## This is a picture of the CS For All logo.

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

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| **Lesson 5: Coding and Computational Thinking** | | **Grade Level: K** |
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| **Concept: Algorithms** | | |
| **Vocab:**   * Algorithms | | |
| **Summary:** In this lesson, students will write a story with a beginning, middle, and end, develop an algorithm to create the story, and publish a story in ScratchJr. | | |
| **Lesson Objectives (learning targets): I can…**   * Ask and answer questions about a story * Write a story with a beginning, middle, and end * Sequence a story with a beginning, middle, and end * Debug an algorithm * Develop an algorithm to represent the beginning, middle, and end of a story scene in ScratchJr | | |
| **VDOE English Standard(s)** | **Computer Science Standard(s)** | |
| **Communication and Multimodal Literacies:**   * 1. The student will develop oral communication skills.   j) Ask and respond to questions to seek help, get information, or clarify information.  l) Increase listening and speaking vocabularies.  **Reading:**  K.7 The student will expand vocabulary and use of word meanings.   1. Discuss meanings of words. 2. Increase vocabulary by listening to a variety of texts read aloud. 3. Use vocabulary from other content areas.   K.8 The student will demonstrate comprehension of fictional texts.  b) Relate previous experiences to what is read.  c) Use pictures to make predictions.  d) Ask and answer questions about what is read.  e) Use story elements of characters, settings,  and events to retell stories sequentially using  beginning, middle, and end.  **Writing:**  K.11 The student will write in a variety of forms to include narrative and descriptive.  c) Use letters to phonetically spell words that  describe pictures or experiences. | K.1 The student will construct sets of step-by-step instructions (algorithms) either independently or collaboratively including sequencing that emphasize the beginning, middle, and end.  K.2 The student will construct programs to accomplish tasks as a means of creative expression using a block based programming language or unplugged activities, either independently or collaboratively, including sequencing, emphasizing the beginning, middle, and end. | |

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| **Materials** |
| **Note:** The following lesson is a culminating project in which students write and code their own adaptation story. You may wish to extend this lesson over several days in order to allow students time for writing, coding, and publishing their story with others.  In preparation for this lesson, you may need a copy of *The Three Little Pigs* and *Hello Ruby.*  You may also wish to review:   * VIRTUAL L5GK Slide Deck - Use these to display all related materials to students during lesson * [Coding Story Map](https://www.dropbox.com/scl/fi/i5ehuo5gh56d8mkmqwegl/Coding-Story-Map.docx?dl=0&rlkey=c2z48zg0qmyoze8on5cvefy1n) * [ScratchJr Checklist](https://www.dropbox.com/s/1xoq3m4ackz9oyf/Scratch%2C%20Jr%20checklist.pdf?dl=0) * ScratchJr [Blocks](https://www.dropbox.com/s/ocguik8q7qery4e/ScratchJr%20Coding%20Blocks.pdf?dl=0) * ScratchJr [Interface Guide](http://scratchjr.org/learn/interface) * ScratchJr Triggering Blocks [Resource Page](https://www.scratchjr.org/learn/blocks) * ScratchJr *“*[Drive Across the City](https://www.scratchjr.org/teach/activities/drive-across-the-city)” activity * ScratchJr “[Dribble a Basketball](https://www.scratchjr.org/teach/activities/dribble-a-basketball)” activity * Coding and Storytelling in ScratchJr [Video](https://www.youtube.com/watch?v=YHoZiaTYBr0)   ***Hello Ruby* Resources:**  In preparation for this lesson, you may wish to read aloud *Hello Ruby* chapter 7 in advance. |

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| **Lesson Structure and Activities** |
| **Warm-up/Bell Ringer Activity: (5-10 min)**  **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.**   1. Introduce Computer Science Word Wall and Algorithms: show “computer science”, “algorithms”, and “motion blocks” word wall cards (Slides 5 & 6) 2. Review motion blocks: start, move right, move left, and end (Slides 7-18) |
| **Introduction: (10 min)**   1. Choose a video to watch: Think about the beginning, middle, and end of stories, and how to bring each part to life in ScratchJr (Slide 19)   Choose the video that is most appropriate for your students:  eSpark Learning - Beginning, Middle, and End  [https://www.youtube.com/watch?v=S96cYTI-gAk](https://www.youtube.com/watch?v=_gcC8B26IcQ)  How to Retell a Story For Kids  <https://www.youtube.com/watch?v=w33-m8-geuM> |
| **Guided Instruction: (15 min)**   1. Discuss Algorithms: **Algorithm** is a set of directions that we give to our computer to tell it what to do (Slide 21) 2. Introduce The Three Little Pigs story and how to use Beginning, Middle, and End (Slide 22)      1. Turn & Talk with partner: Retell the story of The Three Little Pigs across fingers (Slide 23) 2. Review the BME of the story (Slide 24) 3. Introduce Activity: Students will give directions to their own story (Slide 25) 4. Ask which characters/sprites students would use instead of pigs and big, bad wolf: Give time to think (Slide 26) 5. Ask where the story should take place: Give time to think (Slide 27) 6. Ask what the character will be doing: Give time to think. Turn and talk with partner about story that they made up (Slide 28)   Rationale:  Using a familiar story allows students to more easily and creatively adapt the story using their own ideas.  Model think time and allow opportunities for turn and talk in order for students to see, hear, and experience the story writing process. It reinforces that ideas for writing take time and thought, and that students are not expected to have an idea right away. |
| **Independent Practice: (30 min)**  **Time: This is a culminating project that can be extended over several days. Students may complete this portion independently or with a partner.**  **Note**: *Depending on their familiarity with ScratchJr, you may decide to have students work in small groups or pairs for this activity, coding and debugging the algorithm together.*   1. **Planning Beginning, Middle, and End of Students’ Stories**    1. Use [Coding Story Map](https://www.dropbox.com/scl/fi/i5ehuo5gh56d8mkmqwegl/Coding-Story-Map.docx?dl=0&rlkey=c2z48zg0qmyoze8on5cvefy1n) to plan the BME of students’ stories: Draw what will happen in each box and then circle the motion blocks that will be needed below (Slide 31)    2. Students: Complete the [Coding Story Map](https://www.dropbox.com/scl/fi/i5ehuo5gh56d8mkmqwegl/Coding-Story-Map.docx?dl=0&rlkey=c2z48zg0qmyoze8on5cvefy1n). 2. **Planning the Students’ Stories**    1. Use [ScratchJr Checklist](https://www.dropbox.com/s/1xoq3m4ackz9oyf/Scratch%2C%20Jr%20checklist.pdf?dl=0) to plan the rest of the story (Slide 32)       1. **Note**: If needed, review the [checklist](https://www.dropbox.com/s/1xoq3m4ackz9oyf/Scratch%2C%20Jr%20checklist.pdf?dl=0) and/or a few student examples of **algorithms** in Scratch Jr, discussing the parts that the students included. Alternatively, review ScratchJr blocks. *Show* [*blocks*](https://www.dropbox.com/s/ocguik8q7qery4e/ScratchJr%20Coding%20Blocks.pdf?dl=0) *one at a time. Allow students to turn and talk to a partner to name the block and discuss what it does in ScratchJr*.    2. **Students:** Complete the [ScratchJr Checklist](https://www.dropbox.com/s/1xoq3m4ackz9oyf/Scratch%2C%20Jr%20checklist.pdf?dl=0).   *After students complete their storyboard, allow students to share their story adaptation plans with other children. This will allow them to see the different ways that the story can be represented and reinforce the concept of BME in a story.*   1. Go to ScratchJr to code the beginning, middle and end of the story that students created 2. Remind students to use the ScratchJr checklist:   1) Do our pre-writing  2) Click on a new project  3) Choose a setting  4) Choose a character (sprite)  5) Choose the green flag to start our algorithm   1. Remind students to debug if their algorithm isn’t working (Slide 33)   *If students finish early, they can continue coding the other parts of their story. Be sure to save students’ work during this period for a publishing party later.*  Rationale:  By creating a story map, students have a concrete tool to refer back to when coding to bring their story to life. |
| **Wrap up: (5 min)**   1. ScratchJr Publishing Party! 2. Share the beginning, middle, and end of your new story to your partner and show them how you brought a part of your story to life. (Slides 35 & 36)   *Like other writing publishing parties, this is a wonderful opportunity to invite parents to participate. Students can share their ScratchJr creation with them in some way. You may also choose to have students share with more than one peer, giving them practice in their retelling and presentation skills.*  2. Remind students that they are computer scientists and writers. They can use computer science skills like finding **patterns, debugging, decomposing, abstracting,** and **coding algorithms** to do important work, like reading and writing stories (Slide 37)  Rationale:  Creating pieces of writing (and algorithms) for authentic audiences reinforces the purpose of writing and may increase the overall enjoyment of the writing process. Likewise, it reinforces how computers can help us to complete tasks. |
| **Assessment Strategy:**  **Time: The formative assessment for this lesson can occur over several days.**  As students complete their story maps, circulate to ensure:   * Students are adapting the story of the Three Little Pigs, replacing the pigs and the Big Bad Wolf with new animal characters of their choice * Sequencing the beginning, middle, and end in the correct order on the story map graphic organizer * Following the writing expectations outlined above   As students complete their ScratchJr projects, circulate to ensure:   * Students' backgrounds and sprites match their adaptation * Students are using ScratchJr blocks correctly * Students are debugging algorithms when needed |

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| ***Extension Ideas:*** | * **Art:** Provide bingo dotters, stickers, watercolors, or finger paints. Allow children to explore making patterns with the materials, guiding them, and modeling as necessary. * **P.E.:** Play a game of “follow the leader.” Jump, hop, run in place, crawl, etc. using a specific pattern and have your child follow you. Switch roles and follow your child. (Ex: ‘clap, clap, stomp, clap, clap, stomp’) * **Music:** Young children typically enjoy clapping games that require observation, mimicking of the sound pattern, and opportunities to lead the patterns themselves. Model a clapping pattern for them to copy and give them a turn, simultaneously teaching the pattern of turn-taking. * **Writing:** To combine word families and handwriting skills, invite children to choose two markers or colored pencils to use. They can practice rainbow writing words from the word family in different color patterns. Some students may elect to use 3 or 4 colors; encourage them to remember the color pattern they’ve picked as they write. * **Science:** Collect a wide assortment of natural materials, including leaves, sticks, rocks, shells, etc. Invite children to make patterns with the materials. * **Social studies:** Community helpers often have uniforms that tell other people how they help. Show children pictures of community helpers. What patterns do they notice? How are the uniforms the same and different? * **Reading:** There aremany types of word families that have different patterns at the end of the word that helps us to read and spell. Hone students’ visual discrimination by asking them to find words from the same family in a poem, book, or sort that end the same way. |
| ***Alignment:*** | This is the fifth and final lesson in the unit. |