

Sorting Algorithms



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| Title of Lesson: Common Sorting Algorithms | | Date: Lesson will be completed two weeks. |
| Author(s): Kienia Green-Brooks Mentor Teacher: | | School District: Campus: |
| Subject Area(s): Computer Science I | | Grade Level(s)/Course: 11 - 12 |
| State Standards (Texas: TEKS) | <p>Subject Specific TEKS: http://www.tea.state.tx.us/teks/#Grade TEKS 126.22 - 1 (E) differentiate current programming languages, discuss the use of the languages in other fields of study, and demonstrate knowledge of specific programming terminology and concepts.</p> <p>Technology Specific TEKS: http://www.tea.state.tx.us/rules/tac/ch126toc.html TEKS 126.22 – 3 (A) discuss copyright laws/issues and model ethical acquisition and use of digital information, citing sources using established methods; (B) demonstrate proper etiquette and knowledge of acceptable use policies when using networks, especially resources on the Internet and intranet. TEKS 126.24 – 1 (E) demonstrate knowledge of technology terminology and concepts relating them to desktop publishing; 2 (A) demonstrate proficiency in the use of a variety of input devices such as mouse, keyboard, disk/disc, modem, scanner, voice/sound recorder, or digital camera by appropriately incorporating such components into the product; and (B) use digital keyboarding standards in word processing such as one space after punctuation, the use of em/en dashes, and smart quotation marks. 3 (A) discuss copyright laws/issues and model ethical acquisition and use of digital information, citing sources using established methods. 7 (B) identify the tasks in a project and use the tools needed for completion such as word processing, pagination, utility, indexing, graphics, or drawing programs; (D) select and use the categories of type, font, size, style, and alignment appropriate for the task; (E) apply the basic elements of page design including text, graphics, headlines, and white space; (F) distinguish design requirements as they relate to purposes and audiences including one-surface objects, multiple or bound pages, stationery, book jackets/magazine covers, pamphlets, magazines, brochures, and labels.</p> | |
| Stated Objective(s) Technology Integration ∇ Yes | The students will be able to describe characteristics of common sorting algorithms using Quark to develop a one page newsletter providing an explanation of the sorting algorithm, sorting algorithm name, and algorithm efficiency. Students will also use the internet and other resources to research their assigned algorithm. | |
| Anticipatory Set (Focus) Technology Integration ∇Yes | Discuss the basic principals of sorting algorithms; use Microsoft PowerPoint to give a general overview of the algorithms and how each one performs. | |
| Explanation Technology Integration ∇Yes | The teacher will provide students with a summary of Bubble Sort, Cocktail Sort, Selection Sort, Insertion Sort, Merge Sort, and Quick Sort. The teacher will then place the students in groups of three and assign each group to a sorting algorithm. The teacher will then instruct the students on the requirements of the project and will provide the students with the rubric, sample project, and handouts to help complete the project. Students must provide an explanation of the sorting algorithm, sorting algorithm name, algorithm efficiency, and include a group photo as an image on the page. Upon completion of the project the teacher will combine the students work and extra explanation from the teacher on each algorithm, into one newsletter and give copies of the work to the students to be used to complete a quiz at the end of week two. | |

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| <p>Modeling</p> <p>Technology Integration <input type="checkbox"/> Yes</p> | <p>The teacher provides a sample document demonstrating the format of the newsletter page and also provides guidelines for the information that must be included about the sorting algorithm. The teacher will demonstrate basic functions of Quark and provide a tip sheet so students will be able to successfully use the program.</p> <p>Check for Understanding: The teacher will elicit responses from students by asking question concerning the use of Quark and about their individual sorting algorithms.</p> |
| <p>Guided Practice</p> <p>Technology Integration <input type="checkbox"/> Yes</p> | <p>The students will complete sample tasks to assure understanding of the Quark program. Students will also begin research on their particular sorting algorithm, using the internet, so that the teacher can make sure they are on the right track.</p> <p>Check for Understanding: The teacher will move around the classroom as students work on accomplishing the example tasks to create their documents, and the teacher will elicit responses from students by asking question concerning the use of Quark and about their individual sorting algorithms.</p> |
| <p>Opportunities to Relearn <i>(Reteach)</i></p> <p>Technology Integration <input type="checkbox"/> Yes <input type="checkbox"/> No</p> | <p>The teacher will provide feedback and extra assistance for students who are unclear of the requirements or on their particular sorting algorithm.</p> |
| <p>Independent Practice</p> <p>Technology Integration <input type="checkbox"/> Yes</p> | <p>The students will use the internet and other resources (programming books) the rest of the week to research their algorithm and develop their newsletter page in Quark.</p> |
| <p>Assessment or Evaluation</p> <p>Technology Integration <input type="checkbox"/> No</p> | <p>Student projects will be evaluated using the develop project rubric. Students will also complete a quiz covering the characteristics of the sorting algorithms used in this project.</p> |
| <p>Enrichment</p> <p>Technology Integration <input type="checkbox"/> Yes</p> | <p>Students will be given an opportunity to use the sorting algorithms in a short program to gain a better understanding of the algorithms use.</p> |
| <p>Closure</p> <p>Technology Integration <input type="checkbox"/> No</p> | <p>During week two students will present their newsletter to the class and explain the characteristics of their sorting algorithm.</p> |
| <p>Materials</p> | <p>Technology Resources: <i>Quark Express, Visual C++, World Wide Web, Computer Science Classroom Lab, Color Printer, Digital Camera, Scanner, and Adobe Photoshop</i></p> <p>Other Resources: <i>Sorting Algorithms Basics Handout and classroom textbook</i></p> |

Sorting Algorithm Project Rubric

Teacher Name: **Ms. Green-Brooks**

Student Name: _____

| | CATEGORY | 0 | 3 | 4 | 5 |
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| Design | Proximity | Newsletter seems cluttered and unorganized, proximity not addressed. | Information is somewhat organized and some items are not grouped properly. | Proximity is somewhat addressed, information is generally organized and most items are not grouped properly. | Proximity is accomplished; information is very organized and properly grouped together. |
| | Alignment | Alignment inappropriate, no visual connection between items. | More than one text alignment used, visual connection between items is somewhat established. | Text/graphic alignment is appropriate, visual connection between items is more established, but some objects are out of place. | Alignment is accomplished; text/graphics provide proper visual connection. |
| | Repetition | Repetition is not used. | Repetition is somewhat used, some elements are duplicated within the newsletter. | Repetition is used but certain elements are not repeated that could improve uniformity. | Repetition is accomplished, graphic and text elements are consistently used to unify the newsletter. |
| | Contrast | Contrast is not used. | Contrast is somewhat used to highlight ideas and concepts. | Contrast is used to highlight some ideas and concepts. | Contrast is properly used to highlight ideas and concepts; shapes, color, and size contrasts are used. |
| Content Delivery | Text | Font formatting makes it difficult to read the material, fonts create conflict. | Font formatting is planned, however some aspects are hard to read. | Font formatting has been carefully planned to enhance readability. | Font formatting has been carefully planned to enhance readability and content. Concord and contrast are used appropriately. |
| | Graphics | Graphics are unrelated to the content and are distracting. | Graphics somewhat support content and student group photo is not included. | Some graphics support content, most are properly sized, and student group photo is included. | Graphics support content, are properly sized, and student group photo is included. |

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| | Spelling/Grammar | 5 or more grammatical or spelling errors are present. | 3 grammatical or spelling errors are present. | 2 grammatical or spelling errors are present. | No grammatical or spelling errors are present. |
| Purpose (Defining Sorting Algorithm) | Algorithm Explanation | Sorting algorithm is not explained. | Sorting algorithm is explained, example is not clear. | Sorting algorithm is explained, example is somewhat clear. | Sorting algorithm is clearly explained with a short coding example. |
| | Algorithm Naming | Explanation of algorithm name is not present. | Explanation of algorithm name is very unclear. | Explanation of algorithm name is present, but is not very clear. | Clear explanation of algorithm name is present. |
| | Algorithm Efficiency | Explanation of algorithm efficiency is not present. | Explanation of algorithm efficiency is very unclear. | Explanation of algorithm efficiency is present, but is not very clear. | Clear explanation of algorithm efficiency is present. |
| | Audience | Content and design is inappropriate for the audience. | Design and content are somewhat inappropriate for audience level. | Design is appropriate for the audience, but content is somewhat inappropriate. | Content and design is appropriate for the audience. |