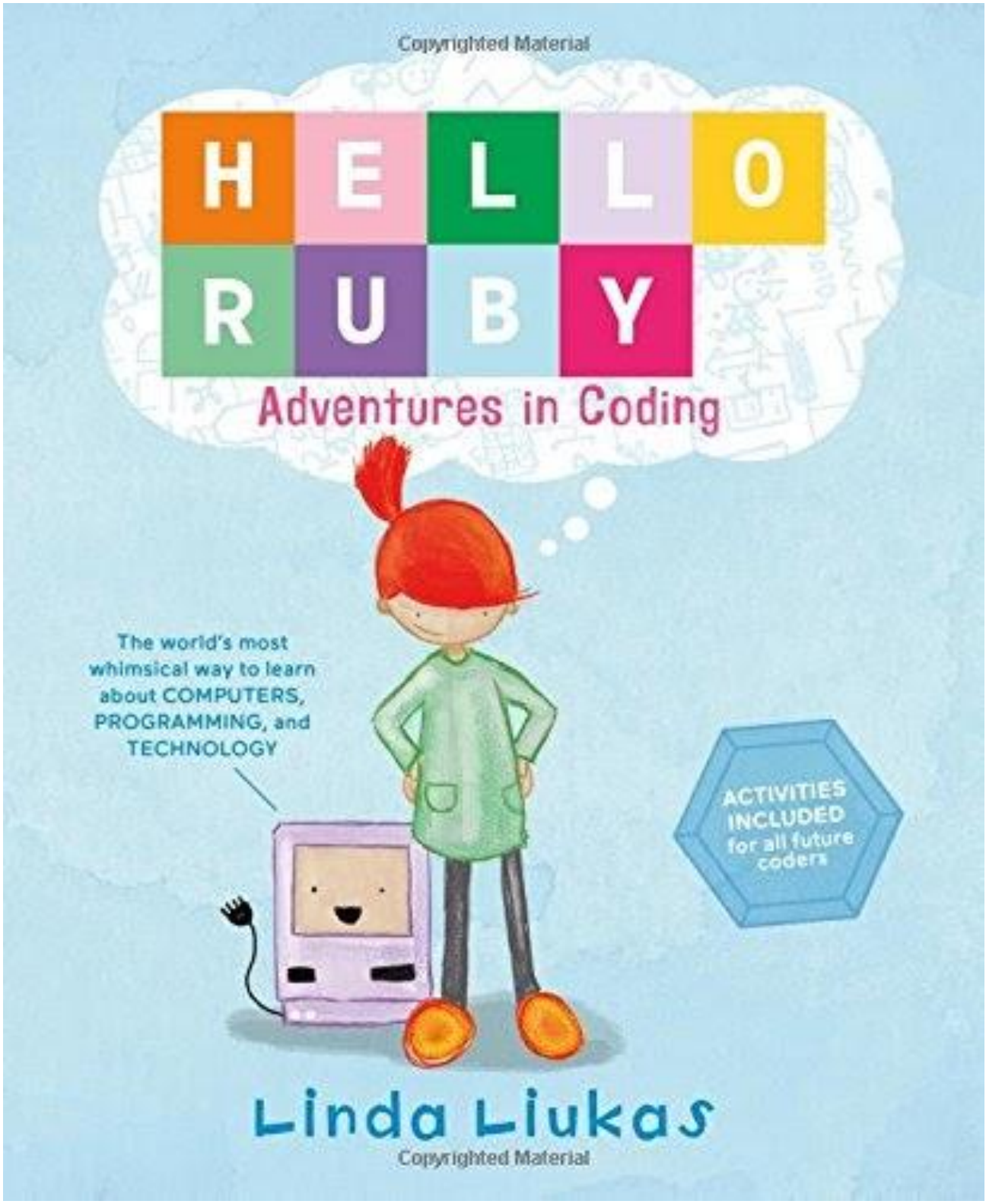
ST LEONARD'S
CHURCH OF ENGLAND
PRIMARY SCHOOL

Hello Ruby Planning

Year 1 and 2

NOS CERTIFIED SCHOOL 2019-20
NOS SAFE REMOTE EDUCATION 2020-21
NOS CERTIFIED SCHOOL 2020-21

You will need this book (Lesons 1 to 5)



ST LEONARD'S CHURCH OF ENGLAND PRIMARY SCHOOL

Ruby's Algorithms: Lesson 1

Objectives:

- 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 *Hello Ruby* 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 coloured 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.
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

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Ruby's Dance Loops: Lesson 2

Objectives:

- learn more about Ruby through a reading of the second part of *Hello Ruby*.
- learn about using loops to repeat a series of steps or tasks.
- practice following a loop's instructions and creating their own loops to perform dances.

Activity Description (40-60 minutes)

5 min.	Engage students by asking them what they remember about Ruby from the previous class. 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. Lead students into a brief discussion of the importance of sequence in the directions Ruby gave and received.
15 min.	Invite students to listen as you continue to tell the story of Ruby, who is about to embark on her big journey to find 5 gems hidden by her father. Read Chapters 4-5 (p. 24-37) of *Hello Ruby* 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 "solemnly" on p. 25. Be sure to highlight how the penguins work together to solve a big problem, each doing a small task to create a raft (p. 29), as well as when Ruby uses a loop to solve the problem of making a ladder to reach the gem (p. 35). Tell students that these are both things that computer scientists do when they make games, art, and music on computers.
5-15 min.	Use this slidedeck to introduce Ruby and her friends' signature dance moves. Have students practice each dance once through, then click on the slide to reveal the loop (in orange) and the new instructions that students should follow to properly do this dance. Be sure to do at least Ruby's dance to prepare students for the activity that follows. If time permits, allow students to have a turn setting the parameters for each dance loop (such as changing "3" to another number in Ruby's dance, or repeating Penguin's dance until a student shouts "hooray!")
10-20 min.	Tell students it is now their turn to create a signature dance using a loop. Use the slidedeck to help students visualize the materials they will receive; use this slide if you are giving 6 dance move options to students, and use this slide if you are giving them 12 dance move options. Distribute the Dance Loops activity sheet *(see note below)* and an assortment of dance cards for students to glue onto their template in the sequence they want them performed. Then, invite students to decide how many times their loop should repeat by writing that number in the white box at the top of the loop. Encourage students to try out their dance numerous times before they glue the dance cards to the template. Once they have glued their dance cards, ask students to practice their dance, following both the sequence and the number of times they should loop the dance. Then, invite students to share their dances with a partner, a table group, or the entire class, encouraging the others to dance along.
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 things did Ruby's friends do that are things computer scientists also do? • What did you use a loop to create today?

Reviewing Student Work

- Are students able to follow the rules of the loops when performing Ruby's friends' dances?
- Are students able to create and loop their own dance sequence, then accurately perform the dance according to the sequence and number of times it should loop?

Lesson Notes

- Consider making a copy of this slide to customize which dance cards students will receive. Depending on your class, you may wish to only use the first page of dance cards or select only a few that you know students will be successful with.
- You may opt to pre-cut the Dance Loops activity sheet in half (the tall way) so that each student has one template, or let one student use both templates to create a second dance. Or, consider letting partners share a sheet, each creating their own dance on their own side of the sheet.

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Ruby's Big Events: Lesson 3

Objectives:

- learn more about Ruby through a reading of the third part of *Hello Ruby*.
- learn about using events which cause something to happen.
- practice using events to make their peers perform simple actions.

Activity Description (40-60 minutes)

5 min.	Engage students by asking them what they remember about Ruby from the previous class. 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. Lead students into a brief discussion of how Ruby used a loop to first create a ladder, and then to perform a dance.
15 min.	Invite students to listen as you continue to tell the story of Ruby, who is continuing along on her big journey to find 5 gems hidden by her father. Read Chapters 6-7 (p. 38-51) of *Hello Ruby* 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 "sheepishly" on p. 42. Be sure to highlight how the boss fox has to give commands to instruct the other foxes on what to do (this is like **events**), and how the robots are using a recipe (like an **algorithm**) over and over again to make a wide variety of cupcakes (like a **loop**). Tell students that these are all things that computer scientists do when they make games, art, and music on computers.
5-10 min.	Use this slidedeck to introduce how events are like remote control buttons that can be pressed to cause something to happen. Starting with the first button, invite a student to suggest something to happen when that button is pressed, then ask the entire class to perform that action when that button is pressed. Add a second button, and use both buttons to trigger students to perform the two different actions. Then add the third button in the same manner. Invite students to be the person that controls when the buttons are pressed.
15-25 min.	Tell students it is now their turn to create a remote control that will use events to control their classmates. Use the slidedeck to help students visualize the remote they will be creating; use this slide to give them an example of what it might look like, and use this slide to show students the blank template. Distribute the Universal Remote Control https://drive.google.com/file/d/0B03ZlEOjN-UIQnBFc3AxLTN1VGM/view?resourcekey=0--owPnx9NS01nuClqJihGAg and an assortment of colored pencils or crayons. Invite students to color each button a different color, and then write the action someone will perform when that button is pressed on the lines next to the button. Encourage students to keep the actions next to each button simple to understand and quick to perform. When students are done, invite them to share their remote controls with a partner, a table group, or the entire class, encouraging the others to follow along and perform the actions when a button on the remote is pressed.
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 things did Ruby's friends do that are things computer scientists also do? • What did you cause to happen using events (buttons on the remote) today?

Reviewing Student Work

- Are students following along with the actions being triggered by the different events - or buttons - on the remote control?
- Are students able to create their own events that trigger something to happen, then accurately use the events they created to command others?

Lesson Notes

- This activity works well with a document camera, allowing one student to "control" the entire class using the buttons on their remote that have been projected onto the classroom screen or wall.

Ruby's Dress Code Conditionals: Lesson 4

Objectives

- learn more about Ruby through a reading of the final part of *Hello Ruby*.
- learn about using conditionals which only run in certain situations.
- practice using conditionals to make outfit choices for Ruby based on the activity, weather, or her location.

Activity Description (40-60 minutes)

5 min.	Engage students by asking them what they remember about Ruby from the previous class. 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. Lead students into a brief discussion of how Ruby used commands, also known as events, to control the foxes in the garden, and then her friends with the remote control.
15 min.	Invite students to listen as you finish telling the story of Ruby, who will be ending her big journey to find the 5 gems hidden by her father. Read Chapters 8-10 (p. 52-68) of *Hello Ruby* to students, allowing time for students to view the images on each page. Be sure to highlight how Ruby runs into a problem (her bridge isn't long enough) but she **perseveres** and asks for help in order to find a way to solve it.
5-10 min.	Use this slidedeck to introduce conditional statements to students using the Ruby's Outfit Rules activity. Invite students to look at the conditional statement written for each day of the week and identify which outfit on the following slide matches the statement. An answer key can be found here. Be sure to use the "if...then…" language with students so they become more familiar and comfortable hearing and using it.
15-25 min.	Tell students it is now their turn to help Ruby decide what to wear for different situations. Use https://hello-ruby-production.s3.amazonaws.com/uploads/exercise_material/attachment/9/paperdoll.pdf to provide students with a menu of clothing options from which they can select as they make the conditional statements true for Ruby's outfits. Use the conditional statements with either English words, and allow students to select the outfit components that best match the conditions. Note that the slidedeck can be printed on 8.5x11 paper in landscape, or can be displayed on a screen or interactive whiteboard.
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 things did Ruby's friends do that are things computer scientists also do? • How did you use a conditional to help Ruby decide what to wear?

Reviewing Student Work

- Are students able to select the correct outfits given the rule presented as a conditional statement?
- Are students able to select the correct conditions to make a conditional statement "true" when participating in the Dress Code activity? Are students able to identify the conditions that would make the statement "false" in the if/then/else extension activity (see below)?

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Rosie's Runtime: Lesson 5

Objectives

- explore additional examples of real-life algorithms
- create algorithms to guide a robotic dog through a complicated task

Activity Preparation

Gather these items prior to the lesson:

- 8 Twister mats (See ICT Room)
- 8 sets of Rosie's Runtime floor tiles (start, end, 4 mud puddles in each set) https://drive.google.com/file/d/0B0TlX1G3mywqb19NMnZiTmxrVEk/view?resourcekey=0-7a74gUzi0BD2H7SHl7kGUQ and https://docs.google.com/presentation/d/18KYyoFGsuSj3V0z7jGPVxCnwSlW6CsDXnbwU-yC_QW4/edit#slide=id.p

Activity Description (45-60 minutes)

5 min.	Engage students by asking them what they used an algorithm to make in the previous class (answer: a sandwich / their favorite food). Invite students to share the algorithms they created, and then review the definition with them: steps to complete a task. Show students the video What is An Algorithm to continue exploring this concept. *Consider changing the video speed to 0.75 to help students better understand the narration.*
10-15 min.	Ask students to recall which algorithm the mouse taught the robot in the video (brushing teeth), then ask them to recall the first step the mouse gave the robot ("pick up brush") and what he had to do to change that step so the robot got the correct brush (change to "pick up toothbrush"). Encourage students to make connections to the sandwich algorithms they created last week; they wouldn't want ketchup if their algorithm said mustard! Introduce students to Rosie the robot dog, who they will be programming to collect bones and jump over mud puddles as she makes her way home. Invite students to gather around one of the Twister mats that has a simple version of the activity set up (see examples at the end of the lesson), and have them identify the starting point, ending point, mud puddles, and bones. Point out the different colored spots of the mat, letting students know that Rosie must only move from one spot to the next. Select one student to be Rosie for the demonstration. Ask that student to stand at the starting point, facing in the direction of the arrow on the start card, and instruct them to only follow the exact directions given by the class. Invite a student to give the first command to Rosie, selecting one of the command cards from the 5 options and placing it in a location where all students can see (pocket chart, chalkboard ledge, floor surface near the mat). Rosie should move based on the card selected: • **forward**: move one spot forward; if there is no spot, Rosie falls off the path! • **left**: stand in place and turn 90 degrees left (do not move to a different spot) • **right**: stand in place and turn 90 degrees right (do not move to a different spot) • **jump over**: jump over the spot in front of you, landing on the spot after the puddle; if there is no spot, Rosie falls off the path! • **pick up bone**: pick up a bone on the spot on which Rosie is standing If an incorrect command is given, allow Rosie to follow the command so students see the error, but then celebrate the error by announcing "**There's a bug in the program!**". Acknowledge which command card caused the bug, and invite the next student to remove that card and replace it with one that does not cause an error. Examples of bugs include: stepping off the game board, stepping in mud, does not pick up a bone while on the same spot, or arrives home without 2 bones. Repeat the above sequence with as many students as needed (consider going around the circle or using equity sticks to select students) until Rosie makes it to her home.
15-25 min.	Review the game rules to check for understanding before dividing students into two separate groups to play multiple rounds of Rosie's Runtime. Use the example board setups below or create your own. After a few rounds, you may decide to allow students to create their own board setups, too! Find a system that encourages students to share roles and responsibilities when playing, but also be sure to prepare students for the reality that not every student will likely get to be Rosie during the class period.
3 min.	When needed, take a dog-themed brain break by encouraging students to move along with Doggie High Five by Awesome Sauce. *(optional)*

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 was one challenge you had when writing an algorithm for Rosie? • How did you work together with others to write an algorithm for Rosie? • Did you fix any bugs in your program? How did you fix them?

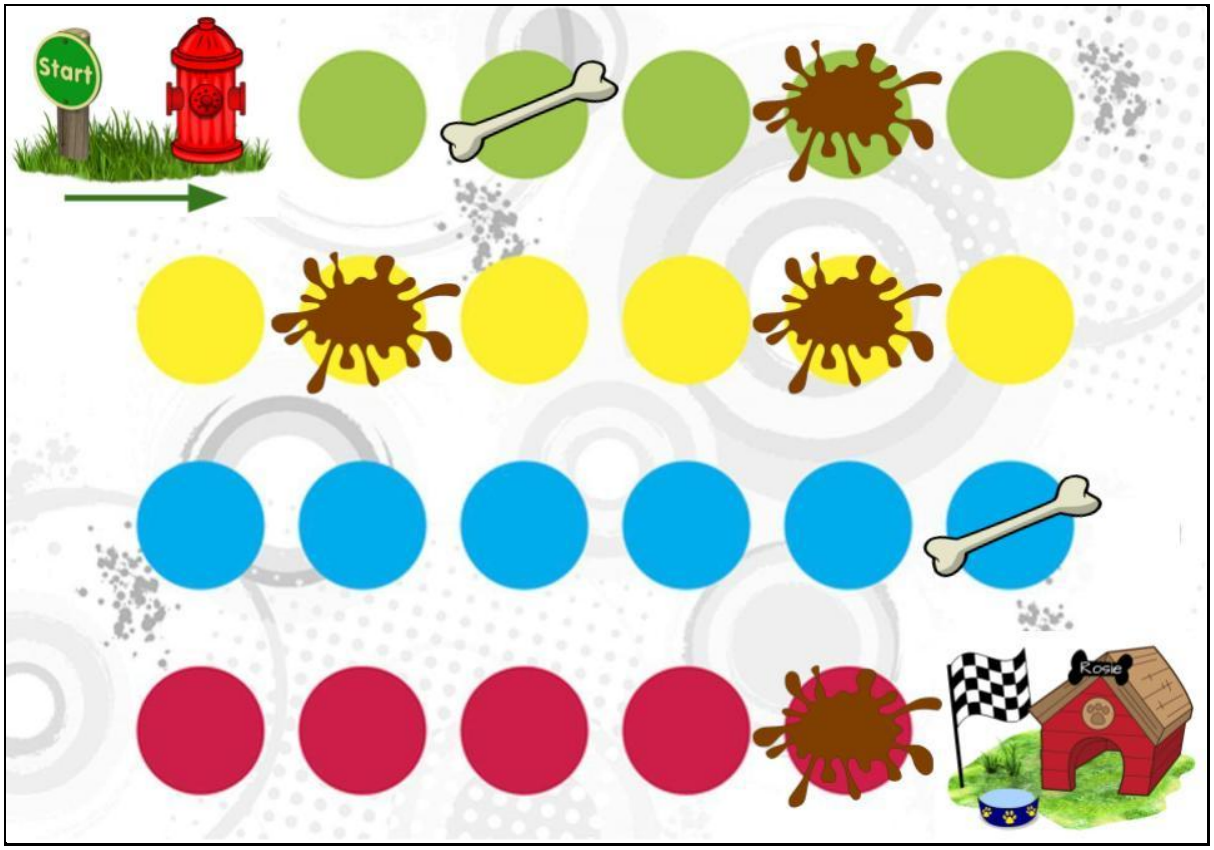
Reviewing Student Work

- Are students able to work cooperatively to write algorithms to help Rosie navigate home while staying on the colored spots, avoiding mud puddles, and picking up both bones?
- Are students able to debug their programs, replacing incorrect command cards with accurate ones?

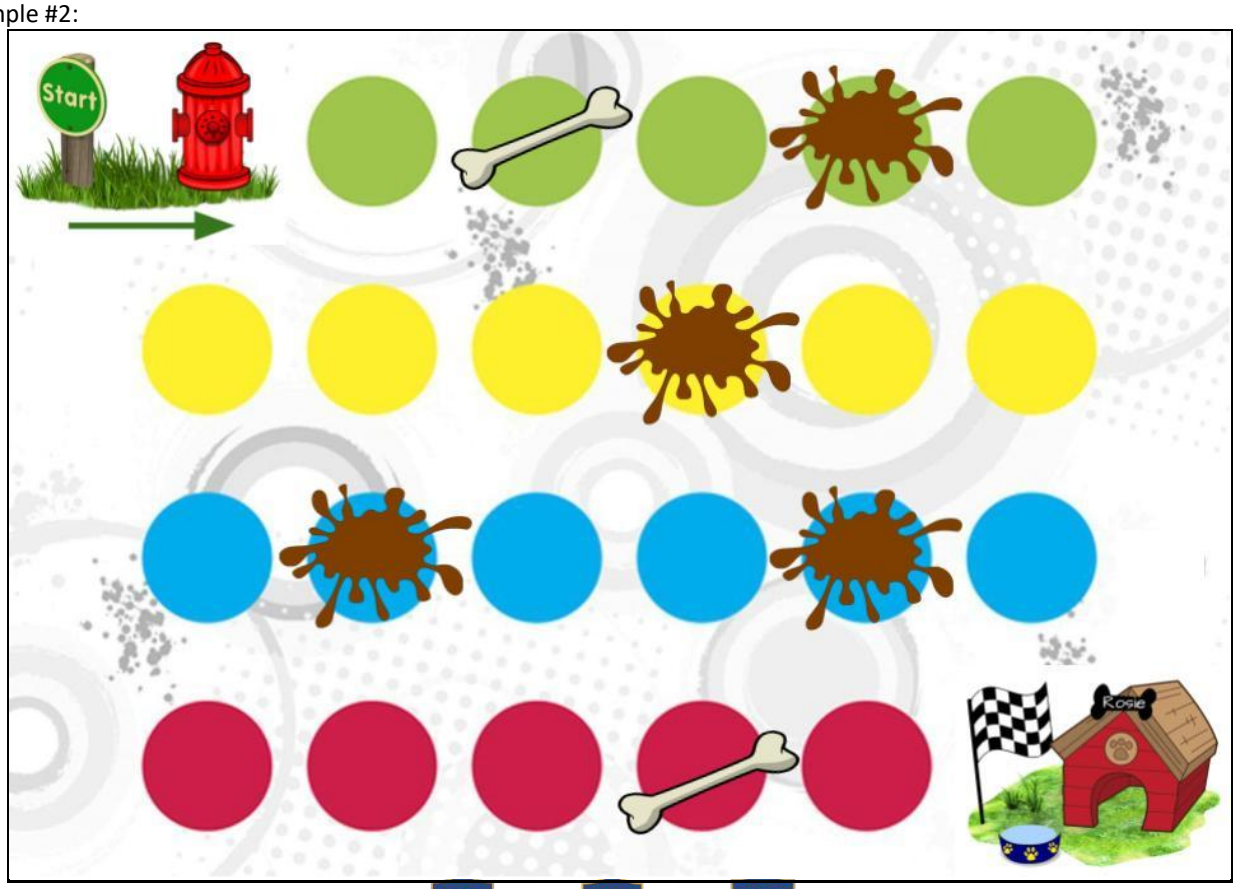
Lesson Notes

- Start off with very simple board setups to enable quick rounds of play to keep students interested and engaged. If the algorithm takes too long to construct at first, many students will lose interest.
- Explore the idea that an algorithm should work over and over again by having multiple students acting as Rosie follow the exact same algorithm, experiencing the same success because an algorithm should always provide a solution to the same problem.
- Invite students to come up with different algorithms to solve the same problem; have students find the "longest" and "shortest" path to pick up both bones and make it home, and then have them count the number of command cards used for each one. Use that comparison to determine which algorithm is the most *efficient*.
- For younger or less-experienced students, consider folding the Twister mat in half so that there are less spots for students to move amongst. Consider using less bones and mud puddles as well.

Example #1:



Example #2:



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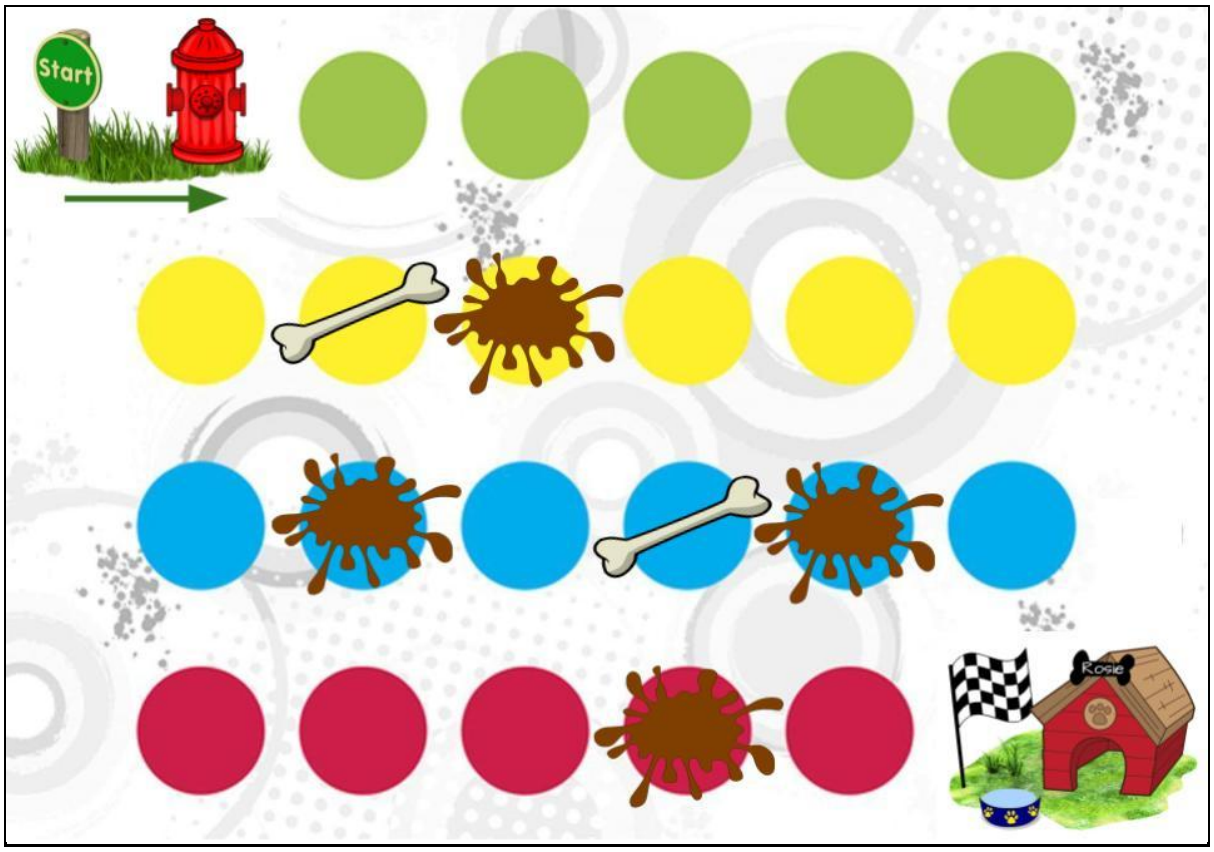

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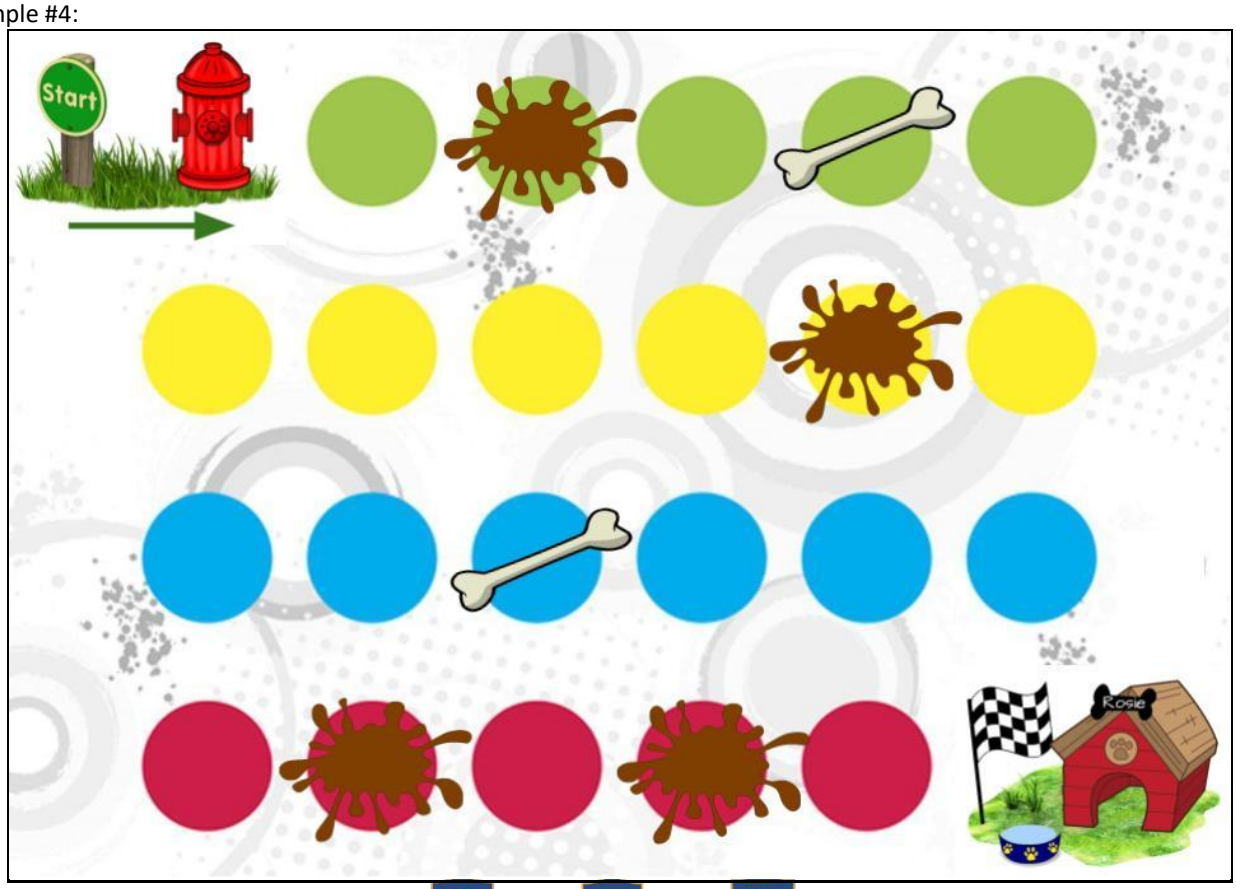
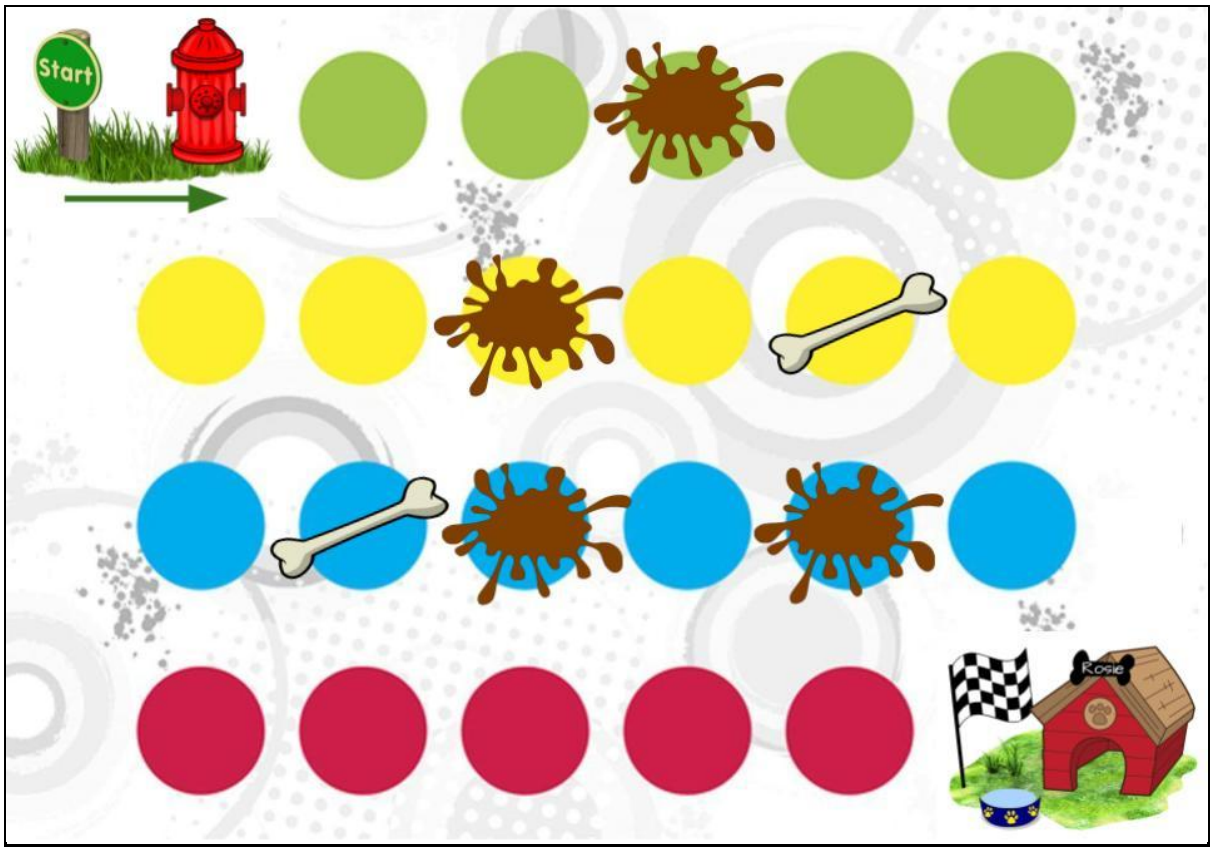
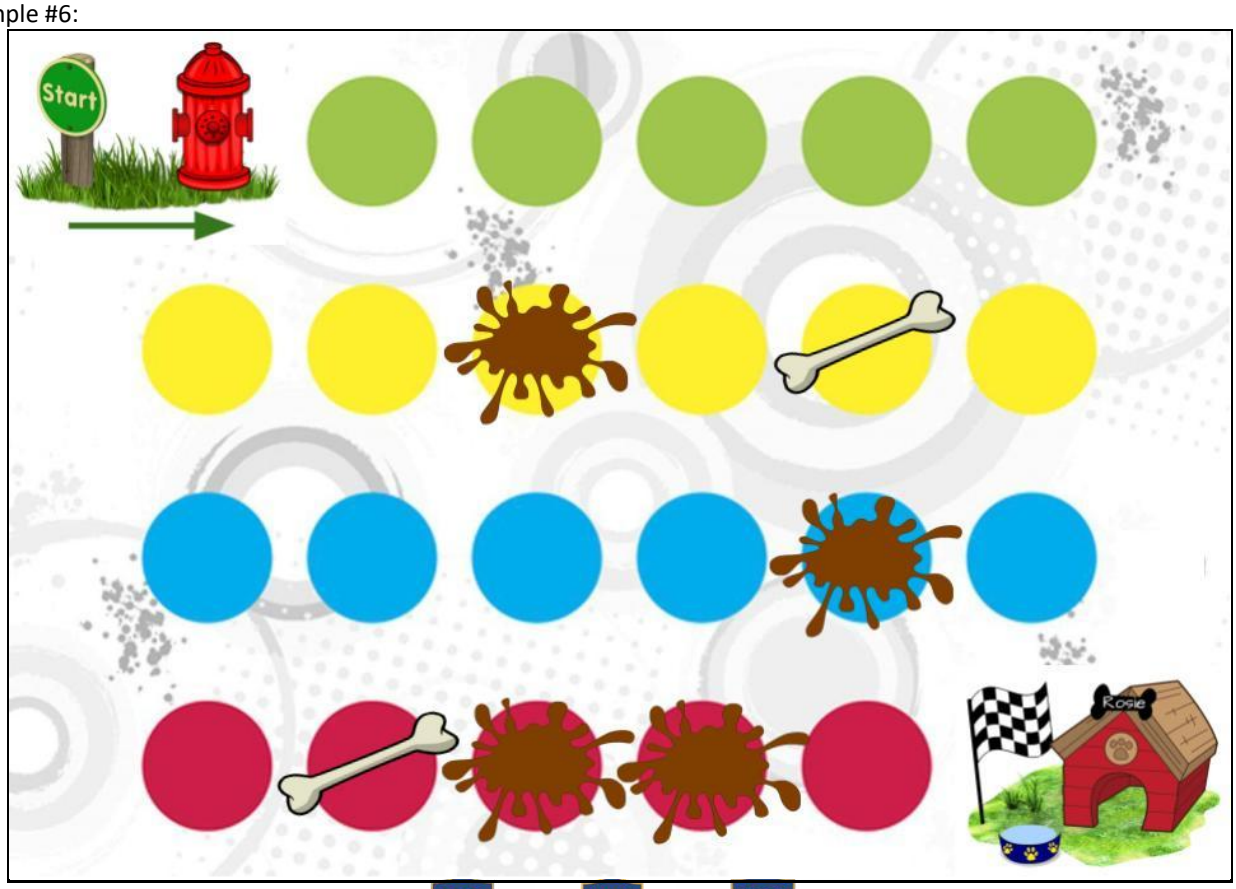


Example #5:



Example #6:



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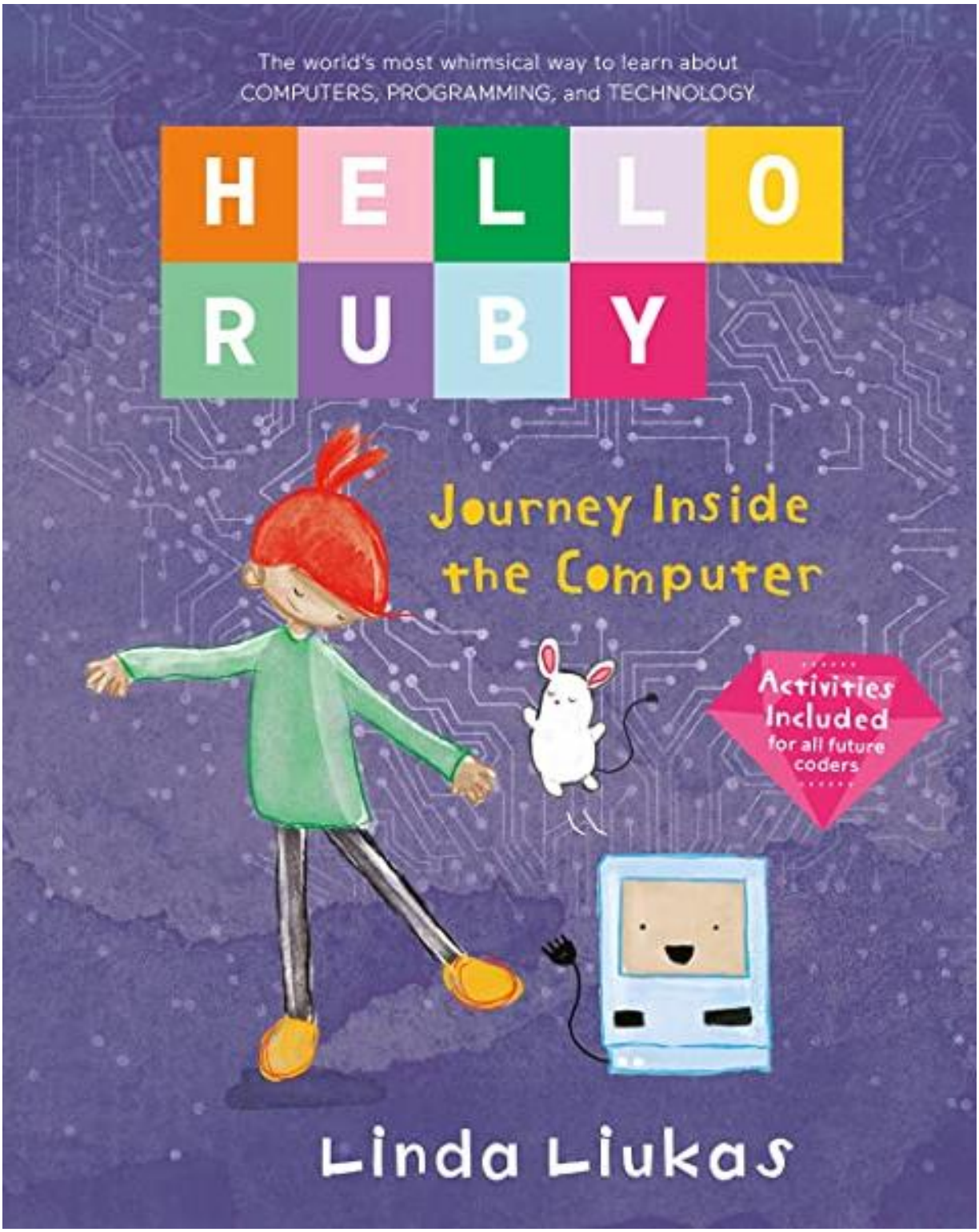
You will need this book (Lesons 6 to)



ST LEONARD'S CHURCH OF ENGLAND PRIMARY SCHOOL

Journey Inside the Computer: Lesson 6

Objectives:

- identify and describe objects that are and are not computers.
- name the four things that all computers do: input, output, process, and store.
- find different types of computers in their classroom, school, or home environment.

Activity Description (45-60 minutes)

5 min.	Engage students by asking them to think about the question "What does a computer look like?". Invite students to respond with a class share out, think/pair/share, equity sticks, or whichever classroom protocol you like to use to allow students to equitably share their thinking.
5 min.	Using the Is This A Computer slidedeck, invite students to identify the objects that are computers. Consider pointing to one object at a time and having students give a sign (like a thumbs up, hands in the air, or standing up) if they believe that object is a computer. Encourage them to back-up their answers with facts and observations, whether the answer is expected (like "phone") or unexpected (like "food" or "plant").
5 min.	Explain to students that all computers do 4 basic things: input, output, process (memory), and store. Connect this to a sequence of movements to help students physically and visually experience these 4 elements of computers: • input (point both thumbs towards body) • output (point index finger away from body) • process (move arms in circular motion in front of you) • store (both hands on head [brain]) Try this call and response after students know the 4 actions: T: What do computers do? S: They input, they output, they process and they store! *Repeat multiple times!* Additionally, use the analogy of baking cupcakes on slide #5 to help students see this process, and let them know they'll learn more about this in future lessons.
10-15 min.	Reintroduce students to Ruby, the little girl from *Hello Ruby* who likes to go on adventures and use computational thinking to solve the problems she encounters along the way. Read Chapters 1-2 (p. 9-19) of *Hello Ruby: Journey Inside the Computer* to students to introduce the premise of this new story: Ruby is about to take an adventure *inside* of a computer!
10-15 min.	In small groups, allow students to go on a Computer Safari to find objects in the classroom/school that are computers. Use the Computer Safari activity sheet for students to record at least 5 different computers, as well as where they found it and how they know it is a computer. Invite students to compare their lists at the end; consider creating a whole class list on a large sheet of paper/anchor chart.
5 min.	Close out the lesson with a review of what students experienced today, and provide space for student reflection. Use these any or all of these questions as a guide: • What are the four things that all computers do? • What surprised you about the computers you found today? • What do you think Ruby will see when she goes inside the computer?

Reviewing Student Work

- Are students able to identify objects that are computers, giving reasons for why something may or may not be a computer?
- Are students able to identify computers in the classroom environment successfully, using the list of suggestions at the top of the activity page?

Lesson Notes

- For a supplement or extension to this lesson, or as a replacement for the Computer Safari, let students brainstorm what the inside of a computer looks like, guided by the What's Inside a Computer activity sheet. Allow students to be creative and use a range of materials (pencils, crayons, markers, clay, pipe cleaners, found objects) to create a depiction of what is inside a computer. Encourage students to focus less on what's "outside" of the computer (keyboard, mouse, screen) and more on what's inside, whether it is abstract or concrete (i.e. files, games, music, or possibly wires, electricity, different components).

ST LEONARD'S CHURCH OF ENGLAND PRIMARY SCHOOL

What's Inside a Computer? Lesson 7

Objectives

- learn more about Ruby through a reading of the second part of *Hello Ruby*.
- learn about using loops to repeat a series of steps or tasks.
- practice following a loop's instructions and creating their own loops to perform dances.

Activity Description (40-60 minutes)

5 min.	Engage students by asking them what they remember about Ruby from the previous class. 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. Lead students into a brief discussion of the importance of sequence in the directions Ruby gave and received.
15 min.	Invite students to listen as you continue to tell the story of Ruby, who is about to embark on her big journey to find 5 gems hidden by her father. Read Chapters 4-5 (p. 24-37) of *Hello Ruby* 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 "solemnly" on p. 25. Be sure to highlight how the penguins work together to solve a big problem, each doing a small task to create a raft (p. 29), as well as when Ruby uses a loop to solve the problem of making a ladder to reach the gem (p. 35). Tell students that these are both things that computer scientists do when they make games, art, and music on computers.
5-15 min.	Use this slidedeck to introduce Ruby and her friends' signature dance moves. Have students practice each dance once through, then click on the slide to reveal the loop (in orange) and the new instructions that students should follow to properly do this dance. Be sure to do at least Ruby's dance to prepare students for the activity that follows. If time permits, allow students to have a turn setting the parameters for each dance loop (such as changing "3" to another number in Ruby's dance, or repeating Penguin's dance until a student shouts "hooray!")
10-20 min.	Tell students it is now their turn to create a signature dance using a loop. Use the slidedeck to help students visualize the materials they will receive; use this slide if you are giving 6 dance move options to students, and use this slide if you are giving them 12 dance move options. Distribute the Dance Loops activity sheet *(see note below)* and an assortment of dance cards for students to glue onto their template in the sequence they want them performed. Then, invite students to decide how many times their loop should repeat by writing that number in the white box at the top of the loop. Encourage students to try out their dance numerous times before they glue the dance cards to the template. Once they have glued their dance cards, ask students to practice their dance, following both the sequence and the number of times they should loop the dance. Then, invite students to share their dances with a partner, a table group, or the entire class, encouraging the others to dance along.
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 things did Ruby's friends do that are things computer scientists also do? • What did you use a loop to create today?

Reviewing Student Work

- Are students able to follow the rules of the loops when performing Ruby's friends' dances?
- Are students able to create and loop their own dance sequence, then accurately perform the dance according to the sequence and number of times it should loop?

Lesson Notes

- Consider making a copy of this slide to customize which dance cards students will receive. Depending on your class, you may wish to only use the first page of dance cards, or select only a few that you know students will be successful with.
- You may opt to pre-cut the Dance Loops activity sheet in half (the tall way) so that each student has one template, or let one student use both templates to create a second dance. Or, consider letting partners share a sheet, each creating their own dance on their own side of the sheet.

ST LEONARD'S CHURCH OF ENGLAND PRIMARY SCHOOL

What Makes Something a Computer? Lesson 8

Objectives

- compare computer hardware that can function as input or output devices.
- explore the differences between hardware and software, and how the two can interact.
- add additional hardware and software to their paper computer.

Activity Description (45-60 minutes)

5 min.	Engage students by asking them about the 4 things all computers do: input, output, process, and store. Review the sequence of movements to help students physically and visually experience these 4 things: • input (point both thumbs towards body) • output (point index finger away from body) • process (move arms in circular motion in front of you) • store (both hands on head [brain]) Review this call and response: T: What do computers do? S: They input, they output, they process and they store! *Repeat multiple times!*
5 min.	Show students slide #1 to connect the 5 components from the last lesson to the input/output/process/store model. • Ask students to identify the 2 "process" components (GPU and CPU) and the 3 "store" components (RAM, ROM, hard drive). • Ask students to identify the 2 things a computer does that they haven't explored yet (input and output). • Ask students to brainstorm what "input" or "output" might look like on a computing device (try to expand their thinking beyond just desktop/laptop computers) Show slide #2 to explore input and output hardware devices. As the teacher or a student points to each device, the entire class should call out either "input" or "output" with the accompanying hand motion. Pause to discuss any devices that do not have a unanimous response or are unknown to students (such as the 3D printer). • Input: mouse, controller, microphone, camera, sensor, keyboard • Output: printer, 3D printer, screen, headphones
10-15 min. *opt.*	*Optional activity:* Engage students in a sorting activity to place the components and devices in the correct category: input, output, store, or process. This can be done by printing out the activity here, or by using the file to create an interactive whiteboard activity in which students drag the 15 components/devices to the correct place on the computer diagram. (Answer key here)
10 min.	Transition back to Hello Ruby by reviewing the components she has met so far (electricity and bits, logic gates, and hardware components). Read Chapters 6-7, p. 34-43. Encourage students to look at and identify the pictures of software in Chapter 6 (p. 34-37). Use Chapter 7 (p. 38-43) to engage students in a discussion of how troubleshooting is like solving a problem by trying many solutions and not giving up when a potential solution fails.
20-30 min.	Return students' Paper Computers and remaining components from the previous class, plus scissors, tape, and glue. Using these slides for guidance, instruct them to finish building their computer step-by-step: 1. Cut out the keyboard and tape the edge inside the computer (allowing it to be flipped up to see the components underneath) 2. Cut out 1 of the 3 operating system logos, and glue/tape it to the back of the computer 3. Cut out the files and include them on the blue computer screen. Ask students to identify the type of file based on the image on it. 4. Cut out the screen and draw a favorite website/app/game (or create a new one) then glue/tape it over the computer screen. 5. *Optional:* If time permits, cut out the "stickers" and glue/tape them to the laptop cover.

	6. *Optional:* Ask early finishers to create an input or output device out of paper or other craft materials, then attach the device to their paper computers. Suggestions include a mouse, a microphone, a printer, or headphones/speakers.
5 min.	Close out the lesson with a review of what students experienced today, and provide space for student reflection. Use these any or all of these questions as a guide: • What 4 things do all computers do? What are some of the components or devices that help a computer do those 4 things? • How did Ruby finally solve her big problem? Have you ever solved a really big problem? • What part of the computer you created today are you most proud of?

Reviewing Student Work

- Are students able to compare input and output devices, as well as hardware and software?
- Are students able to finish building their computers, and add creative touches to personalize them?

Lesson Notes

- Use Chapter 7 to lead a discussion around troubleshooting a problem, and not giving up (persevering) when a problem is not easy to solve. Encourage students to share their own examples of problems they had to work hard at solving.
- Consider pre-cutting paper computer elements to scaffold the activity for students. You may wish to reserve the website creation for a future lesson, classroom connection, or "at home" activity.

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Technology Brain Breaks!

Use this list of videos to provide your students with a brain break in the middle of class. Encourage everyone to put their devices somewhere safe, find their bubble of personal space, and get ready to move!

1. Technology Song (2:13)
2. Wiggle It (1:35)
3. The Robot Song (2:31)
4. Awesome Rainbows (3:06)
5. I to the L (1:27)
6. Digging for Water (3:18)
7. Move and Freeze (4:00)
8. What's That You Say? (2:29)
9. Catch a Brain Wave (3:04)
10. Dinosaur Stomp (3:37)
11. Crossover (3:44)
12. Pop See Ko (2:23)
13. Don't Sit Down (3:50)
14. Following Directions (4:08)
15. Peanut Butter in a Cup (2:29)
16. Clapping Machine (3:25)
17. Monster Moves (3:48)
18. If You're a Kid (2:45)
19. I Get Loose (1:39)
20. Banana Banana Meatball (2:50)

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