Lesson Plan: Lego Data Representation

Instructional Days: 14-15

Topic Description: Today the student will learn how to encode a LEGO structure with binary numbers and then decode the binary numbers to create new structures.

Objectives:

The student will be able to:

- Count forward and backward in binary.
- Explain why binary numbers are important in computer science.
- Use binary digits to encode and decode messages.

Outline of the Lesson:

- Present Lego Encoding Example (15 minutes)
- Activity: Build this Encoding! (15 minutes)
- [Optional] Break: “Shark Attack” (5 minutes)
- Activity: Build Your Own Encodings (30 minutes)
- Journal Entry (5 minutes)

Teaching/Learning Strategies:

Present Lego Encoding Example

- Sample presentation slides are linked on the Lego Data Representation muddX page.
- It will be helpful to read through the entire activity in advance, so that you can revise questions, add your own questions, and think about how you might want to structure each part of the activity. What follows is the minimal suggestion.
- Walk students through encoding example on the first Lego slide, explaining what the numbers in each column represent and the coordinate system.

Activity: Build this Encoding!

- Show the students slide 3 of the presentation and ask them to build the lego board this represents.
- Show and explain the solution.

Activity: Build Your Own Encoding!

- Watch the Activity Warm Up video on the muddX course page.
- Using the worksheet, have students build their own encoding in secret. Then have their partner decode it back into Legos.

- (Optional) Find the most creative Lego structure and show it to the class. Or take a poll to see who got their partner's message decoded into Legos correctly.
- Watch "Activity Wrap Up" video on muddX course page.

Journal Entry

- What did you learn today?
- You used an encoding with 7 digits to determine where the Lego brick should go on the board. Could you have told your partner where to place the brick in English using fewer than 7 words?

Resources:

- Presentation slides (linked on muddX)
- Legos!