GEORGIA | PEACH STATE PATHWAYS

Career, Technical, & Agricultural Education

BUSINESS & COMPUTER SCIENCE

PATHWAY: Computing

COURSE: Computing in the Modern World

UNIT: 8-Data Structures Unit

INTRODUCTION

Annotation:
Students will be introduced to data structures in this unit. Students will show the ability to write a program to iterate through a data structure.

Grade(s):

X	9th
X	10th
X	11th
X	12th

Time: 5 hours

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Additional Author(s):

Students with Disabilities:

For students with disabilities, the instructor should refer to the student's IEP to be sure that the accommodations specified are being provided. Instructors should also familiarize themselves with the provisions of Behavior Intervention Plans that may be part of a student's IEP. Frequent consultation with a student's special education instructor will be beneficial in providing appropriate differentiation.

FOCUS STANDARDS

GPS Focus Standards:

BCS-CMW-20 Students will demonstrate an understanding of basic programming concepts.

a. Define basic programming concepts: variable, data type, procedure, parameter, conditional, iteration, flowchart, and pseudocode.

b. Use variables of different data types in programs.

c. Write programs with sequences, conditionals, and iteration.

d. Use procedures in programs including ones that take parameters.

e. Use tools to express the design of a program: flowcharts and pseudocode.

f. Edit, compile, run, and test a program.

g. Format a program to give a pleasing, consistent appearance.

h. Discuss syntax, run-time, and logic errors.

i. Debug a simple program.

BCS-CMW-23 Students will show the ability to use an ordered data structure.

GPS Academic Standards:

ELA10RL5 The student understands and acquires new vocabulary and uses it correctly in reading and writing.

ELA10RC3 The student acquires new vocabulary in each content area and uses it correctly.

ELA10W1 The student produces writing that establishes an appropriate organizational structure, sets a context and engages the reader, maintains a coherent focus throughout, and signals closure.

ELA10W2 The student demonstrates competence in a variety of genres.

ELA10LSV1 The student participates in student-to-teacher, student-to-student, and group verbal interactions.

National Standards:

UNDERSTANDINGS & GOALS

Enduring Understandings:

Students should develop an understanding of what a data structure is and iterate through a data structure.

Essential Questions:

- What is a data structure?
- What is a data structure used for?

Knowledge from this Unit:

- Students will explain what a data structure is and the reasons a data structure would be used.
- Students will iterate through a data structure using programming techniques.

Skills from this Unit:

- Students will use basic programming techniques to create and iterate through a data structure.

ASSESSMENT(S)

Assessment Method Type: Select one or more of the following. Please consider the type(s) of differentiated instruction you will be using in the classroom.

_____ Pre-test
_____ Objective assessment - multiple-choice, true- false, etc.
__ Quizzes/Tests
__ Unit test
_____ Group project
_____ Individual project
_x_ Self-assessment - May include practice quizzes, games, simulations, checklists, etc.
__ Self-check rubrics
__ Self-check during writing/planning process
__ Journal reflections on concepts, personal experiences and impact on one's life
__ Reflect on evaluations of work from teachers, business partners, and competition judges
_x_ Academic prompts
__ Practice quizzes/tests
_____ Subjective assessment/Informal observations
__ Essay tests
__ Observe students working with partners
__ Observe students role playing
_____ Peer-assessment
__ Peer editing & commentary of products/projects/presentations using rubrics
__ Peer editing and/or critiquing
_____ Dialogue and Discussion
__ Student/teacher conferences
__ Partner and small group discussions
__ Whole group discussions
__ Interaction with/feedback from community members/speakers and business partners
_____ Constructed Responses
__ Chart good reading/writing/listening/speaking habits
__ Application of skills to real-life situations/scenarios
_____ Post-test

Assessment(s) Title: Data Structures Iteration Review

Assessment(s) Description/Directions:

Prior to the Performance activity, students should be given the chance to assess themselves on their ability to iterate through a data structure.

Attachments for Assessment(s):

LEARNING EXPERIENCES

Instructional planning: Include lessons, activities and other learning experiences in this section with a brief description of the activities to ensure student acquisition of the knowledge and skills addressed in the standards. Complete the sequence of instruction for each lesson/task in the unit.

Sequence of Instruction

1. **Identify the Standards. Standards should be posted in the classroom for each lesson.**

   BCS-CMW-20 Students will demonstrate an understanding of basic programming concepts.

   BCS-CMW-23 Students will show the ability to use an ordered data structure.

2. **Review Essential Questions.**
   - What is a data structure?
   - What is a data structure used for?
3. **Identify and review the unit vocabulary.**
4. **Assessment Activity.**

Day 1: Introduction to Data Structures---mention data structures encountered in real life on a daily basis.
Day 2: Programming with Data Structures
Day 3: Traversing a Data Structure
Day 4: Practice Assessment
Day 5: Performance Assessment (Creating a Collection of Board Games)

Technology Connection/Integration
Students use technology to research the topic and produce a computer program that iterates through data structures. The teacher may use the computer to show examples of data structures (movies, sound clips, images, etc.)

Attachments for Learning Experiences: Please list.

Notes & Reflections:
- This unit should be implemented immediately following the programming unit. Using data structures requires use of programming techniques used in the programming unit.

CULMINATING PERFORMANCE TASK (Optional)

Culminating Unit Performance Task Title: **Create a collection of your favorite board games**

Culminating Unit Performance Task Description/Directions/Differentiated Instruction:

Students should write a program to iterate through a data structure. Follow the directions attached with the rubric for the performance task. Teachers may want to provide students with the Game Board class.

Attachments for Culminating Performance Task:

Name;_____

Create a Collection of Board Games

Please create a program that asks the user to enter five board games. Store the games entered into a data structure and show your ability to traverse the data structure by displaying all games. Below are some rules to follow you as you program

- Document and comment your program properly and clearly
- You may take user input anyway you wish
- Games must be stored into a data structure for full credit
- Data structure must be traversed for full credit

Task/Point Value	Incomplete	Needs Improvement	Satisfactory	Excellent	Points Earned
Documentation/ Comments	No documentation or comments are used (0)	Documentation or comments are not present (.5)	Documentation/comments are present but do not explain code (1)	Documentation and comments are used properly (1)	
User is prompted to enter board games	User is not prompted for five board games (0)	User is prompted but data is not read (1)		User is prompted and data is read (2)	
Games are stored into a data structure	No data structure is created (0)	Data structure is created but no games are stored (1)	Data structure is created and student attempts to store items in data structure (2)	Data structure is created and items are stored in data structure (3)	
Board games displayed	No board games are displayed (0)	Some board games are displayed (1)	Board games are displayed but data structure is not traversed (1. 5)	Student iterates through data structure and five board games are displayed (2)	
Proper style/conventions used	Style/conventions are not used(0)	Style/conventions are used most of the time (1)		All style/conventions are followed (2)	
				Total Points	

Web Resource Title: Webopedia Data Structures List

Web Resource Description: A list of data structures that could be used.

Web Resources: http://www.webopedia.com/TERM/D/data_structure.html

UNIT RESOURCES

Web Resources:

Attachment(s):

Materials & Equipment:

Computer

Computer Programming software (development kit & Integrated Development Environment (IDE))

-Suggested development Kit: Java SDK

-Suggested IDE: Dr. Java or Blue J

What 21st Century Technology was used in this unit:

	Slide Show Software		Graphing Software	X	Audio File(s)
	Interactive Whiteboard		Calculator		Graphic Organizer
	Student Response System		Desktop Publishing	X	Image File(s)
	Web Design Software		Blog	X	Video
	Animation Software		Wiki		Electronic Game or Puzzle Maker
	Email		Website		