



# Home Lesson

# LEGO Secret Coding

Appropriate Age or Grade Level: **2 to 3**  
Estimated Duration: **1 hour**

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**Objectives/Key Concepts:** Introduce kids to coding by exploring Morse code and creating their own secret codes with LEGOs. This topic will allow discussion about current coding and how important coding is to software and computer engineering.

### Materials:

- 2x2 and 4x2 Legos
- Morse Code translation sheets (below)
- Plain paper (1 per child)

### Instructions:

1. Explain the Morse Code translation sheet and how it enabled cross-country and trans-Atlantic communication decades before the telephone.
2. LEGOs are going to represent either a dot or a dash on our Morse code sheet today. A 2x2 LEGO will be a dot and a 2x4 will be a dash.
3. Now it's time to think of a secret message. You have to be brief with code, so try to think of one that's only 2-3 words.
4. Once you have your secret message, grab your LEGOs and start building your message. Don't forget to separate words with a larger space.
5. Grab a sheet of paper and start to write down the secret message as you're cracking the code.
6. Just as we're using Morse code, computer and software programmers code in similar, but more difficult, ways.
7. Ready for a longer message? Grab more LEGOs and keep going!

### Background Information:

- **What is Morse code?** A code in which letters are represented by a series of dots and dashes using light or sound.
- **When was Morse code used?** Morse code was invented in 1836 using only numbers at first then expanding to include letters.
- **Is coding important to engineers?** Software engineers use coding in order to design and develop software applications for computers.
- **What is a software engineer?** Scientists who combine the education of computer science, engineering and mathematical analysis to design, develop, test and evaluate the many programs and software that help computers perform their functions.
- **What is the definition of computer coding?** A set of symbols that can be interpreted by a computer or piece of software; the symbolic arrangement of statements or instructions in a computer program, or the set of instructions in such a program.

# International Morse Code:

A ● -	J ● - - -	S ● ● ●
B - ● ● ●	K - ● -	T -
C - ● - ●	L ● - ● ●	U ● ● -
D - ● ●	M - -	V ● ● ● -
E ●	N - ●	W ● - -
F ● ● - ●	O - - -	X - ● ● -
G - - ●	P ● - - ●	Y - ● - -
H ● ● ● ●	Q - - ● -	Z - - ● ●
I ● ●	R ● - ●	

## Bibliography (optional):

<https://cacm.acm.org/blogs/blog-cacm/166115-why-scientists-and-engineers-must-learn-programming/fulltext>

<http://drexel.edu/ece/about/software-engineering/>

<https://wonderopolis.org/wonder/why-was-morse-code-invented>

<http://megamagazin.biz/morse-code-messages-coloring-page/>

<http://www.dictionary.com/browse/coding>

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