

Ruby's Algorithms

Orange Level: Unit 1, Lesson 1

Objectives

In this activity, students will:

- meet Ruby through a reading of the first part of *Hello Ruby*.
- learn about giving precise and specific directions.
- practice creating and writing algorithms to complete a variety of tasks.

Activity Description (40-60 minutes)

5 min.	Engage students by asking them to describe an adventure they have gone on. You may wish to invite students to share their answer with an elbow partner, then invite a few students to share their answer with the class.
15 min.	Invite students to listen to a story about an adventure a little girl named Ruby is about to go on. Tell students that Ruby is going to learn all about computer science during her adventure, and that they are going to learn right along with her, too! Read Chapters 1-3 (p. 6-23) of <i>Hello Ruby</i> to students, allowing time for students to view the images on each page. You may need to explain a few words to students, such as “cheekily” on p. 11. Be sure to highlight the sequences of directions Ruby follows when getting dressed and putting away her toys as well as the map she creates on p. 20-21.
5-15 min.	Ask students to recall what happened when Ruby got dressed for school or put away her toys. In both instances, Ruby followed directions exactly as they were given, which resulted in her putting on her dress over her pajamas, and leaving her colored pencils on the floor because they are not “toys”. Explain to students that computers do the same thing: they follow directions exactly as they are given, and they only do what the directions tell them to do. Challenge students to give you directions for completing a simple task, such as moving across the classroom to pick up a book. Invite students to give you one direction at a time, and follow the directions exactly as given, even if it results in you doing something silly like bumping into a wall or trying to pick up a book with a closed hand. Once you’ve completed the task, discuss which types of directions worked best, leading students to realize that directions have to be very specific and given in order. Tell students that this is what computer scientists call an algorithm, which are the steps to complete a task.

	If time permits, challenge students to work with a partner to repeat the above activity, where one person gives the directions and the other one follows them exactly, just as a computer would. You may wish to make these challenges “seated” so students aren’t all moving around the room bumping into things! Consider these suggestions: eating lunch, making the bed, brushing your teeth, setting the table, lining up for recess.
10-20 min.	Tell students it is now their turn to write an algorithm to help Ruby visit her friends. Display the map (p. 80) for students to see, and model how you can write an algorithm using arrows to lead Ruby from the starting point, over the bridge, to the penguin. If using version 1 of this activity, invite students to create algorithms for Ruby to visit all 4 friends. Begin each algorithm at the starting point, using directional arrows to show the path she would follow. If students finish early, challenge them to write one algorithm that allows Ruby to visit all 4 of her friends, one after another. If using version 2 of this activity, invite students to create algorithms for Ruby to visit all 4 friends. Begin each algorithm at the starting point, using directional arrows to show the path she would follow. Then, show students how to create a “shortcut” to avoid having to write so many of the same arrow in a row, using numbers to show how many times to repeat a command. Have students create this “shortcut” to create new algorithms to visit each friend. If students finish early, challenge them to write one algorithm using the “shortcut” method that allows Ruby to visit all 4 of her friends, one after another.
5 min.	Close out the lesson with a review of what students experienced today, and provide space for student reflection. Use any or all of these questions as a guide: • What tasks did you create algorithms for today? • What was challenging about creating algorithms for Ruby today?

Reviewing Student Work

- ★ Are students able to create an algorithm in the correct sequence to navigate Ruby to each friend?
- ★ Are students able to use the “shortcut” by recognizing patterns in the sequence of directions that are giving Ruby?

Lesson Notes

- ✚ The map algorithm activity works well placed in a sheet protector and having students use a dry erase marker to write out the algorithm on the plastic sheet.