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| **UNIT 2** | **Binary Number System--Days 10-12** |  |

# Lesson #1: Computer Talk--The Binary Number System

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| Overview Tip: Prepare one set of large demo cards and sets of 4x6 cards ahead of time (laminate for reuse).  This lesson introduces the Binary (Base 2) Number System in comparison with our Base 10 number system. Students will be able to determine the pattern sequencing and convert decimal numbers to decimal and vice versa. Lesson Summary Overview: Video introducing Binary Number System, binary demonstration, binary practice, application using an online game format.  Activity #1: Journal Entry--How high can you count with your ten fingers?  Activity #2: Show the video “Introduction to Number Systems and Binary” (Kahn Academy)--<https://www.youtube.com/v/ku4KOFQ-bB4>.  Activity #3: Demonstration of counting in binary (using large cards with dots). Ask for volunteers and call out numbers for them to represent in binary; switch volunteers if others want to try it. Include a discussion about identifying the sequencing aspect of the numbers (ask what the next sequence would be).  Activity #4: Have students go to their tables and give each student a set of 4x6 index cards with dots to represent the numbers 1,2,4,8, and 16. Call out specific numbers and have them flip cards over to represent the numbers. Ask follow-up questions--Is there more than one way to get any number? What is the biggest number you can make? What is the smallest number you can make? Is there any number you can’t make?  Activity #5: Revisit journal entry.  Activity #6: Give out the Binary Number System Notes & Practice handout. Work through examples #1 and #6 together. Then have the students work through remainder of problems, independently but consulting with their elbow partner or group members if they need assistance. If time permits, discuss answers when everyone if finished. (If students finish early, have them quiz each other with their own examples.)  Extension Resource: As time permits or as a review activity at the beginning of class the next day, have students play the online Cisco Binary Game. CS Content Problem solving, how computers process information |  |  | Objectives **Students will be able to:**   * To convert numbers from decimal to binary and from binary to decimal * Explain why computers use binary numbers  Materials and Prep  * One set large binary number cards for demo * Binary number cards * List of decimal numbers to call out (and answers) * Binary Number System Notes & Practice Handout  Resources **Student Documents**   * Binary Number Notes Handout   **Website**   * <http://forums.cisco.com/CertCom/game/binary_game_page.htm>   **Video**   * <https://www.youtube.com/v/ku4KOFQ-bB4>   **Assessments**   * Informal observations * Class discussions * (Converting numbers quiz at a later date)  Notes  |  | | --- | | Fun activity that allows students to learn through hands-on activity, demonstrations, group work, and independent work | |  | |  | |