Lesson Day 10: Binary

Overview
This is an introduction to the binary number system. Students will be able to express digits using the binary system and make the connection with the decimal number system. There is also a connection between binary counting and computing as students will understand how binary numbers allow computers to operate and execute commands.

Lesson Summary
- *Journal Entry*
- *Video and Questions*
- *Teacher Demonstration*
- *CS Unplugged Activity 1*
- *Sending a Secret Message*
- *Journal Reflection*

1. *Journal - "How high can you count with your 10 fingers?"*
   a. *Lead a discussion after students complete the journal.*
2. *Watch the video and have students answer the following questions:*
   a. *What are bits?*
   b. *Because bits have two states they are called_____.*
   c. *In binary a 1 means _____ and a 0 means _____.*
   d. *_____ cables send bits through light.*
   e. *A _____ signal sends bits wirelessly.*
3. *Lead a demonstration showing students how to build binary digits. Use large binary number cards while students share smaller cards in pairs. After practicing with several different numbers have students work in pairs to find the binary representation of 1-20. As a class complete a chart displayed somewhere in the room showing this information.*
4. *For guided practice students will complete pages 7 and 8 from the CS Unplugged Activity 1 lesson; Worksheet Activities.*
5. *Secret Messages Activity: Students write a 5 word message and encode it into binary. The message must make sense and no words can be repeated. Once complete exchange with and decode messages from another student.*
6. *Journal Reflection - "Why are binary numbers important for computers to operate?"*

CS Content
Counting in the binary number system and understanding how the principles of binary numbers connect with the operations of computers.

Objectives
Students 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.

Materials and Prep
- Large binary number cards for demonstration.
- Computer Science Unplugged Activity 1: Count the Dots-Binary Number pg 3-13

Resources
Student Documents
- *Small binary number cards*
- Worksheet Activities: pgs 7-8 from Activity
-

Code Studio
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Video
- https://www.youtube.com/watch?v=ZhEf7e4kopM

Assessments
- Be able to encode a message that is successfully decoded by another student.
- Successfully decoding another student's message

Notes
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