

River Ferry

Help Daniel reach the Spike Tower by programming the river ferry to move!

 30–45 min.  Beginner  Grades 3–5



Teacher Support

Key objectives

Students will:

- Develop a sequence to solve a problem
- Decompose problems into smaller parts
- Recount an experience using relevant facts and descriptive details

Things you will need

(one for every two students)

- LEGO® Education SPIKE™ Essential Set
- Device with the LEGO® Education SPIKE™ App installed

Additional resources

[Building instructions](#)

[Meet the Team: Minifigure Bios](#)

[Assessment Rubric](#)

Educational standards

- CSTA 1B-AP-11
- NGSS 3-5 ETS 1-1
- ISTE 1.5d
- CCSS.ELA-LITERACY.SL.3.4

Math Extension

- CCSS.MATH.CONTENT.3.MD.A.1

Prepare

- Review the *River Ferry* lesson in the LEGO® Education SPIKE™ App.
- If necessary, pre-teach these related vocabulary words: *improve*, *modify*, *program*, *sequence*, *test*, and *upgrade*.
- Consider the abilities and backgrounds of all your students. Differentiate the lesson to make it accessible to everyone. See the *Differentiation* section below for suggestions.
- If time allows, plan and facilitate the math extension. See the *Extension* section below for more information.

Engage

(Whole Class, 5 Minutes)

- Facilitate a quick discussion about creating a sequence to complete an activity.
 - Talk with your students about a situation where they had to follow a sequence to reach a destination, like their classroom or a playground.
 - Ask questions, like: *When you want to get from one classroom to another, how do you get there? How do you know how to get there?*
 - Introduce your students to the story's main characters and the first challenge: sending the river ferry to the Spike Tower.
 - Distribute a brick set and a device to each group.
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Explore

(Small Groups, 30 Minutes)

- Have your students use the LEGO® Education SPIKE™ App to guide them through their first challenge:
 - Create and test the program that sends the river ferry to the Spike Tower.
 - Have your students iterate and test their models to complete the next two challenges in the app:
 - Modify the program to improve the river ferry ride.
 - Upgrade the river ferry for Daniel's next journey.
 - You can find coding and building support in the *Tips* section below.
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Explain

(Whole Class, 5 Minutes)

- Gather your students together to reflect on their completed challenges.
 - Ask questions, like: *What steps did you follow to send the river ferry to Spike Tower? What did you modify to improve the river ferry ride?*
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Elaborate

(Whole Class, 5 Minutes)

- Prompt your students to discuss and reflect on the process of creating a sequence to solve a problem.
 - Ask questions, like: *Why does it help to break a problem down into smaller parts when you're trying to solve it? How can you use these smaller parts to create a sequence?*
 - Have your students clean up their workstations.
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Evaluate

(Ongoing Throughout the Lesson)

- Ask guiding questions to encourage your students to "think aloud" and explain their thought processes and reasoning in the decisions they've made while building and programming.

Observation Checklist

- Measure your students' proficiency in developing a sequence to solve a problem.
- Create a scale that matches your needs. For example:
 1. Needs additional support
 2. Can work independently
 3. Can teach others

Self-Assessment

- Have each student choose the brick that they feel best represents their performance.
 - Yellow: I think I can develop a sequence to solve a problem.
 - Blue: I can develop a sequence to solve a problem.
 - Green: I can develop a sequence to solve a problem, and I can help a friend do it too.

Peer-Feedback

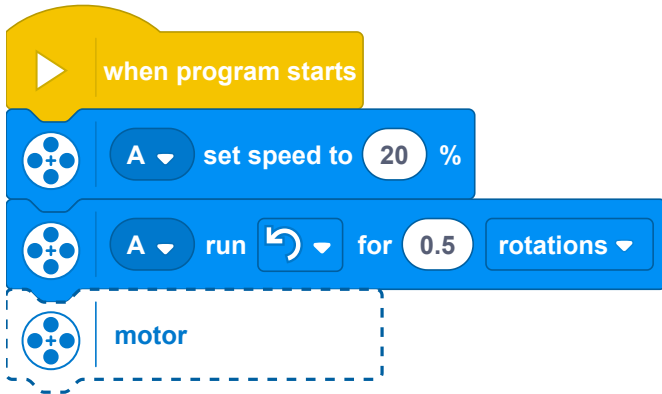
- In their small groups, have your students discuss their experiences working together.
 - Encourage them to use statements like these:
 - I liked it when you...
 - I'd like to hear more about how you...
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Tips

Coding Tip

- After your students complete their first challenge, they'll be provided with three Inspiration Coding Blocks to help them modify their programs.
- The Inspiration Coding Blocks are intended to spark their imaginations as they experiment to find their own solutions.

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Model Tip

- After your students complete their second challenge, they'll be provided with three Inspiration Images and an open-ended prompt for improving their models.
- The Inspiration Images are to help spark their imaginations as they experiment and change their models.

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There aren't any building instructions for this challenge.

Differentiation

Simplify this lesson by:

- Reading the *River Ferry* story and instructions from the LEGO® Education SPIKE™ App aloud to your students
- Selecting one Inspiration Image to help your students change their models

Increase the difficulty by:

- Exploring new and different coding blocks in the program
- Adding the Light to the river ferry

Extension

- Ask your students to create a timetable for the river ferry, including departure and arrival times, and travel time. Have them use their timetables to talk about when to take the river ferry.

If facilitated, this will extend beyond the 45-minute lesson.

Math: CCSS.MATH.CONTENT.3.MD.A.1