**Lesson created by the GMU-ODU CSforAll Team. For more information about**

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| **Unit 3 Lesson 1 Algorithms & Debugging**  *3rd and 4th Grade* | | |
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| **Concept: Algorithms & Debugging** | | |
| **Vocabulary:**  • Algorithms  • Explanatory Writing | | |
| **Narrative/Summary:**  In this lesson, students will identify algorithms and brainstorm and write a new explanatory writing piece. | | |
| **Lesson Objectives (learning targets): I can…**   * Review algorithms and explanatory writing * Identify the characteristics of an explanatory text * Write a sequence of instructions for a new explanatory text in Coco Level 3 * Plan out your animation on paper | | |
| **VDOE ELA Standard(s)** | **VDOE Computer Science Standard(s)** | |
| The student will write in a variety of forms to include narrative, descriptive, opinion, and expository.  a) Engage in writing as a process.  b) Identify audience and purpose.  c) Use a variety of prewriting strategies.  d) Use organizational strategies to structure  writing according to type.  g) Use transition words to vary sentence structure. | The student will analyze, correct, and improve (debug) an algorithm that includes sequencing, events, and loops. | |

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| **Materials** |
| **Lesson materials:**   * Chromebook/Laptop * Internet Access * Teacher Unit 3, Lesson 1 slide deck * [CoCo Link](https://wego.gmu.edu/scratchgo/login.php) * Explanatory text [graphic organizer & storyboard](https://www.dropbox.com/scl/fi/50yphp873dbw9zvrab78a/Explanatory-text-graphic-organizer_storyboard-combo-.docx.docx?dl=0&rlkey=7er9hlofa5unqxw6gsf3b41tf)   **Supplemental resources:**   * Blank paper for brainstorming (optional) |

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| **Lesson Structure and Activities** |
| **Note for Teachers:**   * **Prior to beginning this Unit,** be sure to assign your students a story in CoCo, using **Level 3.** * **Please use the following naming strategy for assigning the story in CoCo:**   + “Unit # + Descriptor”, for example, “Unit 3 Story.” * **Students should use the same naming strategy for their final Scratch Project:**    + “Student Name + Unit # + Descriptor”, for example, “Johnny Unit 3 Story” |
| **Warm up/Introduction: Review**  **NOTE: All slides for this lesson are scripted so that, if needed, you can see exact definitions and instructions for teaching this lesson in the notes at the bottom of the teacher slide deck.**   * (Optional) Read aloud the summary and standards as well as the materials and resources needed for this lesson (slides 1-3) * Review the terms code, bugs, and debugging (slides 4-7)   + Code: The language that computer scientists create and use to tell a computer what to do   + Bugs: An error in a code that prevents the program from running as expected   + Debugging: looking for and fixing the errors in your code   + Tell students that we will continue to use these terms today * Think/Pair/Share: Ask students, “What is explanatory writing?” and give students a few moments to think/pair/share out. Prompt students to think back to U1L3 if they are stuck. (slides 9-13)   + Review examples and characteristics of explanatory writing   + Provide additional examples of explanatory writing, aka instructions for how to:     - Get somewhere (directions)       * To the cafeteria       * The park in your neighborhood     - Do something (instructions)       * Build a fort in your living room       * Do a dance       * Shoot a basketball or kick a soccer ball       * Create a craft     - Explain something       * How your family celebrates the holidays       * About someone important to you or someone famous       * How something happens, such as photosynthesis or the water cycle * Introduce today’s objectives (slide 14) |
| **Direct Instruction & Guided Practice:**   * Re-introduce the term algorithm and define (slides 16-17)   + An Algorithm is a list of steps to finish a task   + Discuss connection between algorithms and explanatory writing * Describe steps for writing an explanatory text: (slides 18-20)   + Brainstorm: What do you want to share?   + Plan: What does your reader need to know? How should you organize your information?     - Graphic Organizers can help (Coco)   + Write!     - Be clear and specific     - Use transition words   + Debug and Edit     - Look for mistakes or things that don’t make sense.     - Fix your mistakes * Brainstorm with a partner: Students should come up with a new explanatory writing idea, it could be any of the above or the teacher could prompt something specific (slides 21-22)   + For example: Explain how to add 2 fractions, explain how the Powhattans helped the settlers at Jamestown, explain how bees pollinate flowers, etc.   + Instruct students to get with a partner and brainstorm their new writing idea |
| **Independent Practice:**   * Remind students about Coco level 3 (slides 23-25)   + Briefly model features of level 3 * Once they’ve finished brainstorming, students should work on their writing using the text boxes in the explanatory text [graphic organizers](https://www.dropbox.com/scl/fi/50yphp873dbw9zvrab78a/Explanatory-text-graphic-organizer_storyboard-combo-.docx.docx?dl=0&rlkey=7er9hlofa5unqxw6gsf3b41tf) (slide 26) * Then, students should briefly draw/plan out what their animation might look in Scratch by sketching out each frame of the animation in the [box next to their writing.](https://www.dropbox.com/scl/fi/50yphp873dbw9zvrab78a/Explanatory-text-graphic-organizer_storyboard-combo-.docx.docx?dl=0&rlkey=7er9hlofa5unqxw6gsf3b41tf) (slide 26) |
| **Wrap up:**   * Review explanatory writing and algorithms (slides 27-28) * Make sure students store or the teacher collects the paper planning graphic organizer for next lesson. (slide 29) |
| **Assessment Strategy:** Evaluate students’ written story with a teacher-made rubric or focusing on a target skill based on the student’s area of need. |