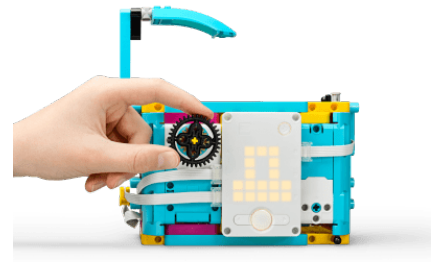


# Keep it really safe!

Use compound conditions to reinforce the encryption pattern on a safe-deposit box.

🕒 90–120 min.    📦 Intermed.    🎓 Grades 6–8

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## Teacher Support

Key objectives

Students will:

- Explore compound conditional programming

Things you will need

[LEGO® Education SPIKE™ Prime Set](#)

Additional resources

[Building instructions](#)

[Building instructions](#)

[Python Programs](#)

Educational standards

### CSTA

2-AP-12 6-8

Design and iteratively develop programs that combine control structures, including nested loops and compound conditionals.

### Common Core

CCSS.ELA-LITERACY.L.7.6

Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

## Lesson plan

### 1. Prepare

- Read through the student material in the LEGO® Education SPIKE™ App.

### 2. Engage (5 Min.)

- Use the ideas in the *Ignite a Discussion* section below to engage your students in a discussion related to this lesson.
- Use the video to explain the lesson.

### 3. Explore (20 Min.)

#### 3. Explore (20 Min.)

- Have your students work in pairs to build the super-safe-deposit box.
- Ask them to play the program to see how the lock works.

#### 4. Explain (5 Min.)

- Facilitate a discussion about how and when to use "AND" and "OR" in compound conditionals

#### 5. Elaborate (15 Min.)

- Ask your students to make their super-safe-deposit boxes even more secure by adding compound conditionals to their programs.
- Don't forget to leave some time for cleanup.

#### 6. Evaluate

- Give feedback on each student's performance.
  - You can use the assessment rubrics provided to simplify the process.
- 

## Ignite a Discussion

Start a discussion about iteration or fixing things by asking relevant questions, like:

- What can happen if somebody hacks your password?
- How can you evaluate the strength of a password?
- What's a compound condition?

Have your students watch this video to see what they're about to do.

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## Building Tips

### Tandem Build

Split each team's building tasks to ensure that everybody is actively involved:

- Student A: Super-Safe box
- Student B: Super-Safe door and arm

## **Align Motors Correctly**

Make sure the arm is raised when you start the program.

## **Manual Unlock**

This model has a manual key to unlock the door if needed.

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# **Coding Tips**

## **Main Program**

## **Possible Solution**

## **Other Programs**

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# **Differentiation**

## **Simplify this lesson by:**

- Programming just one compound condition

## **Take this lesson to the next level by:**

- Having your students add more sensors (e.g., Distance Sensor, Force Sensor) to their models to create other compound conditions
  - Having each team challenge another team to unlock their super-safe-deposit box
  - Asking your students to use the NOT function when defining their conditions
- 

# **Assessment Opportunities**

# Assessment Opportunities

## Teacher Observation Checklist

Create a scale that matches your needs, for example:

1. Partially accomplished
2. Fully accomplished
3. Overachieved

Use the following success criteria to evaluate your students' progress:

- Students understand what a compound condition is.
- Students are able to use compound conditions in their program.
- Students can discuss digital security in detail and with precision.

## Self-Assessment

Have each student choose the brick that they feel best represents their performance.

- Blue: I've used one compound condition in my program
- Yellow: I've used two compound conditions in my program.
- Violet: I've used more than two compound conditions to create a super safe program!

## Peer-Assessment

Encourage your students to provide feedback to others by:

- Having one student score the performance of another using the colored brick scale above.
- Asking them to present constructive feedback to each other so that they can improve their group's performance during the next lesson.

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## Language Arts Extension

To incorporate language arts skills development:

- Have your students explore the meaning of digital security terminology, like:
  - ▷ Boolean
  - ▷ Conditions
  - ▷ Compound Conditions
  - ▷ AND, OR, NOR, NOT
  - ▷ Encryption
  - ▷ Case sensitive

*Note: This will make for a longer lesson.*

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## Career Links

Students who enjoyed this lesson might be interested in exploring these careers pathways:

- Information Technology (Computer Programming)
- Information Technology (IT Applications)
- Information Technology (Oracle / Database Programming)
- Information Technology (Web Design)