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

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| **Unit 3 Lesson 2 Algorithms & Debugging**  *3rd & 4th Grade* | | |
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| **Concept: Algorithms & Debugging** | | |
| **Vocabulary:**  • Algorithms  • Explanatory Writing  • Control Blocks and Loops | | |
| **Narrative/Summary:**  In this lesson, students will continue planning and then animating their explanatory writing in CoCo and check for consistency. | | |
| **Lesson Objectives (learning targets): I can…**   * Review Algorithms and Explanatory Writing * Plan my writing and animation for Scratch using Coco Level 3 (Column 1, 2, 3, 4) * Identify and use Control Blocks and Loops with a partner | | |
| **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 construct programs to accomplish tasks as a means of creative expression using a block or text-based programming language, both independently and collaboratively  a. using sequencing;  b. using loops (a wide variety of patterns such as repeating patterns or growing patterns); and  c. identifying events.  The student will create a plan as part of the iterative design process, independently and/or collaboratively, using a variety of strategies (e.g., pair programming, storyboard, flowchart, pseudocode, story map). | |

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| **Materials** |
| **Lesson materials:**   * Chromebook/Laptop * Internet Access * [Link to Scratch](https://scratch.mit.edu/) * [Link to Coco](https://wego.gmu.edu/scratchgo/login.php) * [Teacher slide deck](https://drive.google.com/file/d/1POCikjXbjPGsZ_GjHz4gkgcqecn5t_DB/view?usp=drive_link) * Students’ completed explanatory writing piece and graphic organizer from last time   **Supplemental resources:** |

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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:**  **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 purpose of explanatory writing. (slide 4) * Make sure students have their paper planning graphic organizer from last lesson. (slides 6-7) |
| **Direct Instruction & Guided Practice:**   * Explain that today students will finishing planning their animation using Coco Level 3 (Column 1, 2, 3, 4) (slide 8)   + *Briefly* review columns 1, 2, 3, 4 * Guide students to fill in CoCo with their writing in CoCo Column 1 from their paper graphic organizer from last time (slide 9) * Next, students should use the paper graphic organizer to plan and select blocks for Scratch in CoCo columns 2 & 3, based on their planned animation (slides 10-12) * *Please make sure that students are using CoCo here!* |
| **Direct Instruction & Guided Practice:**   * Introduce Control Blocks and Loops (slides 13-14)   + Remind students that an algorithm is a series of ordered steps taken to solve a problem or achieve some end--loops are an important tool when we create algorithms! * Direct students in how to create and use loops: (slides 15-17)   + *Teacher Note: Feel free to show students how to use each type of loop individually and then try it in Scratch or you can show them all at once and asked them to use one type.*   + Loops are great tools to use within code and projects to repeat an action multiple times. In the 'Control' section of block code, we can use these loops:     - [Repeat x number of times:](https://www.dropbox.com/scl/fi/9v8tli2nk4ry5uc84hgkb/repeat.mp4?rlkey=mnos7pj33mh1lc07e6pu5x13s&st=gnzhviyk&dl=0) The Repeat Until () block is a Control block. Blocks held inside this block will loop until the specified event happens, in which case the code beneath the block (if any) will execute.     - [Repeat until:](https://www.dropbox.com/scl/fi/gkid4fg2qbjyzg6l5s4ln/repeatuntil.mp4?rlkey=mh7bw3e7w9wtzlfgcd8bt58y1&st=edsm31yp&dl=0) The Repeat () block is a Control block. Blocks held inside this block will loop a given amount of times, before allowing the script to continue. * Instruct students to get into pairs and work through using the Loops Feature. (slide 18)   + Choose a Sprite   + Animate a dance with three moves   + Using the loop function, have the sprite dance using both “Repeat until” and “Repeat \_\_ Number of times” |
| **Wrap up:**   * Students can share their animation using loops with a partner or [share](https://www.dropbox.com/scl/fi/5tyqclimfyxm5w0oduo8i/How-to-Share-Scratch-Products.docx?rlkey=25bxkepw2rdt6hq0pe55ji3ph&st=6ehw2oob&dl=0) to the teacher dashboard. (slide 19) |
| **Assessment Strategy:** Evaluate students’ planning document with a teacher-made rubric or focusing on a target skill based on the student’s area of need. |