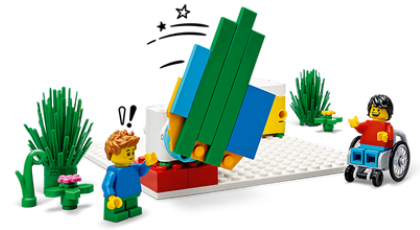


Good Morning Machine

Help Leo say "good morning" to his friends!

🕒 30–45 min. 📦 Beginner 🎓 Grades 3–5



Teacher Support

Key objectives

Students will:

- Define and understand a problem
- Brainstorm and iterate to create a solution that meets the described needs
- Engage effectively in a range of collaborative discussions

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-17
- NGSS 3-5 ETS1-1
- ISTE 1.4a
- CCSS.ELA-LITERACY.SL.5.1

Language Arts Extension

- CCSS.ELA-LITERACY.W.5.7

Prepare

- Review the *Good Morning Machine* lesson in the LEGO® Education SPIKE™ App.
- If necessary, pre-teach these related vocabulary words: *challenge*, *create*, *innovate*, *program*, *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 language arts extension. See the *Extension* section below for more information.

Engage

(Whole Class, 5 Minutes)

- Facilitate a quick discussion about the process of identifying the steps needed to solve a problem.
 - Talk with your students about what they'd do if they had to reach something that was too high.
 - Ask questions, like: *What would you do first? What would happen after that?*
 - Introduce your students to the story's main characters and the first challenge: starting the waving machine for Leo.
 - Distribute a brick set and a device to each group.
-

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 starts the waving machine.
 - Have your students iterate and test their models to complete the next two challenges in the app:
 - Upgrade the program for the waving machine.
 - Design your own waving machine.
 - You can find coding and building support in the *Tips* section below.
-

Explain

(Whole Class, 5 Minutes)

- Gather your students together to reflect on their completed challenges.
- Ask questions, like: *What was Leo's problem? How did you help solve it? How did you improve Leo's waving machine?*

Elaborate

(Whole Class, 5 Minutes)

- Prompt your students to discuss and reflect on ways of defining and understanding a problem.
 - Ask questions, like: *Why is it important to understand what the problem is? What types of questions should you ask to find out more about the problem?*
 - Have your students clean up their workstations.
-

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 defining and understanding the given 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 define and understand the problem.
 - Blue: I can define and understand the problem.
 - Green: I can define and understand the 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...

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.

1

when program starts

A set speed to 20 %

sound

A go shortest path to position 315

A go shortest path to position 45

2

3

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 personalize their models.

1

A LEGO model of a catapult. It features a grey base plate with a red brick at the front. A white beam is attached to the red brick, and a blue axle is connected to it. A yellow cube is attached to the end of the white beam. The catapult is launched upwards, with the yellow cube flying into the air. The background is white.

2

3

There aren't any building instructions for this challenge.

Differentiation

Simplify this lesson by:

- Selecting one Inspiration Image to help your students personalize their models
- Experimenting with either the coding or the building

Increase the difficulty by:

- Exploring new and different coding blocks in the program
 - Including another motor or sensor in the waving machine's design
-

Extension

- Have your students conduct a short research project about how people from different cultures greet each other in the morning.

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

Language Arts: CCSS.ELA-LITERACY.W.5.7