

Activity

Unplugged Coding: Binary Encoding

Level: Kindergarten–Grade 3 • **Topic:** Computer Fundamentals • **Subjects:** Computer Studies, English, Language, Mathematics, Science & Technology

If you are looking for an accessible online version of this content, please visit the [Pinnguaq website](https://pinnguaq.com/learn/unplugged-coding-binary-encoding) (link: <https://pinnguaq.com/learn/unplugged-coding-binary-encoding>).

About the Author

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Kayla is currently one of the educators in the Lindsay Makerspace who helps plan, design and deliver curriculum for a variety of programs. She has a long history of working with children in many different areas such as gymnastics, cheerleading, summer camps and public schools. She graduated from The University of Western Ontario with a BA and specialization in Nutrition and Families and also recently completed a BEd at Ontario Tech University in the Primary/Junior division. Her recent studies have led her to discover a love and interest for LEGO robotics, coding and STEAM education.



Overview

This unplugged coding activity challenges you to encode different words into binary code. In this activity you will explore the computational thinking methods of decomposition. You will break down the word or words you select into single letters and encode it into Binary code using the Binary Code Key to create a secret message!

Background Information

Encoding is the process of taking data (such as the English alphabet in uppercase letters) and turning it into a specific code for a computer to understand. **Decoding** is to take the specific code and break it down to determine what it represents.

Binary code is a language used by computers to receive, store, and process information through the use of numbers. Just like how a **b**icycle has two wheels, in **b**inary, each digit (called a **bit**) can only be one of two symbols. The numbers **0** and **1** are commonly used to write binary. These numbers are placed in a specific sequence. Each sequence represents either a number or a letter. In this activity we are going to use binary code to represent uppercase letters in the English alphabet. Each letter will be represented by an 8-bit binary code.



For more information on how binary code works, watch this video produced by Socratica Kids - **Binary Numbers for Kids** (link: <https://youtu.be/hvteVokz7jE>).

Unplugged coding opportunities allow learners to engage in many areas of computational thinking while helping to develop knowledge on the basics of coding concepts without actually using technology. **Decomposition** is one method of computational thinking that allows learners to develop a solution to a given problem by breaking it down into smaller more manageable pieces.

Materials

- Download and print the **Binary Encoding Activity Sheet** (link: <https://pinnguaq.com/app/uploads/2020/06/pinnguaq-activity-sheet-binary-encoding.pdf>)
- Pencil

Note: if you do not have access to a printer use paper, a pencil and the PDF activity sheet to encode the message.

Step-by-Step Instructions

Step 1 → Select a word or sentence that you wish to encode into a secret message.

Step 2 → Use the Binary Code Key at the top of the page to break down what each letter in your word or sentence encodes to in Binary.

Step 3 → Write out the 8-bit piece of code for each letter in the word or sentence to form the Binary code that represents the word below!

Step 4 → Give this binary code to a family member or friend along with the Binary Code Key to see if they can figure out what the word or secret message is!

Follow Up

Can you create your own secret message using binary code? Create a secret message using the binary coding system and share it with us!

We want to see the awesome things you're creating! Take a photo or video and share your work with us by emailing media@pinnguaq.com or tagging @pinnguaq on [Facebook](#), [Twitter](#), or [Instagram](#). Don't forget to include the hashtag #LearnWithPinnguaq!

Resources

- BBC Bitesize - Introduction to computational thinking (link: <https://www.bbc.co.uk/bitesize/guides/zp92mp3/revision/1>)
- Socratica Kids - Binary Numbers for Kids (link: <https://youtu.be/hvteVokz7jE>)
- TedEd - How exactly does binary code work? (link: <https://www.youtube.com/watch?v=wgbV6DLVezo>)
- ASCII Binary Code - Science Buddies (link: <https://www.sciencebuddies.org/science-fair-projects/references/ascii-table>)
- Code - Binary Decoder Assessment Sheet (link: <https://code.org/curriculum/course2/14/Assessment14-BinaryBracelets.pdf>)