
CS-CA1-3-4	Perform calculations using simple formulas such as addition, subtraction, multiplication, division, etc.
CS-CA1-3-5	Perform calculations using functions. (ie SUM, AVERAGE, IF…THEN, etc.)

CS-CA1-3-6   Modify spreadsheet displays using enhancement features such as clip art, graphics, borders/shading, etc.

CS-CA1-3-7   Design and create spreadsheets using advanced features such as sorting, autofilter, what if statements, multiple calculations, etc.

CS-CA1-3-8   Increase efficiency using templates, wizards, cell comments, hyperlinks, etc.

CS-CA1-3-9   Design and create charts and graphs.

CS-CA1-4 Students will manipulate data to store, retrieve, analyze, and print information.

CS-CA1-4-1   Design, create, save, retrieve, edit/update, and resave/print database files.

CS-CA1-4-2   Manipulate database to find data, query, filter, sort, index, establish relationships, and create queries from related tables.

CS-CA1-4-3   Demonstrate formatting technique to enhance on screen reports and printed reports.

CS-CA1-4-4   Integrate database by importing and exporting data to other applications.

CS-CA1-5 Students will create a professional presentation to illustrate ideas using slides, outlines, speaker's notes, and audience handouts.

CS-CA1-5-1   Design, create, retrieve, and save/resave presentation software.

CS-CA1-5-2   Modify/enhance slides using features such as text, clip art, graphs, tables, and charts, multimedia features like Flash, animated GIFs, sound and video clips.

CS-CA1-5-3   Enhance presentations using design templates, format slides, slide master, edit pictures, text features, spelling/style checker, custom animation, sound, slide transitions, hyperlinks.

CS-CA1-5-4   Work with other visual elements to enhance the presentation such organizational charts, charts and graphs, tables, shapes and other draw tools, etc.

CS-CA1-5-5   Expand the presentation to integrate with other software, work with multiple presentations, replace text fonts in an entire presentation, format painter, output format, publish presentation on the web, send presentation via e-mail

CS-CA1-6 Students will create a wide assortment of documents using desktop publishing

CS-CA1-6-1   Design and create a business card, restaurant menu, newsletter, flyer, certificate, invitation/thank you using templates and self design.

CS-CA1-7 Students will use the Internet and WWW as a productivity tool.
    CS-CA1-7-1   Examine the history and basic terminology of the Internet and WWW.
    CS-CA1-7-2   Identify the components of a Web browser.
    CS-CA1-7-3   Use advanced search techniques in a search engine to locate information.
    CS-CA1-7-4   Verify sites and evaluate quality of information.
    CS-CA1-7-5   Access, create, retrieve, forward, send, attach, print, and delete Email.

CS-CA1-8 Students will understand important issues of a technology-based society and will exhibit ethical behavior in the use of computer and other technologies.
    CS-CA1-8-1   Practice safe, responsible, and ethical behavior in using technology resources and information.
    CS-CA1-8-2   Develop positive attitudes towards technology use that support lifelong learning, collaboration, personal pursuits, and productivity.

CS-CA1-9 Students will understand technology's roles in career opportunities.

Course Title: Computer Applications II
Grade Level: 10, 11, or 12
Length: 2 Terms

Prerequisite: Successful Completion of Computer Applications I
**Begins with school year 2006-2007

Purpose: The student will demonstrate advanced skill in using a computer as a productivity tool.

CS–CA2-1   Students will create professional word processing documents using advanced word processing techniques.

CS-CA2-1-1   Sort and calculate columns in tables.
CS-CA2-1-2   Create and update calculations and formulas in tables.
CS-CA2-1-3   Customize tables and create new table styles.
CS-CA2-1-4   Import, link and embed spreadsheet data into a word processing document.
CS-CA2-1-5   Merge form documents, directories, mailing labels, and envelopes.
CS-CA2-1-6   Format graphics and text boxes.
CS-CA2-1-7   Work with multiple and long documents.
CS-CA2-1-8   Edit documents in workgroups.
CS-CA2-1-9   Create forms templates.
CS-CA2-1-10   Work with Web documents.
CS-CA2-1-11   Create Indexes and Tables of Contents, Figures, and Authorities.

CS-CA2-2   Create a spreadsheet to solve complex problems involving numbers.

CS-CA2-2-1   Apply advanced worksheet and chart options.
CS-CA2-2-2   Use lists to organize, manage, and retrieve information.
CS-CA2-2-3   Manipulate data using filtering, extracting and database functions.
CS-CA2-2-4   Work with analysis tools to validate, manipulate, analyze, interpret, and predict worksheet data.
CS-CA2-2-5   Create PivotTables and PivotCharts to rearrange how data is organized.
CS-CA2-2-6   Create Macros and Menus to automate tasks.
CS-CA2-2-7   Import and Export data.
CS-CA2-2-8   Create templates and use preformatted templates.
CS-CA2-2-9   Work with multiple worksheets and workbooks.
CS-CA2-2-10   Work with shared workbooks.
CS-CA2-2-11   Use outlines, subtotals, and validation to work as efficiently as possible.

CS-CA2-3 Manipulate data to store, retrieve, analyze, and print information.

CS-CA2-3-1	Apply an input mask in setting up data types and apply validation rules to data.
CS-CA2-3-2	Create a lookup field.
CS-CA2-3-3	Establish relationships in tables and queries.
CS-CA2-3-4	Add a subform, a record, and modify a subform.
CS-CA2-3-5	Create and modify a form in Design View.
CS-CA2-3-6	Create and build many types of queries.
CS-CA2-3-7	Create, add, and design reports.
CS-CA2-3-8	Import and export data.
CS-CA2-3-9	Create macros and switchboards.
CS-CA2-3-10	Create data access pages to link a Web page to a database.
CS-CA2-3-11	Use management tools to maintain and secure the database files.
CS-CA2-3-12	Utilize advanced management tools to afford greater flexibility and efficiency for maintaining and protecting database file information.

CS-CA2-4 Students will create a professional presentation to illustrate ideas using slides, outlines, speaker's notes, and audience handouts.

CS-CA2-4-1	Edit and manipulate text in a slide show.
CS-CA2-4-2	Organize text and number data on slides using tables and charts.
CS-CA2-4-3	Modify clip art, insert sound, video and other objects.
CS-CA2-4-4	Customize design templates.
CS-CA2-4-5	Import and export information.
CS-CA2-4-6	Use advanced features to control slides during the presentation.

CS-CA2-5 Students will organize information, communicate with others, and manage time.

CS-CA2-5-1	Create, add view, sort, and print a contacts list.
CS-CA2-5-2	Send, receive, attach, and print e-mail messages.
CS-CA2-5-3	View, edit, and print a calendar.
CS-CA2-5-4	Create, manage, view, and print a Tasks list in Microsoft Outlook.
CS-CA2-5-5	Use Journal and Notes in Microsoft Outlook.
CS-CA2-5-6	Customize and share Microsoft Outlook information.

CS-CA2-6 Students will create a multimedia production.

CS-CA2-6-1	Create, edit, modify digital camera photos.
CS-CA2-6-2	Create, edit, modify digital movies.

Course Title: Computer Programming I
Grade Level: 9, 10, 11, or 12
Length: 2 Terms

Prerequisite: Successful Completion of Algebra I and Computer Applications I

Purpose: The student will use problem-solving skills to create solutions in a programming environment.

CS-P1–1   Students will create an application with a programming interface.

CS-P1-1-1	Identify parts of the Visual Basic IDE.
CS-P1-1-2	Create label and command buttons.
CS-P1-1-3	Set object property values using the Properties window.
CS-P1-1-4	Code event procedures.
CS-P1-1-5	Demonstrate Visual Basic technique including save, run, print, and remove.
CS-P1-1-6	Write assignment statements.
CS-P1-1-7	Change property values at run time.
CS-P1-1-8	Add comments to code.
CS-P1-1-9	Use image objects in application interface.
CS-P1-1-10	Use arithmetic operators to form expressions

CS-P1-2   Students will demonstrate the use of variables and constants.

CS-P1-2-1	Declare variables and constants with appropriate data type.
CS-P1-2-2	Assign values to variables.
CS-P1-2-3	Debug a program using the Immediate window.
CS-P1-2-4	Use a text box to obtain a value from the user.
CS-P1-2-5	Create expressions using integer and modulus division.
CS-P1-2-6	Use option buttons and frames in application interface.
CS-P1-2-7	List programming guidelines for well-written application.
CS-P1-2-8	Develop an application through specification, design, coding, and testing and debugging.
CS-P1-9	Analyze case study for results and edit for additions and/or corrections.

CS-P1-3   Students will control program flow with decision structures.

CS-P1-3-1   Use the If…Then, If…Then…Else, and If…Then…ElseIf decision structures.

CS-P1-3-2   Explain round off error.

CS-P1-3-3   Generate random numbers.

CS-P1-3-4   Use both global and local variables in a program.

CS-P1-3-5   Use algorithms and pseudocode for developing an application.

CS-P1-3-6   Create a password application.

CS-P1-3-7   Include message boxes and check boxes in an application.

CS-P1-3-8   Use a counter or counters in a program.

CS-P1-4   Students will control program flow with looping structures.

CS-P1-4-1   Use Do…Loop structure.

CS-P1-4-2   Define and recognize infinite loops.

CS-P1-4-3   Use input boxes for get user input.

CS-P1-4-4   Describe accumulators and sentinels.

CS-P1-4-5   Convert and manipulate strings with Visual Basic built-in string functions.

CS-P1-4-6   Use For…Next looping structure.

CS-P1-4-7   Generate strings using the String and Space built-in functions.

CS-P1-4-8   Concatenate strings.

CS-P1-4-9   Describe character data storage and the ASCII code.

CS-P1-4-10   Use textual comparison to compare strings.

CS-P1-5   Students will create web pages with text, images, and hyperlinks using html.

CS-P1-5-1   Identify the concepts of HTML.

CS-P1-5-2   Create code for the HTML page shell.

CS-P1-5-3   Format text using HTML formatting tags.

CS-P1-5-4   Create lists using HTML code.

CS-P1-5-5   Identify code used to add images, sound and video to a Web page.

CS-P1-5-6   Organize Web pages with HTML tables

CS-P1-5-7   Identify the code used to integrate a Java applet to a Web page

CS-P1-5-8   Identify the advantages of CSS

CS-P1-5-9   Create code for CSS and include in with HTML Web pages.

Course Title: Computer Programming II
Grade Level: 10, 11, or 12
Length: 2 Terms

Prerequisite: Successful Completion of Programming I

Purpose: The student will use problem-solving skills to create solutions in a programming environment.

CS-P2-1   Students will write general procedures in Visual Basic.

CS-P2-1-1   Create general procedures with and without parameters
CS-P2-1-1   Use the Call statement to execute a general procedure.
CS-P2-1-3   Document procedures properly.
CS-P2-1-4   Write procedures with reference parameters.
CS-P2-1-5   Use static variables in their code.
CS-P2-1-6   Write function procedures.
CS-P2-1-7   Use object parameters in procedures.

CS-P2-2   Students will use mathematical and business functions in programs.

CS-P2-2-1   Use Abs, Sqr, and Sgn mathematical functions.
CS-P2-2-2   Use the IsNumeric function.
CS-P2-2-3   Use the Round function.
CS-P2-2-4   Format numeric output using the Format functions.
CS-P2-2-5   Use the Pmt, PV, and FV business functions.
CS-P2-2-6   Use Sin, Cos, and Tan trigonometric functions.
CS-P2-2-7   Calculate arcsine, arccosine, and arctangent.
CS-P2-2-8   Use the Log and Exp functions.

CS-P2-3   Students will control the application window for data flow.

CS-P2-3-1   Include list boxes and combo boxes in an application.
CS-P2-3-2   Set access keys and tab order.
CS-P2-3-3   Disable an object in an application.

CS-P2-4   Students will use arrays in programs.

CS-P2-4-1   Use variable arrays.
CS-P2-4-2   Pass arrays as arguments.
CS-P2-4-3   Create arrays with meaningful indexes.
CS-P2-4-4   Search an array.
CS-P2-4-5   Use dynamic and control arrays.
CS-P2-4-6   Create a matrix using a two-dimensional array.

CS-P2–5   Students will add graphics, color, and sound to applications.

    CS-P2-5-1   Enhance an application's interface using color, lines, and shapes.

    CS-P2-5-2   Include picture boxes in an application.

    CS-P2-5-3   Move shapes and pictures boxes.

    CS-P2-5-4   Use the Line, Circle, Pset, PaintPicture, and Cls graphic methods.

    CS-P2-5-5   Include timer objects in an application.

    CS-P2-5-6   Move lines.

    CS-P2-5-7   Simulate simple animation.

    CS-P2-5-8   Add sound to an application.

CS-P2-6   Students will make use of sequential access files.

    CS-P2-6-1   Open a sequential access file.

    CS-P2-6-2   Read data from the file, write text to the file, and close the file.

    CS-P2-6-3   Write records, append data, and read records from sequential access files.

    CS-P2-6-4   Update and delete records, delete and rename files, and use the file system controls in an application.

CS-P2-7   Students will use random access files.

    CS-P2-7-1   Create and use user-defined types of files.

    CS-P2-7-2   Open, read, write and close random access files.

    CS-P2-7-3   Update and delete records from a random access file.